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Structure, action and the interpretive flexibility of quality control circle - an analysis of quality control circle systems and practice in Singapore firms.

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PREFACE

This thesis is an inquiry into the promotion and implementation of Japanese QCC in Singapore. The thesis aims to develop a better understanding of the QCC phenomenon and of its applicability outside Japan. The QCC as a small group activity used in promoting quality improvement among workers is examined through several theoretical frameworks: structuration theory, critical systems thinking and the notion of QCC as social technology.

A historical analysis of the Japanese QCC provides an understanding of the socio-historical context in which the QCC as a small group activity evolved. The Japanese QCC system is examined, appraised and critiqued in terms of its key processes and role in quality management using Habermas's theory of knowledge and human interests and critical systems thinking.

An analysis of the promotion of QCC in Singapore and of the general state of QCC activities provides a socio-historical context for five case studies of QCC implementation by Singapore firms. Using Olikowski's structuration model of technology, the thesis discusses the influence of the interactions between institutional properties and human agency on the outcomes of these firms' QCC implementation strategies.

With technology viewed as a system metaphor comprising technical, social, economic and political sub-systems, the interpretive flexibility of the QCC as a social technology is underlined. QCC implementations outside Japan are viewed as incidents of technology transfer, with local inventions, which takes into account the systemic and socially constituted nature of QCC activity, essential for successful transfer. A conceptual map regarding the transfer of QCC is presented. The map incorporates the three theoretical

frameworks used in this thesis. This is an attempt at modelling the processes essential for successful social technology transfer.

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CHAPTER 1 THE QUALITY CONTROL CIRCLE PHENOMENON

1.1 THE NATURE OF QUALITY CONTROL CIRCLES (QCC)

1.1.1 What is a QCC ?

According to the 'father of QCC' Kaoru Ishikawa (1985), the QCC began in Japan in the early 1960s as a mass education programme for lowly educated factory workers. The initial purpose was to disseminate quality control techniques and methods among such workers.

However, it quickly outgrew its original purpose, and evolved to become a ubiquitous Japanese small group activity found at the workshop level, focused on solving quality control (QC) problems of the workshop.

To Ishikawa (1985), the QCC is a small workgroup set up to perform QC activities voluntarily within the workshop. This small group carries on such QC activities continuously, utilizing quality control techniques, and their efforts are a part of a chain of company-wide quality control activities. All members of the group participate in such continuous improvement activities, for the workers' self-development, the mutual development of the group members, and for the control and improvement of the workshop (pp. 139-140).

In Japanese organizations, QCCs are normally viewed as an integral part of the quality control process and Ishikawa (1987:137) asserts that 'where there are no QCC activities, there can be no TQC (total quality control)'. In Japan, the QCC has been regarded as one component of the total quality management system of the organization and not as an independent quality improvement programme, a characteristic that is sometimes overlooked by foreign promoters of the practice:

> Foreign observers make the mistake of considering Japan's QCC activities to be the reason behind Japanese industry's great success. It is not *the* reason, but *one* of the important reasons for success.
>
> (Ishikawa 1985:5)

For Hutchins (1985), a British QCC consultant, the QCC represents the first major organizational move away from restrictive Taylorist structures of production towards more humanistic craft group structures based on a people-centred philosophy of management. The QCC in his view, could bring about a new era of craft groups where workers who are QCC members would be able to have more control over their work. Such craft groups could lead to the eradication of Taylorist forms of production which, because of the preoccupation with efficiency and specialization, had resulted in massive worker alienation. QCCs enable lower-level employees to participate in workplace decision-making, thereby enhancing their work involvement. The end result could be less worker alienation through greater humanization of the factory floor. Thus Hutchins' emphasis is on the perceived job re-design and self-control aspects of QCC.

Lees and Dale's (1990) definition of QCC focus on the voluntary and self-directed nature of activity, and they view the typical QCC as 'a voluntary group of around six people from the same work area who meet for approximately one hour every week or fortnight under the leadership of their supervisor to solve work-related problems which they themselves have selected' (p 242).

Cole (1989) regards the QCC as one version of group-centred work structures or small group activities. These work structures are applied by organizations in various countries and range from autonomous workgroups, cross-functional teams, zero-defect teams to QCCs.

1.1.2 QCC and the quality idea

The main reason for the popular interest in the concept and practice of QCC is the perception of a direct relationship between QCC activities and quality improvements. Ever since the quality idea was elevated to the discipline of quality management and accorded much respect and attention by both the corporate world and academia, QCC has had its fair share of attention from these quarters and also from management consultants. Therefore, it is necessary to explore the relationship between this small group activity and the quality idea.

According to Flood (1993) the quality idea has been around for sometime. In previous centuries, people's concern with mundane quality issues such as the food they consume and the clothes they wear meant that those involved in producing and selling products and services had to be involved in quality assurance activity. As such, tradesmen were directly concerned with quality issues as part of their work.

The advent of the industrial revolution with the widespread application of scientific management practices and mass production technology resulted in the simplification of work to the extent that the quality of a product could not be easily associated with any one worker. The outcome was that quality became separated from the individual worker and in an era of specialization, quality control evolved as an inspection function in manufacturing firms.

The experience of Western nations in managing war supplies during the First World War and the Second World War was instrumental in the development of quality as a scientific discipline and an important activity in the production process (Flood 1993). Statisticians such as Shewhart (1931) and Pearson (1935) laid the foundations for quality control as a manufacturing discipline based on the application of statistical methods to the determination and management of the quality of manufactured products. Hence, the meaning of quality acquired a precise and measurable dimension in the

production of manufactured goods and was associated with the function of inspection and protection (Flood 1993).

The development of the quality idea took a further turn in Japan after the Second World War. With the help of Western quality experts such as W. E. Deming and J. M. Juran (Ishikawa 1985), Japanese government bureaucrats, engineers, corporate managers and workers, participated in a mass movement (Cole 1989) which built on the statistical base of quality control developed in the West , redefined the meaning of quality and developed a comprehensive company-wide approach to the management of quality in Japan (Ishikawa 1985; Mizuno 1988).

It is generally accepted worldwide that the Japanese quality movement contributed significantly to Japan's emergence as a world-class economic power with quality considered a major source of competitive strength of Japanese products. In reshaping the competitive forces in the global marketplace, and placing quality as a primary concern of international firms, the Japanese shifted the quality idea from that of a supporting organizational activity to a strategic issue and a key determinant of a firm's competitive strength.

With quality elevated to the status of a strategic issue, it assumed a market oriented perspective and became redefined in terms of meeting or exceeding customer's expectations. For example, Garvin's (1987) framework for a competitive quality strategy is based on eight strategic dimensions of quality: performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality, all of which are essentially customer-linked measures.

In the late 1950s in the United States , A. Feigenbaum (1991) began promoting Total Quality Control, with quality regarded as an organizational activity to be managed on a company-wide basis, involving all management and operational functions. He also advocated that quality considerations should include both the social and technical

aspects of the organization and that attention should be given to consumer satisfaction and to the quality of supplies and suppliers. Like the Japanese version, Feigenbaum's approach to quality management extends beyond the idea of quality as a specialized manufacturing or production function to become an issue with organizational wide implications. However, Feigenbaum's approach to quality management differed from the Japanese approach in its emphasis on the need for a group of quality management specialists to buttress and support the total quality effort in the organization. On the other hand, according to Ishikawa (1985:90), the Japanese approach 'insisted on having all divisions and all employees involved in studying and promoting QC (quality control)'.

Ishikawa (1985:56) recalls that in deciding to retain the word 'control' in the term 'quality control' (QC), the Japanese were fully aware of the problem this word presented:

> When we first started our QC activities in Japan, the most difficult task was dealing with the concept behind the term control (*kanri*). We had to devise a way to let all employees - from top executives down to middle management, engineers, and workers - understand the meaning of 'control' and let them implement it....The words 'management', 'control', and 'administration' do have differing nuances. But they also have a common denominator. Each of these words implies that one must set a goal or a target and find a way to realize it efficiently.

Hence the Japanese decision to retain the word 'control' in the quality idea was consciously made, with attention directed on the management, and in particular, the planning aspect inherent in the control process. This is evidenced in the widespread use of Deming's quality cycle which is known in Japanese QC literature as the Plan-Do-Check-Action (PDCA) control cycle (Ishikawa 1985:56-59). Furthermore, implicit in the Japanese meaning of QC is that quality management is a work activity that is performed by all employees and not only management or supervisory staff. In this

respect, it is interesting to note that when QCC is discussed as small group activity by managers and academics in Western countries, the term 'control' is often dropped and the activity is more commonly known as 'quality circles' (Crocker *et al.* 1984; Debra 1991; Oakland 1993).

Thus two strands of development in the quality idea can be discerned. Firstly, the meaning of quality itself has evolved from its early manufacturing roots to a customer based orientation reflecting its role as a competitive strategy.

Secondly, the issue of how to manage quality has become a central concern. Quality in the minds of managers is associated with the *management of quality.* In the case of Japanese QC, the management of quality is regarded as an activity that is also the concern of workers as well of managers and quality experts. One of the most well-known means by which Japanese firms integrate workers into the quality management system of their organization is through the implementation of the QCC activities. Through the QCCs, Japanese workers are involved in quality concerns of the workshop and in this way, as a group they contribute to the attainment of the organization's quality goals. Thus the QCC system can be viewed as a practical application of a quality philosophy which emphasizes the participation of all employees in the quality-related problem solving process and through this system, the factory worker is drawn into the quality strategy of the Japanese firm.

1.1.3 The QCC as a small group activity

In the 1950s, the Tavistock Institute's researchers[1] in their recommendations for the application of socio-technical systems theory at the workplace, were the first to emphasize the primary workgroup rather than the individual worker as the basic unit of work (Katz and Kahn 1978). The premise of the socio-technical systems approach is that given the growing complexity of production technologies, individually, workers in

[1] E. A. Trist and K.W. Bamforth.

many industries are unlikely, on their own, to complete a whole job task. For workers to obtain closure and some control over their task activities, the workgroup is the next best alternative. Therefore, group-centred work structures are needed to provide lower level employees with a sense of the meaningfulness of work and some measure of job autonomy.

Following the initial research on autonomous workgroups by the Tavistock Institute researchers, there has been some corporate interest in this work structure, the best known being the applications of the concept in Swedish firms[2] in the 1960s and 1970s (Cole 1989).

In recent years, interest in group-based work activities has gained further momentum with the emergence in the United States and Britain of 'process re-engineering', an organizational re-structuring approach based on integrating information technology and business processes. Advocates of this management approach such as Hammer and Champy (1993), Davenport (1993) and Johansson *et al.* (1993), have all recognized the central role of small groups or teams, in the development of the new work processes. The new potentials offered by information technology and by computer-aided manufacturing have thrown up the limitations of Scientific Management with its emphasis on job specialization and job reduction. The de-skilling of labour that is a consequence of work simplification is considered an inappropriate context in which to implement and realize the potentials of these new technologies. Thus, Hammer and Champy (1993:68-71) advocate the restructuring of jobs from 'simple tasks to multi-dimensional work' with workers making decisions directly related to their work, thereby 'empowering' them. They argue that the basic core of such work is the 'self-directing team', performing work that has been re-organized around the firm's essential business processes. Much of the interest among process re-engineering advocates in small

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[2] Cherns (1979) ranks Sweden as first among European countries in its effort to promote organizational structures such as autonomous work groups. Volvo's Kalmar plant which was designed with such work group structures in mind, has also been cited frequently in literature on such group-centred structures (Cole 1989). However, in 1994, in a conversation with a Swedish auto-engineering consultant, I learnt that Volvo's Kalmar operations have been shut down.

groups or teams is based on the perceived productivity improvements that could result from group work and from employee participation in workplace decision-making. In the United States, these ideas can be traced to Lewin's (in Cartwright: 1951) work on force field analysis and the dynamics of small workgroups.

In determining the place of QCCs as a group-centred organizational structure, it is necessary to trace the characteristics of a typical circle. Cole's (1989) translation of the Japanese Union of Scientists and Engineers' (JUSE) definition of QCCs might help in positioning QCC within the spectrum of small group organizational structures:

> The QCC is a small group within the same workshop that voluntarily carries out quality control activity. The small group continuously conducts control and improvement of the workshop as one part of the chain of company-wide quality control activity. In this fashion, utilizing quality-control techniques, the small groups carry out self-development and mutual development. (Cole 1989:18)

Workers who are QCC members, are trained in relatively simple statistical and problem solving techniques, and meet together for an hour or so weekly or fortnightly to solve QC-related problems, using statistical methods as part of their problem-solving tools to analyse problems and evaluate solutions put forward by members.

As an organizational form, circles are not normally part of the formal organizational structure and they have been referred to by several writers, including Cole, as parallel organizational structures. However, Lillrank and Kano (1989) describe the Japanese organizational form of the QCC as a hybrid organization incorporating characteristics of both the formal structure and the informal organization.

Ideally, circle members determine the work related projects selected for circle problem solving and through the circle problem solving process, they participate in quality issues related to their workplace. Although the degree of this involvement might not

be as in-depth as the Swedish example of self-managing or autonomous work teams, the QCC could provide employees with some degree of participation in determining workplace issues which would not otherwise have been possible within the formal structure of the organization. This ideal has been a key reason for the spread of QCC outside Japan.

The QCC as a small group activity has been highly successful in Japan, where they are regarded as an integral part of the quality management strategy of the organization. From a mere 4930 circles in 1965, the total number of circles in Japan grew by 40 times to 223,762 circles in 1985 (Onglatco 1988).

The apparent success of Japanese corporations in managing industrial productivity has been popularly attributed to the uniqueness of Japanese human resource management policies and practices, including group-centred work activities such as the QCC in contributing to productivity improvements. Cole (1989) notes that the attention accorded to QCC practice by organizations outside Japan is largely a response to the competitive pressures they face from Japanese corporations in the global market. Yet, although the origins of QCC are essentially Japan-based, the impetus that led to its innovation, came from the United States, as did the initial body of substantive knowledge on quality control.

In searching for the American initiative that contributed to the development of Japanese QCCs, Cole (1989) identifies this as a cross-national transfer of modern quality control knowledge from the United States to Japan. The first was the transfer of statistical quality control techniques immediately following the Second World War, mainly through the American Occupation Forces. In the 1950s, the pace of dissemination of quality control (QC) methods and philosophy among Japanese engineers and factory personnel quickened as the works of American QC practitioners such as Deming, Juran and Feigenbaum gained prominence and popularity in Japan. To Cole (1989), it is this newly gained knowledge of QC, combined with, and adapted to indigenous values

and practices, in a process he referred to as 'local invention', that forms the basis of small group activity in Japanese firms as represented by the QCC.

1.2 The systems approach and the QCC

1.2.1 Quality management and the systems idea

A 'system' is a set of richly interacting elements that imports and transforms inputs, has outputs and is distinguished from the external environment by a boundary. The elements of a system communicate with each other and the external environment and the communication medium also provides a means through which control procedures can be brought to bear and purposeful behaviour achieved (Flood 1993:88).

The systems approach is committed to holism and to what Jackson (1992:7) refers to as 'looking at the world in terms of "wholes" that exhibit emergent properties, rather than believing, in a reductionist fashion, that understanding is best obtained by breaking the wholes down into their fundamental elements'. Hence the systems idea involves the concept of the whole is greater than the parts, and this characteristic of a system is known as 'emergence'. Another system characteristic is the idea of hierarchy. This means that a system consists of sub-systems, is itself a sub-system of another system and may be a supra-system comprising other systems.

The discipline and practice of quality management is firmly rooted in the systems idea given the foundations laid by Deming (1988), Juran (1988), Feigenbaum (1991) and Ishikawa (1985). Both Japanese and Western quality experts have highlighted the importance of a holistic approach in quality management and system notions of emergence, communications, control and hierarchy feature widely in quality management literature (Deming 1988; Juran 1988; Mizuno 1988; Ishikawa 1989; Lillrank and Kano 1989; Dale and Plunkett 1990; Hill 1991; Feigenbaum 1991; Flood 1993; Oakland 1993). The practice of quality management in Japanese organizations

rests firmly on systemic frameworks, with Japanese experts consistently presenting their thinking on quality issues in systems terms (Ishikawa 1985; Mizuno 1988; Imai 1986).

Many systems-based approaches to quality management have also been promoted in the West, and the organization-wide quality approach that has been most commonly promoted is *Total Quality Management* [TQM] (Oakland 1993; MacDonald and Piggott 1990; Dale et al. 1990). However, Flood (1993:xi-xii) observes that 'TQM is not a single philosophy with a clear line of argument'. Notwithstanding this, he sees the key characteristics of TQM as incorporating the following goals: eradicating the traditional authoritarian style of management and moving towards greater autonomy; advancing the idea of colleagues as internal customers; promoting the use of hard quantitative measures to enable sophisticated mathematical and statistical control procedures to be implemented and a commitment to continuous improvement of the processes in operations.

Generally, the systems approach has been associated with determinism and notions of scientific causation, and it has been argued that when such an approach is applied to social systems, it assumes that human actors are passive in the face of systemic pressures. This is particularly true in the area of quality management as many of the ideas and practices connected to quality management originated from industrial engineers, physicists and statisticians working in industry and government (Grant et al 1994). Therefore the systems approach applied in quality management is usually deterministic and this is reflected in the approach taken in TQM implementation by organizations. In Flood's (1993) view, it is this deterministic approach which accounts for the unexpected difficulties faced by many organizations in implementation.

Ackoff (1979; 1993) observes that whilst the deterministic analysis of systems might yield knowledge of a system's workings, it is unable explain why a system works the way it does, because deterministic systems approaches ignore the impact of human agency on systems processes. This is not a problem in some areas of 'hard' quality

management such as statistical process control methods, but in the implementation of a an organization-wide TQM programme which requires the coordination and integration of quality activities and which usually involves behaviour change, the issue of human agency cannot be ignored.

Flood (1993:5) notes that with the promotion of TQM, quality management moved from a reactive to a proactive mode, with management's aim being 'to get rid of poor quality from the product rather than get rid of poor quality product'. However, he argues that the problems experienced in many TQM implementations highlight its limitations and requires a quality management approach that goes beyond TQM. This requires a systems approach to quality management that moves the organization from a proactive to an interactive mode, and in Flood's view this implies an approach to TQM which 'recognized the need to manage sets of interacting issues; issues of a technical, cultural and/or political nature'. In taking quality management beyond TQM, Flood is drawing attention to the need to think of organizations as social systems, and the implications of this on systems characteristics of emergence, communications and control. In his view because of the issue of human agency, such a quality management approach requires a strong emphasis on the participation of all stakeholders in the quality problem solving process with due cognizance given to the role of cultural and/or power issues. It also demands a shift from using systems as a description of the real world to using systems thinking as a methodology for inquiring about the perceived world (Checkland and Scholes 1990).

1.2.2 The Japanese QCC system

In Japan, despite the statistical foundations of QC, from the very beginning, Japanese QC promoters avoided a Scientific Management orientation which would have concentrated the function of quality management in the hands of managers and specialists. Instead, the participation of all stakeholders was perceived as crucial to the

promotion and diffusion of QC ideology in Japanese industry, given the socio-historical context at the time of implementation (see Chapter 3).

Through a process which was partly planned and partly spontaneous, groups of foremen (and later, workers also joined in) in Japanese factories gathered together to learn about the new quality control techniques that American quality experts were disseminating among Japanese engineers and managers. Given the overwhelming response and enthusiasm among factory employees to learn about the new statistical quality control techniques, corporate management and government officials responded by providing an organization to manage this learning experience and these study groups became the forerunners of the Japanese QCC.

With the development of the QCC system as an accepted small group activity in Japanese firms, workers participation in the quality management activities of their workplace became the norm in the Japanese factory. Also through circle activities, the Japanese worker was integrated into the quality management system.

The systems idea can be used as a means of understanding the QCC. The circle possesses the systemic characteristic of purposeful activity, as members' efforts (an input) is directed at quality improvement (an output). In Japanese QCC, the transformation process, that is, the emergent properties of the circle as a system is emphasized. Hence Ishikawa (1985) stresses the importance of group processes such as group-based problem-solving and the development of continuous improvement mentality as the more desirable outcomes of QCC activity than short term gains in efficiency.

Ishikawa, who has been referred to as the man most responsible for the development of Japanese QCC (Deming 1988) does not view QCC as an isolated quality improvement activity but as an element of the total quality control (TQC) system of the organization (Ishikawa 1985). In emphasizing the importance of process in circle activity, he sees the

QCC as concerned with promoting consensus among all levels of employees with regard to a quality culture. This is achieved through a network of circles in the organization with all circle activities supported and coordinated by a QCC committee which though not part of the formal organization, is connected with the latter (the details of this link is discussed in Chapter 3). Through these connections, communication and control between the formal organization and the QCC sub-system are effected and via these communication and control networks the QCC is integrated into the total quality management system (the TQC system) of the organization.

Therefore, at the company level, in systems terms, the individual circle is at recursion 3, the QCC committee which coordinates the circles' activity is at recursion 2 and the TQC system is at recursion 1. The TQC system is then integrated with other operations systems for the overall organization system of the firm (recursion 0).

As the quality movement gained momentum in Japan, the consensus on quality extended beyond the firm to suppliers and contractors, and ultimately a network of quality systems is formed linking organizations throughout in Japan. With regard to the Japanese QCC, each firm's QCC system is integrated with the QCC systems of other firms, firstly at the district level, then at the regional level, and ultimately all QCC systems in Japan are linked together at the national QCC Headquarters administered by the Japanese Union of Scientists and Engineers [JUSE] (Cole 1989; Lillrank and Kano 1989). QCC promoters at JUSE together with corporate management have developed a comprehensive infrastructure which when viewed from a systemic perspective, possesses the property of hierarchy: the QCC (recursion 4), the QCC committee of the individual firm (recursion 3), district level QCC organizations (recursion 2), regional QCC organizations (recursion 1) and finally, the QCC Headquarters at JUSE (recursion 0). A key integrating mechanism between the recursion levels is the QCC conventions where circle members, quality experts and corporate management meet to socialize and discuss QC issues at the district, regional and national levels.

Thus the QCC is the smallest cell of QC activity in the Japanese firm and the primary purpose of the comprehensive QCC network developed in Japan seems to be the mass promotion of a quality 'mindset' among Japanese employees and the achievement of this purpose is perceived by the Japanese as critical to the viability of the QC system of the firm.

Despite the Japanese emphasis on the systemic qualities of QCCs, in the adoption of QCC by organizations outside Japan, the emphasis has been on the 'how to' aspects of implementation, such as problem solving tools and QCC organization. In some circle programmes, a reductionist approach can be discerned, in that QCCs are implemented independent of a TQM programme. Some circle activities are implemented without provisions for linking the circle activities to other parts of the organizational system, such as establishing channels for communications and control that would integrate the circles to the TQM system. In other cases, the necessary processes to integrate the circles' suggestions into the operations work cycle have not been well established. In some programmes, there is much emphasis on QCC structures and infrastructures, but group maintenance processes that are part of the Japanese QCC system are ignored. Thus a key implementation problem is the lack of, or a limited systems approach in the implementation the QCC.

1.3 Borrowing from Japan: QCCs abroad

1.3.1 The spread of QCCs

Since its evolution and growth in Japan in the 1960s, the QCC concept and practice have spread far beyond Japanese shores.

Following Dore's (1973) comparative study of a British and a Japanese factory, interest in Japanese management methods have exploded. In the late 1970s and early 1980s there was growing awareness among Western industrialized countries of the heightened

international competition caused mainly by the success of Japanese corporations in developing and maintaining the competitiveness of their manufacturing industries. As the success of the Japanese quality effort was partly attributed to the social organization of these corporations, the QCC was perceived by many as the lynch-pin of this social organization :

> A remaining possibility, however, is the human factor in productivity. Can employees be managed in such a manner that they are more satisfied, more motivated and more productive?
>
> The key may be the involvement of employees at all levels within the organization in the decision-making process. One such approach is quality circles.
>
> (Crocker, *et al.* 1984: 5)

During the late 1970s and early 1980s, QCCs activities caught the imagination of many managers and organizations pre-occupied with the twin problems of competition and quality. Public policy makers of different nations strove to emulate the example of the Japanese and many attempts were made to replicate the Japanese QCC system in countries as diverse as India, Taiwan, Finland, Spain, Australia and Malaysia.

In 1981, the Singapore government embarked on a QCC promotion campaign as a major initiative of the national productivity plan (NPB 1981). The government's basic premise was that through such group-centred activities the organization could co-opt rank and file workers towards greater commitment and involvement in the productivity goals of the firm, and ultimately contribute to the overall national economic growth. The government commitment to QCC promotion has continued to-date, although the strategic focus have changed over the period of time:

> In sum, the goals of QCC activities are twofold : first, the benefit of the company - company building - of which the central issue is the improvement of quality of products and services. In addition, reduction of costs, delivery time, and cycle time are

regarded as goals. It is important to note that the goals are expressed in terms that describe the operational performance of a company, not in financial indicators such as net profit or return on assets. However, the company building benefits are supposed to show up in the bottom line sooner or later. The second goal is the benefit of company members - people-building - of which the central issue is the improvement of motivation, morale, atmosphere, working environment, and professional skills i.e. Quality of Work Life.

('Managing Employee Involvement in QC Circle' in *Productivity Management Training Module*, National Productivity Board, Singapore, 1993.)

The interest in QCCs outside Japan, peaked in the mid 1980s and since then, in many countries such as the United Kingdom and USA, the growth of circles have reached what Dale and Lees (1987) identify as either the phase 3 (plateau stage) or phase 4 (declining stage) of a QCC 'life-cycle'.

In Singapore, since an upsurge in the mid 1980s, growth rate of circles have levelled off (refer to Table 1.1). A considerable proportion of this growth is from the public sector - the civil service and statutory boards. The contrast in participation rate is enormous, with 42.2% of public service employees involved in QCCs, compared to 2.1% in the private sector (refer to Table 1.2). The public sector participation rate is boosted by the high level of QCCs in the Ministry of Defence, where many national servicemen (Singaporean males on compulsory military service) are circle members.

Table 1.1 : Number of circles registered with the National Registration Centre as at September 1993 (cumulative data)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
No. of Circles	1265	2275	3398	4450	5495	7293	8792	9856	11626	13179	14325
No. of Members	9344	16379	24843	32226	39346	52589	63538	72291	85536	96724	105282
No. of Organizations	92	122	140	153	166	181	197	211	226	275	307

Source : QCC Annual 1993, National Productivity Board, Singapore.

Table 1.2 : State of QCC Movement in Singapore as at March 1993

	No. of QCC Organization	No. of QC Circles	Total Membership	% of Workforce
Public Sector	49	9,436	71,454	42.2
Private Sector	235	4,226	28,873	2.1
Total	284	13,662	100,327	6.6

Source : Productivity Digest, September 1993, National Productivity Board, Singapore

1.3.2 Reasons for the spread of QCCs abroad

Despite the essentially quality control origins of Japanese QCC, once exported to other nations, other facets of circle activities took centre stage.

Lincoln and Kalleberg's (1990) interviews with American managers revealed that many expected the potential payoffs from QCC programmes to come from improved worker morale and motivation rather than from tangible improvements in product quality *per se* (p 83).

Lees and Dale (1990) observe that the purpose and use of QCCs among British firms varied somewhat. Reasons given by management for setting up circles include: the creation of a supportive work climate; employee skills development; improving teamwork and communications; the development of problem solving skills and the improvement of product quality and overall productivity.

To Crocker *et al.* (1984), the QCC is an institutionalized mechanism for productive and participative problem-solving interaction among employees. In comparing the practice of QCCs in Japan and the United States, they question the stand that QCCs should be used solely to solve the problems of product quality, explaining that this narrow focus on quality 'was for reasons unique to Japan in the 1960s' (p 10). In their view, QCCs

could and were being used to solve problems in productivity, safety and costs as well as quality.

There are some exceptions to this perception of QCC: Oakland (1993:290) sees the QCC in a quality management context, with circles as means through which employees (other than managers and supervisors) could participate fully in the 'making and monitoring of arrangements for achieving (quality) requirements at their place of work'.

However, many Western advocates of QCC, do not see the relationship between circles and quality control (including continuous improvement) as being fundamental to this form of small group activity as is the case in the Japanese model. This was especially the case in the early period of adoption of QCCs outside Japan, and to some extent, these impressions and perceptions of the QCC concept continue to influence the practice of QCC outside Japan.

1.3.3 The QCC experience outside Japan

Over the past 10 to 15 years, the concept of the QCC has moved from one of high enthusiasm and promise to one of doubt, skepticism and lukewarm support. It is interesting to note how a mechanism which held promises of greater worker participation in the workplace, enhanced employee motivation, job satisfaction and a better quality of work life, failed to meet with the desired response from the people it was intended to serve.

In practical terms, QCC programmes are easy for management to set up and relatively inexpensive to run as they could apparently be latched on to the existing organizational structure of a company without much disruption to the status quo of the formal structure.

The deceptive ease of implementation and comparatively small direct costs associated with QCC programme (when set against the costs of other forms of human relations consultancies) led to the enthusiastic, almost faddish response by managers in the early 1980s. This response created a small industry of consultants and trainers specializing in the implementation of QCC programmes in organizations. Many of these specialists focused on the implementation issues of QCC, the 'how-to' aspect, usually based on some prescribed model favoured by the individual consultant or trainer.

In addition, the innumerable articles written about this topic in academic journals contributed to the global spread of the QCC movement. Many journal articles focused on the applicability, efficacy and lately, the failure of QCCs when taken out of its original context.

While assigning new goals to circles other than that of quality improvement, most QCC programmes abroad were based on what was understood to be the Japanese model. However, according to Lillrank and Kano(1989), there has been very few original studies of Japanese QCCs. In fact, many implementations of QCC programmes in organizations outside Japan were the outcome of case reports by observers on short visits to Japanese corporations. The most influential of these reports was the study tour of Japanese plants conducted by Lockheed Missile Space Company in November 1973 (Lillrank and Kano 1989:5). Given the nature of such study missions, most tended to emphasize on descriptions of QCCs in various settings. Little attention was given to the theoretical and conceptual basis of QCCs and the role and impact of this particular small group activity on organizational processes and structure.

This perception is not helped by the fact that most Japanese QCC literature have a very pragmatic orientation. According to Lillrank and Kano (1989), the lack of theoretical interest among the Japanese could be due to the fact that the QCC concept was designed by engineers responding to what they perceived to be the main problems faced by Japanese industry in the early phases of the country's industrialization programme.

The main consequence of this pragmatic approach was that the organizational implications of QCCs were played down, with even the 'official' definition of QCCs opened to various interpretations. It was highly likely that the JUSE's definition of QCCs was intentionally ambiguous so as to allow for flexibility in implementation, with as much room for interpretation as possible, without losing the spirit of the concept, as perceived by Japanese management leaders.

It is contended that many of the implementors of QCC programmes outside Japan failed to understand, or had a rather shallow understanding of how QCCs had evolved over time in Japan. There is limited understanding of the iterative processes involved in shaping and reshaping the final form of the QCC in response to what were perceived to be the critical operational problems confronting managers in the Japanese factory environment in the 1950s and 1960s. For instance, the QCC creators and promoters took as their starting point the massive task of educating and training the country's workers in the new quality control technology and its applications. This was because they perceived the acquisition of this knowledge as a pre-requisite for the development of the economic and industrial base of Japan. The prevailing interests and concerns of Japanese employees at a time coincided with this objective and as such there was a consensus with regard to the perceived goals of the organization. Ishikawa's (1985) implicit assumption that employees should voluntarily engage in continuous quality improvement activities for their own and their organization's interests, should be viewed in this context.

Therefore, over a period of more than two decades, QCC practice in Japan has been shaped by a complex and unique blend of historical, cultural and organizational contingencies. The end result of the confluence of these unique contingencies is a highly evolved form of group centred work structure and it was this final product that was exported abroad .

However, very few analyses of the QCC phenomenon reflect this complexity and many have tended to emphasize the practical and applications aspects. Lillrank and Kano (1989) observe that much of Western discussion about QCC has been based essentially on a limited number of sources of information. In their view, most of these writings were mainly descriptive and made sweeping conclusions about Japanese culture, groupism, motivation theory and other popular ideas.

It is argued here that the failure of practitioners to analyse the dynamics of the development of QCC in Japan, especially with regard to the systemic properties of the QCC and its impact on the organization system, has contributed to the QCCs' failure to take root in Western corporations. The superficial knowledge of QCC processes has also contributed to the lingering perception of QCCs as just another management gimmick which would go the way of the numerous management fads that die natural deaths after brief periods of popularity.

1.3.4 Recent analyses of QCC outcomes

Many managers and some researchers have argued that the QCC as an organizational form is culture-bound and as such, unable to flourish when lifted out of its native context.

For instance, Bradley and Hill (1983) argue that the QCC is part of a wider set of Japanese employment practices and values which emphasized group work, collective responsibility and a high degree of group consensus. Given this value system, the Japanese employee responds positively to the QCC concept and approach to problem-solving. Furthermore, the QCC is just one part of an overall organizational strategy on quality improvement which capitalized on the values of Japanese workers to improve quality and output. In such an organizational context, QCC could work and did contribute to the significant gains in efficiency and productivity as evidenced in larger Japanese firms over the last 20 years. However, when transposed to another context

where these values are not dominant, such as in the Western industrialized countries, QCCs are unable to produce the outcomes sought by management. Hence they found circles to have limited value for management hoping to increase employee organizational commitment (Bradley and Hill 1983; 1987).

Lincoln and Kalleberg (1990) reject this 'culturist' explanation. They accept the fact that Japanese organizational forms and practices, including QCCs, have been responsible for the high level of employee commitment. Such structures and practices serve to bind employees to the workplace and in doing so, played a major role in the organizational control system. They view the Japanese corporation as the archetypal 'welfare corporatist' firm as defined by Dore (1973), with a leading edge status as an adapter and implementer of a new and highly successful technology of organizational control. Such an organizational control system is responsible for the high productivity rates through a process which Deyo (1983) describes as the typical corporatist principle of the subordination of interest groups to the overall goals of the 'state', which in this case is the organization.

Following from the convergence hypothesis of Dore, Lincoln and Kalleberg argue that wherever the elements of corporatist organization are present, the same level of commitment would arise. QCCs together with other kinds of small group activities are thus seen as organizational forms designed to draw workers into the decision-making process and to diffuse organizational responsibility for quality and production problems. In doing so, they could heighten employees' feelings of participation in the workplace community and hence, commitment to the firm. The employees' commitment to the firm would result in the subsuming of individual goals and the internalization of the organizational goals by the employees. Thus in this view, the QCC is an indicator of the presence of a corporatist strategy of control. They supported their thesis with comparative studies of American and Japanese factories which showed that QCC membership did raise commitment in both countries, hence invalidating the 'culturist' argument. However, it must be noted that Lincoln and Kalleberg's arguments assume

that there is a causal linkage between productivity and corporatist organizational control systems.

Based on Lincoln and Kalleberg's corporatist/convergence thesis, the failure of QCC programmes to generate the expected outcomes is not culture-based but can be traced to the fact that some key elements of the corporatist organizational strategy has been overlooked or ignored. Hence in this perspective, the context could still be a critical factor, but not for culturally derived reasons.

1.3.5 Key issues in the adoption of QCC outside Japan

The dearth of conceptual theories with regard to the QCC mechanism coupled with the wide berth that the Japanese originators gave to its interpretation, made QCC initiatives deceptively simple to implement at the practical level. However, it has also rendered any in-depth understanding of the QCC process difficult and predictions of its outcomes unreliable.

One major problem is the issue of outcomes. Positive outcomes of QCCs have proven to be difficult to quantify. Although there have been evidences of quantitative outcomes such as reduction in scrap and rework costs, falls in the number of customer complaints and time savings, most of the reports of such outcomes are anecdotal, in the form of QCC success stories. For example, since the launching of the QCC movement in the mid-1980s, NPB's monthly magazine, *Productivity Digest*, regularly feature successful QCC case stories.

At the macro level, it has been difficult to isolate the effects of QCC from the effects of investment, technology, marketing or finance. At best, QCCs could contribute only a fraction of the total productivity and performance gains of the organization. This difficulty of quantification at a macro level could well be one reason for the lack of

interest among private sector organizations in Singapore with regard to the QCC as a quality and productivity improvement tool .

On the other hand, QCC researchers and promoters in Japan have tended to emphasize the indirect improvement outcomes of QCC (Onglatco 1988; Lillrank and Kano 1989). Onglatco (1988:44) classifies these indirect effects into several categories: enhanced problem awareness and improvement consciousness, better teamwork, interpersonal relations and communications and enhanced work motivation. According to Lillrank and Kano, JUSE believes that the QCC is good for the building of a strong corporate culture and that the positive measurable results will automatically emerge sooner or later. In other words, JUSE expected Japanese corporations to accept QCCs on good faith as the organizational effects would only be felt gradually.

However, only large corporations possessed the available slack resources in terms of money and manpower to wait for the return on their investment. For medium and small establishments, which make up the majority of private sector establishments in most capitalist economies, the investment of money, resources and management time on a QCC programme is not an attractive option, especially in highly competitive environments. Hence the very low participation rates of the smaller business firms in Singapore's QCC movement and for that matter, elsewhere in the world other than in Japan.

There is also the problem of sustainability as QCC activities are expected to be continuous. Although QCC activities outside Japan have been easy to initiate they have proven to be difficult to sustain and develop. Lawler and Mohrman (1985) dismiss QCCs as unstable organizational forms that are likely to self-destruct as the QCC design possesses several elements that inevitably lead to its decline. One major reason for this is the fact that the QCC process is not integrated into the formal work process of the organization. That is, QCCs are rarely set up as an integral component of the formal organizational structure and often function outside this structure.

Union response to QCC outside Japan ranged from lukewarm to outright dismissal. Debra (1990) reports that the British industrial relations community has dismissed circles, viewing them as a management strategy to bypass the unions and create individualistic relationships with employees, with the aim of enhancing management's legitimacy in the organization while marginalizing the union's influence.

A key problem is with the interpretation of the term 'voluntarism' in the context of QCC practice. In Ishikawa's (1985) and JUSE's definition of QCCs, the element of voluntarism seems evident and in the United States, worker participation in quality circles is usually voluntary (Crocker *et al.* 1984). Referring to the British experience, Hutchins (1985:33) admits that in the context of QCCs, the word 'voluntarily' is hard to define but it should mean that people are 'free to join and free to leave'. Oakland (1993) called for the establishment of formal arrangements for 'quality improvement teams' and stressed that quality circles or *kaizen* teams need the participation of every employee to be effective.

This ambiguity reflects a fundamental contradiction inherent in the QCC concept. On the one hand, circles are promoted as the antidote for employee alienation. Because of this, it is necessary to emphasize the 'autonomy' aspect and associated with this, the employee's free will in deciding whether or not to join a circle. However, for QCCs to be effective as a method of continuous improvement on a company-wide level, every employee has to be concerned with quality improvement and would have to participate in the organization's QCC programme.

It would seem that the Japanese originators of QCC were well aware of this contradiction and it could be said that JUSE encouraged this ambiguity. According to Lillrank and Kano, the Japanese QCC basic text published by JUSE described the QCC as a small group of employees from the same workshop operating on a voluntary basis (or *jishusei*). Yet elsewhere in this basic text, JUSE argued that as quality control is the concern of everyone in the organization, all should be involved in QCC activities.

Onglatco (1988) reports that one Japanese QCC survey showed that about 90% of circles were formed as a result of company policy or management directives. Thus, firms outside Japan attempting to implement QCC both as a 'Quality of Work Life' mechanism because of its participative characteristics, as well as a vehicle for promoting continuous quality improvement among workers, would in fact be placed in an untenable situation.

Overall then, the organizational implications from QCCs have not been well articulated. This led to the rejection of the QCC as a form of organizational intervention by some organizations, while with others, it resulted in overblown expectations and with this, the inevitable disillusion and skepticism that followed.

1.3.6 The QCC movement in Singapore

Singapore presents an interesting case study in the transfer and diffusion of the QCC concept and practice outside Japan.

Firstly, the Singapore QCC programme was based very closely on the Japanese QCC model. During the early stages of the movement, through a grant from the Japanese government, Japanese QCC experts were on hand in Singapore to advise on QCC implementation and at the same time, Singaporeans were sent to Japan to learn about the QCC concept and applications. Like Japan, an impressive national infrastructure has been established for promoting, sustaining and recording QCC activities.

However, on closer examination, there are some aspects of the Singapore QCC movement which differs from the Japanese experience. The main initiator and promoter of QCCs in Singapore has been the Singapore Government, working mainly through one of its agencies, the National Productivity Board (NPB). In the case of Japan, although the government had played a supportive role, it was the employers and their affiliated agency, JUSE that were the prime movers and promoters of the QCC.

It is argued here that this has accounted for some of the differences in QCC implementation and outcomes between Singapore and Japan.

In Singapore, because of the role played by the government in QCC promotion, the QCC movement has been sustained for more than ten years and is still part of the government's national policy for productivity growth and development. Given this reasonably long period of implementation, some of the key issues relating to the adoption of QCC practice outside Japan are likely to be found in the Singapore experience.

1.4 The interpretive flexibility of the QCC: QCC as social technology

Bijker *et al.* (1987) distinguish three layers to meaning of 'technology'. Firstly, technology could refer to artifacts or physical objects, secondly, it could refer to the activities and processes such as steel making or molding and thirdly, the term could also refer to what people 'know' as well as what they do, such as the know-how involved in using statistical process control.

As discussed above, the QCC is designed as a special type of workgroup centred on group problem solving as the method of maintaining continuous quality improvement at the workplace. It is characterized by a well developed set of problem solving tools, with well established procedures and routines used in the problem solving process and operates outside the normal operations cycle of the workshop. As it involves a well defined set of activities and processes and includes a specific set of 'know-how', it satisfies two of the three definitions of technology put forward by Bijker et al. (1987). As a group activity, it can only be constituted socially and as such it should be regarded as a social technology.

This view that small group structures, such as the QCC, should be regarded as social technologies is supported by Cole (1989) who argues that the transfer of small group

activities across national boundaries is in fact a process of technology transfer, no different from that of the transmission of steel-making technology, double-entry book-keeping or the joint stock company.

As a form of social technology,[3] the reality of QCC in the workplace is socially constructed.[4] Hence the promotion, implementation and sustenance of QCC in a context are completely mediated by the social interpretations of the promoters (government and firms), implementors (managers and foremen) and 'users' (QCC members). Because of differing socio-historical context and the issue of human agency, the promotion and implementation of QCC have been subject to a wide range of interpretations and these have had significant effects on the outcomes. In this respect, the Singapore QCC experience presents an opportunity for exploring the interpretive flexibility of QCC concepts and practice and the impact of the different interpretations on the viability of QCC activities.

1.5 Review of analytical frameworks on QCC adoption outside Japan

The adoption of QCC practice outside Japan has given rise to several perspectives regarding its applicability in new and foreign contexts. In their various ways, these perspectives reflect the interpretive flexibility of social technologies and the consequences of varying interpretations on the implementation and viability of QCC programmes abroad.

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3 As the QCC is a specific form of group-centred structure that evolved in Japanese companies, it is in fact, an organizational innovation, that is, a form of social technology. The use of term 'technology' in this context, coincides with the second and third layers of the meaning of the term as defined by Bijker *et al.* (1987), that is, it refers to 'activities and processes' and to' know-how' rather than to physical objects and artifacts.

4 The social constructionist view of technology, such as those of Bijker *et al.* (1987) is that shared interpretations by relevant social groups regarding a certain technology arises and affects the development and interaction with the technology. Although this view was propounded in relation to more 'material' forms of technology, it is argued that this interpretive flexibility is even more so in the case of a social technology.

The wave of interest in the QCC derives from its application as an organizational intervention on a large scale in Japan over a period of more than two decades. Management theorists and practitioners, given the nature of their subject matter, are on a continuing search for organizational interventions and applications that can either improve the organization's effectiveness and performance, or increase the meaningfulness of work for organizational members, or both. The efficacy of QCC application in a global context is examined because it is one organizational intervention which has proven to 'work' on a wide and sustained scale in Japan.

Various analytical frameworks have been put forward and they focus essentially on the role and applicability of QCC as a organizational intervention outside Japan. Overall, four major perspectives have been identified.

1.5.1 The QCC as a transitional structural mechanism (limited role perspective)

The stand taken here is that QCCs are too narrow in terms of their objectives and too weak in their influence on organizational dynamics to survive as an organizational form in the long term. At best they are interim mechanisms used by companies intending to introduce formalized group-centred work structures in the organization.

Lawler and Mohrman (1985) maintain that the QCC is an unstable organizational form because it is essentially a suggestion group and not part of the formal organizational structure. Without the legitimacy and continuity accorded by the formal organization, it is likely to self-destruct after a period of activity. As such, QCCs are only useful as interim devices to move the organization towards formal structures which incorporate a greater degree of participative decision-making.

Similarly, Kochan and McKersie (1990) argue that QCCs are too narrow in scope and not powerful enough on their own to survive or transform organizations. However,

they could provide a good starting point for building trust and by doing so, open the doors to broader changes in the organization.

Under this perspective, the QCC has only a limited role as an organizational intervention, because structurally it is unable to perform the transformative tasks expected of an organizational innovation. However, both groups acknowledge that the processes in the QCC activity could be beneficial for organizations in managing change situations.

1.5.2 The QCC as part of quality management (quality perspective)

A sub-branch of the above perspective is that QCCs can only survive if they are part of a wider organizational quality programme such as a TQM system.

Hill (1991) argues that QCCs have largely failed in the United Kingdom because British management had implemented the QCC as a free standing institution without integrating it into a corporate quality management system.

Oakland (1993) views the QCC as one of a number of team structures, including process quality teams, and quality improvement teams, that can be established by organizations to implement and maintain the organization's TQM programme.

To Feigenbaum (1991:211), the QCC's utility role is in the development of quality and productivity awareness among employees and in nurturing employees commitment to total quality control programme of the company:

> The value of quality circles is far less dependent on the mechanics of particular forms of organization structuring than upon the effectiveness through which these human motivational, behavioural, statistical, problem-oriented, and other practices are presented and implemented.

Thus the QCC as a form of organizational intervention is closely tied to the corporate quality strategy and system. It is also a perspective of QCC shared by Japanese QC experts such as Ishikawa (1989) and Mizuno (1988).

1.5.3 The QCC and corporate culture (cultural change perspective)

This perspective asserts that there must be fundamental changes in management perceptions, values and beliefs regarding participation and decision-making, if QCCs are to take root in an organization. The role of culture is important, but not because of the typical 'culturist' arguments regarding cross-national cultural impacts and barriers. Rather, it is the internal management culture of the organization that presents a major barrier to effective adoption of QCCs.

Hence, Kanter (1984:249) in discussing the pre-requisites of change management, emphasizes the importance of the processual features rather than structural features of the QCC as an organizational innovation:

> QCCs are especially prone to being introduced by overly specific structuring of actions rather than by education in the principles and skills to make this kind of involvement (employee participation) work.

Therefore, the innovative role of the QCC depends essentially on it being a process that could bring about a change in behaviour and ultimately, a cultural change in the organization towards more participative work practices.

Furthermore because of this processual aspect of the QCC, the cultural change implies an acceptance by the current dominant stakeholders, that is, managers as representatives of the shareholders, of some degree of re-distribution of power within the organization.

Kochan and McKersie (1990) argue that to sustain and diffuse human resource innovations such as the QCC in the organization so as to encompass a broader circle of employees, workers and their representatives must be 'partners' in the adjustment and change management process. The QCC involves cultural change and, as such, managers must factor in the concerns of employees and their representatives, if it the practice is to take root in the organization.

On the other hand, Hill (1991) reports that British companies moving into TQM programmes cited 'enhanced business performance and a changed culture' as the main reasons for adopting QCCs. Changing organizational culture is thus seen not as a bottom up process but as dependent on managerial behaviour and attitudes and as such a cultural shift is required of management.

However, Lillrank and Kano (1989) assert that some form of structural device is needed to bring about the necessary cultural change. They argue that the capacity of QCCs to exert an influence on the formal organization is a necessary condition for their survival, but noted that in Western countries, QCC activities have had an insignificant impact on the power, knowledge, information and reward systems of the organization. This is because the status of employee groups such as the QCC is perceived to be rather low. The implication is that if QCCs are to survive, a change in perception is required. For this cultural change to be effected, there is a need to re-adjust the power balances within the organization.

The cultural change perspective is implicit in the role of the QCC as a form of organizational intervention, although the circle mechanism could be viewed as an initiator of cultural change or contingent on cultural change, or both.

1.5.4 The QCC as a form of social technology (technology transfer perspective)

In this framework, the adoption of QCC outside Japan is viewed as a technology transfer process, albeit, a transfer of 'soft' technology.

To Cole (1989), the QCC as an organizational innovation is a form of social technology that could be adopted by firms in much the same way as 'hard' technology is adopted across national boundaries. Dealing with culture (that is, cross-national cultures) is part of the normal process of adopting an innovation that grew out of and is shaped by a particular environment, be it a 'hard' or 'soft' technology. Cole rejects the view of some social scientists that in borrowing a social practice we were pulling it out of a complicated and highly interdependent social nexus and that because of this, the practice would not survive the transplant.

He notes that this viewpoint did not extend to the adoption of hard technology or even some instances of 'soft' technology, such as the spread of double-entry accounting. To him, the processes involved in technology transfers are similar for both hard and soft technologies, issues of holism and culture are not valid reasons to explain the failure of a technology transfer, such as the transfer of QCC concepts and practices.

In support of his view, Cole put forth the case of Japan's borrowing of statistical quality control ideas from the United States, where its application was confined to engineers and where at that point in time, the quality control function was narrowly focused. In combining these ideas with the human relations ideology emerging from the US in the 1950s, he observes that the Japanese had 'literally ripped (the statistical process control ideas) from their moorings to create something almost entirely different in the new environment' (Cole 1989:125). In the process, the Japanese created a mass quality control movement reaching down to the worker on the factory floor. The Japanese did not transfer the entire context from which the quality control ideas were developed, but

adapted it to meet their own local needs. In the process of this technology transfer, a new and creative use was developed from the original technology.

According to Cole, the key to the whole process of successful technology transfer is adaptation, and for effective borrowing to take place, there must be 'local invention' (p 116). By this Cole implies the need for 'responsible parties' to have a sense of having contributed to the invention. This is especially so in the case of QCCs where participation is the desired social arrangement.

Given this analysis, context is still important but for different reasons. To Cole, cultural barriers in terms of the historical rootedness of social ideas and practices are seen as less of a problem in cross-national borrowing than the process of technology transfer. That is, the process of technology diffusion in a new context required additional innovation as it moves from invention to adoption to implementation. Hence in the transfer of a social innovation such as QCCs, local invention is essential in order to create a sense of ownership and to generate commitment to the new activity. Only then can the technology transfer be successful. Further, the innovations brought about by such cross-national technology diffusion can be expected to create new uses for the technology transferred.

This perspective on QCC adoption underlines the critical importance of the approach taken in the implementation of the QCC and of the adaptation of the practice to suit local contingencies.

1.5.5 The QCC and the corporatist control system (corporatist management perspective)

Lincoln and Kalleberg (1990) view the QCC as part of a welfare corporatist control system which seeks to maximize work-force commitment to the organization through a network of labour structures and practices. A corporatist organizational system would have structures which facilitate employee participation and integration, underscored by

high internal labour mobility, and a system of rules and regulations which replaces the domination by supervisors at the work site.

In such a organizational design, the QCC is one of several structures used to facilitate employee participation and integration. It functions as a mechanism which diffuses responsibility for job performance to include all employees and not only management staff. It could also be used to elicit employee commitment to organizational decisions, thereby eliminating the need for strong supervisory controls. Hence Lincoln and Kalleberg conclude that the presence of QCC activities in a firm is a valid indicator of a corporatist strategy of control.

Lending support to Lincoln and Kalleberg's corporatist arguments, Cole (1989) in observing the historical development of QCCs in Japan, notes that QCC implementation coincided with major management initiatives to decentralize responsibility to the shop floor .

Similarly, the quality management perspective highlights the integrative role of QCCs, while the cultural change perspective underlines the need for employee participation to be part of the corporate culture. Hence these perspectives also contain elements of the corporatist management philosophy.

1.6 Systems thinking as a framework for the analysis of QCC

Both Japanese and Western practitioners and writers in the field of quality management have emphasized the systemic nature of quality management approaches (Deming 1988; Juran 1988; Mizuno 1988; Ishikawa 1989; Lillrank and Kano 1989; Dale and Plunkett 1990; Hill 1991; Feigenbaum 1991; Flood 1993; Oakland 1993).

However, in most instances, systems in quality management imply the systematic application of quality tools and techniques, more of a 'how to' approach, and assumes that the question of 'what to do' has been resolved.

Ackoff (1993) argues that quality management requires the control of variables affecting its pursuit but that control is not possible without understanding the phenomena to be controlled and this understanding is not possible without theory.

To Flood (1993) this requires systems thinking, for whilst system methodologies are appropriate as tools of practice, systems thinking could provide the intellectual basis for exploring and understanding systemic relationships, such as the relationships between system actors' assumptions and emergent processes. Flood and Jackson (1991a) contend that the real world is simply too complex to be captured completely by systems models and therefore, we should not equate any systems model with the material world. In their view, systems models could be better used as abstract structures for organizing our thoughts about problem situations (Flood and Jackson 1991a:4). That is, we could use systems models to make sense of the messes that confront us. This in effect shifts the 'systems idea' from the realm of the material world to the realm of the conceptual world. It is an important distinction, especially in the analyses of social systems such as organizations, as it allows both the objective and subjective dimensions of the social world to be integrated in the systems models.

However, as mentioned above, there is a general lack of conceptual frameworks for understanding the Japanese QCC. Japanese QCC experts and even QCC writers from other countries, have generally focused on transmitting the 'how to' aspects of QCC, with little attention on the theoretical basis for circle activities. The implicit assumption seems to be that the role of QCC in the organization is well established and it is not necessary to reflect on this but to get on with its implementation.

It is argued here that because the QCC is a form of social technology, its implementation in an organization is mediated by the socio-cultural context. Thus Flood (1993) asserts that quality principles (such as the QCC technology) have to be interpreted through socio-cultural systems thinking if a consensus on quality is to develop among stakeholders of the organization. Hence his argument is that quality management must move from a proactive to an interactive mode. The latter mode provides opportunities for inquiry into the various interpretations of quality amongst stakeholders and through this exercise, the possibility of a consensus.

Lillrank and Kano's (1989) systems model is probably the first attempt to build a comprehensive theoretical framework of the Japanese QCC. Their aim is to use the systems approach 'as a basis for developing an explanation of the fundamental nature of the phenomena' (p 41). They focus on the supporting organizational arrangements surrounding QCCs and the interrelationships between the various elements of the organizational structure and the processes that were developed by the organizations to promote QCC activities. However, their model is essentially managerialist and functionalist in orientation. QCC activity is seen in terms of the desire of the 'organization'[5] to meet functional imperatives, which in this case, centres on continuous improvement. It assumes this is an objective shared by all employees of the organization. The model thus assumes shared values and norms amongst its key actors, with an emphasis on social order and the exclusion of the possibility of conflicting goals.

To the authors, their systems model is only applicable to Japanese organizations in a given context and at a given stage in their industrial development. They question the full applicability of such a model to a Japan that may undergo major economic and social changes in the future. However, in their view, new systems models, though

[5] It can be argued from an interpretive standpoint, it is people and not 'the organization' that can have desires.

functionally similar to the current one but structurally different, may be developed to fit the contexts in the later stages of the organization's development.

Flood and Jackson's (1991a) critical systems thinking with its commitment to critique, to emancipation and to pluralism (or in their term, complementarism) offers a way forward beyond Lillrank and Kano's functionalist model of the QCC. It is essentially these commitments that led Garnsey (1994) to argue that the systems perspective and the interpretive perspective need not necessarily be incommensurable paradigms.

Critical systems thinking has its roots in Habermas's (1987) critical thinking, especially in his conceptualization of three fundamental human interests - the technical, the practical and the emancipatory. To Habermas, these three interests are individually necessary although by themselves they are insufficient.

In linking Habermas' three interests to systems thinking, Jackson (1992:186)) asserts that all human beings have technical, practical and emancipatory interests in the functioning of organizations and society and that various systems theories and methodologies could address these interests. Thus some systems methodologies could serve the technical interest by improving the productive potential and steering capabilities of social systems. Other methodologies serve the practical interest by promoting and expanding mutual understanding between groups. Then there are those methodologies that serve the emancipatory interest by protecting the practical interest from encroachment by technical/instrumental reason through laying bare situations where the exercise of power or other causes of distorted communications are preventing the open and free discussion necessary for successful interaction. Oliga (1988) points out that, as with Habermas's position on the three interests, the various systems methodologies are individually necessary although not sufficient in themselves. This leads to the idea of complementarism (Flood and Jackson 1991) as the guiding principle in systems thinking and theory building.

Based on this ideal of complementarism and committed to a more interpretive approach to systems thinking, Flood and Jackson (1991b) develop a system of systems methodologies which can be used to understand the assumptions underpinning various systems approaches and to identify the problem contexts in which they could be applied in order to guide thinking about the problem issues. The underlying philosophy in their model can be used as an aid on the analyses and critique of systems model of QCC activities.

With regard to quality management, Flood (1993) developed a general approach for the implementation of TQM which takes into consideration the ideals of complementarism in systems thinking and which incorporates Habermas three knowledge constitutive interests as the basis on which to build a viable quality strategy. His approach is founded on three pillars of *designing*, *debating* and *disemprisoning*:

> The technical interest in prediction and control is catered for in quality control by models that *design freedom* into organizations and society in the form of efficient cybernetic systems. The practical interest in securing through social interaction mutual understanding and learning about each other's roles and needs, to enable us to employ our technical tools, are supported by methods that have been developed that encourage growth of individual *freedom through open and meaningful debate.* The emancipatory interest in achieving freedom from constraints imposed by power relations is tackled by methods that provide an armoury to fight individual *freedom by disemprisoning people from coercive structures.* (Flood 1993:127-128)

Thus his theoretical framework for TQM 'stresses the need for autonomy, responsibility and participation, and the getting rid of coercive forces' (p 127) and within this framework, the QCC is perceived as a method that has the potential to promote debate among organizational stakeholders:

> QCCs are most effectively used when different conceptions and opinions exist about what should be done (non-coercive). It helps to the answer the question, 'What should we do?' (Flood 1993 173)

Using Flood's (1993:114) terms of reference, QCCs could improve the *potentiality* of the organization and 'potentiality is what could be achieved by developing resources and removing constraints'.

Therefore it is argued here that although Lillrank and Kano's functionalist model of the QCC as a continuous improvement system serves as a good starting point for the analysis of QCC, Flood's complementarist framework, will add depth to the analysis especially in the investigation of whether the QCC as a small group technology is able to satisfy the practical and emancipatory interests of the organization's stakeholders. It is argued here that the consideration of these interests is necessary if the potentiality of the organization is to be realized.

It is also through this exercise, that 'local invention' (Cole 1989) could arise, and the QCC subject to an innovative process resulting in a renewal of the QCC concept and practice. Hence, Cole (1989) argues that for the QCC to survive and grow on foreign shores, an evolutionary approach to its application is of vital importance in the QCC adoption and implementation process.

1.7 Structurational theory and the analysis of QCC adoption and implementation

1.7.1 The role of structure and action in circle activity

The social nature of circle activity and the fact that QCCs operate through specific organizational arrangements mean that issues such as culture, structure and history cannot be ignored in QCC adoption and implementation.

Ackoff (1979; 1993) argues that a deterministic analysis of a system is unable explain why a system works the way it does because such approaches ignore the impact of human agency on systems processes. This may not be a problem in some areas of 'hard' quality management aspects such as statistical process control methods, but in issues such as the coordination and integration of quality activities or of promoting a quality 'mindset', the issue of human agency cannot be ignored. Hence in the analysis of QCC, the issue of human agency is a critical one.

Thus in Japan the QCC arose as a product of human agency and the organizational context and reflects the knowledge, interests and social conditions at a given time in the history of Japanese society in general, and Japanese organizations in particular. Hence an informed study of Japanese QCC has to take into account the socio-historical context as well as the role of human agency in producing and reproducing circle activities in the Japanese firm. A sociological theory which focuses on the relationship between social structure and human agency is Giddens's theory of structuration (Giddens 1979; 1984).

In Giddens's theory of structuration, social reality is seen as constituted by both human actors and institutional properties, comprising mainly the structures of meaning, power and norms. The concept of duality of structure is proposed, with structure[6] viewed as both the outcome of human action, and the constraints on future human action. Human interactions is viewed as shaped by the structural arrangements, but at the same time, it is through interactions that structures themselves are reproduced. This is a recursive process and the duality of structure is demonstrated by the fact that structure is both the medium and the outcome of the interaction. Structuration theory therefore focuses on how human action produces, reproduces and changes the structural conditions that

[6] Cohen (1989:199-201) notes that in Giddens's structuration theory, 'structure *qua* structure does not produce patterns, nor does it actively coordinate and control social systems' nor does it articulate systems across time and space. However, structural properties 'shape, channel, and facilitate systems reproduction whenever it occurs by providing human agents with the practical awareness of the practices, relations, and spatio-temporal settings they require in order to participate in the reproductive process'.

shape it. In essence, human action can reproduce as well as transform the existing structure. Structure, in this theory, does not possess any material characteristics and cannot exist apart from the people that enact and interpret its properties.

The dialectical relationship between social structure and human action is mediated by three modalities. These are: the interpretive schemes that human beings draw on to interpret behaviour and events; the resources which are the means through which goals are realized and power exercised; and norms, which are the organizational rules governing conduct and which defines what is legitimate behaviour in a given context. These modalities are the links between the subjective and objective dimension of social reality and are vital to the structuration process (Olikowski and Robey 1991).

Olikowski (1992) views structurational analysis as a theoretical framework which sees structures as both enabling and constraining and actors as purposeful and self-monitoring. Structures are regarded as not having an existence outside of action, they are only realized through individuals using rules and resources to act. The latter is particularly true in regard to the QCC, which only has an existence through the actions of circle members. However, at the same time, the institutional properties such as power relations, organizational structures, control mechanisms and communication patterns, will shape the actions of circle participants.

The role of human agency in QCC can be demonstrated by the effect the following actions might have on circle activity: the rationale for management's decision to implement QCC practices in the organization; the employees' perceptions regarding continuous improvement and employee participation and involvement in QCCs; and the impact of the three modalities of meaning, power and norms on human action, on the rules on QCC membership and on the allocation of resources for QCC activities in the organization. Based on structuration, all social life is thus generated by the action of social actors in particular historical contexts. In regard to the question of the QCC, this

concept offers scope for new insights into the reasons for the emergence and on-going operations of QCC in Japanese firms.

1.7.2 The structurational model of technology and QCC adoption outside Japan

Based on Giddens' theory of structure and action, Olikowski (1992) develops a structurational model of technology in general and Olikowski and Robey (1991) have developed a structurational model for information technology. It is argued that this application of Giddens's theory of structuration to technology presents a well structured framework for the analysis of QCC.

If the adoption of QCC practices outside Japan is viewed as a technology transfer, and if we accept Pinch and Bijker's (1987) arguments regarding the interpretive flexibility of technology, the structurational model of technology could help explain the role of human actors and institutional arrangements in the QCC transfer and adoption process across national boundaries[7].

Hence, a major premise of this thesis, following Cole's (1989) analysis, is that the adoption of QCC practice outside Japan could be studied as an incident of technology transfer, with the QCC concept and practice representing a particular form of organizational innovation that managerial decision-makers introduce into their organizations as a part of the corporate agenda.

The QCC is distinctive as a small group activity performed outside the routine operations cycle of a firm. Yet circle outcomes could mediate the workers' performance of his routine work and in this respect it represents 'know-how' that could be applied for the improvement of work processes. In this way it satisfies the third of the three layers

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7 Although Olikowski (1992) did not extend her concept of technology to social technologies on the grounds that the inclusion of 'this generic approach to technology creates boundary and measurement ambiguity' and that 'it also overlooks valuable information about the mediation of human action by machines'.

of definition of the term 'technology' (Bijker *et al.* 1987). Therefore, although Olikowski (1992) does not see her structurational model of technology as applicable to social technologies (mainly on the grounds that there will be problems concerning boundary delineation between what constitutes the technology and what its context), it is argued here that in the case of QCC system, the problem of boundary delineation is a less crucial one. Furthermore, as her framework represents a comprehensive attempt to take structuration theory outside the realm of sociology and into the realm of organization theory and technology management, it offers a cogent framework for the analysis of the interactions between a social technology such as the QCC, the people who design, sponsor or participate in the activity, and the institutional contexts in which these interactions take place.

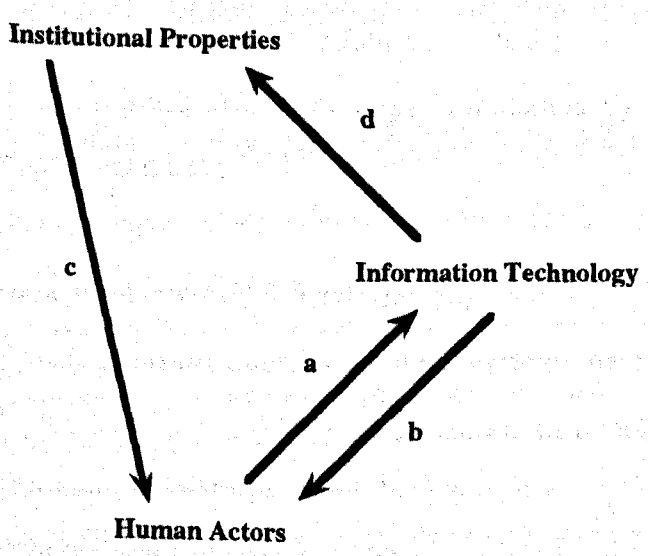
Olikowski's model defines three components central to the human-technology interactions, and these, as applied to the QCC, comprises: (i) *the human agents,* the designers or creators of the QCC, essentially referring to the Japanese designers of QCC; the sponsors of the QCC, such as the Singapore Government in the promotion of QCC, the corporate decision-makers who adopt QCC practice; and, the users of the QCC, including the employees who are members, leaders or facilitators of QCC; (ii) *the technology*, the concepts and practice of the QCC, including the structures and the tools of QCC problem solving and mechanisms such as QCC presentations; (iii) *the institutional properties of organizations*, including organizational dimensions such as structural arrangements, business strategies, ideology, culture, control mechanisms; and, environmental influences such as government action, competitive forces, professional norms and socio-economic conditions.

In the model, these three components interact to produce four sets of influences which Olikowski (1992) has identified as: (a) technology as a product of human action, and refers to the influence of human actors in shaping the technology; (b) technology as a medium of action, which is the extent to which the particular technology facilitates and/or constrains human action; (c) the institutional conditions of interaction with

technology, referring to the contextual factors which influence people in their interaction with technology; and, (d) institutional consequences of interaction with technology, which refers to the impact of QCC outcomes on the institutional context (refer to Figure 5.1). Olikowski considers the relationships between structure and action in the model as a dynamic process which is embedded historically and contextually. It is also a dialectical process, and hence inherently contradictory, with the elements interacting recursively, sometimes in opposition and possibly undermining each other's effects.

To explore the dynamics of the relationships, Olikowski (1992) adapted Gidden's (1979; 1984) modalities of structuration to explain the linkages between the subjective and objective dimensions of social reality, that is the linkages between human agency and social structure, in the interaction between technology and people.

Figure 1.1 : Olikowski's structurational model of technology



Influences:

(a) Technology as a product of human action

(b) Technology as a medium of human action

(c) Institutional conditions of interaction with technology

(d) Institutional consequences of interaction with technology

Source : Olikowski (1992 : 410)

In the concept of the duality of technology (Olikowski 1991, 1992; Olikowski & Robey 1991) three sets of modalities are seen as the connecting link in the interaction between technology and human beings. These are *interpretive schemes, resources* and *norms.*

Interpretive schemes constitute the meaning structures of social systems and in interacting with any technology, people rely on their sets of interpretive schemes to structure and understand the technology and its meaning in their world. These interpretive schemes determine the instrumentality attributed to the technology; at the same time, that a technology is utilized, it changes or reinforces the interpretive schemes.

Resources. In interacting with a technology, human actors require resources to activate it. In an organizational context, the issue of resources is intertwined with the organizational system of domination, in that it is the use of power and authority that allows the allocation of resources for the activation of the technology.

Norms. The design and development of a technology, especially a social technology, embodies the norms, values and goals of the people who design and/or deploy it. Routines or standard operating rules of technology embody the norms of the designers and in use, may be modified through the incorporation of the norms of the users. Hence, the use of a technology is mediated by the normative systems of designers, sponsors and users.

These modalities of structuration are embedded within the historical and organizational contexts, and together, through dynamic interaction, they influence the development, deployment, use and institutionalization of a technology in an organizational context. Through the analysis of the three sets of modalities we will be able to investigate the technology transfer process. The framework could provide a means of investigating the production and reproduction of QCC as it moves over time and space and across national boundaries.

In employing structurational model of technology, the aim in this research is to seek explanations for the different outcomes of QCC implementation across different

organizational and national contexts, and to seek patterns in terms of human action and structural properties among the cases studied.

1.8 RESEARCH ISSUES

1.8.1 Exploring the QCC concept and implementation experiences

Although there is general recognition of the QCC as a proven Japanese small group technology, the role and place of QCCs in organizational quality systems and programmes outside Japan remain rather ambiguous.

The problem is that although the perceived benefits of QCC such as continuous improvement and employee participation are especially attractive to many corporate managers, the experiences of many firms with regard to QCC activities, have been less conclusive and in some cases, actually negative.

This has led to the emergence of various theories with regard to QCC adoption, the major ones were discussed above. Some of these analyses of QCC adoption focused on what the authors viewed as the prescribed role and function of QCCs in organizations (for example, the 'limited role perspective' and the 'quality perspective' mentioned above), or on the contingencies that are necessary for successful QCC implementation (such as the 'cultural change' perspective and the 'corporatist management' mentioned above).

One analysis, Cole's (1989) perspective of QCC as a technology transfer and diffusion process, stresses the importance of innovation in the adoption of QCC practice, and accords a central role to 'local invention' in the transfer and diffusion process. In doing so, Cole has intuitively accepted Giddens's concept of the duality of structure as a dynamic process present in the relationship between QCC, organizational actors and the structural properties of the organization. Based on this conceptual framework, many

QCC programmes outside Japan fail due to the lack of understanding of these interrelationships.

Consequently, any wholesale application of QCC practice outside its original historical context, is not likely to work and the disappointment with, and rejection of QCC practice as a viable form of organizational intervention by organizations outside Japan is an outcome of attempts to transfer and diffuse QCC practice without local invention.

The issue then arises as to the nature and the extent of local invention and the transformational processes necessary for the application of QCC practice in organizations in countries outside Japan.

1.8.2 Research orientation and focus

The approach taken in this research is both historical and contemporary. We believe that present characteristics evolve from historical happening and that we cannot ignore history when we attempt to describe and analyse contemporary phenomena. Therefore, this research looks to history to explore the origins of, and rationale for, Japanese QCC and to understand the Singapore Government's strong endorsement and promotion of circle activities.

It is therefore necessary to explore the roots and the nature of Japanese QCC in order to decipher the essential circle qualities and their potential transferability across national boundaries. This requires looking beyond the practical aspects of circle activities, to conceptual models of QCC activity itself. As mentioned above, there are very few conceptual models of Japanese QCC activity and one work which stands out is Lillrank and Kano's (1989) systems model of Japanese QCC activity. This model distinguishes itself as the first comprehensive systemic model of QCC activity which has attempted to identify major parts and processes of the Japanese QCC system and how they are

interrelated. Therefore, it serves as an important and useful reference point for the understanding of the Japanese QCC concept which is part of this research's agenda.

The Singapore Government's promotion of QCC as part of the government's productivity movement can be better understood against the background of the political and economic context of Singapore's recent history, as this has been instrumental in shaping the government's approach to productivity growth and development.

Grounded in this historical perspective, we then explore more contemporary events with regard to this examination of the implementation of QCC in Singapore. Firstly, we study the national statistics and data on QCC participation in Singapore. These data are collected and collated by the National Productivity Board and the National Register of QCC in Singapore. They provide a broad picture of the application and practice of QCC in Singapore companies. From the national surveys conducted by NPB regarding the state of QCC practice in Singapore, further analysis is possible. However, although these frequency data pertaining to QCC practice are useful as status reports, the fundamental orientation of this research is to explore in depth the QCC implementation process rather than to measure outcomes. To achieve this we need to explore the QCC implementation experience of specific organizations.

By exploring cases of QCC implementation, the aim is to derive, from these local experiences, some insights into the process of transfer and diffusion of QCC across national boundaries. In this research, the basic approach is to seek the global from the local, through the use of case studies. Such case studies would allow for more in-depth analyses of how events in or outside the organizations and which might influence the implementation process, are linked; how these linkages affect the outcomes of QCC implementation; and the actions of organizational members impinge on these relationships. The aim is to examine 'real people' in 'real time' with regard to their specific actions in response to the QCC concept or practice.

1.8.3 QCC implementation: exploring the Singapore experience

Singapore presents an interesting case of QCC implementation for several reasons. The Singapore Government has taken a great interest in the QCC as an organizational development technique, and has been intensely involved in its promotion. The government initiated the QCC Movement in Singapore in 1981 and to-date, is still promoting the establishment of circles among Singapore firms.

The Singapore QCC Movement is modelled on the Japanese, especially with regard to the structures and tools of analysis. In fact, in the early stages of the Singapore's QCC Movement, Japanese QCC experts were on hand to offer advice, and many local government officials, were sent to Japan on study missions and technical training. As such, Singapore's experience with QCCs offers an opportunity to evaluate the transferability of Japanese QCC practice and of the extent to which the essential qualities of Japanese circle activity has been understood and diffused among organizations operating in settings outside Japan.

1.8.4 Research Questions

The Japanese experience in the assimilation of modern statistical quality control approaches is a good example of local invention. The Japanese took British and American statistical methods and practices, re-shaped and re-invented the applications of the discipline to fit their local realities and concerns, and, in the process evolved the Japanese QC management approach, including QCC practice.

Cole (1989) argues that the reverse flow could also apply. That is, the practice of QCC could be subjected to similar innovative processes to render its application viable, as perceived by all involved in the organizational innovation. However, it is contended that with regard to the QCC, local invention is only possible where there is inter-subjective understanding among all involved and that the QCC is perceived by all

involved as addressing not only the technical interests but also the practical and perhaps the emancipatory interests.

Given these underlying assumptions and the theoretical framework outlined earlier in the chapter, the study will address a number of key concerns. Firstly, it has to explore the extent to which the Japanese QCC has taken root in Singapore organizations. To do this, we examine the depth and breadth of the QCC programmes in the firms studied and the organizational resources and structures supporting the QCC programme. We also address the question of human agency and the QCC and this includes an examination of employee perceptions of the role and nature of QCC, the reasons for their participation or rejection of circle activities and their expectations and outcomes experienced.

Secondly, the QCC programme in the organization will be reviewed from the systems perspective in order to evaluate its problem solving orientation, its systems assumptions, its transformation potential and its relationship with other elements of the organization system.

Finally, grounded in critical systems thinking, we will evaluate the extent to which the QCC has addressed Habermas' three 'knowledge constitutive' interests. The issues to be explored in this regard relates to: the expectations of organizational sponsors regarding the perceived contribution of QCC activities to productivity and quality management strategies of the organization (technical interests); the impact of QCC activity on teamwork, on expanding the mutual understanding among employees and between management and workers (practical interests); and, the extent to which QCC activity has increased and expanded employee participation in workplace decision-making (emancipatory interests).

The ultimate aim is to arrive at some understanding of the theoretical underpinnings of QCC activities in Singapore and on the basis of the conceptual framework, to develop

better explanations regarding the QCC as a social technology and its applicability outside Japan.

Nothing exists

A young Zen Student called upon Zen Master *Dokuon* of *Skokoku*. Desiring to show his attainment, he said: 'The mind, Buddha, and sentient beings, after all, do not exist. The true nature of phenomena is emptiness. There is no realization, no delusion, no sage, no mediocrity. There is no giving and nothing to be received.'

Dokuon, who was smoking quietly, said nothing. Suddenly he whacked the student with his bamboo pipe. This made the youth quite angry.

'If nothing exists, ' inquired *Dokuon*, 'where did this anger come from?'

Reps, Paul (1961). *Zen Flash, Zen Bones : A Collection of Zen and Pre-Zen writings*. Anchor books.

2.1 INTRODUCTION

This chapter discusses the key issues that confront us when we conduct research about organizations. These issues have to be addressed because they exert a strong influence on the research process and outcomes. We begin by reflecting on the philosophical issues in social research, and in particular on the 'ways of seeing' in organizational studies, examining how different assumptions about the social world shape the paths taken in organizational analysis. The subjective-objective dichotomy in social analysis is reflected in two distinctive paradigms in organizational analysis: the interpretive and the objectivist approaches. The problem that arises from these two dualistic and apparently non-commensurable views of social reality is discussed and a complementarist approach is presented. The use of the natural science model as the template for organizational research is re-assessed and the need for a critical mode in our epistemological approach is underlined. The opposing rationales between the positivist natural science model of research and the interpretive models as reflected in the differentiation of research methods into quantitative and qualitative approaches is

highlighted. The choice of case study research as the research strategy is then discussed, including the role of theoretical and practical considerations in its selection.

As one of the social science disciplines, the field of organizational studies is confronted with many of the issues faced when doing research and, much of organizational research bear 'the imprint of the contributing social sciences and also shares many of the guidelines and difficulties associated with conducting research that social scientists have identified' (Bryman 1989: 1). One of the most problematic is the issue of differing philosophical assumptions regarding the production of knowledge pertaining to the social world. This has resulted in the emergence of competing paradigms which have serious implications on the generation of social theory and conduct of research about organizations (Burrell and Morgan 1979).

The problem of the subjective-objective divide confronting social science research, and which also applies to research in organizational studies, has given rise to much differences regarding the question of research methodology among social scientists. Kuhn (1970:viii) recalls how he 'was struck by the by the number and extent of the overt disagreements between social scientists about the nature of legitimate scientific problems and methods.

However, the consequences of paradigms are not confined to the social sciences. Kuhn (1970:viii) identifies paradigms as 'universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners'. He is the first to articulate the role of paradigms in the actual structure of scientific change, and on what constituted acceptable research subjects and approaches in a given field of study at a given time. For example, Swerdlow (1993) shows how astrology, which is currently regarded as a pseudo-science, was regarded by most sophisticated thinkers of the mid-fifteenth century as the very best of science.

In systems thinking, a paradigm shift has been developing since the 1970s, and several alternative systems methodologies have emerged such as soft systems thinking, organizational cybernetics and critical systems thinking, all of which challenged the traditional systems approach and its assumptions (Flood and Jackson 1991; Flood 1993; Jackson 1992; Checkland 1981):

> They (the different approaches to systems thinking) rested upon different philosophical/sociological assumptions. In essence, they were based on different paradigms. (Jackson 1992:5)

Given that different philosophical assumptions shape much of our perceptions especially our evaluation of the worth of various social research activities and approaches, it is essential to reflect on the underlying philosophical issues.

2.2 PHILOSOPHICAL ISSUES IN SOCIAL RESEARCH

Scientific research as Morgan (1983:13) has pointed out, involves a process of interaction or what he terms 'engagement' between researcher and the subject of study:

> Scientists engage a subject of study by interacting with it through means of a particular frame of reference, and what is observed and discovered in the object (i.e. its objectivity) is as much a product of this interaction and the protocol and technique through which it is operationalized as it is the object itself. Moreover, since it is possible to engage an object of study in different ways.....we can see that the same object is capable of yielding many different kinds of knowledge. This leads us to see knowledge as potentially resting in an object of investigation and to see science as being concerned with the realization of potentialities - of possible knowledges.

As this is very much the case in social research, given the nature of the object of study, in doing social research the terms of engagement should be reflected upon and made explicit; and some form of 'map-making activity designed to increase awareness of the taken for granted premises that ultimately shape social research' (Morgan 1983:378) should be an integral part of the research process.

Burrell and Morgan's (1979) thesis on the relationship between social theory and organizational analysis is one such map-making activity. Their premise is that it is useful to conceive social theory and research in terms of four key paradigms, each based on mutually exclusive views about the social world. To them, the diverse range of social analyses can be explained in terms of these four paradigms. Their framework emphasizes the fact that it is the different assumptions about the social world that underwrite the different approaches in the social science and the scientist's frame of reference plays a crucial role in the generation of social theory and research.

Thus, paradigms help organize the processes of science and provide direction for its development:

> In the absence of paradigms all facts are more or less relevant and this gives the appearance of randomness for those gathering the facts. The cumulation of knowledge requires an organized framework upon which the facts and ideas are organized.
>
> (MacKenzie and House 1978:8)

In the field of organizational theory and research, such paradigms are indispensable guides. For much of this century, this sub-set of management study, has developed along several lines that draw upon a variety of perspectives and academic disciplines, ranging from Taylor's Scientific Management, Weber's theory of bureaucratic organization and concept of the social sciences, Mayo's report on the Hawthorne Studies and the evolution of the Human Relations movement (Robbins 1990); to the

first major application of systems thinking to organizational analysis by Homans (1950); open systems theory (Katz and Kahn 1966); socio-technical systems theory[1] and theories of power and politics in organizations (e.g. Mintzberg 1983) .

In the 1980s, several new approaches to the study of organizations emerged which challenged many of the philosophical assumptions of the past schools. These include the application of Giddens's theory of structuration to the social study of information technology (Olikowski 1992; Olikowski & Baroudi 1991; Olikowski and Robey 1991; Barley 1986); and in the systems science field, the emergence of critical systems thinking (Flood 1990; Flood and Jackson 1991a &1991b; Oliga 1988), soft systems thinking (Checkland 1981) and viable systems diagnosis (Beer 1985).

With this great variety of theories about organizations, it is necessary to uncover the authors' assumptions regarding the nature of the social world and the way it can be investigated. These epistemological assumptions are important as they define 'how one (the researcher) might begin to understand the world and communicate this as knowledge to fellow human beings' (Burrell and Morgan 1979).

However, these assumptions are not often made clear, though as Burrell and Morgan (1979) have observed, they fall mainly within the functionalist paradigm. The functionalist basis of most of organizational studies is in some measure due to the prevailing orientation that:

> Finally, organizational research is pervasively concerned with the promulgation of practical knowledge. There are other areas in the social sciences which reflect a similar commitment, but a very large proportion of organizational studies are directly or indirectly concerned with practical issues. This preoccupation reveals itself in the widespread concern with organizational effectiveness. (Bryman, 1989:4)

[1] Originating from research by the Tavistock Institute of Human Relations in the 1950s.

This orientation has naturally led most research in organizations to be essentially positivistic, which means that such research favour:

> epistemologies which seek to explain and predict what happens in the social world by searching for regularities and causal relationships between its constituent elements. Positivist epistemology is in essence based upon the traditional approaches which dominate the natural sciences. (Burrell and Morgan 1979:5)

As positivists, many organizational researchers whether they are 'verificationists' or 'falsificationists', accept the growth of knowledge as an essentially cumulative process in which new insights are added to the existing stock of knowledge and false hypotheses eliminated.

Many organizational researchers also assume the existence of a social world external to the individual. This external social world is seen as real, made up of hard, tangible and relatively immutable structures. Thus 'reality' is 'objective' and as 'realists' such researchers maintain that:

> whether or not we label and perceive these structures....they exist as empirical entities....For the realist, the social world exists independently of an individual's appreciation of it....ontologically it is prior to the existence and consciousness of any single human being (and) the social world has an existence which is as hard and concrete as the natural world.
>
> (Burrell and Morgan 1979:4)

These assumptions about the grounds of knowledge favour the use of 'natural science' approaches in organizational studies. The consequence is that with regard to research methodology, organizational researchers have emphasized nomothetic approaches, with great importance placed on basing research upon systematic protocol and technique. In practice, this have resulted in the use of surveys, questionnaires and standardized

research instruments as the accepted tools in much of organizational research and also led to the evolution of deterministic models of human behaviour in many organizational theories.

Based on an evaluation of current textbooks in organizational theory, organizational behaviour and human resource management, it seems evident that the above set of assumptions is accepted as 'normal science' (Kuhn 1970) and the underlying paradigm is what Burrell and Morgan (1979:26) have described as 'functionalistic' :

> The functionalist paradigm generates regulative sociology in its most fully developed form. In its overall approach it seeks to provide essentially rational explanations of social affairs. Its perspective is highly pragmatic in orientation, concerned to understand society in a way that generates knowledge that can be put to use. It is often problem oriented in approach, concerned to provide practical solutions to practical problems. It is usually committed to a philosophy of social engineering as a basis of social change and emphasizes the importance of understanding order, equilibrium and stability in society and the way in which these can be maintained.
>
> (Burrell and Morgan 1979:26)

The functionalist paradigm in social science is thus associated with positivistic philosophies of science with functional analysis accepted as *the* concern of the social sciences as it is of biology. The functionalist's assumptions encourage a belief in the possibility of a value-free and objective social science 'in which the scientist is distanced from the scene which he or she is analyzing through the rigour and technique of the scientific method' (Morgan 1980:606).

However, Kuhn's (1970) seminal work, *The Structure of Scientific Revolution* questioned the assumption of the existence of a theory-neutral body of observable facts. He disputed the fact that there is a theory-independent notion of truth because the meaning of a theoretical term depends on its use within that theory. Given this, what

is regarded as a set of meaningful propositions would vary according to one's theoretical framework. Consequently what is true would vary according to one's theory. Kuhn then arrives at his most revolutionary statement, which is that there is no absolute truth, thereby overturning one of the central notions of the scientific method.

Kuhn's historical account of the structure of scientific knowledge has not only been the focus of much debate and discussions among those working in the area of the 'hard' sciences, but has led to an explosion of new ideas, theories and approaches in the social sciences. Although the management sciences has been slower in its response to this radical viewpoint, by the late 1970s, its impact was beginning to be felt.

Thus Astley (1985:498) argues that it is impossible for the organizational scientist to distance himself from his theories, for the apprehension of social facts is unavoidably subjective since such facts 'enter our knowledge already viewed in a certain way'.

Flood and Ulrich (1988) contend that 'positivist oriented traditional science can only tell us the laws of empirical relationships as derived by scientific experts. It does not question the value contents, that is, the normative assumptions inherent in such scientific models. In failing to do so, such non-reflective positivist rationality in social contexts cannot really claim to be objective.

Ackoff (1979) observes that whilst analysis of a system could reveal its structure and how it works, 'it does not explain why a system works the way it does'. In confronting the issue of objectivity in research, he argues that:

> Objectivity is not the absence of value judgments in purposeful behaviour. It is the social product of an open interaction of a wide variety of subjective value judgments. Objectivity is a systemic property of science taken as a whole, not a property of individual researchers or research. It is obtained only when all possible values have been taken into account; hence like certainty, it is an ideal that science can continually

> approach but never attain. That which is true works, and it works whatever the values of those who put it to work. It is value-full, not value-free.
>
> (Ackoff 1979 in Flood and Jackson 1991:45)

Ackoff's comments signalled a paradigmatic change, not only in regard to his thinking on systems analysis, but also with regard to the discipline of management science. He was not the only one in the systems area to make this shift:

> During the 1970s and 1980s the limitations of OR (operations research) and hard systems thinking came to be recognized, and through the work of C. West Churchman, Russell L. Ackoff and Peter B. Checkland, a new qualitative paradigm, interpretive 'soft systems' thinking, began to take shape and to challenge the 'harder' approaches for hegemony. (Flood & Jackson 1991:1)

Checkland (1985) also notes the limits of an objectivist approach:

> Any approach to rational intervention in human affairs has to accept that in studying purposeful human action and in trying to bring about change in human situations, it is not simply a matter of setting to work to discover 'laws' governing the phenomena in question. Autonomous human beings could, in principle, deliberately act in a way which could either confirm or refute any supposed 'laws' of human affairs.
>
> (Checkland 1985 in Flood and Jackson 1991:59)

Checkland further argues that the idea of goal seeking as the basic premise of a model of human behaviour is not adequate as it fails to account for the temporal element in social systems, 'that in real life the goals change all the time' (Checkland 1985). He moots the concept of 'appreciative systems' as the means with which to understand the social processes that characterize human affairs.

Checkland's concept of 'appreciative systems' is similar to Astley's (1985:498) view of the administrative science as 'essentially an interpretive exercise, a sense making activity in which truth is defined by the rules of intelligibility embodied in theoretical schemata'.

Overall, the effect of Kuhn's ideas about scientific knowledge was to galvanize the dissatisfaction felt in various quarters with functionalistic social studies, and led to the development of alternative paradigms in the various branches of social sciences. One major development was the move away from deterministic reasoning towards interpretive approaches in social studies.

In Burrell and Morgan's (1979:28) framework, the interpretive paradigm is seen as

> informed by a concern to understand the world as it is, to understand the fundamental nature of the social world at the level of subjective experience. It seeks explanation within the realm of individual consciousness and subjectivity, that is, within the frame of reference of the participant as opposed to the observer of action.

Flood and Ulrich (1988) see the interpretivist rationality as one that 'moves completely away from materialism, and introduces the idea that a specific action concept can be transparent only in the context of certain social rules and a deeper layer of 'constitutive meaning' or a world view 'that reflects a culture's conceptions of human needs and purposes'.

Social theories constructed within the interpretive paradigm reject the stance that the natural science model could serve as the basis for investigating the social world. Astley (1985:498) has argued that organizational research is not just about reporting observations, it is also about storytelling, imputing meaning and significance to observations:

> As scientists, we do our job properly only insofar as we are creative in casting phenomena within interpretive frameworks.

Or, as Flood and Ulrich (1988) have put it, 'there are no social realities *a priori* to constitutive meanings'.

In arguing that truth is a subjective construction, interpretivists do not consider the knowledge produced as an idiosyncratic product but that the formulation of knowledge can be highly systematic as 'knowledge is generated not by fiat in the minds of individuals but through a rigourous examination of ideas in public communication' (Astley 1985:499).

The consequence of this break from the straitjacket of the positivistic research approach in the social sciences, is an explosion in the variety of interpretive theories and approaches. This has led the anthropologist Geertz (1983:25) to observe:

> A number of things, I think are true. One is that there has been an enormous amount of genre mixing in intellectual life in recent years, and it is such blurring of kinds that continue apace. Another is that many social scientists have turned away from a laws and instances ideal of explanation towards a cases and interpretation one, looking less for the sort of thing that connects planets and pendulums and more the sort that connects chrysanthemums and swords. Yet another is that analogies drawn from the humanities are coming to play the kind of role in sociological understanding that analogies drawn from crafts and technology have long played in physical understanding. Further, I not only think these things are true, I think they are true together; and it is this cultural shift that makes them so that is my subject, the refiguration of social thought.

Thus if knowledge is regarded as socially constructed and negotiated, language is not only the medium for transmitting information, it is the product of the research, and,

'scientific fields are word systems created and maintained through a process of negotiation between adherents to alternative theoretical languages' (Astley 1985:499). Consequently, there is a widespread use of metaphors in organization theory such as Burns and Stalker's (1961) use of the terms 'organic' and 'mechanistic' to describe two ideal-type systems; and, Flood and Jackson's (1991) use of metaphors to describe the various strands of systems thinking in their 'system of systems methodologies'.

Hence, interpretive social science research attempts to understand the process through which shared multiple realities evolve, and how these realities are sustained or changed. Here science is viewed as a network of language games, based on sets of subjectively determined concepts and rules which scientists invent and follow (Morgan 1980:608-9).

By uncovering the subjectivity of these multiple realities, the interpretivist rationality aims at encouraging mutual understanding among people by opening windows with which we can understand the multi-faceted social world.

The incommensurability of the functionalist and the interpretive rationalities have given rise to two key issues that have to be resolved when conducting research in organizations. These are: firstly, the long standing opposition between the subjective and objective dimensions of social reality and secondly, the applicability of a positivistic natural science model in the conduct of research.

2.3 THE PROBLEM OF SOCIAL REALITY IN ORGANIZATIONAL ANALYSIS

The nature of the social world is central to our research on organizations. In many ways our view of social reality determines how we approach the phenomenon under study. We are thus faced with the basic ontological question about the nature of social reality. With regard to social science research, Burrell and Morgan (1979) identify two opposing perspectives. Firstly, the objectivist perspective which treats the social

world like the natural world, as being hard, real and external to the individual. Secondly, the subjectivist perspective views social reality as created through the subjective experiences of individuals, that is, social reality is the product of individual consciousness.

In terms of organizational analysis, objectivist assumptions of social reality will direct the focus of research around the identification and definitions of elements in this external world and to search for relationships and regularities between these various elements. The aim is to look for universal laws which govern the parts of the objective reality that is being observed. The subjective viewpoint of social reality focuses on the understanding the individual's experiences and the impact of this on his or her own subjectively created world. The aim here is to understand the way in which the individual creates, modifies and interprets his or her world.

To Burrell and Morgan (1979), these two opposing perspectives in combination with other key assumptions, have given rise to different methodologies and approaches to the study of organizations, the key ones being the functionalist and the interpretive approaches. These methodologies, because of the apparently opposing assumptions, are regarded as mutually exclusive, or non-commensurable approaches, and this has given rise to extreme, uncompromising positions being taken by researchers in the field of organization theory and research.

However, this is not a very satisfactory state of affairs and there is the danger that one could be working oneself into the same corner as the Zen student in the parable in beginning of this chapter. He was trying to demonstrate his understanding of some stanzas of the *Heart Sutra*:

> Form does not differ from emptiness;
>
> Emptiness does not differ from form.
>
> Form itself is emptiness and emptiness is form;

> So too are feeling, perception, mental formation
>
> and consciousness.

The student was expressing the view that reality is subjective, a product of individual or shared consciousness, or in Buddhist terminology, empty. Yet, it would be a grave error to see the Zen master, to whom the *Heart Sutra* is the very essence of Zen, as a realist (in Burrell and Morgan's sense of the word). His was an attempt to guide the student away from too great an attachment to any doctrinal concepts and dualistic thinking.

Similarly, with regard to organizational analysis, it is contended that there is a need to avoid the stance of opposing and exclusive viewpoints with regard to the subjective and objective dimensions of social reality. As Berger and Luckmann (1966:30) have pointed out:

> Society does indeed possess objective facticity. And society is indeed built up by activities that expresses subjective meaning....The central question for sociological theory can then be put as follows: How is it possible that subjective meanings ***become*** objective facticities?

The need to balance and move between these two realities has led Miles and Huberman (1984:20) to comment that:

> without our realizing it very clearly, the paradigms for conducting social research have shifted beneath our feet, and most people now see the world with more ecumenical eyes.

Another fundamental issue that confronts organizational analysis and which could also contribute significantly to further paradigm shifts in organizational research, is the debate between the modernists and post-modernists regarding the way we understand

knowledge and reality. This debate could shape our idea of *the* organization, and of what constitute organizational analysis. It is therefore necessary to draw a broad outline of the opposing positions in the modernist/post modernist debate which has an impact on the field of organizational theory.

The emphasis in modernism is on reason, order and the idea of the possibility of progress, unity, identity and consensus (Jackson 1991), and two versions of modernism has been identified: systemic modernism and critical modernism. Systemic modernism, rooted in instrumental rationalism, sees the central problems of society as that of organized complexity, of large-scale systems with many interacting variables and which has to be coordinated to achieve certain goals (Cooper and Burrell 1988). Critical modernism, shares with the systemic modernist, the belief in the existence of a meaningful world constituted by reason or some other universal foundation. However, it rejects the technocratic solution of systemic modernism, and for Habermas, the pre-eminent critical modernist, the ideal is based on a unified theory of knowledge linked to different human interests, with 'a network of interacting individuals' who, through the commonsense of ordinary discourse, can reach a 'universal consensus' of human experience. Critical reason should be the underlying principle behind discourse if individuals are to be emancipated from the totalizing control of the systemic logic (Cooper and Burrell 1988). Hence, Habermas maintains that rational knowledge and human progress can be apprehended without distortions of interest and power, given the right conditions, including the commitment to continually question the status quo.

Post modernism rejects 'the notion of history as the progressive realization and emancipation of the human subject or as an increase in the complexity and steering capacity of societies. Language is not transparent, and it certainly does not offer the possibility of universal consensus' (Jackson 1991:33). There is no possibility of a unifying theory of knowledge and the reality is one of many differences in rules and 'games', and of many interpretations of the world. Therefore, 'consensus can only be possible in localized circumstances and is only desirable if subject to rapid cancellation'

(Jackson 1991:36). Furthermore, post modernists contend that the modernist's ideal of rational, objective knowledge is not possible because knowledge and power are inextricably linked. The post modernist alternative is to question:

> the certainties encouraged by modernism...to emphasize dissension, instability, and unpredictability, and to activate the 'difference'. The blind spots of modernism, those things rendered unpresentable and unspeakable in the narratives of modernism, must be brought to the fore. (Jackson 1991:35).

These differences are mirrored in the different ideas about organizations between the modernist and postmodernists. The modernist view of organizations (and one shared by most organizational theorists) is that the organization is:

> a bounded social system, with specific structures and which acts more or less rationally and more or less coherently. Within this context, the concept of the organization itself functions as a metadiscourse to legitimate the idea that organization is a social tool and an extension of the human agent. (Cooper & Burrell 1988:102).

On the other hand, a post modernist interpretation of organization would include the recognition that all organized human activity is essentially reactive or defensive: that is, organizational processes are in reality reactions to 'local' perturbations and organizational activities are triggered responses to situational factors, rather than deliberated acts implemented to achieve abstract values. Therefore, 'organization, far from being a structure of calculated deliberate actions, is in reality the *automatic* response to an impending threat' (Cooper and Burrell 1988:103). Therefore, the post modernist rejects a concept of organization which is referential, instructional and conceived as a expression of human rationality and argues that organizational analysis should be concerned with the analysis of the production of organization rather than the organization of production.

In framing the organizational issues raised by the modernists and post modernists, Cooper and Burrell (1988:108) noted that:

> Let us remind ourselves that the subject of organizational analysis is formal organization. It is not organization as such that demands analysis but its 'formal' character, though this is often forgotten....What is formally organized takes on the virtue of a moral order. Hence the emphasis in modernism on the search for 'rational authority' as the basis for a good social order. But the logic of human discourse insists that every symbol carries with it its own opposite, so that the 'formal' is continually shadowed by the 'informal'....the 'informal' is that which threatens to transgress the 'formal', it is the local and the immediate, that which resists categorization and rationalization. In short, the 'informal' is the self-referential and as such it is the special province of postmodern analysis.

Hence, the diametrically opposite position of the modernist/post modernist perspectives in relation to the organizing process need not be mutually exclusive and could, as Cooper and Burrell observes, serve to reinvigorate the analysis of organizations. More than just that, as the Zen master had demonstrated, both views need to be grasped simultaneously.

Thus, there is much to recommend for a more eclectic approach in organizational analysis, one which is informed with the key ideas of both the modernist and post modernist viewpoints. An example of such an approach can be found in the complementarism and social awareness principles embodied in Flood and Jackson's (1991a) 'Total Systems Intervention' approach, with its underlying principles rooted in critical systems thinking.

2.4 ORGANIZATIONAL RESEARCH AND CRITICAL THEORY

In the field of organizational studies, theories often do become translated to means of managerial control e.g. the theory of bureaucratic structures. Thus a dialectical relationship exists between organization theories and practice. Because of this reflexivity between the researcher and the objects studied, the observed relationships are subject to constant change and we engage in form of praxis (Astley 1985:506). Therefore the conduct of research in this field must be undertaken with the awareness that organizational phenomena are in perpetual states of flux, making the assumption of enduring organizational realities difficult and rendering impossible the manipulation of variables as part and parcel of the inquiry into an organizational phenomenon.

Giddens (1979:245) argues that 'every generalization or form of study that is concerned with an existing society constitutes *a potential intervention within that society:* and this leads through to the tasks and aims of sociology *as critical theory*' .

In a somewhat similar vein, Flood and Jackson (1991) argue that while Checkland's soft systems methodology, is an improvement over the 'hard systems approaches, it fails to account for the existing structures of power and authority in a system. Such power imbalances are essential inputs when considering the potentials of interventions in an existing organizational context.

Flood and Ulrich (1988) in their search for an adequate epistemological ideal of social inquiry in terms of systems rationality, sociological epistemology and systems practice, see the 'problem' as essentially one 'equivalent' to the 'classical philosophical problem of (inevitable) metaphysics':

> But we need to remind ourselves continually that the difficulty in question not only is (or even primarily) one of theoretical explanation (via concepts and understanding) but is also (or rather) one of taking into account and justifying the normative assumptions

flowing from our theories of social reality. These ***normative assumptions*** concern, for example, 'political' issues such as assumptions about the 'right' distribution of power but may be complicated by the possibility of 'false consciousness' and effects of material conditions. These are likely to produce genuine conflicts of world views and interests and may lead to coercive conditions.

(in Flood and Jackson 1991:187)

Flood and Ulrich (1988) conclude that 'beyond the positivist (objective) and the interpretive (hermeneutic) ideals of science the emancipator force of critical self-reflection is necessary concerning the gap that will always separate the practice of inquiry from those ideals'.

In using critical systems heuristics as the approach to social inquiry, Flood and Ulrich (1988) distinguished it from critical theory as such, though they see these two, as pursuing somewhat complementary ends. Their aim is

to work toward both the systems and the sociological dimensions of a critical theory. It is therefore important for a critical approach to tie its knowledge claims to the ability to satisfy human purposes and desires, and thus 'validity' of the theory must be judged primarily in terms of its potential for bringing about practical application and emancipation. We therefore need to build a facility whereby practical judgments can be constantly reflected upon in transparent non-expert terms, and their partiality revealed by everyday accounts of the nature of social experience in ordinary language. Only in this way can we conceive of a theory that might be translatable into practice so that those involved and those affected can share in the heuristic and critical approach to design and decision-making.

(in Flood and Jackson 1991:201)

The need for a critical mode in epistemological approach underlined by the principle that the knowledge derived should be 'translatable to practice' has also been discussed elsewhere by Alvesson and Willmott (1992:6):

> The existence of a diversity of groups and interests in the practice and discourse of management can be illuminated by contrasting management as a technical function with management as a socio-political phenomenon. When considering management as a technical function, we can point to a number of activities that at the present time, and for the foreseeable future, will be undertaken..... But engagement in productive activity necessarily involves the performance of a variety of tasks and processes that can be examined as technical functions. However, their particular organization - which includes the issue of who is to occupy positions of authority within the division of labour and who is to derive greatest advantage (symbolic as well as material) from this social division - is inescapably a matter of politics that cannot be determined neutrally by an impartial appeal to the requirements of an impersonal, technical logic. Or rather, when such appeals are made, they are heard by CT (Critical Theory) as involving more or less conscious efforts to defend or advance sectional interests in the name of universal interest.

Their aim is thus to apply the intent of critical theory to the 'world of management and organizations', by combining its respective strengths of philosophical and empirical modes of investigation:

> The empirical focus is upon the theory and practice of management in the organization and development of modern (e.g. advanced capitalist) societies. The philosophical focus ensures that the taken-for-granted world of management is examined critically, with the intent that the opposition between science and politics - individuals as neutral observers/managers and as engaged citizens - is debunked and overcome.
>
> (Alvesson and Willmott 1992:17)

Thus although the origins of critical management studies are that of the critical theorists of the Frankfurt School, such as Habermas, the former is not synonymous with the latter. Alversson and Wilmott (1992) take pains to distinguish the two.

> 'Sociologism' must be resisted in critical management studies. If CT(critical theory) is to engage in a successful, although 'modest' managerial turn, idealized and abstract models of the good society or ideal communicative action must be confronted and complemented with understandings that are fully attentive to the material and technical organization of modern society. Those versed in the problem-solving specialisms of management, such as Information Systems, Operational research and even Human Resource Management, can give CT a much-needed kick in the direction of studying everyday corporate life. Conversely, the relevance of CT, such as Habermas complex theory of communication, could no doubt be better appreciated if those most familiar with its complex features were to apply it to the study of management.

In many fields of management research this perspective is almost non-existent. For instance, Olikowski and Baroudi (1991) in a study of journal articles on information technology, found that 96.8% of the articles surveyed were rooted in the positivist paradigm, 3.2% in the interpretive mode while none was in the critical mode. In response to Alversson *et al.*, one of the aims of this research, is to inform it with a critical turn.

2.5 THE APPLICABILITY OF THE NATURAL SCIENCE MODEL

According to Burrell and Morgan (1979) many organizational theorists were brought up within the tradition of sociological positivism, therefore, it comes as no surprise that the dominant framework in the study of organizations is the functionalist paradigm. Hence Bryman (1989:32) notes that :

> The prevailing ethos of (organizational) research is one which gives priority to what might loosely be termed as a 'scientific' approach. This predilection cannot be easily explained, but undoubtedly the cachet that an association with a scientific approach confers cannot be discounted. This cachet is all the more significant in the light of the strong emphasis on practical and applied issues, since in the eyes of some commentators it is just this approach that is most likely to produce 'relevant' knowledge and to gain support among practitioners.

The result has been that the established criteria used in organizational research is the natural science model, and is based on positivist epistemologies, which to Burrell and Morgan (1979:5) involves 'seek(ing) to explain and predict what happens in the social world by searching for regularities and causal relationships between the constituent elements'. The stress on scientific tests as the basis of causality claims in much of organizational research is accompanied by an emphasis on measurements and; on demonstrating the reliability and validity of the measures; and on the possibility of replication of the research process. This is despite the fact that in much of organization research, an idealized linear goal-directed model (of research) is viewed by many practicing researchers as unable to capture the essential characteristics of the research process (Bryman 1988:8).

Within the functionalist paradigm, the dominant perspective insofar as organization theory is concerned, has been that of the organization as a social systems perspective which Burrell and Morgan (1979:121) have characterized as being in 'the most objectivist region of the (functionalist) paradigm'. Jackson (1992) contends that none of the other perspectives of organizational theory described by Burrell and Morgan (1979) and Morgan (1986) has been able to challenge the dominant position of the social systems perspective in organizational theory.

The assumptions and limitations of positivist epistemology was discussed earlier and contrasted with the anti-positivist assumptions behind the interpretive approaches.

Burrell and Morgan (1979) have emphasized the non-commensurability of the functionalist and the interpretive approaches in organizational analysis. Others have chosen to ignore the issues on the basis that as these are philosophical problems that cannot be resolved, it is best to just concentrate on research rather than attempt to resolve the issues. To Giddens (1979:239) such a stand is unacceptable as:

> Quite apart from the untenable character of the positivistic conception which holds that questions of philosophy can be clearly distinguished from the main body of social theory, we must insist that theoretical considerations cannot be without potential impact even upon the most sheerly 'empirical' types of social investigation.

Without doubt this problem has shaken the orthodox consensus regarding the natural science model as the basis for social studies and has resulted in a somewhat disorienting situation in the social sciences. It has also given rise to the wide diversity of perspectives, something that Geertz (1983) has celebrated. His view in support of diversity sees the deeply established disagreements about the nature of human behaviour as an integral part of human behaviour itself and therefore, it is impossible and futile to attempt to seek closure of this diversity.

Unlike Geertz, Giddens (1979:240) does not subscribe to the view that the diversity of perspectives is testimony of the inherent fruitfulness of social theory. Instead, he argues for better integration of these perspectives:

> We may acknowledge the likelihood of continuing disagreements about the basic issues in the study of human action, while stressing the importance of both establishing connections between divergent positions and of attempting to transcend them.

Thus he attempts to tackle the problem of nomology and social research by differentiating the status of 'laws' in social science from that in the physical sciences. To him, the under-determination of theory by facts is greater in the social science and

there is a deep-rooted difference in the logical form between the laws of the social sciences as compared to those found in natural science:

> Although the character of natural scientific laws is still controversial and much debated, there is little basis to doubt that most of such laws are putatively universal in form within the domain of their application.... This is however not the case with laws in the social sciences in which...the causal relations involved always refer to mixes of intended and unintended consequences of reproduced acts. Laws in the social sciences are ***historical*** in character and in principle, ***mutable*** in form.
>
> (Giddens 1979:243)

In his view then, the characteristic and form of laws in the social science render a methodological approach involving the construction of scientific tests as the means of identifying direct causal relationships not possible, thereby invalidating the positivistic natural science model of research for the social sciences.

However as Burrell and Morgan (1979) have noted, the organizational approaches arising from the interpretive paradigm are not without their problems, especially with regard to problem of ontology. For example, given the assumptions of the phenomenological perspective which they have classified within this paradigm, organizations as tangible and relatively concrete phenomena do not exist and 'all concepts which the organizational theorist uses to construct his view of the organizational reality is open to criticism' (Burrell and Morgan 1979:274). As such, students of orthodox organization theory are left with studying a field where much of what they study do not exist.

Hence, the problem of ontology is a serious one if we are to accept the Burrell and Morgan's (1979) classifications of organizational paradigms. However, their classification of realist ontology has been disputed by others. To Jackson (1991:21) the acceptance of 'the existence of a constraining world external to the individual', does

not imply the acceptance of a positivist epistemology and that there could be differences among realists with regard to the epistemologies they employ.

Keat and Urry (1979) explore an alternative 'realist' epistemology as a way out of the dilemma. To them, the positivist epistemological approach attempts to establish patterns and regularities based on empirical observations of superficial levels of the social world, with the primary aim being prediction. A 'realist' epistemological approach, on the other hand, attempts to dig below the surface of social facts to uncover 'structures' and 'mechanisms' at work. This approach sees explanation as the primary objective of science rather than prediction, and the social scientist has 'to dig beneath the surface to discover 'structures' (the patterns and regularities) that determine the arrangement of social facts' (Jackson 1991:22).

Thus unlike the positivist, this 'realist' stance would require the postulation of the existence of types of unobservable entities and processes, which go beyond the 'mere appearances' of things, to their nature and essences. To Jackson (1991), this epistemological difference among objectivists is significant because they go into the heart of how knowledge regarding something can be arrived at. Methodologically speaking then, the realist would go beyond empirical observations to generate theoretical descriptions of causal mechanisms producing the observed phenomena (Jackson 1991: 22). Such a stance not only challenges the positivist natural science model of research as the sole means of producing knowledge about organization, but also the legitimacy of the scientific model with regard to organizational studies. With the primary aim of 'realist' epistemology as that of seeking explanations rather than predictions, theory building becomes an integral part of research activities in organization studies.

While rejecting a positivist model of natural science centred on hypothesis and deduction, with explanation seen as 'the deductive relating of an event to a law', Giddens (1979:258) proposes a wider conception of what explanation could be:

> Explanation, most broadly conceived, can be more appropriately treated as the clearing of puzzles or queries; seen from this point of view, explanation is the making intelligible of observations or events that cannot be readily interpreted within the context of an existing theory or frame of meaning.

He reiterates the need to bridge the divide between the objectivist and subjective approaches in the social sciences:

> ...in the current phase of social theory, we are involved in rotating two axes simultaneously: that of our understanding of the character of human social activity, and that of the logical form of natural science. ***These are not entirely separate endeavours, but feed from a pool of common problems.*** For just as it has become apparent that hermeneutic questions are integral to a philosophical understanding of natural science, so the limitations of conceptions of the social sciences that exclude causal analysis have become equally evident.
>
> (Giddens 1979:259)

These two axes of social theory and the problems they present extend to the problem of social research practices and methods. In this context, the issues have at times been reduced to that of two contrasting positions: 'quantitative' versus 'qualitative' research.

2.6 RESEARCH METHODS

2.6.1 Quantitative methods

Quantitative research methods feature tools such as statistical analyses, survey research and experiments. As the term 'quantification' is the description of some quality or characteristic in terms of quantity and numbers, quantitative studies pertain to

measurement and the use of measurement. These methods have been closely associated with the scientific model:

> Numbers and quantification provide us with a very special language that allows us to express ourselves precisely. Scientific investigation requires precision, and this is gained through use of quantitative methods. (Kaplan 1987:3)

'Statistics ' refer to information in numerical form, thus statistical methods refer to the range of techniques developed to deal with such data. As a research method, it has a long history stretching as far back as 1662 when John Graunt published a book, *Natural and Political Observations on the Bills of Mortality.* In the nineteenth century, Charles Darwin used intuitive notions of probability and statistics in his book, *Origin of the Species.* (Kaplan 1987:6). In the Behavioral Sciences, statistical techniques ranging from the descriptive to the inferential have been developed to deal with numerical data and because of its close association with the scientific model, such techniques are generally accepted as the more rigorous method in the field of management and organizational studies. That this is the case is reflected in Mintzberg's (1979:583) vigorous defense of non-quantitative methods:

> The field of organization theory has, I believe paid dearly for the obsession with rigor in the choice of methodology. Too many of the results have been significant only in the statistical sense of the word.....A doctoral student I know was not allowed to observe managers because of the 'problem' of sample size. He was required to measure what managers did through questionnaires, despite ample evidence in the literature that managers are poor estimators of their own time allocation Was it better to have less valid data that was statistically significant?

In the pure sciences, randomized experiments are regarded as ideally suited for the task of causal analyses. As a method of scientific inquiry, it enables researchers to state with a fair measure of confidence that 'X caused Y'. In the social sciences, the

manipulation of independent variables is more often than not, difficult to achieve. Experimental research in social and organizational contexts, are conducted on people who unlike other forms of subject matter, are capable of self-knowledge and awareness. Thus, the experimentation itself may have an impact on the people studied. In the case of laboratory experiments, there is also the problem that the artificiality of the research setting, which lacks the 'mundane realism' of the 'real' world.

In organizational research, there is a strong pull in the direction of field experiments in real organizations. However, Bryman (1989) notes that some field experiments do not include control groups, as it is often not possible to do so, for example two researchers studying the effects of pay plans will not be able to include control groups due to the problem of resentment on the part of employees not included in the pay schemes.

Some organizational researchers have moved towards comparatively more 'experiment-based' designs or 'quasi-experiments'. Here, although control groups may be included, the criteria of randomized experiments which is the benchmark of the pure science method, is given up as not practical in many organizational settings since the researcher is rarely able to exert the same degree of control as is possible in the laboratory (Bryman 1989:99-103). Thus in the organizational context, true experimental designs are difficult and at times, impossible due not only to the intrinsic nature of the variables, but also to political and ethical considerations.

Among quantitative methods, the survey research emerged as the most dominant sociological research tool by the 1950s (Hammersley 1989). The term 'social survey' has also undergone dramatic changes. At the beginning of this century, it referred to 'a descriptive study of an area geared to the identification, diagnosis, and remedying of social problems' but by the 1940s, its meaning shifted to that of 'a study relying on analysis of interview or questionnaire responses from a large number of people' (Hammersley 1989:92).

To some researchers such as Bryman (1989), survey research is regarded as a specific research design distinct from questionnaires and interviews, since in experimental research there is also considerable use of questionnaires and interviews as methods of data collection.

Thus the survey design is distinct from the experimental design in social research:

> At the very least, we can assert that survey research entails the collection of data (invariably in the field of organizational research by self-administered questionnaire or by structured or possibly semi-structured interview) on a number of units and usually at a single juncture in time, with a view to collecting systematically a body of quantifiable data in respect to a number of variables which are then examined to discern patterns of association. (Bryman 1989:104)

Survey research is associated with quantitative research because of its bias towards aggregating the variables investigated in order to give a quantitative picture of the topic studied.

Surveys in and of organizations are often confronted with the problem of random samplings due mainly to the problems of access. Thus there is the problem of sample representativeness and consequently, that of generalizability of findings.

Survey research also falls short of the scientific model's predisposition towards findings that demonstrate cause and effect relationships due to the difficulty in manipulating independent variables in organizational settings. Another related problem with regard to the notion of causality is the difficulty of identifying which variables are the causes and which the effects since all variables of interest are collected simultaneously:

> Survey research faces a number of difficulties when an attempt is made to infer causality from survey findings, because data is collected at a single juncture. While a

number of procedures can be advocated as ways of checking whether a relationship exists between two or more variables, the problem of the direction of causality is highly intractable. (Bryman 1989:134)

Despite these limitations, the use of survey research has been the favoured research design in organizational studies. The popularity of this research design is not only the result of the spread of positivism and pragmatism but also due to the development of scaling and correlational techniques that could be applied to data collected from social surveys (Hammersley 1989:105)

2.6.2 Qualitative methods

The limitations of quantitative methods led to the development of alternative approaches in the investigation of organizations. Qualitative research methods could be viewed as a counterpoint to the quantitative approach. Organizational research methods grouped under the term qualitative approach evolved as a result of growing dissatisfaction with the hypothetical-deductive model on which most quantitative methods in organization research are based.

However, the term 'qualitative research' itself is subject to many interpretations. Judd *et al.* (1991:299) distinguish between two main types of qualitative research:

> Qualitative research takes many forms and is called many names. One form consists of open-ended questions embedded in a structured interview or questionnaire. We call this qualitative with a small *q* (Kidder & Fine 1987).... The other forms, variously called fieldwork, participant observation, and ethnography, are what we call qualitative with a big *Q*; they rely entirely on open-ended exploration of people's words, thoughts, actions, and intentions.

In differentiating two possible meanings, the authors highlight the fact that qualitative methods could be either positivist (the small ***q***) or interpretive (the big ***Q***).

Others, such as Dooley (1990:276) emphasizes the 'non-measurement' aspect of qualitative research:

> The term qualitative research will refer to social research based on non quantitative observations made in the field and analyzed in non-statistical ways.

However, Kirk and Miller (1986:10) argue that qualitative research 'does not imply a commitment to innumeracy' but 'does imply a commitment to field activities'. They thus define qualitative research as:

> an empirical, socially located phenomenon, defined by its own history, not simply a grab-bag comprising all things that are not quantitative. Its diverse expressions include analytical induction, content analysis, semiotics, hermeneutics, elite interviewing, the study of life histories, and certain archival, computer, and statistical manipulations.

To Bryman (1989:135) the subjective orientation of qualitative research is the major feature that distinguishes it from quantitative research:

> Probably the most significant difference is the priority accorded the perspectives of those being studied rather than the prior concerns of the researchers, along with a related emphasis on the interpretations of observations in accordance with subjects' own understandings.

That there is no one precise meaning to the term qualitative method in any of the social sciences seems evident. More likely, it should be viewed as:

> an umbrella term covering an array of interpretive techniques which seek to describe, decode, translate, and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world. To operate in a qualitative mode is to trade in linguistic symbols and, by doing so, attempt to reduce the distance between indicated and indicator, between theory and data, between context and action. The raw materials of qualitative study are therefore generated **in vivo**, close to the point of origin.
>
> (Van Maanen 1979:520)

As a research strategy, qualitative research has been increasing acceptance since the 1970s (Bryman 1979). For example, *The Administrative Science Quarterly* (December 1979, Volume 24) devoted an entire issue to qualitative research.

In management and organizational research, the increasing acceptance of qualitative approaches has been accompanied by the perceived need to reconcile such research approaches with the natural science model of research (e.g. Lee 1991). That this is so is testimony to the strength of the ideal of the scientific model of research. Thus, Behling(1980:483) notes that in the field of organizational behaviour and organization theory, most of the mainstream textbooks regarding this field accept 'the natural science model of good research' .

To Bryman (1989:168-169), whether qualitative research is scientific does not make much sense:

> There is considerable discussion about what constitutes a science, and many writers would balk at a definitive attribution of quantitative research as scientific (see Bryman 1988; Keat and Urry 1975). Further, in the modern world to label something as non-scientific is to imply lack of rigour, of objectivity and of reliability. In fact, none of these three descriptions could be unambiguously applied to qualitative research, and indeed some quantitative research is lacking in these respects. What emerges from

> these various viewpoints is that qualitative research is simply more than research without measurement or numbers and that within qualitative research itself, there exists quite a few different strands of beliefs of what it entails. More important, these different strands of beliefs relating to qualitative approaches contain implicit assumptions of the researcher how social groups and organizations ought to be studied.

Thus, the issue is not whether one research approach is 'more scientific' than another as such an issue could never be resolved since the researchers on opposite sides of the divide are conducting research based on different assumptions as to how one could gain knowledge of and about social groups and organizations.

2.6.3 Multi-method research approach

However, the need for 'respectability' in performing non-quantitative research remains strong among some organizational researchers. Some have resorted to multiple methods, mixing qualitative and quantitative research methods, a process which has been referred to as 'triangulation', with the aim being to improve the accuracy of the researcher's judgment by the collection of different kinds of data bearing on the same phenomena. Further, the use of triangulation designs enables the researcher:

> not only to examine the same phenomenon from multiple perspectives, but also to enrich our understanding by allowing for new or deeper dimensions to emerge.
>
> (Jick 1979:604)

Triangulation design in research ranges from simple ones involving the scaling of qualitative data to more complex designs which attempt to capture a more holistic and contextual portrayal of the units under study. The focus on context in such research design underlines the prominent role played by qualitative methods in eliciting data and suggesting conclusions not possible with other methods.

The multi-methods approach is commonly applied in organizational research. Cole (1979:3) in his arguments for using a 'multi-method eclectic' approach in his research on quality circles, reiterates the one common assumption of attempts at triangulation:

> The deficiencies of any one of the strategies adopted are often compensated for by the efficiencies of others. The result is that the validity of the research is enhanced and the power of generalizations strengthened. The multi-method approach is a sounder methodological principle than the mechanical reliance on one method that so often characterizes sociological analysis.

In another research on organizations, the researcher argues that the contextual richness and holistic perspective can only emerge with a multi-method approach:

> But I do not rest my case for my analysis on any one study or any one way of examining American companies. Instead I drew on everything I knew, everything I saw, to develop the ideas in this book: from statistical data to personal observations and conversations. Thus this book is not intended to be merely a "report on research"; nor is the "whole" that it represents merely a sum of the specific studies that went into it. Indeed, in making choices about what material to use to express and illuminate my ideas, I leaned toward rendering those dramas of life in the corporation which would make my conclusions come alive, which would cause readers to believe me not because of my numbers but because of the echoes of my ideas in their own experience.
>
> (Kanter 1983:384-385)

The researchers' primary aim to uncover as much of the 'realities' of the organizational phenomena as possible, has led them to eschew too much an adherence to any one research method. That they have done so is an indication that the complexity of organizational life is such that to rely too much on one research method is to unnecessarily limit and constrain their study and impoverish their analyses.

One critical implication of this multi-method approach to the study of organizations is its heavy reliance on the theoretical perspectives of the researchers. Different perspectives will lead to different ways of perceiving and describing 'empirical reality' and from that, different judgments as to what constitute relevant data.

Therefore, in studying organizational phenomena, we are confronted with what Astley (1985) terms 'the subjective construction of truth'. This stance does not preclude accepting Keat and Urry's (1975) 'realist' epistemological premise that the practical world does have its own 'objective' reality, but it is a recognition that 'as scientists our only recourse to that world is through what we see and do'. Thus understanding phenomena is essentially an interpretive exercise, a sense making activity in which truth is defined by the rules of intelligibility embodied in theoretical schemata (Astley 1985:498). This particular viewpoint underlines the research approach in this thesis.

2.7 THE RESEARCH STRATEGY

2.7.1 From research philosophy to research strategy

In essence, the subject of this thesis is a group centred structure, the QCC, implemented by one group of management actors in the organization, with the goal of enhancing the work performance of another group of actors in the organization. The envisaged enhancement is to be derived from the dynamics of small group activities which are expected to emerge from the implementation of such group centred structures.

Insofar as the QCC is devised and implemented by managers with the support of its formal authority, the QCC is part of the formal organization. However, its intended role of encouraging group activity and processes that are outside the workers' normal job scope, brings it into the uncharted territory of the informal organization. Hence, investigating the QCC, due cognizance must be given to the different rationalities

underlying the formal and the informal organizations. That is, both the modernist and post modernist preoccupations have to be reflected in the research approach.

Furthermore, as the QCC is a social invention, that is, it is socially enacted, a deterministic approach to the study is not viable because it is does not allow for the study of the subjective dimensions of social reality.

Given these considerations, the positivistic, natural science model as the basis of research is rejected, but instead, the research would be grounded on the interpretive paradigm:

> Interpretive approaches emphasize unique features of the social world which make it inappropriate to examine human conduct from the outside, disregarding subjective experience which can only be understood in terms of the outlook and understanding of agents as subject. They question the possibility of a vantage point when the observer is part of the system. The concepts and findings of the social sciences are not fully separable from the phenomena under study; instead these interpretations enter into and influence the understandings and reactions of those they analyze. A positivist perspective overlooks the extent to which interpretations of the social sciences form part of and have been instrumental in shaping the social, economic and political dimensions of the modern world. (Garnsey 1993:236)

Hence, as the first step of this research approach, it is necessary to reveal my own vantage point in this research exercise.

2.7.2 Researcher's context

My first encounter with QCCs occurred in the early 1980s, at the government's launching of the national QCC programme in Singapore. Then, as Group Personnel Manager of a local group of companies, I was involved as a management sponsor and

implementor of QCC programmes in some of the firms in the group. Unfortunately, the outcome of these programmes was never known as shortly after the implementation, the parent company was foreclosed by its bankers.[2]

Two more recent encounters with QCCs have probably been critical in shaping my thoughts about the QCC. The first is my role, since 1991, as a facilitator for a QCC team comprising the secretaries and clerical staff in a department in the university where I teach.[3] It was a role that I had willingly accepted when suggested by the Dean as I had enjoyed the company of the members (some of whom I regard as friends) of the circle. My role was (and still is), in some ways unusual. I was not the circle members' supervisor (that role belonged to someone else in the university's administrative hierarchy), although as a member of the academic staff, I depend on them for administrative and clerical support. This encounter with the circle opened many new interpretations of circle activities to me which as a personnel manager, I would never have been privy to.

The other encounter was as a consultant on a project with a firm in the local marine industry. The firm had implemented a total quality management package marketed by some external consultants. As part of the package, the firm had implemented Quality Action Teams (QAT, a hybrid of QCCs) and instituted some structural changes. However, there were some implementation hiccups, and in the words of one of the senior managers, the employees were experiencing 'teamwork' problems. My brief was to study the problems experienced by the QAT members, mainly through in-depth interviews and observations.[4] This encounter enabled me to view, in a wider perspective, some of the issues involved in the implementation of group-centred

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2 In the investigations that followed, a couple of directors and major shareholders of the group were found guilty of criminal breach of trust and served prison sentences for their offences.

3 The university was implementing the government-promoted version of QCCs for government and quasi-government bodies (refer to Chapter 4).

4 My agreement with the firm was that I would have the ability to maintain the confidentiality of the sources of my observations and findings, if necessary, and this was adhered to during the course of the consultancy.

structures, without being weighed down by operational and political concerns, as would have been the case for the managers in an organization.

Furthermore, over the years, I have attended a number of QCC conventions in Singapore, and spoken to many participants who were involved, in various capacities, in QCC activities in their organizations.

These various contextual factors have in some way or another contributed to my interpretations of the QCC phenomenon. They form part of the 'experiential data' (Strauss 1987), that the researchers brings with him/her to the research. I believe that these experiences have been instrumental in the framing of the research questions and shaping of the research design for this dissertation.

2.7.3 Major issues in researching organizations

As discussed above, the approach taken in this research is firmly grounded in the interpretive paradigm, with the scientific method viewed as an inadequate means of producing knowledge in regard to the topic of research. The implementation and diffusion of QCC in various Singapore firms are viewed as situations of technology transfer and the contexts in which the transfer occur are considered crucial to the study of the transfer and diffusion process. As such it is difficult, if not impossible, to delineate the boundaries of the phenomenon from the context in which it takes place. Hence, the research strategy selected should enhance context portrayals and consequently, will invariably be drawn from the qualitative methods.

While the researcher's context *vis-à-vis* the research topic underlines the research approach, the practical reality of doing research in organizations is also a key factor in determining the research strategy. Blumer (1988) notes that several major research issues common to doing research in social settings, are sharply highlighted by studies of organizations.

One major issue is the problem of access. Although the QCC is a common enough practice among Singapore firms so that to some degree access could be negotiated, there is however little prospect of long term access for extensive participation observations. Most firms are not keen about granting access for a long period of time to permit unsupervised observations of employees discussing operational problems. Once admitted, the researcher must establish a workable role that would permit her to gather data through interviews, observations and documentary sources. Sometimes, the moments of insights occur in the most unstructured and casual situations. It is therefore difficult to impose anything other than the broadest common guidelines when studying different organizations. In some organizations, some aspects of the topic seem more accessible than in others and there is the need to respond to such situations. Hence some unevenness in the reports is inevitable.

Secondly, given the hierarchical nature of formal organizations and the nature of the subject researched, access to various levels of organizational members is necessary but not always possible. Part of the problem is the reluctance on the part of senior managers to acknowledge that the programme had failed given the issue of 'face' in the Singapore context. Further, access to employees is usually mediated through managers in the firm. There is thus the possibility of skewed information unless other alternative sources of information are explored. This raises the ethical issue in organizational research, which is an acknowledged problem confronting those doing research in organizations (Blumer 1988; Bryman 1988).

Given these considerations, the research approach should enable the focus on context, allow for multi-level analyses and permit reliance on various sources and types of evidence. The research strategy that most fits these requirements is *case study research.*

2.7.4 The case study research strategy

Drawing from Yin (1989) and Benbasat *et al.* (1987), the essential elements of the case study research strategy is that it involves an investigation into a phenomenon in its natural setting, when the boundary between the phenomenon and context are not clearly evident, using multiple methods of data collection used.

The case study research strategy is an approach which studies a phenomenon and the context in which it occurs together, without imposing any experimental control or manipulation of behavioral variables or events. As a research strategy, its primary aim is to understand the complex interactions between the context and the phenomenon, that is 'on understanding the dynamics present within single settings' (Eisenhardt 1989:534). To Benbasat *et al.* (1987:369-371), this strategy allows the complexity of the unit of focus to be studied in some detail and as such, there is heavy reliance on the interpretive skills of the researcher.

Although Benbasat *et al.* (1987) see case study research as synonymous with qualitative research (excluding application descriptions and action research), Yin (1989:25) thinks otherwise :

> The essence of qualitative research consists of two conditions: (a) the use of close-up detailed observation of the natural world by the investigator, and (b) the attempt to avoid prior commitment to any theoretical model (Van Maanen, Dabbs, & Faulkner, 1982:16). However, this type of research does not always produce case studies (for example, see the brief ethnographies in Jacobs, 1970), nor are case studies always limited to these conditions...case studies can be based...entirely on quantitative evidence; in addition, case studies need not always include direct, detailed observations as a source of evidence.

Benbasat *et al.* (1987:369) do not advocate the exclusive use of case study as a research strategy, seeing it as only suitable for problems where research and theory are at the early, formative stages of development, and thus it should be mainly used for capturing the knowledge of practitioners and documenting 'the experience of practice'.

Yin (1989) differentiates case study research from qualitative research in the classic sense of the word, basically because of his attempt to demonstrate that the case study could be one variation of the natural science model of research. Hence he uses the natural science research criteria of construct validity; internal and external validity; and reliability, as the basis for judging the quality of case study research designs. In doing so, he seems anxious to 'legitimize' the case study research strategy in the eyes of positivist organizational research practitioners. His attempt in this direction can be seen as an attempt to stretch the limits of what is regarded as 'normal science' (Kuhn 1970) in the field of organizational analysis.

Notwithstanding the above, Yin (1989:25) also sees case studies as having a distinctive place in evaluation research, with at least four types of applications.

> The most important is to explain the causal links in real-life interventions that are too complex for the survey or experimental strategies. A second application is to describe the real-life context in which an intervention has occurred. Third, an evaluation can benefit, again in a descriptive mode, from an illustrative case study - even a journalistic account - of the intervention itself. Finally, the case study strategy may be used to explore those situations in which the intervention being evaluated has no clear, single set of outcomes.

It is argued here that the case study as a research strategy has much to offer without the need to link it to the scientific model as Yin has attempted. As Jackson (1991) has pointed out, it is one of the means of producing knowledge and represents a different form of learning.

The power of the case study strategy lies in its flexibility in dealing with a variety of evidence, from documents, artifacts, interview, and observations. It is also able to deal with linkages that need to be traced over time. In this respect it relies on many of the techniques used by historians, but include other techniques such as direct observations and systematic interviewing, not available to historians.

With regard to this research, where behaviour cannot and is not manipulated, the explanatory powers of case study research is essential and facilitate a better understanding of the linkages between events and actions in the QCC implementation process. Thus the case study research method is ideally suited as a vehicle for documenting the 'experience of practice'.

Furthermore, as one of the key aims of this research agenda is to address the dearth of conceptual frameworks by expanding and developing theories relating to QCC practice, the case study research strategy best fits the research goal of analytical generalization rather than statistical generalization. As Yin (1989) himself has pointed out and Markus (1983) has demonstrated, the process of theory building and theory development can be an integral part of the strategy. The complexities and the nuances of various elements and processes related to the subject under study are more likely to be uncovered through this research method.

Finally, the rejection of the scientific model as the criteria in case study research does not imply a disregard for a systematic approach. With regard to this research, the systematic approach involves the following: defining the boundaries of the case study, defining the unit of analysis for the case study; establishing the rationale for the case study design, identifying sources of evidences and the development of a data base.

2.7.5 The research design

The field research was based on a multiple case design based on studies of a number of organizations, each representing a single case. A preliminary study was conducted on a number of firms over a period of one year. From conversations with various people in both academia and industry, and after some pilot interviews, fieldwork on a smaller number of firms (five firms) was conducted over a period of six months. The process was a highly iterative one, with the aim being to capture as much as possible, a rich, complex and dense description of the phenomenon under study. It was not by any means, a linear process and this fact has been confirmed by organizational researchers such as Bryman (1988). As such, it is noted that 'an explication of the research process in terms of a rational goal directed, linear activity' (Bryman 1988:8) might not do justice to the actuality of the research process.

The rationale for adopting a multiple case design is that this would enable comparisons of QCC outcomes across organizational contexts and from these comparative analyses to derive rich insights regarding the status of QCCs as a form of social technology in Singapore. However, this group of cases does not represent a sampling and is not meant to be interpreted as such. It is viewed as containing both unique and common characteristics relevant to the topic under study, the aim being to develop rich descriptions of the organizations insofar as QCC practice is concerned.

However, this thesis rests on more than the field research. The subject of study, the QCC extends into the past, as a organizational form created in Japanese organizations in the 1960s; and, as a group-based activity promoted by the Singapore Government since 1981. Therefore, a historical perspective is essential. As Dunkerley (1988:82) observes:

> ...within organization analysis the emphasis has largely been upon describing and analyzing contemporary phenomena, with scant regard being paid to how present characteristics may have emerged from past happenings.

Hence historical analysis is an integral part of this thesis and the findings are discussed in Chapters 3 and 4.

To add to the rich picture of the phenomenon and its context, surveys conducted by the Singapore Government agency responsible for QCC promotion were also analysed and interviews and informal discussions held with those who involved in the promotion of QCCs in Singapore. Given the proactive role played by the Singapore Government in the promotion of QCCs, it was felt that the survey findings and interviews were important in contributing to the overall picture of QCC practice in Singapore.

2.7.6 The case organizations

In most of the organizations, access was granted only on the basis that the organization's identity would not revealed in the thesis report.

In the selection of cases for this study, luck and serendipity played a part. Despite the issues of opportunity and accessibility, the firms included in the study were selected based on some broad criteria. This was that its inclusion should highlight either the state of the firm's QCC programme (outcome) or certain common organizational characteristics(context). For example, one feature considered was the profile of employees involved in the QCCs. In one case, the employees studied were bus drivers, in another, software engineers. Also, the cases comprised firms who had on-going QCC programmes and others whose programmes were moribund or all but dead. Another feature sought was the strength (or lack) of management support for the programme. As such, the cases were chosen for theoretical and not statistical reasons (Strauss 1987:21). Eisenhardt (1989:537) describes such cases as:

chosen to replicate previous cases or extend emergent theory, or they may be chosen to fill theoretical categories and provide examples of polar types.

The ***primary unit of analysis*** was the QCC implementation process for each case studied. To examine this process, an 'embedded design' (Yin 1989:58) was employed and several levels of analyses were conducted. These included: (1) the firm (ownership, nature of product or service, top management values, approach to QCC); (2) the manager/s responsible for the firm's quality programme or the firm's QCC programme, if these are separated; (3) the manager/s implementing QCC in the unit or department studied; (4) the QCC team itself. Also one contextual factor considered in some detail was the government agency responsible for QCC promotion in Singapore, the National Productivity Board

2.7.7 Sources of evidence

Documentation: These included organizational newsletters, communiqués, news clippings and other articles appearing in the news media; case reports of same site of study by others; QCC team presentation reports and reports of QCC convention proceedings.

Archival records: the major ones were the two national surveys on QCC practices conducted by the NPB. Other statistics include those provided by the case firms and also publications of various government agencies in Singapore.

Interviews:[5] A total of 43 formal interviews were conducted. (Numerous informal discussions were also conducted.) These were usually of an open-ended nature where respondents were initially asked about various aspects of the QCC programme in their

[5] I would like to express my appreciation for all who have helped in arranging the interviews and those who consented to be interviewed. For reasons of confidentiality and/or numbers, their names shall not be mentioned. Also, I would like to thank my collegues J.Tay and B. C. Kam for assisting in a set of interviews; and H.K. Tang for a case report of an interview. Finally, my thanks to C. Thomas for helping to transcribe some taped interviews.

organization and from there, the interview would move from the specific i.e. their relationship *vis-à-vis* QCCs and other aspects of firm's quality programme, to the general, e.g. decision-making, relationships between employees and between different groups in the organization. Each interview lasted about one to two hours and some respondents may be interviewed more than once. Only in one firm were the interviews tape -recorded. In the others, notes (in personal shorthand) were taken of interviews and these were immediately transcribed afterwards. Most interviews were on one-to-one basis but with some of the QCC teams, group interviews were conducted. Besides these formal interviews, there were numerous casual encounters with various individuals (some of whom were among those formally interviewed) where there were discussions and/or observations on QCC phenomenon.

In one of the cases studied I also drew on the write-up of an interview conducted by a colleague with a senior manager of one of the case study companies.

Direct observations: Field trips were made to case sites and from these field trips, observations of environmental conditions were made. The national and firm-level QCC conventions and presentations by QCC teams provided opportunities to observe and assess QCC teams presenting the outcomes of their work. In one case, I spent two days on a management seminar with the top and middle management employees of the company.

2.7.8 Data analysis

In interpretive research, there is no accepted general mode for communicating the findings of the research, for conducting the inductive process central to such research or for theory building. Eisenhardt (1989) noted that 'a huge chasm often separates data from conclusions', mainly due to the enormous amount of field notes and the difficulty of incorporating them *en masse* into the final report without being overwhelmed by the data.

In this study, an iterative process is adopted in analysing the field data. A *within case analysis* is conducted for each of the firms in the study based on a conceptual framework. The analysis is grounded in data but as Strauss (1987:14) has remarked such analysis is 'certainly supplemented by experiential data'.

In producing the explanations, theoretical propositions discussed in Chapter 1 serve as the starting point for:

> the original [6] objectives and design of the case study....(were)....based on such propositions, which in turn reflected a set of research questions, reviews of the literature, and new insights (Yin 1989:106)

The main aim is to build explanations about the phenomenon studied, from which insights could be drawn. Thus the role of theory in this process is critical, as 'empirical data is always theory dependent' (Astley, 1985).

The theoretical underpinnings of this research were discussed in the Preface and in Chapter 1 and include the following: structurational theory; critical systems thinking and the concept of the three knowledge constitutive interests; and, Cole's conceptualization of QCC as a social technology, with QCC implementation viewed as a technology transfer activity.

These conceptual frameworks serve as devices with which to focus and bound the present study. They are the maps of the territory being investigated. As the investigator explores deeper into the territory, these maps will become more differentiated and integrated. Thus maps might shift or change, mirroring the reflexive and continuing relationship between empirical findings and theory.

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6 It is arguable as to whether the objectives are truely the 'original 'ones. As Bryman [(988:8) has pointed out, the explication of the research process never quite match the actual experience. Nevertheless, some area of focus is inevitable in proceeding with fieldwork. Hence the term used by Yin is seen as referring to this original area of focus.

2.7.9 The value of the research findings

The question of the value of a specific social research is a highly (and at times, emotionally) charged one. The assessment is dependent upon where the researcher has positioned the research in terms of the deterministic-interpretive and the modernist-post modernist range of paradigms. Earlier in this chapter, the non-commensurability of the various analytical and research paradigms was underlined and as such it would seem impossible to address this issue from the positions of the rival perspectives. However, some middle ground will be attempted with regard to the research approach undertaken for this thesis, and it is believed that a possible denominator is the question of the extent to which the research findings can move from the particular to the general.

Yin (1989:43) who has positioned himself within the positivistic paradigm observes that 'the external validity problem has been a major barrier in doing case studies'. However, he contends that this need not be so, as case studies, unlike survey research, does not rely on statistical, but on analytical generalization. The aim of the latter is to generalize from a particular set of results to some broader theory.

Tsoukas (1989) argues that from a realist paradigm, explanations produced from case study research (which he terms 'idiographic research') can be regarded as externally valid. He maintains this while disputing the determinism of positivist epistemologies is founded on 'constructing conditions of closure' in the social sciences, which, in his view is an impossibility (p 552). However, if informed with a realist epistemology, explanatory case studies are externally valid:

> For realists, generality is distinguished from recurrent regularities; instead, it is ascribed to the operation of causal tendencies (or powers). The latter act in their normal way even when expected regularities do not occur. This is possible because the realization of causal tendencies is contingent on specific circumstances, which may or may not favour the generation of certain patterns of events. Idiographic research

> conceptualizes the causal capability of structures, while at the same time it sheds light on the contingent manner through which a set of postulated causal powers interact and give rise to the flux of the phenomena under study. (Tsoukas 1989: 551)

Explanatory case study (idiographic) research is epistemologically valid because it is concerned with knowing the structures, their associated generative mechanisms and the contingent factors responsible for producing observed patterns among cases studied. To conduct case studies from a realist perspective requires an explanation of an organizational phenomenon involving a gradual transition from actions, through to reasons to rules and finally to structures[7] and causal powers.

Geertz (1983:22) in summing up the interpretive case, argues that:

> Interpretive explanation - and it is a form of explanation, not just exalted glossography - trains its attention on what institutions, actions, images, utterances, events, customs, all the usual objects of social-scientific interest, mean to those whose institutions, actions, customs, and so on they are. As a result, it issues not in laws like Boyle's, or forces like Volta's, or mechanisms like Darwin's, but in constructions like Burckhardt's, Weber's, or Freud's: systematic unpackings of the conceptual world in which *condottiere*, Calvinists, or paranoids live.
>
> The manner of these constructions itself varies....But they all represent attempts to formulate how this people or that, this period or that, this person or that make sense to itself and, understanding that, what we understand about social order, historical change, or psychic functioning in general. Inquiry is directed toward cases or sets of cases, and toward the particular features that mark them off; but its aims are as far-reaching as those of mechanics or physiology: to distinguish the materials of human experience.

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7 Tsoukas's (1989:554) defines structure as a set of simultaneously constraining and enabling rules and resources that are implemented in human interaction. They shape interactions while at the same time are reproduced in the process of interaction. This definition of structure is very similar to Giddens's and is in fact derived from the latter's concept of the duality of structure.

Thus, in all three perspectives, it can be demonstrated that the shift from the local to the general can be made, although differences regarding what constitutes the 'general' remains. Perhaps this is inevitable, and the trick is to hold all these ideas together at the same moment in time, as the Zen Master in the parable at the beginning of this chapter had tried to demonstrate.

CHAPTER 3 THE JAPANESE QCC

3.1 ORIGINS OF THE JAPANESE QCC MOVEMENT

3.1.1 The aftermath of a lost war

To Japanese quality control (QC) pioneers such as Ishikawa (1985) and Mizuno (1988), the United States and Britain emerged the victors of the World War II because of their superior manufacturing and production capabilities which, when directed to serve the war effort, provided their military with a steady and adequate supply of weapons, equipment and stores that were qualitatively and quantitatively superior to that of Japan, their protagonist in the Pacific war arena. The two Japanese QC pioneers further attribute this manufacturing superiority to the fact that both nations had made extensive use of modern quality control techniques in their production efforts.

They also identified the works of two pre-war statisticians as instrumental in the development of modern QC technology: the American, W.A. Shewhart of Bell Laboratories who in 1931 published *Economic Control of Quality of Manufactured Goods*, defining statistical quality control methods; and the British statistician E.S.Pearson's book *The Application of Statistical Methods of Industrial Standardization and Quality Control*, published in 1935, and which was adopted in its entirety as British Standards 1008. Mizuno (1988:281-282) pointed to the extensive use of QC tools pioneered by Shewhart and Pearson to cope with the rapid rise in production for military purposes in the United States. In his view it was 'this new production technology (that) had contributed so much to helping American industry win the war' (p i).

Ishikawa (1985:14-15) attributed the use of control charts and other QC tools as the reason for the ability of the United States to produce military supplies inexpensively and in large quantities:

> One might even speculate that the Second World War was won by quality control and by the utilization of modern statistics. Certain statistical methods researched and utilized by the allied powers were so effective that they were classified as military secrets until the surrender of Nazi Germany .

Although during the war, the British military standard BS1008 was translated into Japanese, its use was limited to a small circle of Japanese academics, as there was in general, a lack of understanding then, of the use of statistical techniques in Japan (Onglatco, 1988:3).

Ishikawa and Mizuno's conviction of the relationship between the use of QC techniques in manufacturing and victory in war underlined the critical importance of QC for the growth and development of Japanese manufacturing industries, and resulted in the missionary zeal and single-minded pursuit of quality in Japan over the last four decades:

> The Japanese quality movement began in the ruins of World War II. The initial push to start came from the perception of the enormous gap between Japan and the U.S. The war was won because of superior American technology, a fact that most Japanese were ready to admit. Lillrank and Kano (1989:217)

3.1.2 Post-war rebuilding

For Japanese quality pioneers such as Ishikawa[1] and Mizuno[2] and quality consultant,

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1 A s a young graduate in applied chemistry, he was a naval technical officer with responsibility for gunpowder during the war. After the war, he joined academia and in 1949 became involved with JUSE, joining the association's Quality Control Committee as one of the pioneer members and instructor in statistical methods (Ishikawa 1985:2).

2 An electrical engineer by training, he was one of a small group of Japanese academics and engineers who formed a quality control research group under the auspices of JUSE. He also contributed to the QC text for radio course (Mizuno 1988:ii).

Imai[3] the turning point in the post-war evolution of Japanese quality movement was the dismal state of Japanese telecommunications service after the war. Imai described the experience of H. Karatsu,[4] another prominent quality pioneer, who immediately after the war, worked as an engineer with the government owned Nippon Telephone and Telegraph Corporation (NTT):

> Seeing the terrible state of affairs at NTT, General MacArthur's staff invited some American quality control experts from Western Electric to help NTT. The American experts told NTT management that the only solution was to apply QC. Says Karatsu, 'In our pride, we told them that we were applying QC at NTT the Japanese way. But when they asked to see our control charts, we didn't even know what a control chart was!' (p 10).

The first initiative to transfer QC technology to the Japanese was made by the American Occupation Force. In 1946 the United States military sponsored American statisticians to instruct quality control techniques to staff of NTT and other firms in the telecommunications industry (Mizuno 1988; Ishikawa 1985; Onglatco 1988). Following that, Karatsu and Taguchi[5] instructed subcontracting firms in the electrical industry on QC concepts and applications.

The Japanese government took the first step for a basic foundation for the quality movement through the establishment of the Japanese Standards Association in 1945 and the Japanese Industrial Standards (JIS) Committee in 1946. The Industrial Standardization Laws went into effect in 1949 and the Agricultural Standards Law in 1950. A JIS marking system was also implemented to give recognition to

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3 A graduate of Tokyo University majoring in American studies, he was based in the United States in the 1950s, working at the Japan Productivity Center where his job was to escort Japanese businessmen through major U.S. plants so that they could study 'the secret of American productivity' (Imai 1986).

4 An electrical engineer, he joined NTT after the war. He left to join the Matsushita Communcations Group where he eventually became an executive director (Karatsu and Ikeda 1987).

5 Genichi Taguchi is the originator of the Taguchi method.

manufacturers who met the JIS standards (Ishikawa 1985:15-16; Onglatco 1988:5). Although participation was not compulsory, it did much to promote the awareness of standards among Japanese manufacturers.

However, the prime mover of the quality movement in Japan has been the private sector. A number of factors propelled the private sector in this direction.

In post-war Japan, the Japanese manufacturer did not have one big specific buyer, such as the military, for their goods (Onglatco 1988:4). One of the Allied occupying forces' first action was to dismantle the huge Japanese industrial concerns, the *zaibatsu*, which had dominated Japanese industry before the war (Matsushita 1984). This changed the pre-war oligopolistic situation in Japanese industry. Furthermore, the devastated state of the domestic economy after the war (Ishikawa 1985:15; Lillrank and Kano 1989:218) forced Japanese manufacturers to look beyond Japan for new markets to sell their products. All these meant greater and more intense competition among manufacturers.

In addition, a new generation of corporate leaders was emerging. Many of the old industrial leaders of the *zaibatsu* were purged as war criminals and an estimated total of 3600 key executives were replaced by a new generation of young managers who by Japanese standards lacked both seniority and connections (Lillrank and Kano 1989:220). Among this new breed of managers, unshackled by traditional practices, there was enthusiastic acceptance of new production techniques from the West, and hence the role of QC in manufacturing became deeply entrenched in post-war Japanese industry:

> Suddenly, Japanese quality and dependability turned upward in 1950 and by 1954 had captured markets the world over. The new economic age had begun. What happened? The answer is that top management became convinced that quality is vital for export, and that they could accomplish the switch. They learned, in conference

after conference, something about their responsibilities for the achievement of this aim, and that they must take the lead in this aim. (Deming 1988:486)

3.1.3 The transfer and diffusion of quality control technology

The Japanese Union of Scientists and Engineers (JUSE) became the focal point in the introduction of QC practices and technology among Japanese manufacturers. It was a non-profit organization with members drawn from universities, industries and government, and dedicated to serving its corporate members in areas of quality and reliability and in raising the standards of Japanese manufacturing technology (Mizuno 1988; Ishikawa 1985; Onglatco 1988; Cole 1989; Deming 1988).

Several writers, mainly Japanese, placed the establishment of JUSE as immediately after the war in 1946 (Ishikawa 1985; Mizuno 1988; Onglatco 1988). Others like Cole (1989), Deming (1988) and Imai (1986) put the establishment of JUSE around the late 1940s, between 1948 and 1949.

In 1949, Kenichi Koyanagi, a senior managing director of JUSE, who was also one of the scientists involved in the Japanese military war effort (Deming 1988:486), was instrumental in persuading Kaoru Ishikawa, together with Shigeru Mizuno, to establish the Quality Control (QC) Research Group within JUSE. In the same year, the QC Research Group and the Japanese Standards Association began offering courses in QC (Ishikawa 1985:2; Onglatco 1988:5).

JUSE's first basic QCC course was designed for engineers and used as its textbooks translations of American Wartime Standards and British Standards (Ishikawa 1985; Onglatco 1988). However, it quickly became apparent to the instructors and the participants that the texts were not completely applicable to the Japanese context:

> After conducting the first course, it became clear to us that physics, chemistry, and mathematics are universal and are applicable anywhere in the world. However, in the case of QC, or in anything that has the term 'control' attached to it, human and social factors are strongly at work. No matter how good the American and British methods may be, they cannot be imported to Japan as they stand. To succeed, we had to create a Japanese method. (Ishikawa 1985:16-17)

Thus from the second course onwards, the QC Research group wrote their own texts for the course.

Yet, this underlying aim of creating a uniquely Japanese way, did not deter or obstruct these pioneers from looking outwards to search for new technologies and tools. The genius of that generation of Japanese quality pioneers was their ability to seek out, and capitalize on new QC technology from abroad, and then to assimilate and adapt such new knowledge to suit local conditions. The most fruitful of these efforts was their study and adaptation of American QC technology, and especially their promotion of the work of W. E. Deming and J. M. Juran.

Japanese quality control pioneers and subsequent writers have all acknowledged the pivotal role played by Deming and Juran in the development of QC in Japan (Ishikawa 1985; Mizuno 1988; Imai 1986; Onglatco 1988). Both men have been accorded recognition by the Japanese government.[6]

Deming's work on statistical QC was brought to the attention of members of JUSE's QC Research group by American engineers attached to the civilian section of the Supreme Commander of Allied Powers, the post-war occupation authority. These engineers were from Bell Laboratories and it was they who showed members of JUSE the link

[6] Both Deming and Juran have been awarded the Order of the Sacred Treasure, second class, by the Japanese government (Mizuno 1988:282)

between statistical methods and the accuracy of American weapons (Lillrank and Kano 1989:219; Deming 1988:487).

In 1949, JUSE invited Deming to Japan to lecture on quality improvement and in 1950, Deming began a series of lectures and engagements with the Japanese that was to shape the country's quality movement. In the early 1940s, Deming was instrumental in initiating a series of courses on statistical methods by Stanford University. He had observed the efforts of the American military in conducting courses for its suppliers dissipate from lack of management awareness of their responsibility for quality, and from the 'specialization' of quality control in American factories. He was determined that these problems would not be repeated again in Japan and for him, the only solution was to bring the message across to top management (Deming 1988:487-488).

Given JUSE's organization and corporate network, and the eagerness of the new post-war Japanese management generation to seek new solutions, Deming was able achieve his objective of reaching the top management of Japanese industry.

The main thrust in Deming's work was the use of statistical methods to control work processes. To him, however, it was not only the substance of his lectures on statistical control such as the *Plan-Do-Check-Action* (PDCA) cycle, variance analyses and control charts, that was important, but also the way such knowledge was disseminated. As such, Deming's first few seminars were targeted at the top executives, with subsequent seminars between 1950 and 1952, aimed at the middle management of Japanese corporations (Ishikawa 1985; Lillrank and Kano 1989; Onglatco 1988). In this way, Deming's ideas on quality control was disseminated throughout the managerial levels of Japanese organizations.

The joint JUSE-Deming effort gave a tremendous boost to the implementation of statistical QC methods and they quickly became widespread in Japanese factories. At around this time (1950), JUSE commenced publication of a monthly quality journal

Hinshitsu Kanri [Statistical Quality Control] as a means of disseminating knowledge about quality control to its members (Ishikawa 1985:5).

However, the implementation of QC ideas was not without problems. Firstly, there was resistance from skilled workers who preferred to rely on their intuition and experience, rather than data and figures. Factory management was also unwilling to implement standardization procedures and there was a dearth of data with which to work with. Measuring devices installed were treated with much suspicion by workers who saw them as means of measuring and tracking their work performance. Also, the QC movement remained confined to engineers and was perceived mainly as a factory-level issue (Ishikawa 1985:18-19). It thus became evident among the Japanese promoters of quality control that top management involvement and direction was necessary if QC technology was to advance further in Japanese industry (Lillrank and Kano 1989:223).

The QC Research Group analysed the problem as their own failure to persuade top managers to join in the quality movement 'because of our relative youth' (Ishikawa 1985:19). This was when the QC Research Group decided to turn to foreign talent again for help:

> Japanese managers had shown little understanding or interest when those young Quality Control Research Group members explained QC to them, but Dr. Juran, with his worldwide reputation, was more persuasive. Ishikawa (1985:19)

It was thus JUSE's diagnosis of the problems and its reading of the sentiments of Japanese management that led to the invitation to Juran in 1954 to conduct seminars on 'QC and the Role of Management' (Ishikawa 1985:19; Onglatco 1988:6).

Juran had, by then, acquired a world-wide reputation in quality management (Mizuno 1988:283; Ishikawa 1985:19). Since the 1940s, Juran had highlighted managerial

responsibility for quality and the fact that quality was achieved through people rather than techniques. He was thus 'the first of the quality gurus to work out that achieving quality was all about communication, management and people (MacDonald and Piggott 1990:109).

Ishikawa (1985:19) placed Juran's series of lectures as a turning point in Japan's QC movement:

> Dr. Juran's visit marked a transition in Japan's QC activities from dealing primarily with technology based in factories to an overall concern of the entire management. There is a limit to statistical quality control which has engineers as prime movers. The Juran visit created an atmosphere in which QC was to be regarded as a tool of management, thus creating an opening for the establishment of total quality control as we know it today.

The total approach to quality as preached by Juran, was reinforced by Armand V. Feigenbaum's ideas on Total Quality Control (TQC), which found their way from the United States to Japan in 1958 partly as a result of the activities of a Japanese quality control overseas observation team sent to the United States (Onglatco 1988:6). However, as Mizuno (1988:284) had pointed out, by the time Feigenbaum's seminal book *Total Quality Control* was published in 1961, the Japanese were on their way to developing a distinctive version of TQC that differed from Feigenbaum's on some critical fundamentals. Furthermore, in Lillrank and Kano's (1989:223) view, despite the widespread publicity given to TQC following Juran's visit and the circulation of Feigenbaum's TQC ideas among Japanese management circles, the real implications of TQC were not fully understood as the 'basics of QC were only beginning to be common business knowledge' and 'TQC was too theoretical a system to have much practical value'.

What seemed to have emerged by the end of the 1950s is that the practice of QC become a mass movement in Japan. Courses on QC were aired on educational radio (Mizuno 1988:11; Onglatco 1988:15); QC became viewed as part of running a business by management ; and a number of 'mass' symbols for quality were created. These included the adoption of a flag for quality - the distinctive Japanese *'Q'* mark and the nation-wide designation of the month of November as the 'quality month' complete with flag raising ceremonies and various other public activities to celebrate the event. What is also significant is that these mass events were not organized by the government as such but by JUSE together with private Japanese corporations (Ishikawa 1985:4). The stage was thus set for the emergence of the QCC in Japanese organizations.

3.2 THE DEVELOPMENT OF JAPANESE QCCs

3.2.1 The evolution of QCC in Japanese factories

One problem encountered in the 1950s in implementing QC on the factory floor was the resistance of the more experienced workers to the use of statistical methods in their daily work. This was mostly due to the fact that these workers had up to then relied mainly on their work experience and common sense to solve work problems (Ishikawa 1985:18).

To the Japanese QC pioneers at JUSE, the dissemination of QC concepts and applications amongst blue collar workers was of considerable importance. It is evident that the strategy adopted was to teach the foremen QC concepts so that they could be the catalyst to disseminate such concepts and practices amongst their workers. However, there was one big problem:

> It was not difficult to educate engineers and staff members through various seminars and conferences, but there were simply too many foremen and group leaders to handle. These were also scattered across the country. It was not easy to start educating them.
>
> (Ishikawa 1985:21)

JUSE resorted to the mass media and in 1956 began a QC correspondence course for foremen by means of radio broadcasts supplemented by written text for guidance. The response to the course was overwhelming, with some 110, 000 copies of the text sold, and as a follow up to the radio series, in 1960, JUSE published a QC guidebook for foremen (Ishikawa 1985:21).

At about the same time, JUSE organized open-ended discussions with participation from foremen from various industries. At one of these sessions, the foremen unanimously called for publications on QC focusing on QC applications for the workshop. JUSE quickly responded and a new journal specially aimed at foremen, *Gemba to QC* [The workshop and QC] and later renamed *QC for the Foreman* [FQC], appeared in April 1962 (Ishikawa 1985; Mizuno 1988; Imai 1986; Onglatco 1988; Lillrank and Kano 1989). One of the recommendations of the journal's editorial board was that QC activities be conducted under the name of the QCC (Ishikawa, 1985:22).

JUSE's initial idea of using the study group was as a complement to the mass education programme for foremen through the mass media and written text. As Ishikawa (1985:22) observed, 'most foremen and other factory workers were not in the habit of studying', so it would have been difficult to expect them to study on their own. Furthermore, reading alone 'would not do much good for QC' as whatever studied had to be implemented at the workplace. Thus, to overcome these problems, employee study groups were initiated and these groups became the forerunners of today's QCCs.

According to Lillrank and Kano (1989:224), JUSE's idea of small study groups as a means of educating factory workers on QC was a natural development. Firstly, earlier

on, JUSE staff had observed the effectiveness of some test cases of employee study groups in a chemical plant. JUSE's own experience with the QC Research Group as a higher level study group had been positive. There was also the fact that group study was widely practiced in Japanese schools.

Thus the beginnings of the Japanese QCC movement was very low key beyond the journal's recommendation to form QCCs and to register such groups with JUSE's QC Circle Headquarters which was established in 1962:

> It was tough going at first, and QC activities did not have many adherents. As of April 1965, three years after the initial push, only 3700 groups were registered with us as practicing QC activities. Our insistence on voluntarism[7] had obviously worked against us. Ishikawa (1985:23)

3.2.2 QCCs as a grass-roots movement

Though originally started as a means of group study for foremen, the trickle-down effect was soon felt as study groups made up of factory workers were formed. In May, 1962, NTT employees registered the first circle with JUSE, and in November 1962, the first series of regional Annual Convention for Foremen was held. To stimulate circle growth, in 1964, JUSE established a network of QCC Regional Chapters as satellites of the QC Circle Headquarters, giving rise to a nation-wide infrastructure committed to the diffusion of QCCs in Japan. With this network, 'a teaching chain emerged whereby companies shared their experiences on circle introduction', and firms who had already established QCCs roped in other firms to participate and provided guidance to those firms setting up QCC programmes (Onglatco 1988:16).

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[7] By this Ishikawa (1985:22) meant that originally circles were to be created on a voluntary basis. However, in the same list of goals, Ishikawa named eventual total participation by all workers as the ultimate goal.

To help in the diffusion of QCCs, additional written material on QCCs was published by JUSE, including a new and more comprehensive textbook (Lillrank and Kano 1989:226).

Thus Ishikawa, who was the prime proponent in JUSE of the principle of 'voluntarism' in the setting up circles, felt that he was vindicated when the lull of the early years was followed by a sudden surge in formation of circles, and by 1966, more then 10, 000 circles were registered (Ishikawa 1985:23; Lillrank and Kano 1989:226).

With the QCC infrastructure and means of promotion in place, and following the success of the initial push, the unprecedented growth of Japanese QCCs over the next two decades, took off.

Over the next twenty years, the number of circles registered with JUSE increased forty times, from 4,930 circles in 1965 to 223, 762 circles in 1985. In terms of annual increase, the period of the two oil crises (1973 to 1979), saw higher annual growth when compared with the period prior to the crises, pointing to the fact that adverse economic conditions, instead of impeding circle growth, actually increased the rate of circle formation (refer to Table 3-1). Furthermore, in the early 1980s, as the Japanese QCC movement matured, it expanded from its traditional bases in production, maintenance and equipment into design, research and development, management, sales and services (Onglatco 1988:17).

Table 3-1 : The annual increase of QCC in Japan 1965 -1984 [JUSE 1985 data]

Fiscal Year	Net Increase	Total	Comments
1965	2,379	7,309	4,930 circles in 1965
1966	4,342	11,651	
1967	5,765	17,416	
1968	8,557	25,973	
1969	7,526	33,499	
1970	8,867	42,366	
1971	9,249	51,615	
1972	5,984	57,599	
1973	7,878	65,477	First Oil Crisis
1974	6,998	72,475	
1975	5,920	78,395	
1976	7,794	86,189	
1977	8,598	94,787	
1978	8,857	103,644	
1979	11,610	115,254	Second Oil Crisis
1980	13,491	128,745	
1981	19,361	148,106	
1982	25,847	173,953	
1983	26,991	200,944	
1984	22,818	223,762	223,762 circles in 1985

Source : Onglatco 1988 : 17

From the above narrative, it is evident that the development of QCCs in Japan did not arise as a deliberate application of some organizational behavior theory such as the semi-autonomous work-groups that evolved from socio-technical systems theory. In fact QCCs were promoted by corporate management and academic engineers serving at JUSE, as the best means to promote QC knowledge and techniques among shopfloor employees. As Lillrank and Kano had observed (1989:3):

> The QCC evolved as the result of a long series of trial and error based on common sense and practical experience in the workshop, the preoccupation being to improve the quality of Japanese products. Some influence from American human relations movement can be traced, but ideas from the Japanese education system and traditional workshop management made a far greater contribution.

To Askenazi (1991:385), this was an example of a successful use of 'cultural modelling' where evolved sets of practices, that fulfilled requirements of a society in specific problem contexts, were adapted and used in a new problem context. He argued that Japanese traditional small group organizations, such as those found in local neighbourhood communities and served to managed local festivals and other social and welfare programmes, presented several enduring and effective models of group association that Japanese corporations adapted for their own purposes. The use of QCCs as a group-based solution to the problem of diffusion of QC technology in the workplace was an effective one as the middle-class Japanese had in various other aspects of their lives, associated themselves socially and emotionally with a number of groups.

JUSE's major role in the spread of QCC in Japan arose as a result of its primary goal of promoting the spread of quality control technology among Japanese manufacturers. It was instrumental in evolving the concept and later, in defining the functioning and goals of the fully developed QCC. Yet, as Cole (1989:295) notes:

> JUSE did not by itself create either QCCs or the social movement that drove them forward; QCCs were the results of individual actors at the corporate level forging corporate policy both in support of JUSE and in support of building QC circles in their firms. By correctly reading where these companies wanted to go, involving their personnel in its activities, interacting with them to develop and codify new ideas, training materials, and practices, and ensuring inter-company collaboration, JUSE operated as a powerful catalytic agent.

Thus, the QCC movement was driven by the individual corporations themselves, and the corporate strategy towards QCCs targetted all the major players in the operating chain of an manufacturing organization, from top management, middle management and engineering staff to foremen and factory workers.

QCCs in Japan developed as **one** part of an organized effort to transmit and entrench the concept of quality in Japanese industry. Japanese QCCs emerged after the seminal lectures of Deming and Juran, and after Feigenbaum's work, *Total Quality Control* had been widely read in Japanese manufacturing circles. By the time, this group-centred QC activity emerged, Japanese industry had already evolved their own version of total quality control sometimes referred to as Company Wide Quality Control (Imai 1986, Onglatco, 1988, Ishikawa 1985).

Although QCCs were primarily seen as a device to promote effective learning among lower educated employees, the present-day QC circles emerged from a reflexive learning process involving feedback between corporate QCC promoters and the workforce, and between JUSE and business firms.

One factor that could have contributed to management support for QCCs was the pace of technological innovations and the intensity of capital investments among Japanese manufacturers. According to Cole (1989:57-58):

> Japanese managers generally do not see capital investment as a solution that permitted them to avoid dealing with issues of work organization. Rather, their experience has taught them that to get the full benefits of capital investments in equipment, they must work to optimize the relationship between the new technology and human factors.

Therefore, because the need to be internationally competitive was perceived to be hampered by the low education levels of skilled older workers and foremen, Japanese managers were forced to look at new ways of maximising efficiency. The result was the evolution of the original QCC as a study group to its present-day organizational form, with the outcome being the involvement of foremen and other shopfloor workers in a continuous cycle of improving product quality and productivity.

Thus the major achievement of Japanese corporations and JUSE in this respect is their creation of a mechanism through which new technology could be diffused effectively down the organization and by which they could draw on the talents of lower level employees in the organization, that is, the 'distribution of intelligence' down the organization (Cole 1989:295). Through the QCC, the top-down flow of QC knowledge and techniques from technical specialists to foremen and workers was complemented by a bottom-up flow of information and ideas from the latter, regarding the adaptation of this knowledge to suit workshop processes, practices and conditions.

3.3 THE NATURE OF JAPANESE QCC

3.3.1 The ideals of Japanese QCC

JUSE's QCC objectives

In 1962, when the first issue of the journal *Gemba-to-QC* [QC for Foremen] was published, Kaoru Ishikawa (1985:138) as the chairman of the editorial board issued a policy statement, which besides setting out guidelines on the use of language and pricing, also included what must have been the first description and conceptualization of QCCs:

> At shops and other workplaces, groups are to be organized with foremen as their leaders and include other workers as their members. These groups are to be named QCC. QCCs are to use this journal as the text in their study and must endeavour to solve problems they have at their place of work. QCCs are to become the core of QC activities in their respective shops and workplaces.

Eight years later, in 1970, as the momentum of QCC activities picked up across Japan, JUSE published a two-volume basic text, *QC saakuru Koryo* [The General Principles of

the QCC] (hereafter known as the 'basic text') setting out the fundamental principles and guidelines for QCC activities. This basic text has since its publication, become the definitive authority on QCC in Japan. Although prepared by a team, the mastermind behind this work is Ishikawa. The basic text spells out very clearly that QCCs are to be implemented as part of company-wide quality control activities. The objectives of QCC as set out in this basic text are that they should: (1) contribute to the improvement and development of the enterprise; (2) respect humanity and build a 'worthwhile-to-live-in' happy, and bright workshop; and (3) exercise human capabilities fully, and eventually draw out infinite possibilities (Ishikawa 1985:139-140; Lillrank and Kano 1989:14-15).

According to Lillrank and Kano (1989:15), the philosophy behind these objectives are very similar to that expressed in the works of American writers belonging to the human relations school of management such as Abraham Maslow (1970), Rensis Likert (1961; 1967) and Douglas McGregor (1960). They further asserted that although many ideas, such as participatory management, mooted by the human relations school during that time, found little real support amongst American managers, the Japanese consider these ideas along with quality management, as modern and superior management approaches that could be utilized by Japanese firms (Lillrank and Kano 1985:224).

In emphasizing the importance of the people-centred goals, the Japanese did not forget the economic factor. The first objective of Japanese QCC 'to contribute to the improvement and development of the enterprise' underlines the importance placed on the economic success of the enterprise. However, it is notable that this survival and growth goal is not expressed purely in terms of profitability, although this is the *raison d'etre* of private enterprises in capitalistic economies (Japan's economy is seen as one version of the capitalist model), but is framed in terms of the long-run survival of the organization.

Although the first objective is fundamentally an economic one, the Japanese corporation does not rely on what Etzioni (1961) terms 'utilitarian compliance structures' such as incentive payments to facilitate employee acceptance of this goal. Instead, the second and third objectives set out the human relations ideals on which QCC activities are to be based, that is, respect for humanity, a conducive work environment and self-actualization of employees' skills and capabilities.

This approach contradicts Etzioni's (1961) postulations regarding the relationship between employee compliance of organization's goals and the type of structures or systems designed to bring about this compliance. To Etzioni, economic organizational goals such as higher corporate profitability or growth worked best with utilitarian compliance structures, such as increases in remuneration or job promotions.

In promoting the primary goal of improving and developing the enterprise, JUSE and Japanese employers emphasize the use of workplace ideals such as the respect for humanity, improving workshop conditions and developing human potential to fullest, to achieve its basic economic goal. As part of this strategy, the Japanese management elite appropriated the traditional value of *kaizen* in the service of their corporate goals.

The kaizen principle

One could interpret the three fundamental principles of QCC as embodying the Japanese concept of *kaizen* which according to Imai (1986:3-5) 'is deeply ingrained in the Japanese mentality':

> KAIZEN means improvement. Moreover, KAIZEN means ongoing improvement involving everyone, including both managers and workers. The KAIZEN philosophy assumes that our way of life - be it our working life, our social life, or our home life - deserves to be constantly improved.

The defining characteristics of *kaizen* are: continuous and incremental improvement; involvement of everyone in the organization and utilization group efforts; focus on maintenance and improvement, with emphasis on process rather than outcomes; a systems approach to problem solving and with a view on the long term (Imai 1986:24-25).

Although JUSE literature does not mention the term *kaizen* specifically, the *kaizen* philosophy flows through much of JUSE's principles and guidelines for QCC activities. For example, in discussing the issue of evaluation of QCC activities, Ishikawa (1985:148) discounted the monetary impact of such activity, while emphasizing the importance of process:

> Thus evaluation must emphasize factors such as the manner in which QC circle activities are conducted, the attitude and effort shown in problem-solving, and the degree of co-operation existing in a team.

The effect of *kaizen* when applied to the workplace, was a mindset which encouraged the stretching of the capabilities and the resources of the individual employee and of the workgroup, on an unending basis, much as the waves at sea gradually smoothen and round the edges of submerged rocks. Given this orientation, it is not surprising that the discipline of quality control management with its inbuilt mechanism for continuous improvement, caught the imagination of Japanese managers, engineers, foremen and workers.

The concept of jishusei

The basic text (Ishikawa 1985:140) also sets out the ten criteria that should be used as *the* guide when conducting QCC activities. These were: (1) self-development (2) voluntarism, (3) group activity (4) participation by all employees (5) utilization of QC techniques (6) activities closely connected with the workplace (7) vitality and

continuity in QC activities (8) mutual development (9) originality and creativity, and (10) awareness of quality, of problems, and of improvement.

Some of the guidelines for conducting QCC activity set out in the basic text seems contradictory and may have caused much confusion and misapplications. Some organizations might have found it difficult to reconcile the concept of 'voluntarism' (*jishusei*) with the guidelines that such activity should be continuous and that all employees should participate in QCCs. Ishikawa (1985:140-141) seemed well aware of this contradiction. In the 1985 translation of his book, he notes the growing 'spinelessness' and lack of independence' of the post-war generation of Japanese workers, but he is quite emphatic on the issue of voluntarism:

> ...so many companies forget that voluntarism is the key to success. They may command that everyone join QCC activities. Under certain circumstances commands may be necessary, but once the activities are at the take-off stage, this policy of command must be quickly changed. Unless employees can feel that they are participating in the activities on their own free will, they[these activities] cannot succeed.

According to Lillrank and Kano (1989:94), the English meaning of the word 'voluntarism' does not do justice to what Ishikawa meant by the term. In their translation of a Japanese guidebook on quality by Ishikawa (1981), the term *jishusei* was interpreted as possessing three characteristics. This included self-motivation-*jishusei*, where employees adopt an attitude of self reliance; process-*jishusei*, where employees decide on procedures and take responsibility for establishing their own standards; and, results-*jishusei*, where employees evaluate their own results and set their own goals.

In their survey of Japanese companies regarding the meaning of the term *jishusei*, Lillrank and Kano (1989:140-141) found that most Japanese employers' understanding

of the term is similar to that found in the Japanese guidebook on quality. They conclude that there are two major aspects of *jishusei* and voluntarism. These are: (1) the decision to join an activity; and (2) the motivating power that sustains the activity. To them, the difference between the English and Japanese terms is the difference in emphasis: the English term 'voluntarism' focused on 'free will' in the decision to join an activity while *jishusei* is more concerned about 'free will' as the self-motivating element in sustaining the activity (pp. 94).

With regard to the guideline of 'participation by all employees', Ishikawa (1985:142) is quite firm that it does not mean that all in the organization must join in QCC activities:

> 'Participation by all members' means that if there are six persons in one workplace, all six of them must participate in QC circle activities. It does not mean that all employees in a given company must participate in QC circles.

To Ishikawa, the principle is that all employees should participate in the company's total quality control programme in one way or another. The QCC is only one part of such a programme and some employees might still be involved in the company's quality control programme without being a QCC member. Yet, he is equally emphatic that in some situations, full participation was essential:

> To return to the case of the six persons in one particular workplace, participation by all six is imperative. If even one person decides not to participate, the QC activities cannot function smoothly. This is often the most difficult problem faced by leaders in programmes that are just beginning.

Although Ishikawa acknowledges the difficulty of securing all-employee participation even at the workgroup level, he is uncompromising in his stand regarding total participation by all group members. From this, it could be inferred that the basic unit of continuous work improvement in Japanese manufacturing enterprises is the group

and not the individual. In defining three stages of participation by employees, Ishikawa (1985:142-3) underlines the importance placed on full participation at group level:

> The first stage is to have everyone join a specific QCC. The second stage is to have everyone attend QCC meetings....The final stage is to engage in activities with each member assigned a particular task. When all three stages are completed the QCC becomes fully participatory.

Despite the difficulties, JUSE and Japanese employers, hold firmly to the concept of *jishusei* and all-employee (in the workgroup) participation to propel the grass-roots based QCC movement in Japan. According to Lillrank and Kano (1989:245) this is because Japan was originally a society made up of small farming communities, and the Japanese group-centred mentality originating from these small agrarian communities serves as an important lubricant in making the small group the natural social form. In using a group model emphasizing all-employee participation at the workgroup level, Japanese employers are involved in 'cultural modelling' (Askenazi 1991), and by employing a familiar social form they introduced an element of continuity in the new context, thereby facilitating the promotion and awareness of QC amongst the Japanese workforce.

Kaizen vs jishusei

The ambiguity inherent in the JUSE's interpretations of *jishusei* and all-employee participation in QCC activity is an example of the tension resulting from the use of normative structures of compliance on employees to achieve essentially economic goals of the organization on the one hand, and the individual-based nature of the *kaizen* concept on the other.

With Japanese QCC, the group and, not the individual, is perceived to be the basic unit for work improvement. This derives from the use of a cultural model based on small agrarian communities for the QCC which facilitated the use of normative methods of compliance, especially with regard to the ideal of all-employee (of the workgroup) participation in QCCs.

On the other hand, the ideal of continuous improvement or *kaizen* (Imai 1986) requires that each individual make a personal commitment to continually improve his performance beyond his job requirements, without any expectation of personal (material) gain. This involves an act of 'free will' and thus the element of voluntarism is an essential part of the *kaizen* process.

These two ideals are both essential for the growth and development of QCCs, as unless there is substantial employee involvement in QCCs, the impact of incremental improvement would not be significant. However, for continuous improvement, the commitment of the individual employee is essential. Thus the inherent tension in the QCC concept and the ambiguity in the interpretation of *jishusei*.

The ideal of bottom-up communications

Japanese TQC or Company Wide Quality Control systems emphasizes the need for bottom-up and horizontal communication flows, if the TQC plan is to succeed. Mizuno (1988:23) notes that a TQC system in which management creates standards to be followed blindly by workers would not work:

> Workers who reluctantly do only what they are told within their allotted time cannot produce good quality products. Good quality products are produced only when everyone is willing to put his all into his work. Still, modern, sophisticated equipment makes it impossible for everyone in the workshop to work at his own pace and in his own way like the craftsmen of old. This is where QCCs come in. QCCs provide a

forum for people in the workshop to exchange ideas and to stimulate each other to do better work.

Mizuno also emphasized the need for managers to stay in touch with the factory floor as:

> Out of touch with floor workers and the nitty-gritty of daily operations, corporate executives often fail to develop a feel for what is happening or the sense of crisis that things are not as they should be. As a result, they lack that sense of urgency, that awareness of TQC requirements, and that determination to meet the challenge of implementing TQC that are the ingredients of success (p 28).

It could be surmised that very early in the history of their quality movement, the Japanese were conscious of the need for a well developed system of bottom-up communications. Ishikawa (1985:141) in his discussion on voluntarism and QCC activity, concludes that:

> In an ideal form of democratic management, the systems operating from the bottom up and from the top down are well coordinated. If only one of these systems is emphasized, it never works.

Ishikawa's ideal of a 'democratic management' as a well coordinated system of 'bottom-up' and 'top-down' communications is a distinctly Japanese hybrid. It is also a fundamental tenet that has underlined much of Japanese quality control philosophy and practices, and the QCC is no exception. This is reflected in the distinctive characteristics of Japanese QCCs and its unique organizational arrangements.

3.3.2 Characteristics of Japanese QCCs

In its mature form, the Japanese QCC is a small group of employees from the same work area, who meet together regularly and continuously, using systematic problem solving tools that are applied to their intimate knowledge of their own work in order to continuously improve it (Lillrank and Kano 1989:249).

QCC membership

Membership of the QCC is usually based on the work unit or section, and the number of members in a circle was determined by the number of employees in the unit. The average size of a QCC based on a 1983 survey by JUSE was 7.21 individuals (Onglatco 1988:19). Each QCC has a leader who guides the activities and perhaps also a theme leader depending on the circle theme handled. In newly formed circles, the foreman or first-line supervisor could assume the leadership role in the circle, while the departmental head or workshop manager is designated as the 'person-in (overall)-charge' of the QCC programme in the workshop or department.

In practice, employee participation in circles seems to be compulsory. According to Onglatco, JUSE's 1983 nationwide survey of 478 managers, 90% reported that QCCs were formed as a result of company policy or directives (Onglatco 1988:19). Only 6% reported that circles arose as a result of employee initiative (refer to Table 3-2).

Table 3-2 : The basis of circle formation [JUSE Survey 1983]

Basis of Circle Formation	Percentage
Company policy/directives	90
Employee initiative (*jishusei*)	6
Others	4

Source : Onglatco 1988 : 19

Group problem solving

Central to the Japanese QCC is the emphasis given to regular group meetings. This is also the most difficult QCC operating problem for many firms especially if members were involved in shiftwork (Lillrank and Kano 1989:71). Onglatco (1988:27) reports that in the 1980s, the majority of Japanese QCCs met for about an hour every fortnight.[8] Thus, in contrast to autonomous work teams or self-managing work teams found in some Swedish firms, Japanese QCCs are not directly part of the daily work routine of its members (Cole 1989). However, Onglatco (1988) notes that although the time spent on the group meeting is relatively short when compared to the total work hours of each employee per fortnight, it would be a mistake to base the effects of Japanese QCC activities on circle meetings alone as Cole (1979) has done. This is because other activities such as data collection and data collation, were carried out by individual members outside of the group meetings and during the course of their daily work.

Based on the same JUSE survey, Onglatco (1988) also reports that about two-thirds of QCCs in Japan meet during regular working hours, while one-third conduct their circle meetings after working hours. About 40% of companies surveyed paid overtime allowances for QCCs which conduct their activities outside the members' normal working hours. The majority of circles completed at least two themes a year. The data also indicates that more than 80% of circle themes are directed towards the attainment of company policy, and 78% of themes deal with quality improvement, efficiency enhancement or cost reduction (refer to Table 3-3).

[8] Onglatco's findings are based on JUSE's 1983 survey of 800 companies and on the *Denkiroun* survey (July 1983) of 712 unions in Japan.

Table 3-3 : Circle theme content [JUSE 1983 Survey]

Theme Content	Percentage
Improved quality	24.8
Enhanced level of efficiency	24.1
Cost reduction	18.9
Innovation of facilities	9.6
Prevention of errors	5.0
Higher standards of control	3.2
Safety	3.2
Others	9.4

Source : Onglatco 1988 : 22

One distinguishing feature of QCCs is the use of a range of problem-solving tools, including statistical process control techniques. Commonly known as the seven tools of QC, they are: the *Pareto* diagram, the histogram, the tally sheet, the control chart, the *fish-bone* diagram and the scatter diagram. Two newer methods recently introduced are the relations diagram and the *tree* diagram (Karatsu and Ikeda 1987).

Role of the kanji

Some foremen and supervisors in the workshops function as *kanji,* or QCC coordinators, whose role is to advise circles on a daily basis. They helped the circles define themes, advise circles on technical problems, and provide role models to the circle members (Lillrank and Kano 1989:67). The *kanji* are given intensive training in the whole range of QCC tools and are expected to disseminate this knowledge to the workers they supervise (Cole 1979:137-138) and through them, workers would have the opportunity to acquire and apply QC tools and techniques. Thus, the *kanji* played a crucial role in the on-going operations of the QCC:

> In interviews with employees and managers, the most often encountered explanation for why circles work well in some departments, and fail or are ineffective in others, is the difference in the personal enthusiasm of the kanji. Their function as role models for circle members is essential. Their strategic function as the 'linking in' (Likert 1967) between the promotion organization and the circles is decisive, however. As a

linking pin, the kanji translate the company policies and targets and other input from management to the circles. (Lillrank and Kano 1989:67)

The QCC convention

Another key characteristic of Japanese QCC is the QCC presentation conference or convention. This is a regular forum whereby circles present their results to an audience made up of managers, including top management, and other workers. To Japanese corporate management, the convention serves several purposes. Firstly, it is an opportunity for management to publicly display their interest in the QCC programme. It is also used to demonstrate that the QCCs are part of the company-wide quality programme. It provides a forum for the diffusion of circle ideas and methods, and serves to motivate circles to greater effort. Furthermore, regular conventions at specified dates on the QC calendar help spur circles by providing deadlines for their projects (Lillrank and Kano 1989:72).

QCC as part of company wide quality control programme

In Japanese firms, the QCC is implemented as one aspect of the firm's quality management system or TQC system (Ishikawa 1985; Imai 1986; Onglatco 1988; Mizuno 1988; Lillrank and Kano 1989) and is usually targeted at employees at the lower levels of the organizational hierarchy. However, these employees are not left to their own devices to tackle their work-related problems, but are supported by an infrastructure to aid them in their group problem solving process. Thus the Japanese QCC programme is essentially management driven with top, middle managers and workshop managers/ supervisors/foremen all involved in the promotion of QCCs in their organization (Lillrank and Kano 1989). Lillrank and Kano's (1989) survey research on the organization of QCC activities in Japan also reveal that line management is heavily and directly involved in the management of circle activities

through the setting of goals, provision of advice on the problem-solving process and evaluation and implementation of results of QCC efforts (pp. 67).

From the Western organizational framework such as structural analysis, the distinctive characteristic of Japanese QCC is the existence of two seemingly conflicting characteristics. This is the central role played by management in QCC activities and the decentralization of responsibility of corporate objectives for quality control down the organization to shopfloor workgroups. However, a Japanese interpretation would be that the management's role represented the 'top-down' aspect of QC activities while QCC presentations of problem-solving themes are the 'bottom-up' flow of communications in the organization.

3.3.3 The Organization of Japanese QCC

The need for a theoretical framework

Discussions regarding the organization of Japanese QCC have focused on the way circles themselves are organized (Imai 1986; Mizuno 1988; Onglatco 1988), or on the national structure that was an integral part of circle activity in Japan (Cole 1989). Except for Lillrank and Kano (1989), there has been no other attempt to conceptualize Japanese QCC in terms of social or organization theories.

Outside Japan, the emphasis has also been on the way circles themselves are organized (Wood *et al.* 1983; Hutchins 1985; Dale and Lees 1987; Oakland 1993) and on QCC outcomes/impact, benefits and/or pitfalls (Wood *et al.* 1983; Bradley and Hill 1987). There have been some attempts to take a more structural perspective: Crocker *et al.* (1984:38-41) and Lawler and Mohrman (1985:66) explain the QCC system as a parallel organization existing alongside the formal organizational structure.

One reason for this general failure to analyse QCCs from the perspective of organization theory is that in Japan QCCs evolved as a response to workshop quality problems and not as a deliberate attempt at restructuring work as is the case of the autonomous work teams derived from socio-technical systems theory (Cole 1989). Further, as a movement led by practicing engineers and academics/consultants in the engineering science disciplines, it is essentially practice-oriented. For instance, Ishikawa (1985:118) observes that:

> As QC activities have become widespread, group psychologists want to get a part of the action. There are theorists who create Theory X, Theory Y and Theory Z and provide their critique of our activities. My response to them has remained the same. 'All of such theories are contained in our QCC activities. We do not present them as theories, however, we simply practice them.'

One major consequence of this iterative and practical approach taken in the resolution of the issue of worker participation has been the paucity of theoretical concepts in Japanese QCC literature. Given this approach, most literature on Japanese QCC has basically concentrated on describing and prescribing the phenomena itself with little attempt at conceptualization. However, to examine the universality of QCC practice across geographical boundaries, or for that matter, in the same locality but at different points in time, theoretical concepts and frameworks will be essential.

Thus it is neither possible nor desirable to exclude theoretical analyses especially as this research thesis attempts to explain the outcomes/consequences of QCC implementation in a specific national context outside Japan.

In this thesis, the QCC is viewed an organizational development/intervention tool borrowed from Japan and used to 'manage change' in organizations in Singapore. To explain the consequences of this Japanese import into the Singapore organizational context, it is necessary in the first place to develop a theoretical framework on which

analysis could be based. In this regard, an analysis of the organization of Japanese QCC is a vital starting point in the exploration process.

QCCs as parallel organizations

In describing QCC programmes as parallel organization structures, Lawler and Mohrman (1985:66) regard QCC activities as operating

> independently and in ways different from the existing organization. They emphasize different group processes, assign new roles to people, and take people out of their normal day-to-day work activities. To accomplish anything, the circles have to report their results back to the existing organization, which is the object of change as well as the controller of the resources necessary to effect it.

The QCC is thus seen as an adjunct to the formal organizational structure. This is because it falls outside the hierarchical ordering and flow of authority and decision-making that characterizes the formal organization (Bleu and Scott 1962). Further, the activities of the circle are likely to demand that members' involvement in the activities exceed that of their daily work behaviour as defined by their roles and positions in the organizational hierarchy. For these reasons, Lawler and Mohrman (1985) argue that QCCs are unstable structural devices.

However, the Japanese QCC has been more enduring than the prognosis given by Lawler and Mohrman. Lillrank and Kano (1989:114) see Japanese QCC activity as a hybrid parallel structure which incorporates elements of both the formal and informal organization:

> QCC activity is formal in the sense that it is established by management initiative: the parallel organization is accepted as part of the company and given directions by management. It is informal in the sense that its smallest unit, the circle, can

> independently set internal operations, styles and goals. In this sense QCC activity is a hybrid organization: it includes elements of both its 'parents', the formal and informal organization, but also includes some unique aspects.

Implicit in the Japanese emphasis on QCCs as mechanisms for continuous improvement is that they should be permanent structures within the organization. Lillrank and Kano (1989) argue that the concept of *jishusei* and other key ideas embodied in the QCC basic text are central to understanding the nature of QCC activity as a hybrid organization structure (p 93), and that the English translation of the Japanese term, *jishusei*, as voluntarism 'does not do justice to the Japanese term' (p 94). In the English language the term 'voluntarism' imply that employee participation is voluntary and the decision to participate rests solely with each individual employee. Yet, Lillrank and Kano note that JUSE's principles of QCC activity include the insistence that everyone in the workshop should participate in QCC activity. To the Japanese, the term *jishusei*

> is not a matter of an individual being able to decide whether to join the activity or not; rather, it implies that the activity, once started, should be propelled by the energy of the members themselves, without constant oversight(sic) and interference from outside...Thus, jishusei essentially is not as much a concept about the rights and freedoms of individual employees as it is about the autonomous nature of QCC activity. (Lillrank and Kano 1989:94-5)

In short, the ultimate autonomy of QCCs is *the freedom to produce results.* The theme selection mechanism is left to the individual circle although circles are expected to choose themes that are solvable within the competencies, skills and other resources available to members. There was also the freedom to decide about the internal structures and procedures within the circle. Lillrank and Kano (1989:99) argue that as employees could not be coerced into generating productive ideas against their will, companies following the principle of *jishusei* do not attempt to 'command' or use formal

penalties to implement QCCs and no mechanism exists to enforce management commands by means of sanctions as would have been the case if QCCs are part of the formal organization.

Therefore, although a company could establish a framework for the promotion of QCCs, such as the emphasis on all-employee participation (within a workshop or department) in QCCs and the importance placed on the personal and public involvement of top managers in the organization's QCC activities (Ishikawa 1985; Mizuno 1988), it has to rely on the internal motivation of employees, role models and peer pressure to encourage and spread QCC activities in the organization.

Given this, Lillrank and Kano (1989:99) conceptualize the QCC as:

> a sort of 'autonomous island' within the legitimate company organization, in which members can freely set the style and interaction patterns of the activity without having to hide it from public view.

That is, QCCs are neither completely part of the formal or the informal organization, but a hybrid of the two.

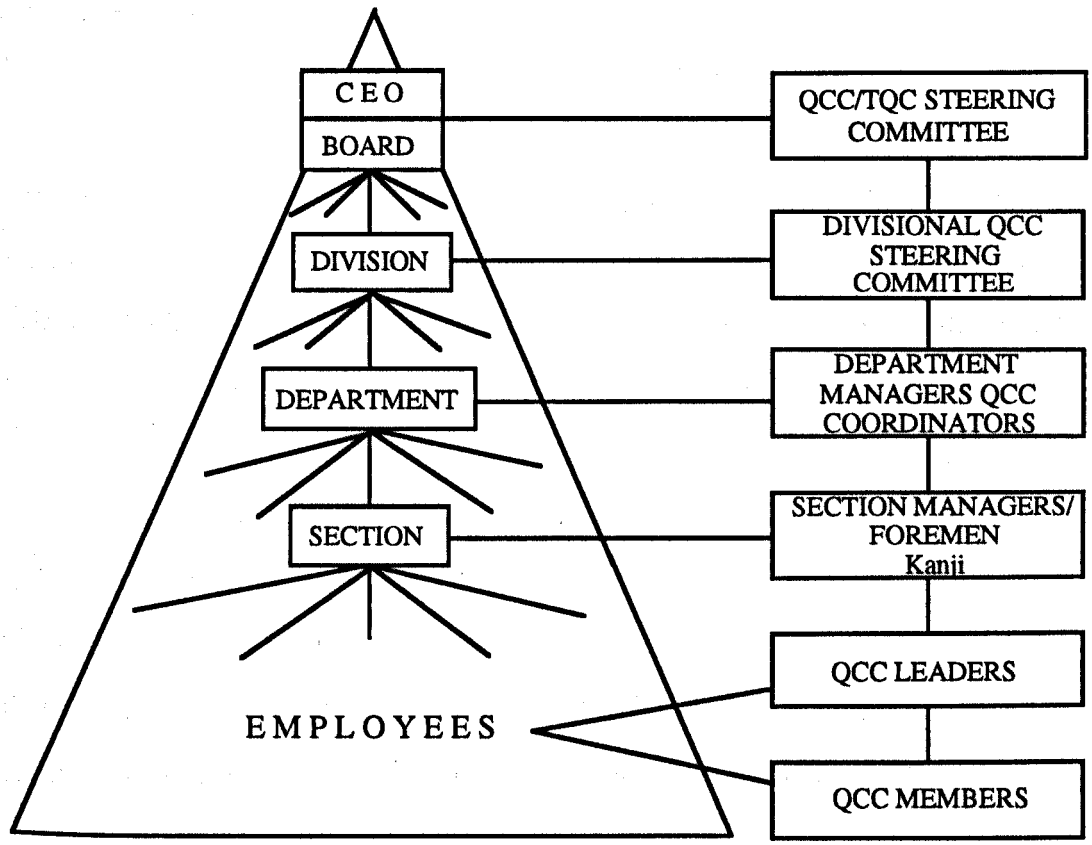
QCCs as hybrid organization structures

In contrast to the loose groupings that make up an informal organization, Lillrank and Kano (1989:116) see the Japanese QCC as a hybrid structure organized into three levels which correspond to the hierarchical levels found in the formal organization. These are: (1) the QCC promotion committee comprising members of top management. Its role includes overseeing a system for evaluating and implementing circle suggestions, and the building of a corporate culture conducive to QCC activities; (2) the *kanji* (QCC coordinators) who are mainly the line/workshop managers, and who function as coaches and coordinators of the circles ; and (3) the QCCs, made up of employees from

the same workshop, engaging in continuous work-based problem solving activities in permanent small groups, outside their normal daily work routines.

Thus unlike the informal organization, the QCC organization is a highly structured organization set up by corporate management for the sole purpose of running the QCC programme in the organization and in this sense, it is a hybrid parallel organization structure (refer to Figure 3-1).

Figure 3-1 : QCC Hybrid Parallel Structure



Adapted from Lillrank and Kano 1989 : 64

The development of this hybrid structure can be seen as an attempt by Japanese corporate management to deal with two perceived inherent weaknesses of Japanese organizations.

Ishikawa (1985:18) identifies one of these weakness as the over-reliance on feelings. Thus the use of statistical tools and of facts and data in QCC problem-solving are aimed at correcting and countering the inclination towards 'gut feel'. It is also an effective

method of gaining the formal acceptance of superiors (in the hierarchy) of worker suggestions and proposals, as such proposals would then be perceived to be based on rationale and not intuition.

The formal hierarchies in Japanese organizations are seen by Ishikawa (1985:24) as being too much of 'a vertical society'. The hybrid structure thus ensures that lower level employees would get a better hearing if their ideas are channelled through the QCC structure than if these ideas are submitted on an *ad hoc* basis to factory management or if workers' proposals are voiced at the workshop level. The QCC hybrid structure enables circles to present their findings and recommendations direct to top management for evaluation, thus by-passing the workshop line managers' decision-making authority. This legitimizes the bottom-up communication by workers direct to top management. In a rigid organizational hierarchy such as the Japanese firm, bottom-up flow which by-pass the immediate supervisor would not normally occur as subordinates are expected to comply with the formal chain of command.

At the same time, the use of a parallel structure to cater for the continuing flow of bottom-up communications of work improvement ideas also protects the status quo of the formal organization, and leaves the hierarchical order unchallenged. Furthermore, with the formal organization left intact, the managerial prerogative of accepting or declining employees' QCC suggestions or proposals, is preserved.

Finally, the hybrid organization allows free expression of workgroup creativity in the problem solving stage, while at the same time, ensuring that the circle's output is subjected to the rigorous examination of the formal organization through the QCC conventions and company suggestion schemes. Thus, through these structural arrangements, new ideas and work improvement proposals by workers could be introduced into the formal operational/production cycle with the minimal disruption to the daily operational or production task.

Limitations of structural arrangements

Although these organizational arrangements do elicit high QCC participation among workshop employees, Lillrank and Kano observe that the ideals of QCC activities are not always achieved. Their research indicate a weak relationship between quantity of QCC activity, and the quality of the activity and end results. This suggests that 'there is a lot of QCC activity going on that does not lead to anything' and 'there seems to be a fairly large number of workshops where the activity is quite unproductive' (pp. 158). They also quote a number of Japanese survey findings which show that only about 10-20% of circles are 'very active', with the same proportion of respondents 'totally passive', and the rest 'working so-so', with periods of high activity and occasional slow-downs (pp. 173). According to Lillrank and Kano (1989), this aspect of QCC activity is recognized in Japan as *mannerika*, this being a Japanese term for an activity that is carried out as a mere formality. They also report that the presence of *mannerika*, resulted in circles 'working with unimportant problems and making presentations in conferences just for the sake of giving a good impression' (pp. 158).

The occurrence of *mannerika* could be seen as a means of passive resistance to QCC practice by some Japanese employees. Lillrank and Kano (1985:175) see it as a natural outcome of the policy of all employees (of the workshop or department) participation in a QCC programme, a policy which is enforced as a result of directives originating from the hierarchical chain of command. *Mannerika* is thus an outcome of the hybrid organization structure and its presence indicates that despite the integration of the formal and informal elements of the organization, the tension between these elements are not fully resolved.

Notwithstanding these problems, the hybrid structure remains the main mechanism through which Japanese corporations implement the QCC activities in their organizations (Lillrank and Kano 1989; Onglatco 1988). This would seem to imply that while Japanese corporate management subscribe to the principle of bottom-up

communications, they are just as determined to leave the hierarchical structure of their organizations intact. With the hybrid structure, both these aims are to some extent achieved.

According to Lillrank and Kano (1989: 110) this Japanese solution to the problem of worker participation in work improvement developed from years of trial and error:

> In retrospect, it may look like a systematic and planned activity, but the truth is rather that it was a trial and error process, driven by the immediate needs of meeting performance targets.

Nevertheless, the final outcome of this iterative process is a systematic and planned approach for directing worker efforts and focus towards quality awareness and improvement. Therefore, despite the strong systems thinking underlining the Japanese QCC concept and practice there have been few attempts to bring systems thinking into the analysis of the Japanese QCC.

Thus, Lillrank and Kano's (1989:1) attempt to develop 'a systematic model of the organizational nature and management of Japanese QCC activities' is one of the few comprehensive theoretical works on Japanese QCC to develop a systems model for this popular small group technology.

3.4 LILLRANK AND KANO'S SYSTEMS MODEL OF JAPANESE QCC

3.4.1 An open systems framework

Lillrank and Kano (1989) frame their model of Japanese QCCs on systems theory, with organizations seen as a special class of open systems. Thus the organization is viewed

as 'an energic input-output system in which the energic return from the output re-activates the system' (Katz and Kahn 1978:20).

The model defines three units of analysis: (1) the actors; (2) the 'settings' or contexts; and (3) the functional or behavioral sub-systems. In emphasizing the roles of actors as the units of analysis, Lillrank and Kano (1989:43) assume a more prominent role for the actors in the system and in this respect, they base their assertions on the dominance of actors as highlighted in the decision-making theory perspective of Herbert Simon (1960) and the Carnegie School (e.g. Cyert and March 1963).

The QCC system environment is viewed as comprising seven levels: global, national, industry, company, unit /division (strategic business unit), workshop and workgroup. Each context is linked to an actor. The workgroup is regarded as both an actor and a context since workgroups comprise the context for the first line supervisor (as an actor) but when individuals in a workgroup (circle) express an opinion, it becomes an actor (refer to Figure 3-2).

Figure 3-2 : Lillrank and Kano's QCC systems model: Actors and Settings

ACTORS	SETTINGS
	Global
Government National Organizations	**National**
Labor Unions	**Industry**
Industry Organizations	**Company**
Company (top management)	**Unit (SBU)**
Unit (middle management)	**Workshop**
First-Line Supervisors	**Workgroup**
Workgroup	
Individuals	

Source : Lillrank & Kano 1989 : 45

3.4.2 The functional sub-systems

To analyse the QCC system, Lillrank and Kano (1989:45) conceptualize three interdependent functional sub-systems: *hardware, software* and *humanware*.

The *hardware* sub-system encompasses Kast & Rosenweig's (1973) technological, natural resources, demographic and economic sub-systems. The logic of this sub-system is seen as essentially 'the logic of costs' and which exerts an influence on the formal organization and the organization of the task of technical production.

The *software* sub-system refers to the rules, routines and institutional arrangements, that is, rules and procedures that are created for a specific purpose, in the same sense that a computer software programme is a system of rules. It operates on the 'logic of efficiency', and addresses 'the problem of how cooperation between individuals and groups can be assured' (p 46). The *software* sub-system encompasses 'the macro-level institutional arrangements that provide the major framework for human behavior' and as such, is essentially 'the same as the formal organization of classical organization theory' (pp. 45).

Lillrank and Kano put forward the concept of *humanware* to categorize those behaviours in the organization that are not the direct outcome of explicit rules and regulations but which are important for the performance of organizations. Thus the *humanware* sub-system follows 'the logic of sentiments', that is, human feelings, such as established ways of doing things (within a social group) and what they call 'a social atmosphere'. It is governed by implicit rules and is influenced by the cultural values of the society and the values and norms of the groups in the organization. In terms of organization theory, the concept a *humanware* sub-system refers essentially to the emergent properties of the informal organization (pp. 46-47).

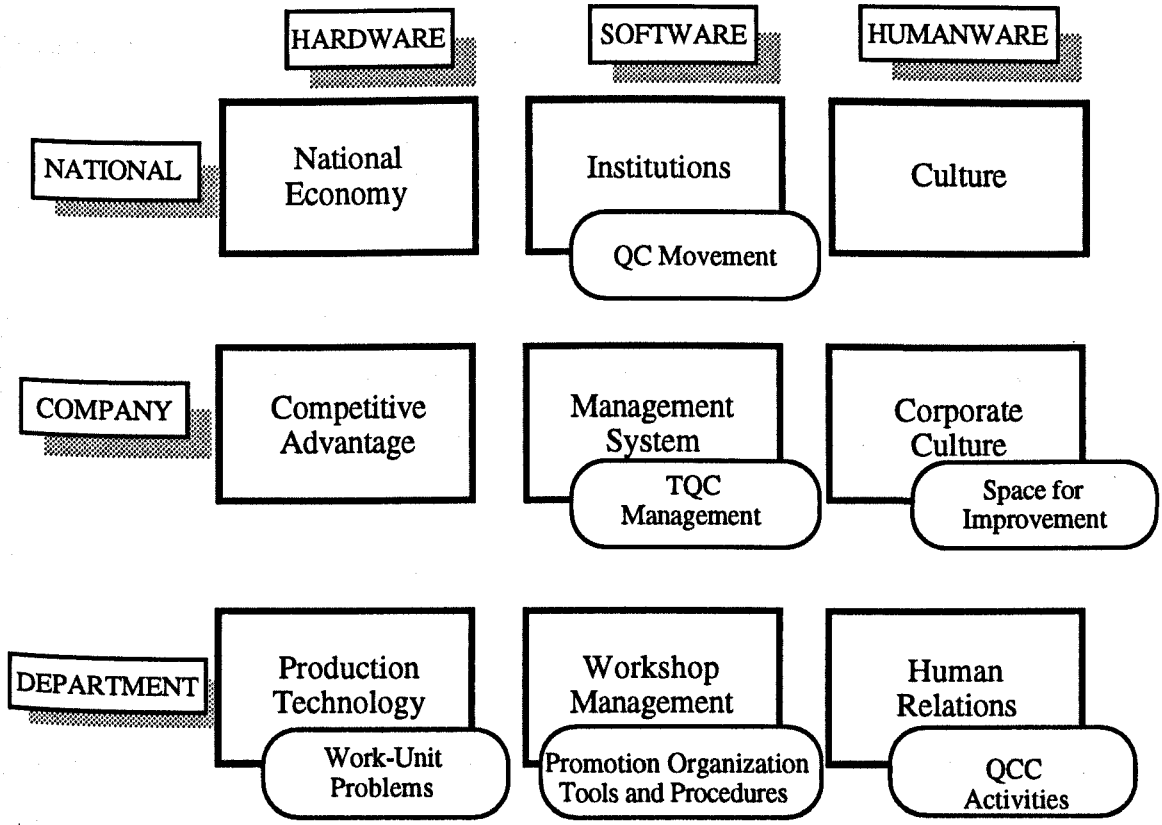
Thus the formal organization is seen as comprising elements of the *hardware* and *software* sub-systems while the informal organization is represented by the *humanware* sub-system.

In this systems model, the management of the QCC organization involves managing the interactions of the three sub-systems so as to achieve the desired goal:

> Management of organizations relies on mix of *hardware, software,* and *humanware* [own italics] methods. Hardware management operates through physical set-ups such as factory layouts, machine pace, material flow, etc., and uses economic incentives as motivators. Software management relies on order, rules, and bureaucracy, the main incentive being promotion through the hierarchy. Humanware management is executed by establishing common objectives, by providing information for employees who are supposed to be able to make intelligent decisions, and by enthusiasm and 'corporate culture'. (Lillrank & Kano: 47)

Lillrank and Kano (1989:48) link these three behavioral sub-systems to three contexts: national, company and department, to arrive at a conceptual map of the environment of Japanese QCC activities (refer to Figure 3-3).

Figure 3-3 : Lillrank and Kano's QCC systems model : conceptual map of the environment of QCC



Source : Lillrank and Kano : 1989 : 48

3.4.3 Management as the key actor

The management of QCC activity is viewed as a systematic effort with management playing the crucial roles of 'investing' in *hardware* resources such as money for education and compensation, provision of meeting facilities and allocation of executive time to QCC activities; of 'installing' *software* resources such as the establishment of a QCC organizational structure and administrative measures to implement circle themes; and, through the personal effort and enthusiasm of managers, who by adopting a 'QCC promotion style', direct the *humanware* resources present within the social groups in the organization towards the achievement of QCC goals (p 49).

The model highlights the relationships between the three management levels in the organization hierarchy and the three sub-systems, that is, the roles played by each management group in the administration of QCC activities in the organization (refer to

Figure 3-4). Thus, Lillrank and Kano systems model has a strong management orientation as they see management as the key moving force behind QCC activity in the organization:

> The circle, as a sub-system, needs constant input of energy (negative entropy) from its environment in order to survive and grow. There are no instances where a QCC movement could survive and grow without the support from management. Without management support, informal activities would lose their hybrid character and with it much of their direction, goals and systematic problem-solving methods. To put it simply, QCCs exist because they are perceived [by management] to be needed. Without this perception, they won't survive (p 38).

Figure 3-4 : Lillrank and Kano's QCC systems model: the Japanese administration of QCC activities

	HARDWARE	**SOFTWARE**	**HUMANWARE**
TOP MANAGEMENT	Basic investment of money, time and facilities	Establish a QC policy and organization	Encouragement Example Enthusiasm
MIDDLE MANAGEMENT		Maintain the promotion organization	Management Support
KANJI (Workshop Management)			Promotion style : Advice and help to QC circles

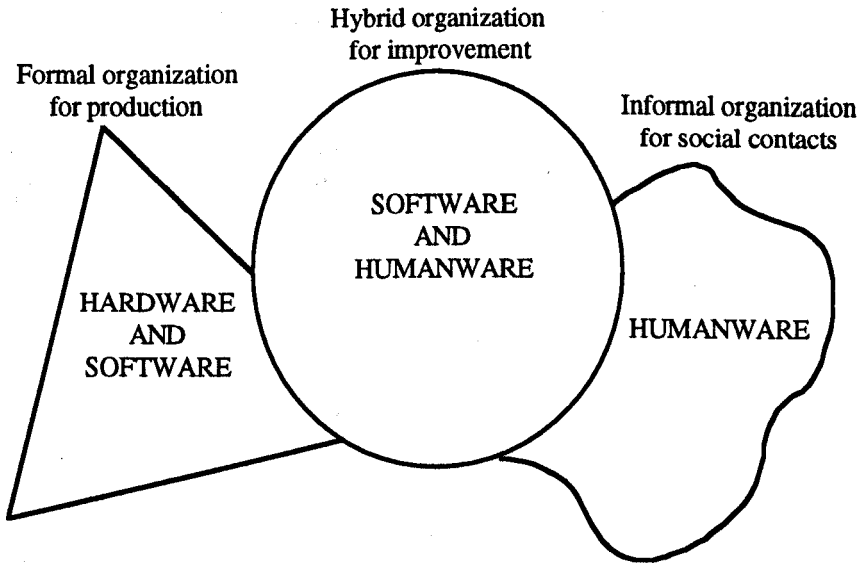
Source : Lillrank & Kano 1989 : 50

The model also explains how Japanese organizations manage the organizational problems arising out of the hybrid parallel organization structure set up to run QCC activities. The main organizational problems are seen as: (1) how to systematize innovative and spontaneous behaviour without destroying by trying to fit it in a framework that is too mechanistic; (2) how to promote the role of QCC as mechanism

for continuous workshop improvement in a context where such activity is undertaken by employees whose main task is to do the normal routine work and to follow the rules and maintain standards, and where 'coming up with good ideas for the organization and presenting them to management is not the typical job of the worker' (Katz and Kahn 1978:404); and (3) how to ensure worker participation in workshop and operational improvement without eroding management prerogatives and opening the door to radical demands by workers for participation in all aspects of management (Lillrank and Kano 1989:109-110).

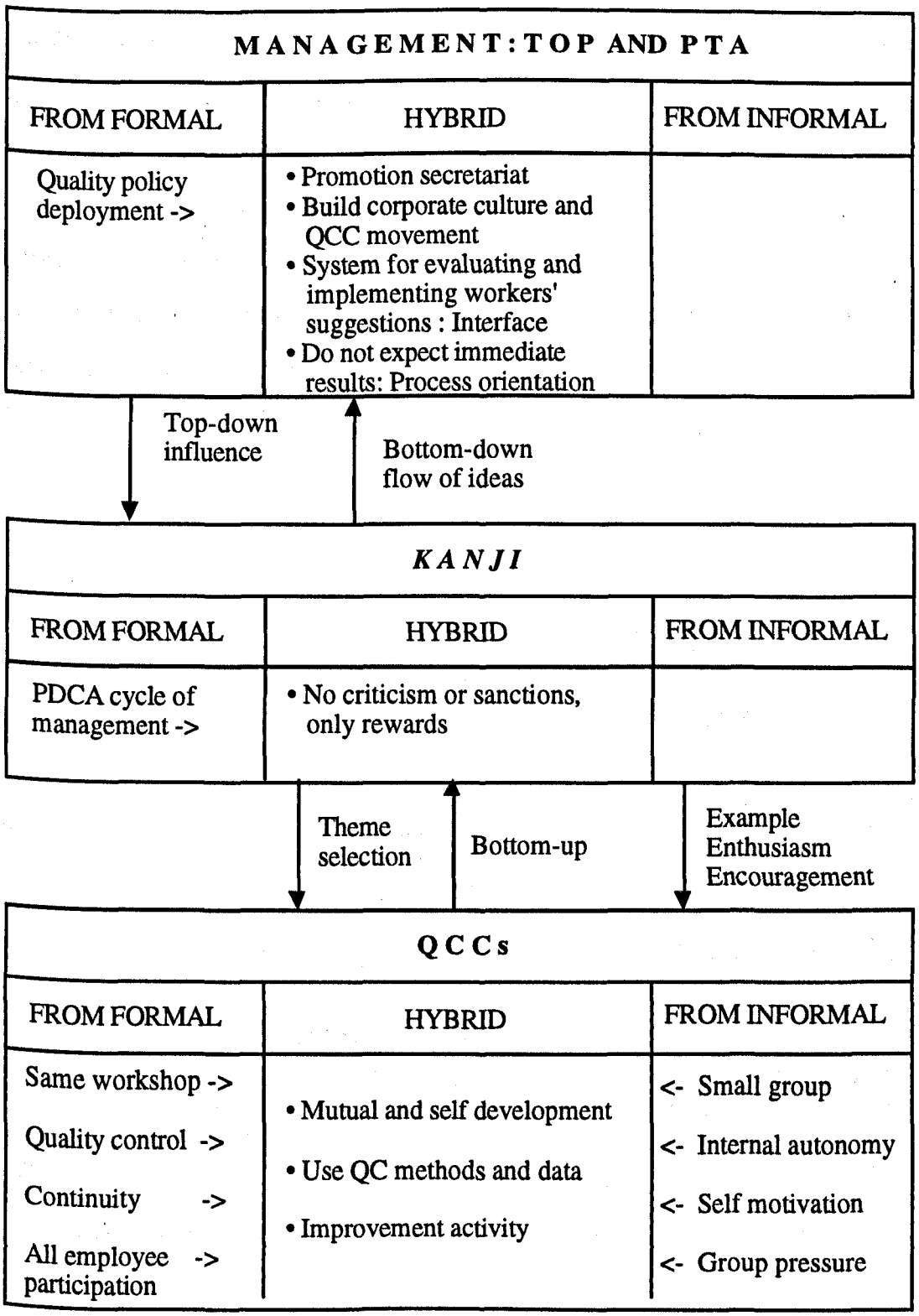
Lillrank and Kano attribute the enduring quality of Japanese QCCs to the success of Japanese corporate leaders in managing the QCC hybrid parallel organization structure. Top management through the QCC Promotion Committee, influence QCC activities with the use of *hardware* incentives such as money and other resource allocation decisions; and through the *software* sub-system by the imposition of rules and regulations regarding QCC activities, for example, the implicit rule that workshop managers and supervisors should regard QCC promotion as part of their job. On the other hand, workshop managers have to rely on *humanware* resources, such as culture, norms and values, and leadership style, to influence the circles. The QCC hybrid structure comprises mainly elements of the *software* and *humanware* sub-systems and within these sub-systems, it incorporated elements of both the formal and informal aspects of the organization [refer to Figures 3-5(a) and 3-5(b)].

Figure 3-5(a) : Lillrank and Kano's QCC systems model: The hybrid parallel organization



Source : Lillrank & Kano 1989:116

Figure 3-5(b) Lillrank and Kano's QCC systems model: QCC activity as a hybrid organization

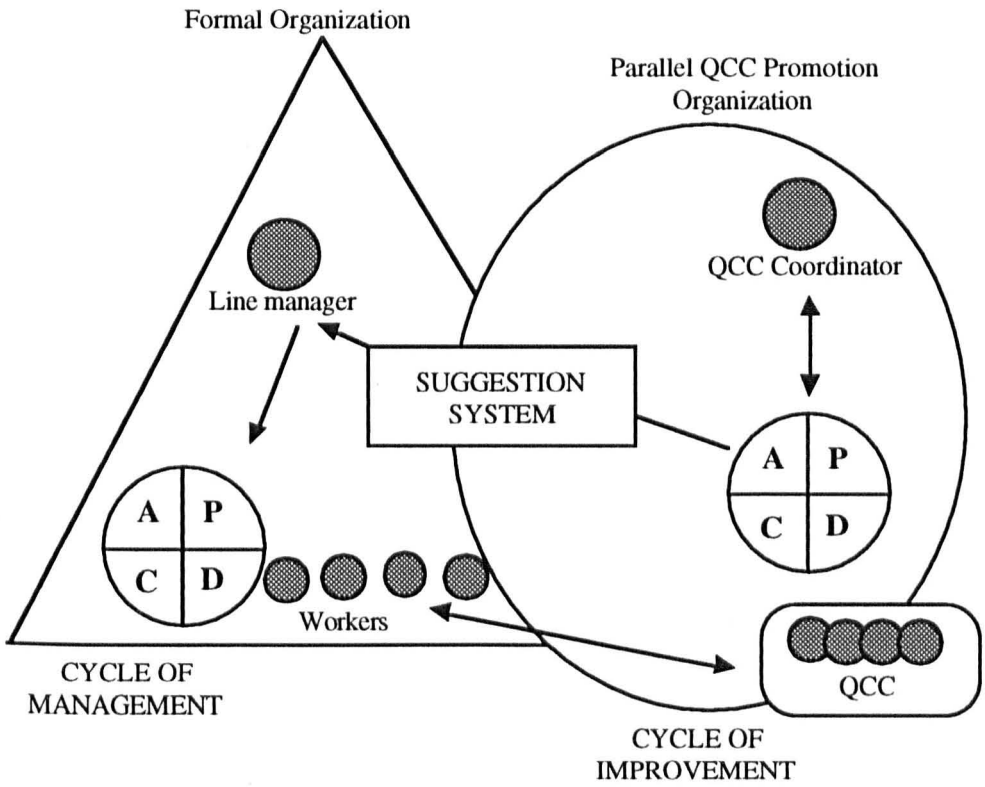


Source : Lillrank and Kano 1989 : 116

3.4.4 Key transformation processes

For QCC activities to be continuous, there must be a permanent conduit between the QCC system and the formal organization (refer to Figure 3-6). The top-down methods used by the QCC Promotion Committee and which mirror the authority flows of the formal organization (that is, from top and middle management to the QCC system) are not enough to encourage enduring improvement activities. Thus an on-going bottom-up flow of communications from the circles up to the formal organizational hierarchy is needed for continuous improvement.

Figure 3-6 : Lillrank and Kano's QCC system model : the suggestion system and QCC



Source : Lillrank and Kano 1989 : 117

However, because of the constraints of daily production operations, such as the formal authority and the management control cycle, there are practical problems in testing and implementing *ad hoc* ideas from employees through the formal routine production system. The QCC hybrid organization represents a channel through which employees

who are circle members, with the help of QC problem solving techniques, could systematically test and refine their ideas for work improvement, with the possibility of these ideas being incorporated into the routine production system.

To incorporate QCC work improvement projects into the daily work operations, it has to cross back from the QCC hybrid organization to the formal organization. The bridge or interface mechanism in this case is the QCC convention or the suggestion scheme, and it is here that the completed circle project is submitted for evaluation by the senior line managers in their formal capacity. If accepted, the ideas, generated by the employees, would be incorporated into the standard operating procedures of the formal operations cycle.

Within the circle, a key transformation mechanism is the development of the *QC Story* a problem solving approach which not only provides members with a systematic problem solving guide for group decision-making, but serves as a template for organizing the group's theme presentation to management (Lillrank and Kano 1989; Onglatco 1988; Karatsu and Ikeda 1887).

3.4.5 Critical system features

By formalizing the channel between the QCC system and the formal organization, the 'interpersonal randomness and uncertainty' (Lillrank and Kano 1989:118) of the informal organization was eliminated. Furthermore, as a result of this linkage, employee suggestions and proposals would have more clout than if they are put forward by employees, either individually or in groups, as part of the daily operations routine.

To Lillrank and Kano (1989), the success of Japanese QCC is the result of the unique methods that Japanese organizations used to manage their *humanware* sub-system. One key method is the establishment of strong corporate cultures to influence and shape workplace values and norms, such as the values of continuous improvement, innovation

and group centred problem-solving. In addition, to maintain and reinforce these norms and values, that is, to support the efforts of the *humanware* sub-system, Japanese companies arrange their *hardware* and *software* sub-systems to include programmes such as *zero-inventory* or *just-in-time* production, in order to break down work barriers and elicit cooperative work behaviour from workers.

By evolving a structure and system for mobilizing small group activities in the organization, Japanese corporate management is able to harness the innovative and spontaneous behavior of employees and to direct these released energies towards the fulfillment of the strategic goals of their organizations. It is for this reason that the Japanese QCC system has generated much interest outside Japan as most organizations have encounter difficulties in eliciting spontaneous work improvement behaviour on a continuous basis from their workers.

> The organizational significance of Japanese QCC activity is that it shows it is possible to create sub-cultures and areas of different realities within an organization and use these areas to achieve corporate goals. With a hybrid organizational structure incorporating aspects of both the formal and informal organization, improvement activities can draw resources both from the systematic and persistent aspects of management and the spontaneity of the informal organization.
>
> (Lillrank and Kano 1989:252)

The uniqueness of this hybrid structure is that it avoids the problems of relying on only the formal or the informal organization as a framework for conducting continuous improvement activities in the firm. Finally, it has been attractive to many corporate management outside Japan because it leaves the organization's hierarchical authority system undisturbed and hence, does not present a threat to management authority and would not upset the established power relations in the organization.

3.4.6 Critique of model

According to QCC pioneer Ishikawa (1985:151-152), the *Zero Defect* (ZD) movement[9] failed to take off in the United States in the 1960s because the necessary organizational arrangements needed to sustain worker involvement in improving standards did not exist and were not created as part of the movement:

> The ZD movement became a mere movement of will. It emphasized that if everyone did his best there would be no defects ...it failed to teach participants the QC method of implementation. It was a movement without tools...The movement became just one big show...Had there been an organization like the QCC conference to provide opportunities for mutual development, results might have been different.

The different outcomes of these two similar programmes regarding worker involvement in QC activities can be attributed to the failure of the ZD movement to develop structures and processes needed to sustain the desired behaviour. However, this does not imply that the QCC as a small group technology can be universally applied across national boundaries. This is because the application of social technologies in 'new' contexts is usually problematic:

> under the right conditions certain institutional arrangements are fairly rapidly grasped as being essential to economic progress. Consider the spread of the joint stock company, double-entry book-keeping, and multi-divisional decentralized management structures. Many other institutional innovations, however, are not easily compared and evaluated *vis-à-vis* existing arrangements. Social innovations often interact with other processes in a way that obscures their respective contributions to economic growth... Social innovations like small group activities may have multiple goals, of which contribution to economic success is only one...The complexity and the lack of

[9] This QC movement originated from the United States defence industry at around the same time as QCCs in Japan.

> clarity in these relationships and the abundance of unwarranted inferences both lead to an element of fad in the adoption of social innovations.
>
> (Cole 1989:107)

In this respect, Lillrank and Kano's (1989) systems model of Japanese QCC as a theoretically grounded organizational study of the QCC is an important contribution to the study of small group technology in organizations. Furthermore, its systems roots imply an attempt 'to dig beneath the surface to discover "structures" (patterns and regularities) that determine the arrangements of social facts' (Jackson 1991:22).

In terms of Burrell and Morgan's (1979:159) organizational framework, Lillrank and Kano's (1989) model fall into the functionalist paradigm:

> The organization is regarded as essentially purposive in nature and as having certain needs and functional imperatives which must be fulfilled if the organization is to continue to exist. Thus systems models of organization are often predicated upon the assumption that organizations, like organisms, aim at survival.

Based on an open systems framework, the organization is perceived as having an overriding common goal to which all in the system are working towards and with the 'sub-systems (are) defined and their actions judged with reference to their influence upon the ability of the system to achieve its primary task' (p 159).

The primary focus is on the managerial sub-systems, hence there is a strong managerial bias in the model as the authors are firm in their belief that without management support, the QCC would not survive.

Although they claim to adopt the decision-making perspective of Herbert Simon and the Carnegie School, they seem quite content to treat the 'lower levels' as 'black boxes', on the grounds that their approach, like Cole's (1989), is a macro-level analysis of the

QCC phenomenon. The focus of their model is centred essentially on the decision-making role of managers in devising and maintaining the QCC hybrid structure and they see the 'institutional arrangement and management systems as closely linked to the QCC phenomena' regarding them as part of the software sub-system, which could be manipulated by 'forward-looking managers'. Thus management is perceived to be the key actor:

> To put it simply, QCCs exist because they are perceived (by the management) to be needed. Without this perception, they won't survive.
>
> (Lillrank and Kano 1989:165)

The model would have been improved if the roles of other key actors such as circle members and leaders are also explored, especially with regard to how they influence the transformation process.

There is also an implicit assumption in this model that the system is stable. This somewhat constrains the assumption of 'openness' in the system and in fact, their model deals very little with the interaction between the QCC system and the environment beyond the organization. Thus, their analysis of how the QCC hybrid structure draws on these three behavioral sub-systems to implement the goal of continuous improvement and bottom-up communications fails to explain how the sub-systems cope with the changes in the business and social environment.

Although the model defines six pairs of actors and settings, in the authors' analysis, the emphasis of the systems model has been on only three pairs, namely: top management and the strategic business unit; middle management and the workshop; and first-line supervisors and the workgroup.

The underlying assumption is that organizations are essentially cooperative systems, with the management of the organization charged with the major role of sustaining the

organization and ensuring its survival. In this respect, the model reflects the influence of Chester Barnard's (1938) theory of executive functions and the role played by other employees who are involved in the QCC system have not been fully considered. Consequently, workshop employees and QCC members are delegated to a rather passive role in their framework.

Given the model's unitarist underpinning, issues of interests, conflict and power are not considered and this constrains analyses and explanations as to how such issues are resolved among the different groups in the Japanese organization. Hence Lillrank and Kano (1989:177) explain the lack of active resistance (by employees) to QCC participation as unnecessary 'as the activity is(was) supposed to be voluntary'. Yet they attribute the presence of passive resistance to both peer pressure and the use of management authority. A more pluralistic view might have provided a better understanding of the emergent processes of the *humanware* sub-system from the viewpoints of the subjects (such as workers and their supervisors), and possibly, a better understanding outcomes such as *mannerika*. However, this is beyond the scope of the functionalist rationality on which the model is based. Thus although the authors make a limited attempt at explaining 'perceptions', they do not go far enough (pp. 167-168). A more interpretive approach, mediated by critical systems thinking, might be necessary to break away from the confines of the unitarist perspective on which their model is predicated.

The unitarist perspective is popularly used to explain Japanese organizational practices. This perspective is often based on the assumption that all members of Japanese organizations share certain central cultural values, namely lifetime employment, group orientation or collectivism, loyalty to organization, and tradition of quality workmanship, all of which facilitate the acceptance of the overriding common organizational goal of continuous work improvement by all employees.

However, Lillrank and Kano (1989) see no credible causal links between culture and the QCC. They argue that although practices such as lifetime employment and the seniority wage system are cited as reasons for Japanese employees' commitment to QCC, female workers, part-time workers and employees of many medium and small-sized companies in Japan also participate in QCC activities. In these sectors, such employment practices are not features of the employment system. Furthermore, as wide differences in quality levels exist between export and non-export oriented companies, they argue that the 'culture of quality' argument does not apply across the board when comparing the Japanese worker to those of other nationalities:

> Consequently, for an explanation of the existence of QCC activity, the culturally based explanations are not of much help. This is not to say that cultural matters are of no consequence, only that their role is limited (p 160).

Therefore Lillrank and Kano's explanation for the existence of QCCs is closer to the structural functionalism approach (Selznick 1948). They viewed the emergence of QCC as a response to the effects of growing bureaucratization and centralization in Japanese companies over two preceding decades, and see the QCC as a specific response to the problems of worker alienation (p 162-163). Thus they emphasize the structural linkages between the formal and informal organization that facilitate the process of employees' contributions and the structural mechanisms in the transformation process as the key factors influencing QCC outcomes. In this respect, their conceptualization of the relationships between the formal and informal organizations by means of the three functional sub-systems of *hardware, software* and *humanware* is quite novel and useful.

Thus, notwithstanding the limitations imposed by its functionalist underpinnings, Lillrank and Kano's open systems model of Japanese QCC activities provide a sound theoretical framework for analysing organizations from a managerial point of view.

However, to move beyond a limited managerial perspective, it is necessary to undertake a critical analysis of the Japanese QCC phenomenon.

3.5 CRITIQUE OF THE JAPANESE QCC PHENOMENON

The QCC could be regarded as a form of social technology created by a Japanese corporate leadership consisting of top management and technical (QC) experts, and specifically designed to co-opt and mobilize lower level employee groups in Japanese organizations to work together to achieve the corporate quality and productivity goals. It is considered a small group technology because the workgroup is the primary mechanism for task-based problem solving in the workshop.

3.5.1 QCC and inter-subjective communicative action

The approach taken here with regard to a critical perspective on the Japanese QCC phenomenon is to examine whether the practical and emancipatory interests (Habermas 1979) have been considered in addition to the technical interests. Furthermore, in the pursuit of the technical goals, the main concern is whether purposeful discourse between the subjective selves have been displaced or ignored. At issue then, is whether in the case of e Japanese QCC system, the technical goals are obtained at the expense of inter-subjective communicative action, and as such, at the expense of the practical and emancipatory interests of those involved.

It could be argued that the process by which QCCs evolved in Japan could not have been possible without some degree of open discourse among the various groups in the organization. Here, the environment during the two decades after the World War II is seen as a key factor promoting open discourse. The country's defeat in the Pacific War, together with the demolition of the pre-war Japanese leadership structure by the American Occupation Forces presented the Japanese with a urgent need and an

opportunity to forge a new consensus among all Japanese, and a key point where this new consensus was forged was in the corporate and industrial relationships. Shibagaki *et al.* (1991:xii) explain this consensus as a lack of cultural resistance to the formation of a new economic system:

> The culture of a country or region is generally conservative in character, for it normally includes social consciousness deriving from religion, ethnicity, social status, and class. In contrast to this, economic activities are productive and therefore innovative in character. When we take up the question of culture in relation to the economy, we should examine the negative influence of culture on the economy rather than emphasize the positive and innovative aspects. In other words, we should ask whether or not and how and how much a culture acts as an obstacle to economic innovations. If we ask the question this way and examine the cultural roots of the economically rational character of Japanese management and establishment of the internal labour market or the corporate capitalism underlying it, I must say that the presence of the type of culture that could prevent the formation of such a new economic system was not very strong. Or to put it strongly I would say that there was no such culture in Japan. Conversely, we may say that in the case of Western countries, the culture formed by the nineteenth century acted as an obstacle for economically rational innovations demanded by the new industries that appeared in the twentieth century.

Although this is essentially a managerialist view-point, it is likely that the lack of cultural resistance, in the sense that new relationships had to be forged from the ruins of the old, made it possible for quality experts like Ishikawa and Mizuno (considered 'young Turks' in those days) to emphasize the need to draw in the workers and the majority of employees into the quality movement. In the context of post-war Japan, it is more than likely that these employees were ready to be part of the national agenda to build a strong, industrialized Japan.

This analysis seems to support the view that in evolving the QCC system, the technical rationality which seems to pervade Japanese QCC practice was in fact arrived at through inter-subjective communicative action by a process of consensus building among the actors. Even in the 1980s, Lillrank and Kano's (1989) survey indicates that 77% of *kanji* (workshop supervisors in charge of QCCs) reported that they 'discuss(ed) matters with QCC members rather than simply push their ideas' (p 88). The survey also showed a strong relationship between the existence and non-existence of rules for feedback and evaluation of circle suggestions and the quality of QCC outcomes (p 145). These findings seem to indicate that Japanese QCC members were not passive receivers of ideology but that some genuine discourse did occur through on-going discussions with the *kanji*. Furthermore, the fact that QCC members have linked their 'input' to the presence of feedback channels indicated that they are not passive and unquestioning in their participation in QCC circles, and are only prepared to 'give as good as they got'.

It could be argued that through such open social discourse, the practical concerns of the individuals and groups involved are expressed and resolved. Implicit in this perspective is that the ideology behind QCCs, which is the principle of continuous improvement for the ultimate good of the organization, is accepted by all involved and not perceived by any party as biased towards any one group or set of individuals. That is, the ideology behind QCC is seen as neutral.

3.5.2 The role of ideology

However, critical theorists do not subscribe to the notion of the neutrality of ideology. Thus any ideology is viewed as favouring one group more than others, and usually, the bias is towards the more powerful parties in the relationship. Based on this, the critically anchored explanation would be that in the evolution of Japanese QCC, technical rationality displaced practical concerns and subordinated the process of inter-subjective communicative action. Also, the ideology of the more powerful group, the managers and specialists, are forced on the workers, irregardless of such employees'

interests and desires. Thus the technical interest, that is, improving 'the productive potential and steering capacities' (Jackson 1991:186) prevails at the expense of the practical interests, and also, emancipatory interests of the people involved.

From a critical standpoint, given the wide difference in power and status among the different levels of the organization, a state which mirrors the prevailing situation in the wider societal context, it is not possible for those lower down in the hierarchy to object or exert their own interests through open discourse. As a consequence, they resort to other means of expressing disaffection. The phenomenon of *mannerika* which Lillrank and Kano (1989:173) estimate as present in about 20% of circles in Japan, could be interpreted as a consequence of the lack of or inadequate level of open discourse and inter-subjective communication among the different groups in the Japanese QCC organization. Because the practical concerns of employees affected by QCCs were not considered, and as Japanese organizations were rigidly hierarchical, employees had to resort to this form of passive resistance as a means of registering their disaffection with the QCC process.

However, this explanation cannot account for the other 20% of circles who were very active, and the balance (about 60%) of circles whose performance was considered 'average' by Lillrank and Kano (1989), that is, QCC groups which had 'periods of high activity and occasional slow-downs' (p 173). For these groups, the critical theorists would contend that the organizational actors might not be aware that organizational processes were 'increasingly governed by objectifying technical rationality at the expense of inter-subjective, communicative action' (Steffy and Grimes 1992:195). These circle members would be regarded as unaware of their own objectification because ideology was employed to conceal this. Habermas (1975) regards ideology as distorted perception sponsored by dominant groups to stabilize and legitimize their control and domination over others:

> Ideology possesses two necessary traits that characterizes it as a distorted perception. First, it is self-imposed. Secondly, members falsely interpret these self-imposed behaviours as self determined, or their own (Geuss, 1981). In other words, members impose distorted forms of rationality upon themselves by continually reproducing the normative, objectifying structures that distort communications and constrain praxis. These self-imposed objectifying organizational processes are perceived as legitimate and even self-willed because ideology is itself built upon distorted communication. Therefore, if organizational communications is structured in a way which sustains ideology (Mumby 1988), since members are unaware of their state, they have few opportunities to realize their delusion and change. In this sense, power is rooted in distorted communications.
>
> (Steffy and Grimes 1992:195)

Thus from a western critical viewpoint by subscribing to the ideology of continuous improvement for the ultimate good of the enterprise, Japanese workers are victims of distorted communications as communications in the organization are being manipulated by corporate management so as to sustain this 'false belief'.

3.5.3 Critical assumptions and Japanese thinking

It is argued here that Habermas's thesis on knowledge constitutive interests is based on a Western philosophical tradition that is radically different from that of Japan's. It is only in the last one hundred and fifty years that the two value systems have interacted, and only in the last fifty years that the level of interaction has intensified. Hofstede's (1984; 1994) recent studies of cultural differences among world-wide staff of a multi-national company (MNC), is evidence that despite the cross cultural interactions among its various units, differences in values and attitudes still prevail.

For example, Hofstede's survey of these cultural differences show that power distances among different levels in Japanese organizations are much wider when compared with

most western countries such as the United States, Great Britain, Australia and the Scandinavian countries (1994:26). He defined power distance as

> the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally' and that this construct is derived from the 'value systems' of the less powerful members of the organization (pp. 28).

However, Hofstede (1994:160-4) is aware that his survey is a product of a Western mind and to respondents from non-Western countries some of the questions may be irrelevant while others which are relevant might not have been included in the survey questions. In comparing his own values survey with one compiled by Chinese social scientists from Hong Kong and Taiwan, he notes that one of the four dimensions from his 'Western' based values survey is missing in the Chinese Values Survey (CVS) whilst a dimension uncovered in the CVS was absent from his own survey. Although critical theorists might argue that Hofstede could have been a party to distorted communications with regard to his own values survey[10], they would accept the probability of different interpretations of central values from individuals and groups from different cultures and societies.

In explaining the role of values in the Japanese QCC context, it is necessary to review those concepts central to a critical perspective which seem to contrast with or for which there are no equivalent concept/principle in Japanese philosophy and culture.[11] This limited cross-cultural ontological comparison forms the basis of a critique of the critical (Habermasian) perspective.

The Japanese concept of non-duality

[10] They are likely to dispute Hofstede's claims that the dimension of power distance represent the value systems of the less powerful members of the organization.

[11] This is undetaken with the awareness that the analysis is not conducted from within the Japanese cultural milieu but from one that share some similarities. The aim of the analysis is to provide a counterfoil to the Western critical perspective.

Implicit in Habermas's critical theory and Western thought in general, is the opposing concept of subject and object. There is no equivalent concept in Japanese philosophy. In its place is the concept of non-duality, one of the fundamental principles of *Mahayana* Buddhism:[12]

> Non-duality (*advaya*) is the rejection of opposites and contradictory viewpoints, but it is also a rejection of nihilistic negation. This 'no position' is called voidness (*sunyata*), but this is not nihilism. It is a dynamic principle of life which permits a becoming of infinite progression. Non-duality is so called because it negates the pairs of opposites, but the opposites themselves are also in infinite progression; and therefore, though it is a function of the process of negation, comparison, measurement, elimination, abstraction, postulation and universalization are all involved.
>
> (Yukawa 1967:62)

This Japanese concept of non-duality does not imply mere intuition, but a working through or going beyond the rational process through the negation of the opposites. Given this, the idea of emancipation, could be interpreted as the freeing of oneself from the opposites or from dualistic thinking.

The value of cooperation and consensus

Yukawa (1967:56) observes that one of the dominant patterns in the Japanese mentality was 'the tendency to side step as far as possible, any kind of confrontation' in social life. Miyamoto (1967:6-9) traces this to the Seventeen-Article Constitution written by a Japanese prince, Prince Shotoku, in the seventh century A.D.:

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[12] Buddhism travelled from China to Japan in the sixth century but Zen Buddhism, in which the concept of non-duality is central, reached its full development in the period between the twelve and fourteenth centuries A.D. (Miyamoto 1967; Hoover 1977)

> Harmony is to be valued and an avoidance of wanton opposition is to be honoured. All men are influenced by partisanship, and there are few who are intelligent. Hence, there are some who disobey their lords and fathers, or who maintain feuds with the neighbouring villages. But, when those above are harmonious and those below are friendly, and there is concord in the discussion of business, right views of things spontaneously gain acceptance. Then, what is there which cannot be accomplished?
>
> (Miyamoto 1967:7)

Thus the ideal of consensual thinking and cooperative behavior in Japanese society was established more than twelve hundred years ago. Of critical importance is that the principle underlying the conduct of relations between individuals and between groups were seen as vertical in nature, essentially framed in 'senior and junior' terms, rather than those between equals.

Given these deeply entrenched values with regard to personal and group interactions, the processes through which the practical and emancipatory interests could be addressed would have to be highly ritualized, if we are to assume that either of these interests have not been ignored.

Cultural modelling - the role of Neighbourhood associations

In his study of Japanese neighbourhood organizations, Askenazi (1991:390) noted that these neighbourhood groups share three sets of broad but flexible principles:

> First...personal interaction is characterized by a high degree of normative acclaim and support for group efforts, (and) by expectations of polite 'appropriate' behaviour... relations between individuals and between groups...are largely those of junior-senior, rather than those between equals...are viewed in the long term, but are examined critically periodically to see if they have fulfilled the expectations members have of them....Groups are expected to be able to cooperate successfully with others, to be

> responsive, to at least some degree, to the demands of the situation, the demands of their members and constituent sub-groups, and the demands of others that they are cooperating with. The accommodation is often formal and superficial, rather than substantive, but it allows diverse groups to act in concert without much overt friction.
>
> (Askenazi 1991:390)

The study also reports that these neighbourhood organizations are unofficial and were not recognized by the government or by law. Yet they are pervasive and provide an important means for articulation and expression of local sentiments and preferences. They deal with a range of issues, from religious matters (e.g. the maintenance of the neighbourhood shrine) to environmental (clean-up campaigns, playgrounds) and social (neighbourhood solidarity and welfare, traffic safety) issues. Within each association there are several office bearers. Yet Askenazi could not find any data available that indicate that contested elections for positions in these neighbourhood organizations are ever held. He reported that office-bearers are selected through rotation by households or by nomination by peers. There is a preference to limit conflict within groups as much as possible and elections are 'considered likely lead to conflict, bad feelings and difficulties in common action'.

Hence to Askenazi, the organization of neighbourhood associations is the product of residents' preference and not by fiat from a superior level. The variation in the range of issues dealt with by the different neighbourhood association is also a matter of choice rather than by fiat or by law.

He observes that in the sample studied, although relations between these groups and other bodies range widely from incorporation, cooperation to competition, 'much store is set by long term mutual interest and association' (p 389). Decision-making ranges from being broad-based, or delegated to sub-groups, or left to the elders in the neighbourhood.

Askenazi's (1991:390) impressions are that the rate of participation in neigbourhood affairs is very high among the Japanese. There is also a range of group models based on the degree of participation, neighbourhood profiles, and range of issues dealt by the associations, but underlying this, a set of common assumptions are shared. Thus, from a fairly young age, most Japanese would have come into contact with the organizational practices of their neighbourhood associations:

> More-over, individuals are familiar with the cultural rules by which these associations are run, as well as with specific variations and adaptations. This variation-within-a-pattern means that Japanese can more easily adapt to management practices they run into in their professional or working lives....It also probably means that they might resist, and perhaps reject out of hand, other practices that do not fit their experience of managerial models.
>
> (Askenazi 1991:390)

Given the above, although an institutional framework in the sense of rules and regulations defines behaviour in this context, the role of agency (Giddens 1984) is evident in Japanese neighbourhood organization as households could choose not to participate or to change the rules of engagement in such associations. That they choose to participate based on a common underlying set of principles imply that, to some extent, their practical interests are being served, albeit not through the critical method of open discourse. More likely, it is by ritualized means so that the core values of harmony, cooperation and non-confrontation are not seen to be threatened.

Thus to equate the principles of Japanese neighbourhood organization as a form of ideology and as distorted, self-imposed perception on the part of residents, may not be appropriate in these circumstances, given the role of human agency in such associations.

3.5.4 QCC and practical interests

Transposing these observations to the issue in focus, that is the QCC as a Japanese organizational practice, it could thus be said that the Japanese QCC pioneers have addressed two of three knowledge-constitutive interests.

The technical interest has been well served, as the tools and techniques, and the learning mechanisms put in place permit the knowledge of QC technology to diffuse rapidly amongst Japanese workers, thereby improving the productive capacity of the social system. Furthermore, the QCC hybrid parallel structure, improves the steering capabilities of the organization with respect to its ability to elicit on-going incremental productivity improvement from workers. This was and continues to be of major importance to the survival and growth of Japanese corporations, and their success in utilizing small group activities as an integral part of their corporate strategies have led to many imitations all over the world.

However, the successful outcomes from QCC activities would not have been possible if the Japanese organizations had ignored the practical interests of those involved. Employee participation in workplace issues, if genuine, allow workers to have an input in that part of the operations process in which they are involved in, and ultimately, some degree of influence over how the operations cycle should be run.

Insofar as the QCC as a social activity allows for the flow of genuine bottom-up communications as a counterweight to the top-down nature of hierarchical communications flow, it has also served the practical interest, by expanding the understanding among the groups participating in the organizational system.

3.5.5 The issue of emancipatory interests

The issue of emancipatory interest is more problematic as the concept of subject and object is in direct opposition to the group orientation of the Japanese (e.g. the high degree of normative acclaim and support for group efforts observed by Askenazi) and to the principle of non-duality.

With regard to Habermas's emancipatory interests, the question of whether these have been adequately addressed in Japanese QCCs (as judged from a critical standpoint) is doubtful. Alvesson and Willmott (1992) argue that the presence of asymmetrical power relations (for example, between the sponsors and the participants of QCC) would result in the dominant role of top management (the QCC sponsors) in defining and determining the practices and discourses that comprise organizational reality (that is, QCC practice). For Flood and Jackson (1991:49):

> The exercise of power in the social process can prevent the open and free discussion necessary for the success of interaction. Human beings have, therefore, an 'emancipatory interest' in freeing themselves from constraints imposed by power relations and in learning, through a genuine participatory democracy, involving discursive will-formation, to control their destiny.

That the creators of Japanese QCC are aware of the asymmetry in power relations between workers and middle management was demonstrated by their use of a hybrid parallel structure for QCC activity which circumvents the formal hierarchical chain of authority. This freed circle members from the constrains imposed by their relationship with their immediate managers, and which could influence the quality of their communications and recommendations. In this respect, there is an attempt to level the power differences.

However, it could be argued that they are merely exchanging one group (front line and middle management) for another group (top management) where the power difference is even greater. Yet, for the employees at the workshop levels, the power differentials between them and their immediate supervisors might have been more relevant to them and have more impact on their daily work life than their power difference *vis-à-vis* top management.

Further, despite the ideal of voluntarism, the insistence on 100% workgroup participation in QCC activities is an example of asymmetrical power relations being used to assert the will of the dominant group in the organization. Thus, even in the creation of QCCs, the concept of non-duality and of negating the opposites seems to be an underlying principle.

3.5.6 The future for QCCs from a critical perspective

The contradictory and ambiguous stand with regard to employee participation in QCCs is a reflection that the traditional value of non-duality prevailed in work organizations in Japan. Traditional Japanese values which emphasize harmony and cooperation for the overall good of the group, the subordination of individual preferences to group norms and goals, and the avoidance of overt confrontation, have all contributed to making the QCC the key small group technology used in Japanese corporations over the last three decades.

As long as these traditional values of Japanese society are not substantially challenged, the prevailing organization of QCC will continue to serve corporate goals of quality and productivity.

The challenge to these traditional values could come from two sources. Firstly, there is the problem of the nature of change that can be expected in the coming millennium, and what Handy (1990) terms as 'discontinuous change':

> For many years, we have viewed change as within our control....It was a comfortable view of change....It was a view of change which upset no one. The only trouble is that it did not work. It never has worked anywhere for very long, and even those societies in which it has seemed to be working, Japan, Germany, and, perhaps, the USA, are about to see that it does not work forever (pp. 7-8).
>
> Facts, figures, words, pictures, ideas, arguments, meetings, committees, papers, and conferences all proliferate. Information goes down telephone lines, so technology and economics begin to blend together to create a massive discontinuity in the shape, skills, and purposes of many of our organizations. Clever organizations do not, it seems, work the way organizations used to work. They have different shapes, different working habits, different age profiles, different traditions of authority (pp. 15).

As mentioned above, Shibagaki *et al.* (1991), identify the lack of cultural obstacles to business innovations as the reason why Japanese corporations after World War II were able to develop a very successful corporate form and a style of capitalism. Four decades later, these very successful economic institutions and the accompanying corporate structures and practices are likely to be part of the established order. It remains to be seen whether these corporate practices become cultural obstacles to business innovations or, whether Japanese organizations possess the ability to adapt and innovate their traditional ways to meet the new demands of the social and business environment.

Finally, in discussing the impact of modern Western culture on Japanese society, as Kishimoto (1967) has observed, while Japanese cultural traits and religions could survive the process of modernization they might not survive the process of Westernization. Thus as Japan becomes a member of the select club of the developed industrialized countries in the world, and as the only non-Western member of this group, it remains to be seen whether it is able to continue to separate the process of modernization of its society and corporations from the Westernization process. The

jury is still out on the eventual outcome and that this would be a long process is clearly demonstrated by Kenzaburo Oe's lecture on receiving the Nobel Prize for Literature in 1994 (as reported in *The Straits Times*, 9 December, 1994:17):

> The ambiguous orientation of Japan drove the country into the position of invader of Asia....As someone living in the present world and sharing the bitter memories of the past imprinted on my mind, I cannot utter in unison with Kawabata the phrase 'Japan, the Beautiful and Myself'....The contemporary state of Japan and its people in their post modern phase cannot but be ambivalent....I have said that I am split between the opposite poles of ambiguity characteristic of the Japanese.

The QCC is one Japanese organizational innovation that utilizes modern western knowledge of statistics and quality control without imbibing the Western values of industrial democracy and pluralism. Its creators have in fact capitalized on traditional Japanese values of acclaim and support of group efforts, inter-group cooperation and harmony, and the acceptance of the vertical nature of relationships between groups in organizations.

If these values become less central to members of Japanese corporations in the future, and provided that in its place, 'the reflexive project of self moves to centre-stage' (Giddens 1992:76), the existing form and properties of the QCC will be unable to address the emancipatory interests of those involved. In such a situation, new forms of small group technology may have to be created that would better address all three knowledge constitutive interests of employees in the organization.

3.6 JAPANESE QCC AND SYSTEMS THINKING

In the foregoing, the Japanese QCC was examined from historical, descriptive and theoretical frames of references with the analyses firmly rooted in the context of Japanese organizations.

However, the main focus of this research is the implementation of Japanese QCC in a non-Japanese context. The Japanese QCC is viewed here as form of a social technology that is applied by firms outside Japan as a plausible organizational intervention technique to improve organizational quality, teamwork and productivity:

> The cross-national transmission of ideas and practices such as small group activities is, in fact, a process of technology transfer, not fundamentally very different from the transmission of, say, steel making technology....uncertainty as to the benefits of the new technology is a prominent feature of the innovation process....The success of a technology transfer process depends on the adopter, first, having the appropriate 'know-how' and second, having the requisite resources. (Cole 1989:105-7)

Furthermore, the relationship between the application of a social technology and its contributions and 'use' in the new context might not be easily discerned:

> The complexity and the lack of clarity in these relationships and the abundance of unwarranted inferences both lead to an element of fad in the adoption of social innovations. As a result, arguments are often grounded more in ideology and power relationships than in tested generalizations....The task, for example, of evaluating the applicability of Japanese management practices in the United States and judging what the needed adaptations are is a Herculean one. (Cole 1989:107)

Thus cross-national borrowings of social technologies are fraught with difficulties. Besides the issue of cultural differences, borrowers are confronted with the need to

adapt a social innovation which had evolved in a particular environment at a specific point in time, and render it such that it can thrive in the new environment. This was recognized by the Japanese (Ishikawa 1985) when they were attempting to implement QC knowledge and techniques developed in Britain and the United States in their factories.

However, the tendency in cross-national borrowing have often been to plunge into the 'how-to' aspects without working out what should be borrowed and what should be adapted. This has been the case of Japanese QCC, and also for many other social technologies,

The problem confronting adopters of social technology is how to render the complex mess of information about the social phenomenon meaningful so as to facilitate intelligent organized purposive action regarding the technology transfer.

Often, interpretations of social innovations by prospective implementors have been mechanistic, reducing all events and objects into discrete parts, and identifying causes and effects between these parts and the outcomes in a somewhat linear fashion. This has been the case for the adoption of QCC outside Japan. Thus, the success of QCC outcomes has been linked with the degree of participation, the involvement of top leadership or the presence of facilitators. Alternatively, the cultural differences have been put forward as the immovable obstacle to cross-national adoption of social innovations. However as Cole (1989) has observed, if cultural differences are insurmountable barriers, then a social innovation such as the practice of double entry accounting could not have spread across the world.

Furthermore, the limitations of mechanistic thinking is most evident in the analysis of social phenomena:

> the 'classical' or 'rational' view of organizations sees them as made up of parts, each of which can be optimized independently in pursuit of some goal. Unfortunately for mechanism...'organization', whether in the biological or social realm, would not yield to reductionism. For example, organizations failed to perform well as a whole when the parts were all independently optimized.' (Flood and Jackson 1991:3)

There have been a few exceptions to such reductionist analyses regarding the QCC phenomena. Lillrank and Kano (1989) is one. Senge (1990:99-102) uses a simple systems model to explain why QCC activities in the United States usually run out of steam and diagnoses how patterns of behaviour could be changed by identifying and changing the limiting factor in the system.

In both analyses, a shift is made from mechanistic to systems thinking, that is, the mess of information regarding QCC is interpreted in a fundamentally different way. In systems thinking, organizations are 'treated as whole entities, or systems, whose identity and integrity had to be respected...(and with) "emergent" properties peculiar to themselves which could not be derived from their parts' (Flood and Jackson 1991:3).

The systems approach emphasizes interconnectedness between the parts and the presence of emergent properties, that is, 'the complex whole may have properties which refer to the whole and are meaningless in terms of the parts which make up the whole' (Checkland and Scholes 1990:19). Therefore systems thinking is an invaluable part of any attempts at cross-national transfer of social innovations because social processes do not lend themselves easily to mechanistic thinking and any attempts to reduce the whole to the parts is likely to miss the essential qualities of the social innovation. Cole (1989) described how American attempts at adopting Japanese organizational innovations went to some lengths to conceal its Japanese origins:

> Even companies that have borrowed directly from this approach (the Japanese labour-management consultation system), such as Ford, feel a need to go to some lengths to

conceal its Japanese origins: Ford calls its labour-management consultation programme 'mutual growth forums' (p 115).

The implicit assumption seems to be that as long as the 'essential part' was extracted, the rest does not matter. In this reductionist approach, knowledge regarding the context and the complex relationships between and among the parts is lost. This is also the case in the adoption of QCC programmes by American companies. For instance, Cole notes that few American companies have explored the link between participation in small group activities such as QCCs, and job security:

> Clearly, Americans feel a strong need to indigenize quality circles. In doing so, managers minimize, if not eliminate, the Japanese origins of the concept. The danger is that this reduces their opportunities of learning from the 'available stock of trans-national resources'....Thus contrary to popular wisdom, a major cultural barrier to borrowing Japanese small group activities approaches is not their rootedness in group-oriented Japanese historical experience. Rather, it is our own reluctance to seriously examine foreign ideas and practices in the area of worker-manager relationships that inhibit the learning process (pp. 117).

While Cole's observations demonstrate that the issue of cultural barriers is a 'two-way' affair, it also underlines the need for systems thinking with regard to the cross-national transfer of social technology.

Thus the aim here is to apply systems thinking to the issue of Japanese QCC, and to use it as a language to analyse and discuss the Japanese QCC phenomena, so as to present an alternative to the more prevalent reductionist approach in analysis of the QCC phenomenon.

3.6.1 Systems and systems thinking

The core idea of systems thinking is the notion of systems, which is:

> that a complex whole may have properties which refer to the whole and are meaningless in terms of the parts which make up the whole....The (this) hierarchically organized whole having emergent properties, may in principle be able to survive in a changing environment if it has processes of communication and control which would enable it to adapt in response to shocks from the environment.
>
> (Checkland and Scholes 1990:18-9)

Thus the systems concept comprises essentially two sets of ideas, that of emergence and hierarchy, and, communication and control (Checkland 1981); and 'to make mental use of that (this) image is to do systems thinking' (Checkland and Scholes 1991:19).

With regard to the social sciences, two main strands of systems thinking can be discerned. The hard paradigm in systems thinking assumes that the real world is systemic, and the systems thinker is concerned with understanding 'the structure of reality and of processes observed going on within it in terms of whole entities' (Checkland 1981:100).

On the other hand, soft systems thinking assumes a more subjective and interpretive stance towards perceived reality. Instead of thinking of the real world as being systemic, it is the process of inquiry about the real world, that is systemic. Thus, '(soft) systems thinking is above all a methodology, a heuristic device for making sense of the interconnections we perceive through experience' (Garnsey 1994).

This analysis of the QCC falls firmly within the soft paradigm of systems thinking and is grounded in Churchman's version of systems analysis, which is that the systems

approach begins with the embracing of subjectivity and with the discovery that every interpretation or world is 'terribly restricted' (Flood and Jackson 1991:121).

In framing Japanese QCC in systems thinking terms, two lines of inquiry emerges. Firstly, there is the issue of whether systems methodologies and methods were employed by Japanese corporations and QC experts to manage the diffusion of QC technology among the Japanese workforce and throughout Japanese industry. This inquiry facilitates the understanding of emergent processes in the application of Japanese QC technology including the adoption of QCCs. It thus provides a better understanding of the interrelationships between various elements and processes that make up Japanese QC technology.

The other line of inquiry involves using Checkland's Soft Systems Methodology (SSM) as a means of 'making sense' of Japanese QCC in a 'foreign' context. The inquiry process focuses on essentially two stages (Stage Five and Stage Six) of the conventional seven-stage model of SSM, and as such has taken to heart Checkland and Scholes (1990:275) stance 'that SSM not only develops and change but also gets used in different ways by different users in different circumstances'.

Furthermore, in this inquiry, the Japanese QCC as a systems methodology is compared with a known western systems thinking methodology, rather than the 'real' world, as would have been the case with Stage Five of SSM. However, Stage Six of SSM which is to examine possible changes (and in this case, differences) in terms of what is systematically desirable and culturally feasible is essential in any attempt at the cross-national transfer of a social or organizational innovation.

By comparing QCC with a similar, but known western systems methodology, the aim is to reveal the implicit assumptions on which the methodology (as applied in Japanese companies) rests. Such a conceptual mapping is essential in the transfer of social technologies. When mental images of this social innovation are set against another

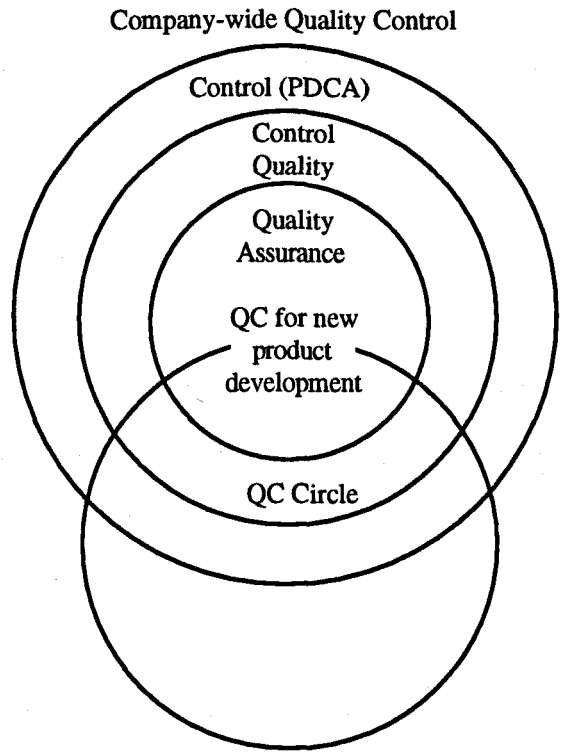
model formulated in other contexts, there will be opportunities for learning as essential issues and potential problems in the transfer as similarities and differences in assumptions are brought to the surface. This dialectical exercise could become the essential springboard for Cole's (1989) 'local invention', which is the adaptation of the social innovation to local context.

Systems thinking in the Japanese approach to QCC

Japanese approaches to QC possess a strong systemic character in both the organization of QC activities and in the tools and techniques used. Thus Japanese corporate quality strategies as embodied in TQM or *Company Wide Quality Control* (CWQC) programmes are essentially systemic in approach. Ishikawa (1989) used a diagram (refer to Figure 3-7) to conceptualize a CWQC/TQC programme:

> The essence of TQC is found in the central ring, which contains quality assurance narrowly defined, which means doing QC well for the company's new products....Once the meanings of QC and of good quality and good services become clear, the second ring comes into play. the ring represents control of quality that is defined more broadly, including questions of how to bring in good sales activities, how to make salesmen better, how to make office work more efficient, and how to deal effectively with sub-contractors....the third ring...stresses that control of all phases of work is to be done effectively. It utilizes the PDCA circle, turning its wheel over and over again to prevent recurrence of defects at all levels....QCC activities must always be conducted as part of CWQC activities. The QCC is regarded as a ring that intersects all other rings. (Ishikawa 1985:93-4)

Figure 3-7 : Japanese Company-wide Quality Control



Source : Ishikawa 1985 : 95

Both hard and soft systems thinking are evident in the Japanese TQM/CWQC programme. Thus, Flood (1993) interprets TQM principles[13] through viable systems thinking and in his view, 'viability and quality imply each other' (p 118). *Fish-bone* diagrams, control charts and the *Taguchi* method in process control are all examples of strong foundation of hard systems thinking in Japanese quality control.

Soft systems thinking on the part of the Japanese is clearly evident in evolution of QCCs as a means of group problem solving which emphasized participation by all and which utilized a set of systems tools including the PDCA cycle. Hence the QCC is doubly systemic.

Firstly, the systems based approach is emphasized in group problem solving. The basic goal of continuous improvement in QCC activities implies a belief that the

[13] Although Flood does not base his exposition of TQM principles on the Japanese model, many of the TQM principles he brought up are also integral parts of Japanese CWQC programme.

consequences of all incremental improvements is greater than the sum of the parts. There is also the emphasis on group processes rather than end results in circle activities. Both of these features highlight the importance that QCC promoters such as Ishikawa placed on emergent processes, a key systems concept.

Secondly, in Japan, QCC is viewed as part of a wider system of CWQC activities (Ishikawa 1985; Mizuno 1988), that is, the systemic concept of hierarchy is employed in designing Japanese TQM/CWQC. In the conceptualization of TQM policy as top-down flow of information counter-balanced by the bottom-up ideal for QCC, the Japanese have created another mental image that is central to the systems ideas, that of communications and control.

Thus, it is fair to state that the ability of QCCs to survive and spread in Japan is in no small measure due to the systems approach that underlines its design and implementation. It began with the awareness amongst Japanese QC experts and corporate management of the need for some means of social intervention to spread a new technology, QC knowledge, tools and techniques, to all members of their organization. From this starting point, through an iterative process of practical testing and negative feedback, the social and educational limits of the workforce were continually stretched to evolve the QCC practice and process which was then conceptualized as a sub-system of the Japanese organization's TQC framework.

Japanese QCC as a systems thinking methodology

Given its underlying participative ideal, Japanese QCC as a systems thinking methodology is an implicitly interpretive approach in which the subjectivity of social and thus organizational life is recognized. Hence, it falls within the soft systems paradigm and like other methodologies in this paradigm, it is regarded essentially as a systemic process of inquiry which makes use of systems models.

Based on Flood and Jackson's (1991) analysis of a range of systems methodologies, Ackoff's (1981) Interactive Planning (IP) is a systems methodology that has several features which are similar to that found in the QCC methodology.

In both these methodologies, participation in problem solving is emphasized, in a large part, to factor in as much subjectivity in interpretations as is possible in the problem solving process. Both are also rooted in the assumption that consensus among stakeholders is possible. The concept of organization in Ackoff's IP bears many similarities to the Japanese concept of organization:

> Organizations should be considered as serving three purposes. They are themselves purposeful systems and have their own goals, objectives and ideals which must be taken into account. But they also contain, as parts, other purposeful systems: individuals, whose aspirations must be met, whose interest also should be respected. Hence corporations have responsibilities to themselves (control problem), to their parts (humanization problem and to the wider systems of which they are parts (environmental problem). Managers should seek to serve the purpose of all three layers, developing all the organization's stakeholders and removing any apparent conflict between them.
>
> (Flood and Jackson 1991:146)

As the first principle of IP is participation, planning has to be interactive, based on participation and aimed at enabling others to plan effectively for themselves. This is similar to the QCC methodology which rests on worker participation and on decentralizing QC responsibility (that is, the QC planning and control processes) right down to the factory workers.

The second principle of IP is continuity, that is, plans have to be constantly revised to adapt to constant flux of changes in the planning environment. In QCC methodology, the driving force is that of continuous improvement, *kaizen*, or the stretching and

challenging of taken for granted constraints, and which is the process used to address changes in the QC environment.

The third principle of IP is the holistic principle, which is that planning should be done simultaneously and interdependently for as many parts and levels of the system. It emphasizes the importance of coordination between planning units at the same level, and of integration, which is the simultaneous and joint planning of units at different levels, as the decisions taken at one level would usually have effects at other levels. Ishikawa (1985)'s exposition of Japanese TQM activities (of which QCC is a part) give much emphasis to the twin issues of coordination and integration.

In IP problem solving, the aim is to *dissolve* problems by changing the systems or the environment in which the 'mess' of problems in embedded, an approach very similar to the PDCA process in QCCs.

In practice, the key difference between IP and Japanese QCCs, is that the latter methodology was applied down the organization to the worker level, and became a mass movement that spread throughout Japan. It is doubtful that IP as a problem solving methodology has reached both the breadth and depth of application as Japanese QCC.

This issue is: what accounted for this difference in outcomes? Flood and Jackson (1991:157) use the 'coalition' metaphor to illustrate Ackoff's version of pluralistic power relations in organization. Through participation in the planning of ideal designs in the IP process, a strong culture would develop, shared by all participants, and with it consensus amongst the different stakeholders would emerge. In IP such consensus seeking activity is deemed necessary because it is assumed that the diverging interests and power differences among the various stakeholders result in conflicts which must and can be resolved through participation in the planning process. However they argue that IP ignores the existence of structurally based conflict and power relationships

which remains unchallenged and unchanged and thus, constrains the use of the methodology:

> Ackoff plays down the obstacles to full and effective participation. To get started, interactive planning depends on all the stakeholders being prepared to enter into participative planning concerning the future. But will the powerful be willing to forego their dominant position and submit their privileges to the vagaries of idealized design? (Flood and Jackson 1991:160)

They also contend that free and open discussion between stakeholders is not possible as the less privileged would not be able to participate equally in the process because of the differences in intellectual, power and economic resources, and would thus find themselves in the sway of a 'dominant ideology'. Thus, they argue that in coercive contexts, the results of IP would favour the powerful. It could be argued then that in coercive contexts, 'committed' participation is not possible as the phenomena of *mannerika* in some QCCs has shown, and in such circumstances, there would be no worthwhile 'results'. Therefore, IP methodology cannot function in coercive contexts.

Given the above, IP remains a systems methodology that is based on participation as the means of bridging the gulf among the different stakeholders (however limiting this may be) in what is perceived to be a pluralistic context, and that bridging this gulf is a pre-condition for developing a learning and adapting system.

The QCC methodology on the other hand is based on participation as the means of spreading knowledge of QC technology to all employees in the organization, and that it is through the exercise of this knowledge by all employees of the organization that learning and adapting systems can develop.

Therefore, while the promoters of IP methodology aspire to fulfill fundamental humanist ideals,[14] those of Japanese QCC focus on promoting a perceived substantive concern of the organizational system, that of continuous improvement. Given the difference in orientation, it is not unexpected that the latter methodology had the support of corporate management while the former, which demanded a withholding of some privileges of the more powerful as a precondition, has not been equally well received.

In addition, it is argued in this thesis that committed participation by Japanese employees (another pre-requisite of QCC or IP activities) was more forthcoming because of the interrelationships between a number of factors, namely: history; cultural values and traditional practices; and structural features which institutionalized participation with built-in systems for coordination and integration.

3.7 CONCLUSIONS

This chapter began by exploring the origins of Japanese QCC and its impact on the evolution of the QCC concept and practice in Japanese factories. It traced the reasons for the spread of the QCC movement in Japan and the key achievements of Japanese QCCs.

The nature of Japanese QCC was also explored in terms of the ideals, the characteristics and the organization of QCC activities at the firm and national levels.

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[14] This includes the belief that human beings have potential value in themselves and possess latent powers which once liberated would enable them to exercise a degreee of freedom of choice and action in shaping their lives. It also includes the rejection of any system of thought which regards human beings as expendable raw material for use and exploitation by political and economic systems.

Lillrank and Kano's theoretical framework regarding the organization of Japanese QCC based on an open systems model was then discussed and a critique of the model conducted.

A critical study of the Japanese QCC followed as a means to understand the philosophical and political (in terms of power relations) underpinnings inherent in the phenomena and this was analysed in relation to Habermas three knowledge constitutive interests. The issue of ideology with regard to Japanese QCC was then appraised and the ideology behind critical thinking itself as applied to a non- Western context examined.

After the theoretical exploration, the chapter took a more practical turn and examined the social phenomena in terms of systems methodology and systems thinking. Two lines of inquiry were taken, firstly, the examination for the presence of systems thinking in the QCC concept and practice. The second line of approach used a soft systems methodology (mode 2) as the means to explore QCC as a social technology. The aim is to see QCC through 'multiple lenses' available in systems thinking (Flood 1993), an approach regarded as essential in considering the adoption of QCC as an organizational technology by companies operating in contexts that are different from that from which Japanese QCC evolved and matured.

The key issues involved in the practice of Japanese QCC drawn from this chapter, will provide useful and important reference points for the next chapter which examines the implementation of Japanese-style QCC in Singapore.

CHAPTER 4 THE QCC IN SINGAPORE

4.1 BACKGROUND TO THE MOVEMENT

4.1.1 Introduction

In Singapore, unlike Japan, the main motor behind the QCC movement has been the Singapore Government. The promotion of QCC was and still is viewed as part of the national productivity agenda. It was the government that articulated the need for small group activities at the workplace, identified the QCC as the vehicle for small group activities and proceeded to build and fund a national infrastructure to support and maintain the growth of QCCs in Singapore. That this was the case can be understood against the political and economic context of Singapore's recent history.

4.1.2 The political-economic context: state corporatism & the national economic policy

In 1965, after being freed from British colonial rule and following the failure of the merger attempt with Malaysia, Singapore seceded from the Federation of Malaysia and became an independent republic comprising some 580 sq km and a population of less than 2 million people (Department of Statistics 1983:4 &7).

Singapore was then economically very dependent on *entrepôt* trade. A fledgling industrialization programme geared to a largely domestic (Malaysian) market was threatened by its abrupt departure from Malaysia, as on its own, Singapore lacked the hinterland, the natural resources and the population base to pursue such an industrialization strategy.

There was also a very serious unemployment problem looming ahead. The first development plan published by the Singapore Government[1] estimated that between

[1] State of Singapore, Development Plan 1961-64 (Singapore Government Printer, 1961).

1957 and 1972, the labour force would increase by some 234,000. Three independent reports by international economic experts between 1955 and 1961,[2] all stressed the need to expand the manufacturing sector in order to absorb the growing workforce (Cheng 1991:187-90). The problem was compounded when Britain announced in 1968 that it would accelerate the withdrawal of its armed forces stationed in Singapore. This was a serious blow as an estimated 6% of the workforce were employed directly by the British military (Tyabji 1987:26).

The threat posed by high unemployment for the Singapore Government was especially critical in the face of the political orientation of the trade unions, a characteristic common among newly independent countries of the third world:

> Political unionism derives in part from the typically weak economic bargaining position of unions in the context of labour surpluses and economic stagnation, which encourages unions to turn to government for protection against employers .... The struggle for independence was itself associated in many cases with the nationalistic mobilization of organized labour to oppose colonial rule....A similar pattern of labour politicization results from the competition among aspiring national (political) parties or elites to capture labour support.
>
> (Deyo 1981:1-2)

The issue for the ruling political party was how to avoid a situation where the unions would have ample cause to resort to political action detrimental to the stability of the newly independent government and its political and economic agenda. The spectre of political instability resulting from growing unemployment was very real:

> Thus there were grave doubts as to the economic viability of Singapore in 1965. Fortunately the opportunity for organizing society around a crisis situation was not lost

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[2] The International Bank of Reconstruction and Development Report 1955; the Lyle Report 1959 (under the auspices of the Colombo Plan); and The Winsemius Report 1961.

> on the political leaders who have shown tremendous resilience in coping with the disruptive effects....These political events with their attendent economic ramifications required a drastic revision of Singapore's development strategy and policies.(Tyabji 1987:27)

The strategy identified was one of rapid industrialization by promoting massive investment in the manufacturing industries. Most local entrepreneurs were then involved mainly in trading activities, and lacked the industrial know-how and willingness to invest in longer term investments required in manufacturing projects. The Singapore Government thus saw its role as one of promoting industrialization by means of an active and intensive programme of aid and assistance to industrialists including involvement in joint ventures to setup and run factories (Cheng 1991).

The Economic Development Board (EDB), a statutory board, set up in 1961, became the main instrument for the development of the manufacturing sector. The EDB was endowed with wider powers to promote and establish new industries and to accelerate the growth of existing ones:

> In effect, it (EDB) acted as a one-stop investment agency and undertook liaison between manufacturers and various government departments dealing with labour, health, public utilities, immigration and so on, so as to facilitate the implementation of projects.
>
> (Cheng 1991:190)

Central to this industrialization strategy was the development of Singapore's only abundant resource - its labour force. This aspect of the national development plan emphasized the upgrading, utilization and discipline of labour and the institutionalization of corporatist labour relations in Singapore:

> From the outset of PAP (People's Action Party) rule in 1959, party leaders had pledged to allow no private interest groups to sabotage official development plans for Singapore

(Chan 1976:36). And particularly after its expulsion from the Malaysian federation, government leaders could point to the real possibility that Singapore could not survive on its own, economically or politically, without heightened unity, discipline, and sacrifice, and that excessive demands from labour or other special interest groups could therefore threaten national survival itself. In the interest of rapid industrialization, therefore, unions had to give up their narrow membership-welfare orientation and look to their broader responsibilities to the nation: responsibilities which included wage restraint, increased productivity, and industrial discipline. (Deyo 1981:42)

Hence, through a series of political, legislative and structural moves, and in the light of the national crisis situations that prevailed during the 1960s in Singapore, the PAP brought the union movement into its fold by the end of the decade. The government introduced two politically controversial employment bills [3] which it felt was needed to create an attractive labour climate for foreign investment. The bills constrained changes in working conditions and restricted workers' rights to strike or negotiate for bonuses:

Between the first reading and second reading (of the Employment Bill), tripartite consultations took place between the government, the employers' organizations and the National Trade Union Congress (NTUC),[4] following which certain modifications and refinements were made to some provisions of the bill....There was active back bench participation during the (parliamentary) debate at the second reading...that lasted four days but no one opposed the bill in principle. The dissenting views were on the specific wording and application of the clauses....In assessing the legislature's function in this instance, it is clear that the Executive in Singapore clearly sets the goals of the society by determining the principles on which the bill was based. The legislature did not alter principles though informally selected members with a special interest in the

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3 The Employment Act (1986) and The Industrial Relations Act (1968)

4 The NTUC was and still is the only officially recognised trade union federation in Singapore.

bill were consulted and were able to exercise their influence.

(Chan 1987:77-8)

Deyo (1981:41) referred to this as 'the institutionalization of corporatist labour relations' in Singapore, in which the union movement, guided by the NTUC 'assumed a productionist role in national development, a role which has emphasized the needs for stabilization of labour costs, increased labour productivity, and industrial peace' (pp. 44).

With the fundamentals of the government-labour relationship established, tripartite consultations between the government, the employers' organizations and the NTUC became a feature of the industrialization programme in Singapore. This loose tripartite consultation between the three parties on industrial issues relating to the national economic policy evolved in the 1970s into more institutionalized and structured mechanisms such as the National Wages Council (NWC).[5]

The outcome of the incorporation of organized labour into the governing structure has been the redefinition of the role and purpose of trade unions to extend beyond collective bargaining to include the promotion of good industrial relations and the raising of productivity.[6] Such a redefinition was premised on the priority of national goals over sectoral interests and emphasized the non-confrontational approach to employer-union relations.

In 1965, early tripartite consultation was symbolized by the ratification by the NTUC, the Singapore Manufacturers' Association and the Singapore Employers' Federation of a

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5 The National Wages Council was set up in 1972 as a tripartite body to determine wage issues, at the national level, on an annual basis.

6 The definition of 'Trade Union' in the Trade Unions Act was amended in 1982 to incorporate a clause on the promotion of good industrial relations and raising of productivity. The previous definition included as part of the objective of a trade union, the imposition of restrictive conditions and the promotion or organization or financing of strikes and lock-outs.

'Charter for Industrial Progress' which recommended the setting up of a tripartite productivity centre to look into productivity issues and practices.[7] As a result, the National Productivity Centre (NPC) was set up in 1967 as an autonomously run division under the purview of the EDB (Cheng 1991:191). In 1972, the NPC was upgraded to the status of a statutory board.[8]

The objectives of the NPB as spelt out in the *National Productivity Board Act 1972* (Singapore Statutes, Act no. 11 of 1972), were to: promote productivity consciousness in management, trade union leaders and workers; provide training for managerial and supervisory personnel; train workers' representatives in measures for raising productivity; render management consultancy services, promote the formation of joint consultative councils; assist in the shaping of national wages policy, and, to undertake manpower and wage studies. Given these roles NPB became the main government agency planning and implementing the government's policy connected with the human aspects of productivity

4.1.3 Economic development and the productivity imperative

The fundamental objective of the Singapore Government's economic development policy has been the achievement of high annual growth rates through the export of goods and services, with the expansion of the economy based mainly on continuing foreign investment (Ministry of Trade and Development 1986).

In the 1960s, with unemployment a central concern, the strategy adopted to achieve the goal of rapid industrialization was based on export oriented, labour intensive manufacturing:

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7 1993 NPB Productivity Management Training Notes.

8 A statutory board is an autonomous government agency separated from the civil service, set up by an Act of Parliament to perform special functions. The reasons for their creation and their rights and powers are clearly specified by legislation. They also have greater flexibility and autonomy than the civil service in the performance of their functions (Quah 1987).

> With the stress on exports, the government turned increasingly to foreign investors, for it was evident that only well established Western and Japanese firms and, to a lesser extent, other Asian firms could compete outside the region, where advanced technology, management, expertise, access to capital, efficient marketing as well as established markets gave them a decided edge....From 1965 to 1976, the value of foreign asset holdings in manufacturing increased 24-fold. (Cheng 1991:208)

The success of this strategy in resolving the unemployment problem was such that by 1978, a labour deficit situation resulted in the manufacturing sector. A steady stream of unskilled labour was recruited from the neighbouring region and by the end of the 1970s, foreign labour accounted for 10% of Singapore's workforce (Lim 1988). To maintain high annual growth rates which the government saw as its primary economic objective, it felt that it was no longer feasible to rely on labour-intensive manufacturing which was contingent on increased labour inputs, and there was the need to move to higher value added type of manufacturing. As part of this new strategy, official attention shifted towards improving labour productivity, and as a consequence of this policy shift, a tripartite Committee on Productivity was set up in April 1981. The recommendations of this committee (NPB 1981) was instrumental in the national campaign to promote QCCs in Singapore.

4.1.4 The problem of labour productivity

Since the 1980s, one of the major preoccupations of the Singapore government has been the international competitiveness of Singapore goods and services. This is because the growth of the Singapore economy was and still is, highly dependent on the export of goods and services. As the internal labour supply tightened in the late 1970s and early 1980s, the pressure of rising wages was inevitable and as this rose, the competitiveness of Singapore exports *vis-à-vis* those of other newly industrialized countries such as Korea, Taiwan and Hong Kong became a matter of some concern:

> The productivity growth rates of the manufacturing sectors of Japan, Korea and Taiwan were more rapid when compared with Singapore's. Before 1979, Singapore's labour cost was below its productivity growth which helped keep Singapore competitive. However, since 1980, labour cost climbed steeply even when productivity growth had fallen. The three years of high wage policy (1979-1982) was implemented to induce capital-labour substitution in our economic restructuring efforts.
>
> In the case of Japan, there was an interesting pattern of the rate of increase in labour cost falling below the rate of productivity growth. Keeping her wage increase below productivity growth is one way Japan is able to sustain her competitiveness in the world market.
>
> (Report of the Committee on Productivity in the Manufacturing Sector [1985] 1986:2)

In 1981, the NPB set up a tripartite Committee on Productivity (COP) to address what was seen as a growing problem of labour productivity:

> The Committee was charged with the responsibility of formulating a set of recommendations to improve work attitudes, productivity and labour-management relations in Singapore. This is necessary as the subject is crucial to our nation's well-being in the eighties.
>
> (Report of the COP 1981:2)

Thus it was clear that by 1980, the key human-centred problems of the industrialization process had moved from the destabilizing effects of massive unemployment to one of labour productivity and that this issue was seen by the policy makers as essentially linked to the twin problems of labour force commitment and the labour-management relationship.

The COP Report noted that issues such as the human aspects of productivity, work attitudes and labour-management relations were intangibles:

> They (these issues) cannot be brought about overnight or by procedural changes. The approach of the Committee is to identify the governing principles and recommend changes to existing practices or policies to provide conditions that facilitate employers and workers to take the right approach to productivity (p 3).

Given that expectations of change were for the longer term, the COP recommended the formation of a tripartite Productivity Council to chart and monitor the change process and to suggest and outline the national productivity strategy on an annual basis.

4.1.5 The Japanese productivity model

The COP recommendations were strongly influenced by the success of the Japanese labour management system and an entire annex of the COP Report (NPB 1981:23-26) was devoted to a description of what were perceived to be the key features of this system. This attempt to import the Japanese model into Singapore coincided with the growing world-wide interest in Japanese corporate practices that emerged at the end of the 1970s and early eighties.

The COP identified nine characteristics of the Japanese system which in their view, had considerable success in raising productivity. Of these, job involvement, small group participation, business welfarism, and, loyalty and identification with the company, were seen as having the potential for implementation in Singapore. In the COP's opinion, 'bottom-up' management, house unions and multi-functional job assignments would require some time to evolve, while the Japanese system of seniority and life-time employment were unlikely to be implemented in any substantial way in Singapore (p 4).

In the light of their analysis of the potential areas for the transfer of Japanese corporate practices, the committee identified four areas of action which they considered viable for the implementation in the Singapore context. These were: 1) public education centred on a 'Productivity Movement' involving the mass media and the national education

system, and which would not only reach employers and workers, but also students in schools and tertiary institutions; 2) reinforcing employee commitment to the company through payment of variable bonus, company welfare schemes and the establishment of house unions; 3) information dissemination and training services to help companies improve their productivity; and 4) the promotion of labour-management joint consultation through the establishment of Work Excellence Committees and QCCs.

A Productivity Council was established to take overall charge of the Productivity Movement and the COP suggested a set of guiding principles and objectives for the Productivity Movement which was based on the Japanese model.

4.1.6 The rationale for QCCs

The Committee identified the improvement in the labour-management relationship as a potential source of productivity gain, and saw the promotion of labour-management joint consultation and employee participation as the means to improve the relationship.

Based on the experience of the Japanese system, the Committee recommended the setting up of WECs modelled along the lines of the Japanese labour-management joint consultation committees, as a mechanism for continuing dialogue between top management and workers' representatives.[9]

While such WECs were to function at the higher levels of the organizational hierarchy, for the shop-floor level, the Committee recommended the setting up of QCCs as the means of promoting employee involvement at the work-place. It is notable that when

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9 Of note was the fact that the Committee recommended that joint consultation should be between management and workers and not management and unions, so 'as to avoid an adversary relationship in WECs' (p 18). It may be perhaps due to this last proviso that WECs as a group centred activity in Singapore forms failed to take off in the same manner as QCCs. On the one hand, WECs lacked the support of unions, and on the other without the union's organizing capabilities and legitimacy among workers, the problem of worker representation in the WECs would be difficult to resolve. In 1990, WEC was dropped from the productivity goals drawn out by another tripartite committee, 'The Productivity 2000', launched 'to steer the Productivity Movement through the 1990s and into the 21st century (NPB 1990b).

the COP mooted the idea of QCCs, the main rationale was the use of this small group activity to increase employee participation at work rather than as a mechanism for QC activities. Thus in its Report, the committee stated that:

> Although QCCs started with Quality Control as its most important activity, today they deal with all activities that bear upon productivity improvement. QCCs play an important part in promoting workers' involvement and participation at work. For these reasons, the Committee believes that promotion of QCC activities should be encouraged....***The Committee recommends that coordination of the promotion of QCCs should be brought under the Productivity Council as they are a major ingredient of the Productivity Movement.***
>
> (NPB 1981:18-9).

Thus, from the very beginning the rationale for QCCs in Singapore, as seen by its key sponsors, was its potential for promoting teamwork and improving management-labour relations. Although its origins in the QC movement was acknowledged, the QCC was regarded as 'a major ingredient in the Productivity Movement' ***because of its perceived potential in improving employees' work attitudes and commitment to the organization, and through this, contribute to the human aspects of productivity improvement.***

4.2 THE SINGAPORE GOVERNMENT AND THE PROMOTION OF QCCS IN SINGAPORE

4.2.1 Early beginnings

The first QCC was formed in 1973 by Bridgestone (Singapore), a Japanese tyre manufacturing plant in the Jurong Industrial Estate (NPB 1984). In the same year, the Singapore Quality and Reliability Association (SQRA) and the Singapore Institute of Industrial Research (SISIR) were the first two non-commercial organizations to explore the practice of QCC (NPB 1991:18). The following year, a Japanese QCC expert was

invited to Singapore by the Government to speak on his QCC experience (NPB 1992). After this initial enthusiasm, there was no other discernible interest in QCCs until the end the decade.

In 1978, interest in QCCs appeared from another quarter - the Singapore Civil Service. From 1978 to 1980, Ministry of Finance officials were sent to Japan for QCC training under auspices of the Asian Productivity Organization (Ng 1990). However, these study missions were essentially exploratory, and no concrete plans for implementation of QCC were established on their return (Lim 1985:1).

A few large multi-national companies (MNCs) such as Hewlett Packard, Yokogawa Electric and Sanwa Bank; and government-owned Chartered Industries, implemented QCC programmes between 1978-1980, but these were by and large, isolated attempts at implementation (NPB 1984).

NPB's early interest in QCC was mainly as an application in industrial engineering (NPB 1984), perhaps because of the range of statistical tools that is part of the circle process. In 1980, an expert from JUSE was invited to give a seminar on QCCs but 'there was no spark to ignite widespread enthusiasm' (NPB 1984:14).

The turning point in the introduction of QCCs in Singapore organizations was the emergence of Japan as a major economic force and the general world-wide perception of the role played by the uniquely Japanese organizational system in the nation's economic growth. This led to much interest in Japanese management systems, especially Japanese productivity and QC management approaches, including the methods for managing the human aspects of productivity improvements.

In Singapore, in the late 1970s, as the spectre of high unemployment receded, Government planners were beginning to perceive the human aspects of productivity as

major issues that had to be addressed in the promotion of the national economic strategy:

> top civil servants were beginning to feel uneasy about personnel management in the civil service. They felt or were beginning to feel that more attention should be paid to the human factor in the coming years if the civil service was to continue to progress.
>
> (Ng 1990:183)

In the late 1970s, high labour turnover and absenteeism were becoming serious problems among Singapore firms, especially in MNCs involved in export-oriented manufacturing (Deyo 1981).

These problems were viewed with some concern by policy makers because of its impact on labour productivity, especially with the fall in unemployment and a shift to a almost full employment situation by the end of the 1970s. Given the government's industrial policy of rapid industrialization based on labour intensive, export-oriented manufacturing, it was thus perceived as an issue that had to be resolved at a national level.

It was in this context that the COP was formed with one of key tasks being to address this aspect of the labour productivity problem. The outcome of the committee's deliberations in 1981 in connection with this issue was to recommend the promotion of QCCs as a major initiative of the Productivity Movement in Singapore.

4.2.2 The QCC and the Productivity Movement in Singapore

4.2.2.1 Launching the QCC Movement

Thus it was only till 1981, when the Productivity Movement was launched in Singapore that a concerted effort began to promote QCCs in Singapore organizations as part of the agenda of the Singapore Productivity Movement.

The NPB was charged with the task of promoting productivity in the private sector, while the Ministry of Finance chaired a central committee which took overall charge of promoting QCCs in the civil service.

As the government agency responsible for promoting the initiatives of the Productivity Movement in the private sector, NPB's role included the conceptualization and planning of productivity strategies, the promotion and initiation of annual productivity campaigns; the training and transfer of information and knowledge of productivity approaches and techniques; and, the monitoring and measurement of progress of the Productivity Movement. NPB saw the Productivity Movement as:

> the active and widespread commitment and participation of the whole nation, particularly the government, employers and workers - in activities that will lead to higher productivity. The ultimate objective is to raise the standard of living of the people.
>
> The Productivity Movement ensures that the productivity improvement process proceeds smoothly. This is done by setting goals and the corresponding strategies and activities to achieve them; and galvanizing the whole nation to engage in productivity activities.
>
> (NPB 1993:35)

The COP Report gave direction to NPB's effort to promote QCCs:

> The COP Report advocated the promotion of QCCs as a major ingredient of the Productivity Movement. NPB responded by stepping up promotion and training of QCCs.
>
> (NPB 1984:14).

Hence, immediately following the public release of the COP Report, the NPB launched a nation-wide promotion of QCCs for private sector firms. At about the same time, the Singapore Civil Service set up a Central Productivity Steering Committee (CPSC) to look into the setting up of QCCs, and the QCC was launched in the public sector as Work Improvement Teams (WITs). By October 1982, 700 WITs were established in the civil service (Lim 1985; Chan 1990).

The co-optation of the civil service into the implementation process was a major part of the strategy to launch and promote QCCs. The COP had noted that the government as an employer could 'set an example in improving productivity, work attitudes and human management' as 'a number of conditions in the public sector favour the adoption of selected features of the Japanese management system'. This included the fact that the government by and large took a longer term view of expected outcomes when compared with most business enterprises. Also, the security and stability of employment in the government service would provide a more conducive environment for the implementation of QCCs (NPB 1981:19).

The Singapore Prime Minister supported mass promotion and implementation of QCCs. In his speech launching the designated 'Productivity Month' in 1982, and reported in the QCC Annual 1984 (NPB 1984):

> 'In nearly all work situations, small consultative groups can help get workers involved and motivated, and also tap their intimate knowledge of the work. Hence QCC is one of the best tools to increase productivity. Workers' involvement and contribution will

> also create in them a sense of pride in their work and identify with the enterprise they work in. The public sector has made a good start with WITs or Work Improvement Teams'.

Thus, it was clear that the political leadership saw QCCs as a solution to the problem of labour productivity, and given this top level endorsement, the QCC became one of the key initiatives launched in the first phase of the Productivity Movement .

The QCC was seen as a means of promoting teamwork and good labour relations management, both of which would lead to improvements in the human aspects of productivity. Through QCCs, managers and workers would develop greater awareness of productivity issues in their organizations and would then be ready for the second phase of the Productivity Movement (NPB 1993:36).

In the case of the civil service, the acronym, 'WIT' was considered more appropriate for QCC activities in public services as it de-emphasized the 'control' aspect and the production-bias perception that the term 'QC' tended to invoke. Furthermore, as 'WITs emphasize improvement rather than problems, it would be more meaningful and acceptable [to civil servants]' (Lim 1985:2).

In effect, the early strategy for the implementation of QCC involved two parallel 'movements' one in the government sector and the other in the private sector. Public sector WIT activities were coordinated by the WIT Development Unit, based in the Civil Service Institute, while the private sector QCC activities were coordinated and promoted by the NPB.

As recommended by the COP, a national media campaign on the Productivity Movement was mounted which included the promotion of QCCs. The promotion encompassed newspapers, radio and television and promotional materials sent to employees and employers, with events linked to the Productivity Movement being

given prominent media coverage. For example, in the annual National Day Parade in 1985, the NPB fielded a QCC contingent (NPB 1985).

In addition to mass media promotion, both the NPB and the CPSC began promoting the QCC concept to organizations.

To spread the QCC concept among the private sector firms, the NPB organized talks and seminars for managers, union leaders, supervisors and workers. It also conducted a survey to gauge responses to the circle concept (NPB 1984).

As for the public sector, the CPSC was chaired by the Permanent Secretary of the Ministry of Finance, and with other top civil servants co-opted into the committee, the 'top-down' effect flowed rapidly:

> Each Ministry in turn set up its own Ministry productivity steering committee. Departments and statutory agencies under each ministry also formed their own Productivity Steering Committees (PSCs).
>
> PSCs are made up of top personnel of the Ministry, department or statutory agency as the case may be.
>
> (Ng 1990:184)

This QCC campaign by NPB and the promotion of WITs in the public sector, including the Armed Forces, ensured that within a few years, there was general public awareness that QCCs and WITs were linked to the Productivity Movement.

Apart from this promotional campaign, during this period, the NPB also set up a comprehensive national infrastructure to conduct QCC activities in Singapore.

4.2.2.2 Building a national QCC infrastructure

Following JUSE's example, the NPB in 1982, established a QCC National Registration Centre (NRC) and by September of that year, 300 circles were registered. At the end of the same year, the NPB organized the first National QCC Convention to publicize the efforts of some of the circles (QCC Annual 1992, Chan 1990).

In 1983, to promote greater interest in QCC activities amongst employers and employees, the NPB implemented a system of national QCC Awards for QCC participants in circles, facilitators and companies. These awards were linked with the annual national conventions for QCCs organized by the NPB, and from that year on, two conventions were organized each year. Other QCC awards were also created: NTUC's Singapore Labour Foundation Award for QCC of the Year; *Business Times* Award for Outstanding QCC Company and NPB's Outstanding Facilitators Award (NPB 1984).

A QCC Promotion Unit was also established which coordinated various promotional activities and published a bi-monthly newsletter on QCC activities (QCC Annual 1992; Chan 1990).

In an adaptation of the Japanese practice of linking work and social practices as a means of generating and sustaining interest in circle activities, the NPB organized a range of social activities such as QCC Clubs, QCC Camps and forums for circle members, facilitators and QCC managers (Chan 1990). Such social activities were seen as reinforcing participants understanding of the QCC process through informal exchanges between individuals and companies.

In 1985, promote QCC activism the NPB set up the Singapore Association of Quality Control Circles (SAQCC) which was aimed at building a core of QCC managers and facilitators who would actively promote QCCs among organizations in the private and

public sectors (NPB 1987). With the establishment of the SAQCC, NPB hoped 'to involve greater private participation in promoting QCCs ' (NPB 1988:24).

Between 1982 and 1985, the public sector WITs movement also organized annual conventions. However, in 1985, the national QCC and the WITs conventions were integrated. The aim according to Lim (1985) was to reduce duplication, as some WITs teams were present at both the national WITs and the QCC conventions. With this merger, the NPB became the national headquarters for QCC activities in Singapore.

4.2.2.3 Transfer and diffusion of QCC knowledge and practice

Immediately following the COP report in 1982 NPB embarked on a comprehensive plan to acquire QCC knowledge from various sources and to transfer such knowledge, practices and techniques to Singapore organizations.

Acquisition of QCC knowledge

NPB's efforts in promoting QCCs were given a boost when in 1983 the Japanese Government gave Singapore a US$20 million grant to support a Productivity Development Project. This was a seven-year programme aimed at transferring Japanese productivity concepts and techniques to Singapore. There were two components to this project: firstly, technical cooperation, which involved the despatch of Japanese experts to NPB to help develop and implement productivity programmes in Singapore and for NPB officers to study productivity practices in Japan; and secondly, grants were given by the Japanese Government to NPB for the acquisition of both hardware and software, including training materials. (NPB 1987a:85).

To learn more about QCCs, study missions organized by the NPB were despatched to Japan in 1983 and 1990, to Korea in 1983, and to the United States in 1984 (NPB 1984;

1990). Firms in the latter two countries had implemented QCC programmes, and NPB wanted to learn from their experience of this technology transfer.

As part of an information exchange strategy, NPB initiated international QCC exchange activities with other countries, encouraged circle members to attend international QCC conferences and in 1984 began hosting an annual international convention of QCCs in Singapore (QCC Annual 1992).

Disseminating QCC knowledge

For the first four years, NPB concentrated on training QCC facilitators and circle leaders. Within this period, 2,056 facilitators and 3,700 circle leaders had undergone training (NPB 1985). In the civil service, training was conducted by a WITs Development Unit and cover the same period a total of 1,299 facilitators had undergone the WITs training programme (Lim 1985).

By 1984, NPB set up a QCC College specializing in the teaching of QCC concepts and techniques. The college pursued a sectoral approach with training materials tailored to the needs of a particular sector, such as the manufacturing sector, banking sector, the hotel sector and the service sector (NPB 1984). In 1985, it began running QCC training programmes for middle managers and senior managers and was planning a programme for QCC steering committee members (NPB 1985).

To address the need for the training of circle leaders and members arising out of the 1983 QCC survey (NPB 1983), programmes were developed on basic problem solving and interpersonal skills (NPB 1985). By 1990, the NPB was customizing QCC training programmes for companies (NPB 1990c).

QCC diagnostic and advisory services

In 1984, NPB introduced a number of QCC clinics to help firms diagnose problems in their QCC programmes and to provide feedback to circles on their QCC projects, including their application of QCC tools and techniques.

By 1990, the NPB had widened their area of QCC advisory service somewhat by offering companies a comprehensive consultancy package for implementing or re-vitalizing a QCC programme, including advice on the setting up the QCC steering committee, guidance of facilitators and leaders, the monitoring and implementation pilot QCCs, organization of in-house presentations and launch of QCC promotion activities (NPB 1990c).

Thus by means of a linked three-pronged approach, the NPB attempted to acquire and disseminate QCC knowledge among the Singapore workforce. By 1985, there were more than 24,800 QCC members and almost 3,400 circles formed by employees in both the private and public sectors (refer to Table 1.1). The participation rate of Singapore employees for that year was 1.8% (refer to Table 4.1). However, the number of firms involved in QCC activities remained rather small, with only 140 firms (mainly larger sized firms) participating in QCC activities in 1985.[10]

Within a period of three to four years, the NPB had established a network of interlinked structures to promote and sustain QCC activities in Singapore. However, the outcome of better labour-management relations proved elusive. For example, in 1986, a tripartite committee set up to evaluate the overall productivity of the manufacturing sector in the wake an economic recession in Singapore, noted that:

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[10] In 1983 and 1987 there were a total of 58,904 and 63,764 establishments in Singapore respectively. Of these establishments, about 3,000 were establishments with 50 or more employees (Wee 1988 : Table 4). Based on these available data, [and assuming that the majority of QCC participating companies had more than 50 employees] less than 5% of the companies with more than 50 employees participated in the QCC programme in 1985.

> The National Survey on Productivity Attitudes over the last three years (1983-85) has identified poor labour-management relations as a major factor hindering productivity at the company level....Good labour-management practices will help change the labour-management relations climate from one of mutual tolerance to active cooperation. Management and labour should institutionalize these practices in their companies....Notable among good labour-management practices are WECs and QCCs.
>
> (NPB 1986:7)

Hence, in the early years of the Productivity Movement, the NPB succeeded in setting in place of an infrastructure on which to build QCC activities. However, the attitudinal changes sought, that is the goal of a higher level of teamwork and productivity, had yet to materialize.

Table 4-1 : Participation rate* of workforce in QCCs

May 1983	:	0.6%
May 1985	:	1.8%
May 1987	:	2.9%
March 1993	:	6.6%

* *The participation rate of the Singapore working population in QCCs is defined as the ratio of the number of QCC members to the total workforce.*

Source: *(a) 1983-1987 figures: from 'Survey on Quality Circles, 1987', Research & Development Centre, National Productivity Board, December 1987.*
(b) March 1993 figure: from 'Productivity Digest', September 1993, National Productivity Board, Singapore.

4.2.3 QCCs and the second phase of the Productivity Movement

4.2.3.1 The impact of the 1985-86 recession on the QCC programme

The 1985-86 economic recession in Singapore was a turning point for the Productivity Movement. Singapore's Gross Domestic Product in real terms fell to minus 1.8%, the

first year of negative growth since 1964. Employment fell sharply with a net loss of 96,000 jobs, including 37,000 jobs held by Singaporeans. Unemployment rate rose to 4.9% in December 1985 and 6.5% in June 1986, compared with the pre-recession levels of 2% to 3% for the first half of the 1980s (Ministry of Trade and Industry 1985; 1986a).

As a result, an Economic Committee was appointed by the Ministry of Trade and Development (MTI) to conduct a major re-assessment of Singapore's national development strategies. The Committee's findings, published in February 1986 (MTI 1986b) made two key recommendations. Firstly, it recommended the continuation of the strategy to restructure the Singapore economy, with economic growth based primarily on high productivity improvements. Secondly, that the campaign to promote positive productivity attitudes should continue, but, there should be a new approach to productivity.

> A total approach to productivity must be aimed at improving all levels of the business process. Some key areas are: (i) management skills and overall business efficiency; (ii) investments in technology (both in production processes and office automation); (iii) education and training: (iv) labour-management relations; (v) positive work attitudes at all levels; and (vi) sectoral productivity strategies.
>
> (MTI 1986b:124)

The Economic Committee felt a need for a shift in the focus of the Productivity Movement from one centred on the human aspects of productivity to a broader based approach.

> The COP recommended that the focus should initially be on the human aspects of productivity. Therefore, the NPB, which spearheaded the (Productivity) Movement concentrated on promoting productivity 'consciousness' and 'will'. As this 'will' could not be expected to evolve overnight, the strategy is a long term one.

> We should continue to promote positive productivity attitudes. Surveys have shown that although the workforce as a whole is still not yet fully productivity conscious, as a result of NPB's efforts, workers are now more aware of the concept of productivity. We should now move beyond productivity consciousness, to begin to take a total approach towards productivity, incorporating other elements of productivity.
>
> (MTI 1986b:124)

Thus in the opinion of the Economic Committee, there were other areas where improvement was much needed, such as :

> Good management must be the starting point of any productivity improvement programme....A business that improves its efficiency will automatically achieve higher productivity, but the converse is not necessarily true. To achieve business efficiency, managements must be competent...in...(i) Market awareness; (ii) Sales promotion; (iii) Product design and development; (iv) Up-to-date and properly run plants; (v) Up-to-date management systems, and (vi) Human resource management....***The key element of our productivity programme should be training in modern management methods to improve the efficiency of Singapore companies.***
>
> (MTI 1986b : 124)

Hence, the 1985-86 recession changed the direction of the Productivity Movement, at least in the short and medium term, in a very fundamental way. The focus shifted from raising workers' participation and job involvement to the more substantive issues such as management and technical skills training. As for QCCs, the Economic Committee's stand was that :

> The promotion of positive work attitudes must continue, if we are ultimately to have a productivity-conscious workforce....Participation in QCCs and WITs must be encouraged....One important area is the attitudes of both workers and managements towards the introduction of new technology... resistance to technology changes must

be overcome to enable our industries to restructure smoothly....Another crucial area where workers' attitudes need to change is their aversion to third-shift work.

(MTI 1986b:125-6)

The recession highlighted the fact that Singapore's exports were not as competitive as its international rivals in the global market place and heightened the need for immediate solutions to the declining productivity growth rates. With that, the general perceptions of QCCs went through a dramatic change.

4.2.3.2 The focus on business efficiency

In response to the recommendations of the Economic Committee, the NPB adopted what it termed as 'the total approach to productivity' (NPB 1987a:1). The new areas of emphasis were: assistance to small and medium sized enterprises; flexible wage systems; worker training; and total quality improvement.

Although the NPB's new approach to productivity did factor in issues such as work attitudes and labour-management relations, the primary focus in 1987 was on the more immediate problems of the inefficiencies of small and medium sized firms and skills upgrading.

In the initial stages of the Productivity Movement, QCCs were promoted as the means of increasing worker involvement and improving labour-management relations. With the new focus, there was a perceptible change in NPB's perceptions regarding QCCs' role *vis-à-vis* productivity. The link between QCC participation, attitude change and productivity improvement outcomes was no longer clear.

It was perceived that in the short-run, QCCs were unlikely to have any impact in productivity or business efficiency. However, the short-run problems needed to be addressed immediately, and the key objective was to increase business efficiency so as

to improve productivity, and the means to achieve this was through the acquisition of new technology and equipment and intensification of training efforts.

Thus NPB's training role was broadened to include a full range of managerial training and the statutory board was transferred from the Ministry of Labour to the Ministry of Trade and Industry, a reflection of the widened scope in its role in promoting productivity.

The NPB continued to promote and sustain nation-wide QCC activities over the next few years. However, in NPB's review of the first ten years of the productivity movement in Singapore, little was mentioned of the QCC movement's impact on productivity growth:

> 86% of the productivity growth between 1981-1990 came from higher capital investments per worker, while 14% was from Total Factor Productivity (TFP). TFP accounted for 9% of GDP growth over the decade. In industrialized countries, this figure is 50-60%....TFP growth refers to the improvements in the quality of labour and capital, and the efficiency with which they work together. It reflects skills upgrading, better organizational and management systems, improved production processes, technological progress, and movement to higher value added processes and industries.
>
> (NPB 1991:1)

Despite the fact that QCCs had been vigorously promoted in the decade under review, there was no specific mention of the contribution of QCC to TFP and much emphasis was given to the more technical aspects of TFP such as systems and technological innovation.

Thus the outcomes from the implementation of QCC in the first decade failed to meet the initial high expectations of substantial productivity improvements and as such, the search for such productivity gains was taken elsewhere resulting in a loss of momentum

in the QCC movement. It did not help that in the experience of most QCC programmes, the QCCs in many Singapore firms had hit what has been referred to as the plateau or decline stage (Lawler and Mohrman 1985).

In 1990, NPB sent another QCC study mission to Japan, as in the view of its Executive Director, the QCC movement in Singapore had reached the point where it was now necessary to sustain, as well as to promote QCCs (NPB 1990a:2). The mission's report highlighted the key role of management especially top management in the success of Japanese QCCs. The report also noted that Japanese QCCs were implemented as part of the organization's quality management programme.

In the same year, a long-term productivity plan drawn up by the NPB recommended that:

> Companies should make it part of their corporate philosophy to communicate with all levels of employees, and also build the necessary infrastructure to support it. Communication should be managed in a company in the same way as production, marketing and other functional areas. Employers could do this by setting up an information-sharing network (comprising)...formal channels of communication...well-defined communication role for the first-line supervisors...small group activities, such as QCCs, and cross-functional work teams, which could operate as basic units of information-sharing among managers, supervisors and workers.
>
> (NPB 1990b:39-40)

It is significant that in this report on the long-term productivity plan set out by NPB (the *Productivity 2000* Report), there was only one reference to QCC and this was in the paragraph quoted above. Compared to the emphasis on QCCs in previous NPB productivity reports, there seemed to be a discernible attempt to down-play the contribution of the QCC in productivity improvement .

Furthermore, when the COP raised the idea of QCCs in its 1981 Report, the main focus was on the role that QCCs could play in promoting workers' involvement and participation at work so as to improve work attitudes and through this, improvements in human aspects of productivity (NPB 1981:18). The role of QCC as part of an emergent process of information sharing was first highlighted in the *Productivity 2000* Report. This was the beginning of a re-appraisal by policy planners of the role of QCCs in Singapore. The future role of QCC in productivity growth remained unclear, and there were indications that the movement had reached the maturity stage of development.

However, a turning point for the QCCs movement occurred two years later which was to breathe new life into its promotion. This renewed interest in QCC arose as a consequence of the inefficiencies encountered in the use of capital assets in the Singapore context .

4.2.3 A new QCC initiative for the 1990s

4.2.3.1 The problem of total factor productivity

By 1992, the reliance on capital-driven growth in Singapore was beginning to bring in diminishing returns. In its Productivity Statement 1993, NPB attributed 90% of overall productivity (measured by GDP per worker) in Singapore, for the period 1980 to 1992, to larger amounts of physical capital used per worker (NPB 1993a). More alarming for the Singapore Government was the fact that the rapid accumulation of capital had resulted in a decline in the returns from capital investment:

> Rapid capital accumulation, and a higher capital intensity as the primary source of productivity growth, are not inherently undesirable. The caveat lies with the declining returns from capital investments....the growth of GDP (gross domestic product) per dollar of capital stock, a measure of capital productivity, was negative (for Singapore)

> for most of the years during the period 1980-1992. On the average, it declined by 2.4% per annum. This meant that increasingly, more capital was required to generate each dollar of output. Likewise, more capital per worker was needed to achieve the same level of output per worker (or overall productivity). Thus while higher capital intensity remained the major source of overall productivity gains, increasingly larger investments were required to keep such improvements.[11] (NPB 1993a:24)

As a consequence of this development, a new perspective emerged with regard to the operator's role in continuous improvement and innovation, in order that the full potential of new technology was to be exploited:

> Another point about capital investment is that the full potential of new technology is normally not realised immediately after its invention. Empirical studies show that large gains in productivity can be achieved by introducing a series of small improvements to existing technology. Shop-floor innovation is therefore necessary for the full potential of technology to be exploited. It can be promoted through schemes that involve workers in improving work systems, such as QCCs.
>
> (NPB 1993a:30)

Thus quantitative increases in capital had to be accompanied by improvements in TFP if the capital productivity growth rate was to be positive and growing. With this realization, NPB turned its attention towards the improvement of TFP.

4.2.3.2 QCC and the 'Vision 95' agenda

Based on these developments, in 1992, the NPB set out its agenda for raising productivity in for the next three years, which it named 'Vision 95' (*Straits Times*, 2

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[11] According to NPB (1993a), there are two components of capital productivity, namely, capital intensity and TPF, which is the qualitative aspect of productivity. Key determinants of TPF growth are educational level of workforce; inter-industry employment shifts from less productive sectors; skills deepening of workforce and in general, the ability to maximise the potential from capital investments.

March 1992). The NPB named four areas of focus as: 1) doubling the productivity of small companies by 1999; 2) ***doubling the rate of QCC participation among private sector workers by 1995;*** 3) doubling training investments of companies by 1995 and, 4) halving the cost of QC activities by 1995.

At the inauguration of the 1992 Productivity Month, Singapore's Deputy Prime Minister articulated the productivity issues that the government wanted to address. These were the promotion of 'teamwork (which) is crucial for improving productivity'; training and skills upgrading as 'to build an effective team requires a strong commitment by management and substantial investment in training'; and 'to promote an attitude of quality consciousness' and sense of pride in the work done'.[12]

Given this set of productivity issues, the QCC was seen as an appropriate mechanism to promote teamwork, improve workers' on-the-job skills and inculcate a sense of quality awareness among the workforce. NPB's Productivity Statement for 1993 asserted that 'the QCC have proven to be an effective tool to get workers' participation in company efforts to improve quality, efficiency and work methods and to reduce cycle time, wastage and re-work' (NPB 1993a:53). The underlying assumption here was that through worker participation in circles, effective teamwork, QC activities and quality consciousness would emerge, and through this process, the relationship between QCCs and productivity established and hence QCCs would have a positive impact on quality and productivity improvement.

NPB's new strategy was 'to target its QCC promotion efforts at chief executives of companies; provide more training for middle managers; and develop more sustenance programmes for QCC members' (NPB 1993a:3).

This new strategy for QCC promotion was the result of a decade of experience in QCC implementation and feedback from regular surveys conducted by the Board. NPB

[12] Excepts from speech by Mr. Ong Teng Cheong, Deputy Prime Minister & Secretary General of NTUC at the inauguration of Productivity Month 1992, on 3 November 1992, at the Kallang Theatre.

defined three factors as crucial for the success of the QCC movement, namely: 1) teamwork starting from the top management downwards; 2) a strong QCC corporate structure and 3) recognition for QCC participants (*Straits Times,* 1 May, 1992). As the presence of these factors depended to a large extent on the support of top management, their involvement in the QCC programme was regarded as essential by NPB.

Also, by the 1990s, the disparity in QCC membership between the 42.2% QCC participation rate in the public sector and the 2.1% in private sector for 1993 (refer Table 4.2) was quite pronounced, and it became apparent that the success of any new initiative to promote QCCs had to focus on the private sector. As such, a QCC Task Force was set up in August 1992, made up of senior management representatives, to help double the rate of QCC participation in the private sector to 4% in 1995.

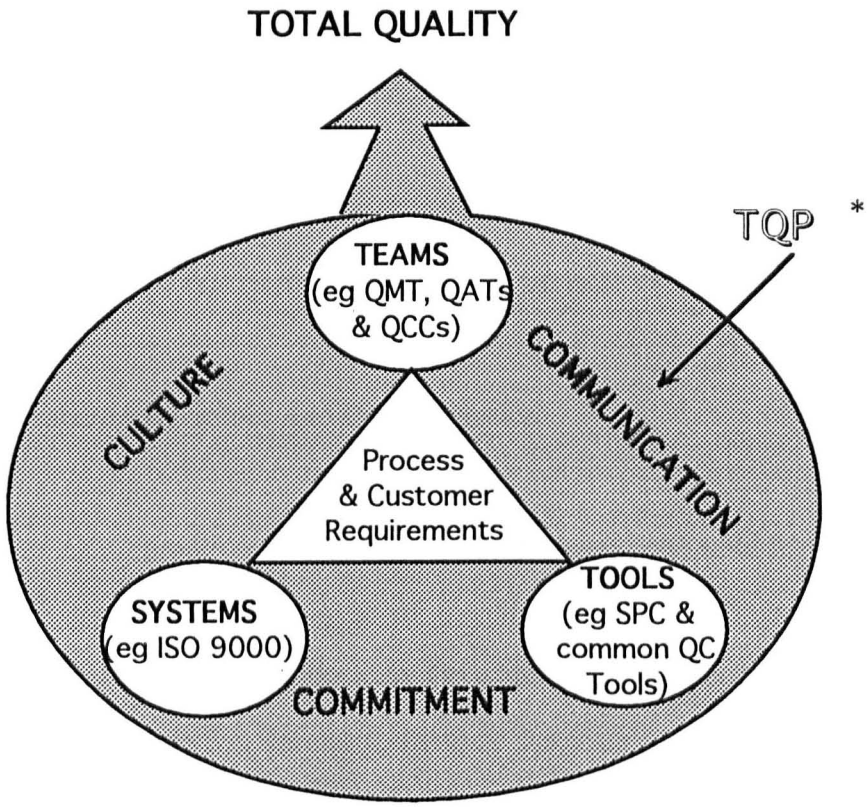
A new media campaign on QCC was launched to generate fresh interest in QCCs. Besides wide press coverage of QCC events, NPB together with the main local English newspaper jointly organized an annual 'Best Circle Award' with monthly features on circle activities, and a competition for newspaper readers to vote for the best circle each year (NPB 1993b).

At the NPB itself, The NPB-QCC College was revived with a new curriculum and a new training team including external trainers. In line with the emphasis on top management support of QCC activities, Chief Executive forums on the QCC were organized (NPB 1993c:36). There was greater recognition of the processual aspects of circle activities with interpersonal courses designed for QCC members on communications, group interaction and team working skills. To intensify NPB assistance to firms setting up or operating circle programmes, the QCC guidance service staffed with NPB's QCC consultants was also restructured. NPB also co-opted external institutions into its new QCC promotion campaign. This included the national union

federation, the NTUC, and the NPB Productivity Activists.[13] The activities of the QCC association, the SAQCC, were also given a higher profile in the news media.

Thus in the 1990s, the NPB began adopting a systemic approach to the issue of quality management, promoting the concept of a 'Total Approach to Quality' (NPB 1994:42). In this model for quality management, QCC activities featured as one of several small group activities viewed as vital components of the quality management strategy (Refer to Figure 4-1).

Figure 4-1 : NPB's Total Approach to Productivity



Total Quality implementation model encompassing TQP, QCC & ISO 9000 Quality System

* Total Quality Process

Source : Productivity Digest, March 1994, NPB

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[13] The Productivity Activist Scheme was launched by NPB in 1989. It comprised of individuals and organizations whose main roles are to generate enthusiasm for productivity programmes in their companies, to promote and publicise productivity schemes and to organize productivity programmes. Activists include QCC facilitators, trainers, productivity managers, supervisors, union leaders and workers

By 1994, more than thirteen years after the launch of the Productivity and the QCC Movements, QCCs continue to be part of the national strategy for productivity.

Hence, in the Singapore context, the Government, through the agency of the NPB has, and continues to play a key role in promoting QCCs, drawing on many of the resources at its disposal to promote the QCC concept and practice in Singapore.

In contrast, although the Japanese government had taken a positive and supportive role in the promotion of QC technology, it was the Japanese corporations and JUSE, as an affiliate of Japanese industry, that shaped and determined the role of QCCs in Japanese industrial life. The issue arises as to whether Singapore organizations have responded in the same way to the QCC concept and practice as their Japanese counterparts.

4.3 THE STATUS OF QCC PRACTICE AMONG SINGAPORE FIRMS

4.3.1 Organizational actors and QCC practice

The status of QCC practice among Singapore organizations could be viewed at two levels. Firstly, there is the issue of the diffusion of QCC amongst Singapore organizations as a whole, that is, the extent to which the QCC concept and practice have taken root in Singapore. Secondly, there is the issue of the depth of response in individual organizations to the QCC concept and practice, and hence the extent to which the practice is applied within the individual organization.

The spread of QCC in Singapore is one measure of the attractiveness of QCC to Singapore firms as a whole. Despite the NPB's very high profile as Singapore's QCC champion, in the final analysis, the practice of QCCs in Singapore organizations is dependent on a set of actors whose motives, perceptions and aspirations may be quite different from that of the NPB. Although NPB provided the necessary infrastructure

and support for QCCs to take root, it is for the organizational actors to perceive them as necessary and desirable:

> Pull is available in the 'market place of ideas' where 'change agents' such as scholars, consultants, and special-purpose organizations, propagate their wares. If there is only push, the actor has to develop solutions and courses of action himself; if there is only pull, solutions are chasing problems and the result might be a faddish 'me-too' introduction of a course of action. (Lillrank & Kano 1989:167)

At the organizational level, the key actors involved in QCC practices are top management, the middle and front line managers and the employees who are the potential circle members. As Lillrank and Kano (1989) have demonstrated, the QCC is a hybrid structure, relying on the dynamics of both the formal and the informal structures of the organization.

To Lillrank and Kano (1989), management support is critical:

> Without management support, informal activities would lose their hybrid character, and with it much of their direction, goals, and systematic problem-solving methods. To put it simply, QCCs exist because they are perceived to be needed. Without this perception, they won't survive....Thus management involvement is a necessary precondition for QCCs (p 165).

However, the viability of QCC is also contingent on the perceptions and actions of the employees for whom it was designed. As a small group activity that is not wholly part of the formal organizational system, informal group processes supportive of circle activities must occur if outcomes are to be meaningful and fruitful. That is, employees themselves must want to participate in a meaningful way in circle activities. It is argued here that this will only arise if employees perceive that involvement in QCC would address their practical interests in addition to satisfying the technical interests of

the organization, that is, the rationale for QCCs must go beyond the quality and/or productivity goals as articulated by management.

Therefore, besides the presence of the necessary structural arrangements, the spread of QCC is contingent on the responses of the various organizational actors to the QCC concept and practice.

4.3.2 The diffusion of QCCs among organizations in Singapore

The number of employees who are circle members and the number of circles formed in an organization, are the most cited measures of QCC diffusion. Very early on in its development of QCCs, JUSE established a national register for QCCs in Japan to monitor the spread of the practice across the country. Similarly in Singapore, the NPB began collecting data on circle formation in 1982 and publishes regular reports on QCC formation on a cumulative basis.

The NPB, as can be surmised from the QCC goals stated in the 'Vision 95' statement, used the NRC data as a key criterion in assessing the outcomes of the board's QCC promotional efforts.

Based on the NRC's data, in 1993, twelve years since the launch of the QCC movement in Singapore in 1981, more than 14,000 circles with a total of more than 105,000 members had registered with the NPB's register for QCCs (refer to Table 4-1). Based on a total of 1.592 million employed persons in Singapore in 1993 (Department of Statistics 1993), this represents 6.6% of the workforce.

Although 6.6% of the total workforce are registered with the NRC as circle members, a closer examination of the statistics reveal that 42.2% of the public sector employees are members of WITs, compared to only 2.1 % of private sector employees (refer to Table 1-2).

In the public sector, the response to the QCC movement, in terms of circle formation has been very successful. This was to be expected given that the circle concept had been given endorsement at the highest level of the government.

Furthermore, the organizing machinery needed to implement a QCC network across the board in the public sector was already in place, in the form of the existing civil service machinery. A parallel QCC structure could be set up that mirrored the hierarchical chain in the civil service, from the establishment of the central committee, the CPSC, to the steering committees at the ministry level to the departmental steering committees within each ministry (Ng 1990). The public sector included some of the larger employers in Singapore, such as the armed forces, which had the largest group of WIT participants, with the Ministry of Defence accounting for more than 40% of WIT participation in the public sector in 1992 (*Straits Times* , 13 April 1992).

In the private sector, in 1993, more than half of the QCC participants (65.6%) were from the manufacturing sector (refer to Table 4.3), but in terms of the total workforce in the manufacturing sector, only 4.4% were involved in circle activities. More than three quarters of QCC participants were from firms with 200 or more employees. In terms of QCC participation by private firms in 1993 (refer to Table 4-2):

> QCCs in the manufacturing sector are found in only 141 companies, of which 132 are in establishments with 50 or more employees....The 132 represent 11.3 % of the total number of manufacturing establishments in Singapore with more than 50 employees....the majority of the manufacturing companies with QCC activities are MNCs in the electronics industry owned by Americans, Japanese and Europeans. There is a noticeable absence of large private locally-owned manufacturing companies active in QCCs. To redress this, NPB intends to intensify its efforts in reaching the large local manufacturers in the next two years.
>
> (NPB 1993a:54-55)

Table 4-2 : Where the QCC companies in the private sector are found (as at 31 March 1993)

Sector	Employment Size							
	< 10	10-49	50-99	100-199	200-499	500-999	≥ 1,000	Total
Manufacturing	1	8	23	28	39	25	17	141
Construction	-	-	-	1	1	1	1	4
Commerce	1	5	5	8	6	1	3	29
Transport and Communication	-	3	3	4	3	-	7	20
Financial and Business Services	1	4	3	8	8	2	6	32
Community, Social & Personal Services	1	-	1	2	1	1	3	9
Total	4	20	35	51	58	30	37	235

Source : NPB 1993a : 55

Based on the total number of 4,069 manufacturing establishments in Singapore in 1993 (Ministry of Labour 1994:151), only 3.46% of manufacturing firms in Singapore responded to the QCC promotion programme over a period of 12 years. This in part is due to the fact that about 2,900 manufacturing firms were rather small sized, with less than 50 workers per establishment.[14] The ownership profile of manufacturing firms was also quite varied, with the larger firms comprising mainly of MNCs (of various nationalities) and government-linked companies, while the small sized firms comprised mainly locally owned business enterprises. There has been very little interest among the smaller firms in QCCs, and in 1993, manufacturing firms with less than 50 employees, accounted for only 1% of total QCC members registered with the NRC (refer to Table 4-3).

[14] If 141 firms constitute 11.3% of the firms in the manufacturing sector, the total number of firms with more than 50 employees each is 1168.

Table 4-3 : Distribution of QCC in the private sector - March 1993

Sector	Employment Size								
	< 10	10-49	50-99	100-199	200-499	500-999	≥ 1,000	Total	%
Manufacturing	4	204	1,325	3,011	4,873	3,251	6,264	18,932	(4.4)
Construction	-	-	-	8	469	17	10	504	(0.5)
Commerce	5	74	200	348	557	36	601	1,821	(0.5)
Transport and Communication	-	23	114	139	105	-	2,027	2,408	(1.6)
Financial and Business Services	5	52	64	747	1,374	59	1,943	4,244	(2.6)
Community, Social & Personal Services	7	-	48	66	18	599	226	964	(0.5)
Total	21	353	1,751	4,319	7,396	3,962	11,071	28,873	(2.1)

Source : Productivity Digest, September 1993, National Productivity Board, Singapore.
Note : For each row, the figure in brackets indicates the percentage of QC Circle members to the total workforce in that row.

In the service sector, there has been more QCC participation among employees of local firms, such as the bus companies and the large local banks, although they comprised less than 10% of the total firms (with more than 50 employees) in these sectors (NPB 1993a).

Thus the NRC data show that in the private sector, QCC diffusion is mainly among the larger firms (of more than 50 employees), mostly in the manufacturing sector and among foreign-owned firms.

Although in terms of the growth in QCC participation, NPB data showed that the participation rate had risen from 0.6% in May 1983 to 6.6% in March 1993 (refer to Table 4-1), it should be noted that the data reported by NPB pertained only to cumulative data on circle formation, and there is no data on registered circles that had subsequently ceased activities.

As sustainability is a significant measure of the viability of QCC, it is unfortunate that the NRC is unable thus far to provide data on the number of active circles. This

information would render a more representative picture of the spread of QCC practice in Singapore.

Given the low QCC participation rate in the private sector based on the NRC information and in the light of the Singapore Government's productivity agenda for the 1990s, it was inevitable that the NPB has chosen to focus on the private sector firms in its new QCC initiative, as any improvement in the TFP element of productivity growth would to a substantial extent, be dependent on TFP growth in the private sector.

4.3.3 The organizational response to QCC

At the level of the individual firm, organizational actors must experience the 'push' towards QCCs. Senior management must be convinced of the efficacy of QCC in contributing to the overall organizational quality and productivity improvements; middle management and front-line supervisors must be convinced that employee participation in QCC would result in outcomes which would 'justify' the time allocated to such activities, and, for employees QCC participation has to address their practical if not emancipatory interests, besides the technical interests. These issues need to be explored to obtain a rich picture of QCC practice in Singapore.

This chapter will examine secondary data sources on QCC, while the next chapter will focus on findings of field research conducted.

The major source of secondary data on QCCs in Singapore is the NPB, which has conducted various productivity-related research, mainly surveys, to obtain feedback on its policies and to use the findings as inputs in strategic planning process. One key source of information is the QCC surveys conducted by the NPB.

4.3.3.1 Highlights of NPB QCC Surveys

As the main promotional body for QCCs, the NPB has been conducting surveys on QCC impacts and effects since 1983. Of the four major surveys conducted (1983, 1985, 1987 and 1992), only three reports (1983, 1987 and 1992) were obtainable for analysis.

Although the 1985 QCC Survey Report was unavailable, references to 1985 data were made in the 1987 and 1992 surveys and some degree of cross-comparisons. However, the survey methodology, sampling and response rate for the 1985 and 1992 remains unknown.[15]

NPB's objectives for conducting the QCC surveys ranged from obtaining information on substantive issues such as meetings, incentives, basis of participation; evaluation of the impacts and outcomes of QCC activities including the benefits and problems of QCCs; reasons for implementing QCCs; and, attitudes towards QCCs (NPB 1987b:1).

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[15] The 1983 QCC survey was conducted shortly after the launch of the QCC movement, on companies and circle members registered with the NRC. A report of the findings, including an assessment and recommendations was published by the NPB (1983).

The survey sample size was 284 circles covering all 85 companies then registered with the NRC. Circles were selected by random sampling and one facilitator, the chairman of the steering committee and three volunteer circle members of each selected circle were invited to participate. The survey questionnaires were mailed to the facilitators and the steering committee chairman, while the circle members were interviewed on a group basis. The response rates were: 44.7% for steering committees; 52.9% for facilitators; and 61.9% for circle members (pp. 2-3).

In comparison to the 1983 survey, the 1987 QCC Survey (NPB 1987c) included non-QCC members, besides the chairmen of QCC steering committees and QCC members. With regard to data collection, QCC steering committee chairmen filled in mailed questionnaires while face-to-face interviews were conducted with QCC members and non-QCC members.

The survey had a sample size of 515 circles, with 336 from the public sector and 179 from the private sector. Three members from each circle in the sample were invited to participate in the face-to-face interview. The chairmen of the QCC steering committees of all 165 organizations registered with the NRC were included in the sample and two non-QCC members from each of the 165 organizations were targeted for the sample (NPB 1987c:2).

The response rate for chairmen was 56%, QCC members 80% and non-QCC members 123% as more than those targeted for the sampling responded to the invitation to participate in the survey.

The 1985 QCC Survey Report was not available to the public and I was unable to obtain a copy. I was more fortunate with the unpublished 1992 Survey as I was able to obtain the data in a summarized form. However, no details regarding 1992 QCC survey is available as the data provided me in a summary form.

For NPB, the data collected from these surveys have been a principal source of information concerning state of QCC practice in Singapore. For example, chapter five of NPB's *Productivity Statement 1993* made extensive references to the findings of 1992 QCC Survey.

However, the survey method underlines an implicit positivistic bias in the research so that greater depth of examination regarding issues such as attitudes towards QCCs cannot be adequately addressed and in these areas, an interpretive and more holistic approach could yield a better picture of the practice and phenomenon.

Notwithstanding this, the surveys provide snapshots regarding the prevalence of certain features of QCC practice as a whole, and could help build a coherent and clearer picture of QCC practice in Singapore firms. Some of the more pertinent survey findings are as follows:

Profile of circle members

More than 75% of the circle members sampled in 1992 survey were below 40 years old and four-fifth of them were educated in the English language medium. Educationally, more than 40% had post-secondary education, while 54.7% had completed secondary schooling.

In terms of their occupational profile, about one-third were professional or technical personnel, 22.9% were clerical workers and 15.7% were production workers. More than 30% of circle members were from their organization's service or maintenance departments, about 20% from production and 17% from administration.

Profile of QCC organizations

In 1992, a majority of the private sector companies sampled (63%) that had QCC programmes were foreign-owned and the majority of private sector companies with QCCs were in the manufacturing industry (68%).

Most of the organizations with QCC programmes had a coordinator or a secretariat to administer the programme. About 54% had up to two full-time QCC Secretariat staff while almost 30% had five full time staff.

The overall QCC participation rate at the firm level

In the surveys, the QCC participation rate is defined as the percentage of employees involved in QCC activities in a company and was obtained by dividing the total number of QCC members by the total staff strength of the organizations (NPB 1987c; 1992b).

From the surveys (refer to Table 4.4) the overall QCC participation rate in firms in the private sector rose from 21% in 1983 to 26% in 1985 but fell by 9% to 17% in 1987. No overall percentage rate was available for 1991. Unfortunately, in the 1992 survey, data on overall QCC participation rate in the private sector for the year 1991 were not available, as the data provided were based on company size.

The survey findings also revealed that in contrast to the private sector, overall QCC participation rate in the public sector has been rising since the start of the QCC movement.

Table 4-4 : Participation rate by organization size and sector

Company Size	Participation Rate (%)											
	Private				Public				Overall			
	83	85	87	91	83	85	87	91	83	85	87	91
Less than 500	37	35	22	37	15	29	30	67	35	34	26	47
501-1000	23	9	18	20	26	24	20	36	25	19	19	23
1001-2000	23	17	13	15	11	13	21	32	18	15	16	19
More than 2000	14	12	23	13	6	11	17	25	9	11	18	15
Overall	21	26	17	NA*	16	18	18	NA*	19	22	18	NA*

* data not available

Source : NPB 1983, 1987 & 1992 QCC Surveys.

Voluntarism and QCC participation

The concept of *jishusei,* that is, voluntarism, is a much discussed ideal in Japanese QCC and there has been some degree of ambiguity involved in the application of this concept in Japanese QCC practice (see Chapter 3).

With regard to the application of this concept in QCC practice in Singapore, the NPB surveyed QCC members (all three QCC surveys) and senior managers (1992 QCC survey) with regard to the basis of their participation in QCCs (Refer to Table 4-5).

Table 4-5 : Basis of participation (as viewed by QCC members)

Form of Participation	1983 (%)	1985 (%)	1987 (%)	1992 (%)
Voluntary	42.0	28.0	25.0	18.3
Encouraged by superior/manager	8.0	34.0	27.0	33.5
Instructed by superior	43.0	33.0	30.0	28.4
Required by company policy	7.0	5.0	9.0	27.5
Encouraged by friends	-	-	9.0	7.6

Source : NPB QCC 1992 Survey. (1992 figures do not add to 100)

In 1983, when the QCC programme was just beginning to take off, 42% of employees involved in QCC activities did so voluntarily. A decade later, the number of employees volunteering to participate in QCC activities had fallen to 18.3%.

On the other hand, there was a steady up-trend in the number of employees who reported that they joined QCCs as a result of being 'encouraged by superior or manager to do so' (1992 QCC survey), that is, from 8% in 1983 to 33.5% in 1992.

Unlike the Japanese firms, peer pressure was not a major reason for participating in QCCs, with only 9% attributing this as the reason in 1987 and 7% in 1992.

Almost three-quarters of all QCC members sampled in 1992 had indicated that some form of corporate authority was used to influence their action in joining QCC participation. This view was collaborated by the response from senior managers, with almost 85% agreeing that members participated because of encouragement from superiors (refer to Table 4-6).

Table 4-6 : Basis of participation as viewed by the senior managers

Forms of Participation	Senior Managers (%)					
	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Total
Because of encouragement from superiors	31.0	53.5	11.6	1.6	2.3	100
On instruction from superiors	20.9	42.6	17.1	14.0	5.4	100
Because they are keen to take part	14.7	36.4	34.1	13.2	1.6	100
Because they are given incentives to join QCCs	10.9	33.6	28.1	13.3	14.1	100
Because it is a company regulation	10.4	17.6	21.6	12.0	38.4	100

Source : NPB QCC 1992 Survey

The 1983 QCC survey reported that 85% of respondents surveyed had felt that QCC participation should be voluntary. However, as there were no further reports on this

issue in the later surveys, it is not possible to assess any change in this sentiment over the decade of QCC practice.

These findings suggest that unlike Japan, peer pressure was not a major factor in the employee's decision to join. Rather, it was the encouragement or directives of management that was the impetus. In this respect, the practice of QCC in Singapore firms is essentially a top-down process.

QCC activity level in organizations

One of weaknesses of the NRC statistics was the fact that it only reported on circle formation and not on level of QCC activity within the organization. The 1992 QCC survey did attempt to address this by asking senior manager respondents to assess the level of QCC activities in their companies. Only 13.2% of senior managers surveyed in 1992 reported that the circles in their organization had all been continuously active, while about half reported that only some of the circles in their organizations were active, and about one fifth reported that the circles in their companies were inactive (refer to Table 4-7). In the light of this, the number of operating QCCs and total number of employees participating in QCCs will be less than that listed in the NRC statistics.

Table 4-7 : Management's views on the present status of the QCCs in the organization

Status of QCCs	Senior Managers (%)
Circles have always been active	13.2
Circles are active now, but there were some problems previously	14.0
Some circles are active, some are not	48.1
Circles are inactive now, but were active previously	21.7
Circles have never been active since QCC was introduced in the organization	3.7
	100

Source : NPB QCC 1992 Survey

Employers expectations of QCC

Employers (senior managers in the 1992 survey and steering committee chairmen in the 1987 survey) were asked to rank a list of reasons for implementing QCCs.

In 1987, the three highest ranked objectives were: promotion of teamwork and good relations; improving quality and increasing efficiency (in descending order). In 1992, the highest three ranking reasons were: improving quality; promoting teamwork among workers and thirdly, to improve communication between management and non-management staff (this reason was not included in the 1987 list of reasons). Respondents ranked the objective 'involve workers in decision-making' seventh place in 1987 and ninth place in 1992.

These findings imply that while the managers sampled (like their Japanese counterparts), hoped that quality improvement and teamwork would be a major outcome of QCC implementation, they did not envisage employee participation (through involvement in work decision-making) as important for the attainment of these goals.

Issues related to the hybrid nature of QCC activities

In Chapter 3, the QCC was shown to be a hybrid organization form which straddled both the formal and informal organizational systems. As they were not part of the formal work arrangements, QCC activities could to be performed at the expense of the normal work routine. Yet for QCC activities to be fruitful, members had to allocate time for data collection, collation and analyses. This is collaborated by the 1992 QCC survey finding that QCC members spent an average of 24 hours of their own time on each QCC project (NPB-QCC 1992 survey summary of findings : Figure 68). Consequently, a key issue with regard to circle activities was the problem of time allocated for such activities.

For circle members not disposed to using their own time outside normal work hours to work on QCC projects, time would be a major problem. Thus QCC members surveyed rated members' reluctance to have meetings after working hours' as the second most frequently encountered problem by QCCs (NPB-QCC 1992 survey summary of findings : Figure 69).

Furthermore, the survey results showed that 'QCC members' lack of time for QCC activities' was most frequently cited by senior managers themselves as the biggest problem encountered by QCCs (QCC 1992 survey summary of findings: Figure 70).

The problem of time is not confined to the Singapore QCC experience. In surveys carried out on Japanese QCC activity, lack of time was the most frequently mentioned problem associated with QCC work (Lillrank and Kano 1989:171).

In the 1992 QCC survey, the problem of lack of time for QCC activities was also cited by middle managers and supervisors for their failure to be actively involved in QCC activities.[16]

There is the possibility that 'lack of time' could be used by employees and supervisors as a more legitimate excuse to avoid involvement in QCCs in place of a reason such as 'lack of interest' due to the apparent top management endorsement of such activities. However, given the nature of the research method, this possibility could not be explored.

[16] A sizeable proportion [45.5%] of senior managers surveyed in 1992 were not satisfied with the involvement of middle managers and supervisors in QCC activities. The percentage was higher for the public sector senior managers [54.5%] than for private sector managers [41.6%] (NPB-QCC 1992 survey summary of findings : Figure 41). 78% of these senior managers reported that the reason given by the middle managers and supervisors for their low involvement in QCC activities was because they were too busy to be actively involved even though they recognise the need to give their support (NPB 1993:57).

Another finding of the surveys that requires further probing is the issue of 'members intentions on QCC membership' (1987 &1992 QCC Surveys). QCC members were asked if they intended to continue as QCC members (refer to Table 4-8).

Table 4-8 : QCC members who wished to continue with QCC activities and their reasons

Wish to Continue	1987 (%)	1992 (%)
Yes	74.0	81.6
Reasons:		
Provides an opportunity to be involved in making improvements at the workplace	98.0	79.7
Helps in developing personal abilities	91.0	60.2
Helps to understand job and makes it more interesting	87.0	54.7
Helps to make friends with fellow workers and to understand them better	86.0	50.9
Improves communication between management and non-management	79.0	43.9

(Base : All members who wished to continue with QCC activity)
Source : NPB QCC 1992 Survey

Although the number of QCC members who stated that they intended to continue with QCC increased from 74% in 1987 to 81.6% in 1992, the proportion of such members who felt that QCC membership would provide them an opportunity to make improvements fell from 98% in 1987 to 79.8% in 1992.

Similarly, in 1992, 60% of those intending to continue with QCC activities felt that QCC membership would help them develop their personal abilities compared with 91% in 1987 and only about half of these members felt that QCC made the job more interesting compared to more than two-thirds in 1987.

Furthermore, in 1992, only 47% of the respondents who wished to continue with QCC activities were of the opinion that QCCs would improve communications between management and non-management, compared to 79% in 1987.

Given the structure of the surveys, the reasons for the apparent contradictions in these two sets of findings were not known. As such the issue of employee response to QCC practice needs to be explored further.

Perceptions of support for QCC

Circle members' perception of support they received from others in the organization regarding QCC activities showed that workers in general were not very supportive of their colleagues' QCC activities.

Table 4-9 : Members' view on sources of support for QCCs

Sources of Support	% who strongly agree		
	1985	1987	1992
Top management	62.0	64.0	62.9
Supervisor	40.0	50.0	49.8
Middle management	39.0	51.0	49.2
Union	22.0	34.0	29.2
Workers	25.0	30.0	27.0

Source : NPB QCC 1992 Survey

Figure 4-10 : Senior managers' view on sources of support for QCCs

Groups that gave support	Senior Managers (%) - Strongly Agree			
	1983	1985	1987	1991
Top management	76.0	87.0	70.0	75.2
Supervisor	21.0	23.0	32.0	40.5
Middle management	45.0	31.0	30.0	37.2
Union	21.0	21.0	24.0	27.1
Workers	na	18.0	13.0	17.1

Source : NPB QCC 1992 Survey

Workers were perceived to have the lowest level of support for QCC activities both by the QCC members (27% in 1992; 30% in 1987) and by senior managers (17% in 1992; 13% in 1987) [Refer to Tables 4-9 and 4-10].

On the other hand, both senior managers (75.2%) and QCC members (62.9%) sampled perceived fairly high levels of top management support for QCCs.

Furthermore, senior managers assessment of circle members' attitude towards QCC revealed that a very high proportion were indifferent to QCCs (refer to Table 4-11).

Table 4-11 : Senior managers' views on the members' attitudes towards QCCs

Members' Attitudes	Sector		Overall (%)
	Private (%)	Public (%)	
Are indifferent to QCC activities	48.3	39.5	52.7
Glad they have circles	49.5	60.5	45.7
Are against having circles	2.2	0.0	1.6
	100	100	100

Source : NPB QCC 1992 Survey

These survey results indicate that in general Singapore workers are indifferent to QCC activities . The lack of support of employees' participation in QCC is an indication of the failure of QCC as an organizational technology to take root in Singapore firms.

4.3.3.2 Other related research findings

As the government agency charged with the task of undertaking manpower studies, the NPB has since its formation, conducted or commission research on productivity issues. For example, it conducts regular surveys on the state of labour-management relations in Singapore (NPB 1985) and on productivity in general.

Some of the findings of these research projects have not been published and if published, were often presented in summary form. This constrains analysis of the various findings in greater depth. In this respect, the QCC research findings have provided much more potential for analyses compared with other NPB published research findings. Despite such limitations, there are some findings of past NPB research which could add to the picture that is being built in this chapter with regard to QCC practice in Singapore.

For example, a productivity survey conducted in 1987 showed that there was a general fall in implementation of productivity schemes by companies between 1984 and 1987 (NPB 1987a:64). QCC implementation among the companies surveyed fell from 51% in 1984, to 36% in 1986, to 28% in 1987 (refer to Table 4-12). NPB attributed the decline to the fact that many companies were preoccupied with the immediate problems of the 1985-86 recession. However, the fall could also indicate a growing perception among the companies surveyed regarding the efficacy of QCCs in resolving the organization's productivity and quality problems.

Table 4-12: Productivity schemes implemented by companies (%)

Productivity Scheme	1984	1986	1987
Dialogues/meetings/committees between workers and supervisors/ managers	70	53	37
Improvement in work methods	76	50	35
Training courses/seminars	-	-	35
(a) Training courses for workers	59	48	•
(b) Training to improve managerial/supervisory skills	49	35	•
Suggestion scheme	38	35	29
QC Circles/Work Improvement Teams/Small Group Activities	51	36	28
Job enlargement/taking on more duties of a different nature	70	38	26
Company newsletters	50	32	18

Source : Productivity survey of Singapore 1987, NPB

On the other hand, the NPB reported that in those companies that had implemented productivity schemes, the participation rates of employees in QCCs rose from 39% in 1986 to 61% in 1987. This seemed to indicate that employees were responding to the participative approach adopted by their organizations (refer to Table 4-13).

Table 4-13: Employees' participation in productivity schemes (%)

Productivity Scheme	**1984**	**1986**
Dialogues/meetings/committees between workers and supervisors/ managers	62	81
Improvement in work methods	49	84
Training courses/seminars	-	68
(a) Training courses for workers	55	•
(b) Training to improve managerial/supervisory skills	35	•
Suggestion scheme	21	65
QC Circles/Work Improvement Teams/Small Group Activities	39	61
Job enlargement/taking on more duties of a different nature	50	81
Company newsletters	19	62

Source : Productivity survey of Singapore 1987, NPB

A NPB commissioned research on the impact of a multi-cultural environment on productivity management in successful companies in Singapore (NPB 1993d:2-3), concluded that the Singapore workforce studied possessed a set of attributes which included 'a need for a sense of belonging' and 'the expectation that managers should take the lead in any strategy adopted by the company'.

According to this research,[17] the need for a sense of belonging was the result of close working relations with people of different nationalities, the proximity of different communities on the island, and the impact of management practices from diverse cultures (pp. 3). It also reported that the expectation of strong leadership was due to the influence of traditional values of paternalism, and as a consequence, power

[17] The research was based on in-depth interviews with chief executives and managers of companies selected on the basis of their national ownership, size and industry sector. As no other details on the research design and the data were available, it is not possible to know the basis on which the observations on employee attributes were made.

inequality in organizations and directive management styles were viewed more positively than in Western developed countries.

Seen in terms of the implementation of QCC practice in Singapore, the need for a sense of belonging among Singapore workers might make them predisposed to working in teams provided that the appropriate group processes are at work. On the other hand, the acceptance of greater power inequality and directive leadership styles among Singapore workers might hamper the promotion of employee participation in decision-making and the development of QCCs as bottom-up channels of communication in the organization.

4.3.4 An emerging picture of QCC practice in Singapore

4.3.4.1 The Singapore Government as prime promoter of QCCs

Since 1981, QCCs in Singapore has been actively promoted by the Singapore Government as a component of the national strategy for labour productivity. In the earlier phase of this strategy, the QCC was viewed mainly as a mechanism for inculcating positive work attitudes among employees resulting from greater work involvement brought forth by participation in QCCs at their work-place. In the 1990s, QCC activities were being promoted as a means of improving the Total Factor Productivity (TFP) element of productivity growth.

4.3.4.2 QCC as means of building employees' associational bonds at work

In the context of Deyo's (1981) analysis of a corporatist industrial relations system, the QCC initiative could be interpreted as an attempt by the government to address the problem of labour force atomism, which is a state of a lack or loss of associational bonds (among workers) in industrial life, and which he argued, is common among workers in developing countries where a corporatist industrial strategy is adopted:

> ...(this) atomistic labour market behaviour reduces commitment to industrial institutions and norms... (as) institutional commitments are most stable and reliable when anchored in supportive bonds relating, in an industrial context, to work-groups, firms, and unions.
>
> (Deyo 1981:7)

To Deyo (1981), union membership provided the necessary supportive anchor by reducing worker alienation and increasing normative commitment, but in corporatist industrial systems, the unions could not fulfill this function satisfactorily because they had been co-opted into productionist roles that required the subordination of their own sectoral goals in favour of the national goals for industrial development.

Notwithstanding Deyo's contention that unions provided the major institutional means for the development of associational bonds among the workforce, it is argued that the major attraction of the QCC for the Singapore Government lies in the perceived potential of this small group activity in developing the desired associational bonds. In the early phase of the QCC Movement, this was expressed as worker participation and involvement, while in the later phase it was articulated as 'teamwork'.

4.3.4.3 Well established national infrastructure for QCC activities

Over the last fourteen years, the NPB has been the key government agency responsible for the promotion of QCC among Singapore companies. During this time, it has built a comprehensive national network to support the implementation of QCC activities in Singapore.

4.3.4.4 Employers' expectations of QCC

It is also evident that organizations adopting QCCs were more concerned with the quality improvement potential of QCC than with the opportunities for employee

participation embodied in the QCC concept. However, in regarding teamwork as a major benefit expected from QCC practice, senior managers also saw process outcomes as a major reason for implementing QCC activities.

4.3.4.5 Employees' response to QCC

During the early stages of the QCC movement, there was a fair degree of interest in QCC activities with a high proportion of employees voluntarily forming or joining circles. However, by the 1990s, employee enthusiasm for QCCs seemed to have declined, as the number of employees who joined QCCs voluntarily fell by more than half. Many QCC members had joined as a result of the exercise of some form of corporate authority.

However, some contradictory findings were observed. One 1987 survey finding showed that in companies with QCC programmes, there was an increase in the number of employees participating in the QCC programmes between 1986 and 1987.

Also, the 1992 QCC survey indicated that more QCC members intended to continue with their circle participation, although there was a fall in expectations of positive outcomes from such membership.

4.3.4.6 Problems arising from QCC's hybrid nature

Although at the national level, a well laid out infrastructure for QCC activities was established, the structural implications of QCC activities within the individual firm have not been as well understood or articulated.

As such, organizations encounter problems arising from the hybrid nature of QCC activities, such as the problem of lack of time for QCC activities. As time is a key resource of organization, the formal organization is invariably involved in its the

allocation, and given the competing demands on an employee's time, this could influence the amount of work time devoted to QCC activities.

The feature of bottom-up communications, another characteristic of the QCC, remained largely unrecognized because the hybrid nature of QCC activities has not been understood.

4.3.4.7 The public sector more successful in QCC formation than the private sector

The public sector in Singapore, with its established hierarchical chain across ministries and departments, has been more successful in forming and sustaining circles than the private sector.

The disparity in participation between the public and the private sectors, could be attributed to differences in authority and administrative systems and to differences in perceptions of the government-sponsored QCC movement in Singapore.

The public sector in Singapore probably has one of the highest QCC participation rate in the world. Of note is the fact that public sector organizations are essentially service-based, whereas in its country of origin, Japan, QCCs are more successful in the manufacturing sector than in the service sector.

The QCC programmes of public sector organizations were not implemented as part of TQC or TQM programmes although in recent years they have been integrated with suggestion schemes.

4.3.4.8 QCC activities based on 'pull' factors

In Singapore, QCC activities seemed to be more the result of 'pull' factors rather than 'push' factors. That is, the QCC activities were sustained mainly by the NPB's

promotional efforts, in the case of the private sector, and government policy, in the case of the public sector.

4.3.5 Areas for further research

The 'picture' that emerges of QCC practice in Singapore gives rise to a number of questions which existing research have not explored in much depth.

The surveys conducted by NPB provided information on the general state and frequencies of various aspects of QCC practice in Singapore. In this respect, they were able to address the questions of 'who', 'where', 'how many' and 'how much' and 'what' (Yin 1989:17). It enabled some degree of statistical generalization to be made.

However, given our present knowledge of the theory of QCCs, these statistical generalization are inadequate if our aim is to arrive at better understanding and explanation of this organizational phenomena.

Ackoff's (1993) observations that there is not enough theory in TQM also applies to the problem of QCCs. It is argued here (as Ackoff has done regarding TQM), that there is a need to build more theories regarding QCCs to enable us to have better explanations of the outcomes of QCC implementations.

From the perspective of constitutive process theories, the QCC had evolved in Japan through the dynamic interplay of a set of institutional properties and the agency of various organizational actors in a specific temporal-spatial context. Although this does not imply that as an organizational practice, the QCC cannot be transferred across the spatial and temporal divide, it does mean that for such a transfer to be successful, the essential elements of the concept must be well understood, and for this theoretical frameworks are required.

It is through this dynamic interplay of institutional properties and human agency, that social reality is constituted, a process Giddens referred to as structuration (1979; 1984). Hence it could be argued that structuration is also at work in the transfer and implementation of QCC practice in Singapore. It is argued here that the constitution of the social reality of QCC in Singapore is too complex to be investigated and explained using the survey methodology alone, and that other more interpretive research methods such as the case study approach would be able to provide richer explanations of the causal links and the outcomes of the implementation of QCCs in Singapore.

This research attempts to address the problem and add to the very small pool of theory in relation to QCC. The next chapter explores the implementation of QCCs in a number of companies in Singapore based on the case study research strategy using a structurational model of technology and systems thinking to interpret the findings of the field studies.

CHAPTER 5 CASE STUDIES IN QCC IMPLEMENTATION

5.1 INTRODUCTION

5.1.1 The scope of fieldwork

This chapter moves from a macro-level to a micro-level of analysis of QCC outcomes in Singapore by investigating the QCC programmes of five Singapore companies. The aim is to obtain a more in-depth knowledge of the operations of QCC programmes in Singapore through case studies of QCC implementation.

Ten companies were studied during the preliminary part of the research. All these firms had, at some time or other in the last fifteen years, implemented QCC programmes but they varied widely on a number of factors such as ownership, size, business type, employee profiles, management styles and whether the QCC programme was still in operation. The aim of this preliminary study was to select a smaller number of cases which shared some major characteristics so that cross-case analyses could be attempted regarding the company's experience in implementing QCCs.

A review of these cases was made resulting in the decision to focus on five cases, which were seen to offer more potential for cross-case analyses.

Three of these five cases (cases #01, #02 and #03) are business firms whose shareholders include government-linked companies. With the Singapore Government as a major shareholder, these firms shared some common organizational characteristics such as organizational form and broad business and organizational objectives including the management's application of government policy on quality management in general, and QCCs in particular. Some common official management approach on QCC programmes could thus be expected and this characteristic has been used as the starting

point to study in some detail the contexts and dynamics of their QCC programme implementation.

The other two cases (cases #04 and #05) are both local subsidiaries of Japanese multi-national companies. Their parent companies were early pioneers in the QCC movement in Japan and both these firms were early implementors of the QCC programmes in Singapore. However, with these two companies, it was not possible to study the circles themselves (as was possible in cases #01, #02 and #03). Instead the focus is on the management's approach, impressions and experience of the efficacy of the QCC programme in their Singapore company. During the field work, it was also discovered that both companies were attempting to extend the QCC to their engineers and to the best of my knowledge and assessment, neither was aware of the other's actions in this regard.

5.1.2 Analytical framework

The analyses of these five cases are based on Olikowski's (1992) 'Structurational Model of Technology'. The underlying premises of this model is that:

> Technology is created and changed by human action, yet it is also used by humans to accomplish some action. This recursive notion of technology - which I call the *duality of technology* - is the first of the premises....The second, a corollary of the first, is that technology is interpretively flexible, hence that the interaction of technology and organizations is a function of the different actors and socio-historical contexts implicated in its development and use. (p 405)

Olikowski's model incorporates Giddens (1979; 1984) theory of structuration with its emphasis on the central role of human agency in the structurational process, and Pinch and Bijker's (1987) concept of the interpretive flexibility of technology, which is the

capacity of users of a technology to control their interactions with a technology and its characteristics.

Following Cole's (1989) analysis, is that the adoption of QCC practice outside Japan could be studied as an incident of technology transfer, with the QCC concept and practice representing a particular form of organizational innovation that corporate decision-makers introduce into their organizations as a part of the corporate agenda. The QCC is distinctive as a small group activity performed outside the routine operations cycle of a firm. Yet circle outcomes could mediate the workers' performance of his routine work and in this respect it represents 'know-how' that could be applied for the improvement of work processes. In this way it satisfies the third of three layers of the term 'technology' (Bijker *et al.* 1987). Therefore, although Olikowski (1992) does not envisage that her structurational model of technology is applicable to social technologies (mainly on the grounds that there will be problems concerning boundary delineation between what constitutes the technology and what its context), it is argued here that in the case of QCC system, the problem of boundary delineation is a less crucial one. Furthermore, as her framework represents a comprehensive attempt to take structuration theory outside the realm of sociology and into the realm of organizational theory it offers a cogent framework for the analysis of the interactions between a social technology such as the QCC, the people that design, sponsor, use or are affected by the technology, and the institutional contexts in which these interactions take place.

QCC analysis and the Structurational Model of Technology

We can examine the adoption, implementation and practice of QCCs in the five case studies in terms of the three modalities and of the four influences as posited in Olikowski's (1992) model, and derive a structurational model of QCC adoption in Singapore. It is argued here that this conceptual framework, with its emphasis on both agency and structure, is an ideal vehicle for our present study of the interaction between the QCC as a social technology and the people on which it is applied.

The key QCC-people relationships from a structuration framework are: (a) the influence of the designers, the sponsors, the decision-makers and the users in shaping and modifying the QCC concept and practice; (b) the influence of the QCC as a medium of human action, in that it facilitates and/or constrains human action, or that its net influence is negligible; (c) the institutional conditions of interaction between the human agents and QCC, that is, the elements of the organizational contexts which exert an influence on the human-QCC interactions; and, (d) the effects of the interaction between organizational actors and QCC, on the institutional properties of the organization. These four key influences on human-QCC interactions are the key elements which are detailed in the chart below (refer to Table 5-1).

Table 5-1 : The four sets of influences in people-QCC interactions

Influence (a)	Influence (b)	Influence (c)	Influence (d)
Role of people: • creators • sponsors • decision-makers • users	QCC practice and human action: • constrains • facilitates • has no impact on human actions	Contextual elements such as: • structural properties • cultural traditions • socio-economic conditions • workgroup norms	Impact of QCC outcomes on institutional structures of meaning, norms and power.

With regard to the modalities of structuration, the interpretive schemes of organizational actors are instrumental in the actors' response to the practice; the system of domination within the organization will determine the resources brought to bear on the practice while the normative schemes will determine the actors' rationale for accepting, promoting or rejecting the use of QCCs.

5.1.3 QCC implementation and the systems approach

As discussed in Chapter 3, the Japanese approach to quality management possesses a strong systemic flavour and this is evident in their approach to QCC practice. As the QCC model in use in Singapore was based essentially on the Japanese model, it is necessary to examine if the QCC programmes implemented in case studies retained the systemic characteristics of their Japanese parent.

As discussed in Chapter 3, Japanese QCC is doubly systemic. Firstly, the systemic approach is emphasized in circle problem solving. The fundamental goal in QCC is continuous improvement, and is based on the belief that the total effect of all incremental improvements is greater than the sum of the individual outcomes, with great importance placed on the emergent processes of circle activity, such as, quality awareness, continuous learning and 'good housekeeping'. It is this systemic emphasis that enables the decentralization of QC responsibility down the formal organizational hierarchy.

Secondly, circle activity provides a channel for negative feedback as a counterfoil to the essentially top-down approach adopted in Japanese Total Quality Management System or Company Wide Quality Control System. Thus, the principle of employee participation in QCC problem solving is mediated through a structured bottom-up feedback process that enables such feedback to be articulated and organized and integrated into the normal production/operational control cycle of the organization. This systemic flow ensures that local innovations from shop floor employees, where appropriate, will be integrated into the normal production process.

This thesis views QCC adoption as a technology transfer process, and as systemic characteristics are fundamental to Japanese QCC practice, the QCC programmes in the case studies will be also be reviewed in the light of those systemic features which have been transferred to the local companies' QCC programme.

5.2 CASE #01 : AECO SHIPYARD

5.2.1 Company background

Aeco is a ship repair and ship construction firm located at the western end of Singapore. It was started in the early 1980s by two brothers to service and repair small vessels passing through the port of Singapore.

In 1989, the two brothers sold 90% of Aeco to a government-linked company, Shipco. As the major shareholder, Shipco revamped Aeco's board of directors, fielding in its own board representatives. Mr Tan, a senior manager from Shipco who was instrumental in the acquisition of Aeco, was appointed as the non-executive chairman of Aeco and another Shipco manager was seconded to Aeco to manage the daily operations of the shipyard.

Shipco, is a well established, Singapore-based ship owning and ship management company with an extensive international shipping network. It is a major employer of sea-going personnel, including sea-faring professionals in Singapore and has received awards from the Port of London Authority for schedule reliability and efficiency.

In 1993 due to irreconcilable differences in management styles between Shipco and the brothers, the former bought over the brothers' 10% share and Mr Tan assumed the role of executive chairman of Aeco, in addition to his other duties at Shipco. According to one of the company managers, Mr Tan began to 'modernize' the shipyard's management. As part of this drive, he launched a productivity improvement programme and expanded the repair facilities so that by the end of 1993, in terms of production and service facilities, Aeco had one floating dock; three berths for shipbuilding; five ship repair berths and three workshops.

In January 1994, Shipco invited another government-linked company with more experience in the ship repair and shipbuilding business, Repco, to jointly own and operate Aeco. The aim was to tap Repco's technical expertise in running shipyards and to widen the Aeco's client base through Repco's contacts and network.

Under the share purchase agreement, Repco bought over 25% of Aeco's equity from Shipco, with an option to purchase another 25%. A Repco manager, Mr Yang was seconded to Aeco as deputy general manager to assist in the daily operations of the shipyard.

Repco's roots were Japanese-based, as the key driver in its early years (some thirty years ago) was a major Japanese shipbuilder and one of the pioneers in the ship repair and ship building industry in Singapore. Within a month of taking over the daily operations, Mr Yang launched a daily morning exercise programme. Circles were painted on the grounds of the front yard of the company premises, with the names of the employees marked on each circle. Employees assembled each morning in the front yard, took their positions within their designated circles and for five minutes, accompanied by music, went through the morning exercise regime led by the deputy general manager.

In July 1994, Repco, exercised the additional 25% equity purchase option under the sale agreement. Of this 25%, Repco sold 15% to another government-linked shipbuilding company, who was in the process of developing a shipyard on the empty lot adjacent to Aeco. Mr Yang was promoted to general manager of Aeco and Mr Tan was re-designated as non-executive chairman. The new general manager re-introduced regular Saturday work for the company's employees (except for clerical staff). Prior to this, Aeco operated on a five-day week (as did Shipco) and was probably the only shipyard in Singapore to do so. In re-introducing Saturday work, Mr Yang was seen as bringing Aeco's working hours were more in line with those of other Singapore shipyards.

Thus over a period of five years, Aeco transformed from a local privately run small shipyard to a company where all the shareholders were large government-linked companies. From being run by private entrepreneurs, it came under the wing of a 'ship owner/liner' management for three years and in 1994, it was undergoing yet another transformation to a more 'shipyard' based management. The high turnover among employees over the last five years, averaging about 6-8% each month, could be one consequence of these major changes.

5.2.2 Aeco's functional organization

In late 1994, Aeco had 500 employees, half of whom were shipyard workers. These shipyard workers were unionized and were represented by a marine-based union.

The company was organized into four divisions: Ship repair, Shipbuilding, Commercial, and Finance. Below these four divisions, were fourteen departments. The Human Resource Development department was part of the Finance division. All division managers and the Quality Assurance Manager reported directly to the General Manager.

5.2.3 Aeco's productivity improvement programme

In 1992, the executive chairman, Mr Tan, embarked on a productivity drive to focus on what he considered to be the most pressing issues confronting Aeco, that is, the problem of work attitudes and work practices.

In the top management's view, the programme objectives were: 1) to encourage highly adaptable and productive workers who took pride in their work; 2) to reduce absenteeism to a negligible 2% from the current monthly level of 6 to 8 %; 3) to encourage workers to take responsibility for quality; 4) to inculcate positive work attitudes and quality awareness among employees; and 5) to encourage QCC

participation and the '110% solution' mindset. According to a company manager, the 110% solution promoted by the executive chairman comprised four maxims which were: learning from doing, more responsibility for work done, doing what you love and loving what you do; and developing the potential of all employees.

With the executive chairman a key sponsor of Aeco's productivity policy, a series of activities in the company were launched, aimed at 'institutionaliz(ing) individual responsibility from every employee' (*Aeco newsletter* July 1993).

Central to this programme was a quality policy with these objectives: firstly, meeting contractual requirements of customers; secondly, continuous improvement on work processes; and thirdly, to encourage every employee to take individual responsibility for quality. The programme theme used by Mr Tan was: 'Teamwork Together We Can Really Achieve'.

In February 1993, a series of on-the-job-training sessions was implemented, with the executive chairman himself conducting the sessions for supervisory staff on Saturday mornings. This course focused on basic supervisory concepts and skills with heavy emphasis on interpersonal communication using transactional analysis.

In 1993, about 90% of Aeco's work-force of 300 employees attended an in-house training programme on quality service. This was a customer service training programme that Shipco, the parent company had imported from external overseas consultants and was implementing in all companies in the group. It was promoted by the management as a two-day course on service thinking, and in particular, customer service improvement.

Aeco also launched its plan for International Standards Organization (ISO) 9002 certification and an external consultant was appointed to take the company through the steps necessary for certification by Det Norst Veritas, the Norwegian Ship

Classification Society. The target date for certification was set for September 1994 and the QA Manager in Aeco was put in charge of the ISO 9002 certification project.

As part of Aeco's quality policy and partly due to the requirements of ISO 9002 certification, a QCC programme was also re-launched in April 1993. This re-launch was aimed at kick-starting a moribund QCC programme launched in early 1992. The manager of the Human Resource Development (HRD) department was put in charge of the QCC programme.

In 1993 Aeco also became a participating company in the NPB's Jurong Zone Productivity Project, whereby two companies were paired to share their knowledge in core areas of productivity improvements. Aeco was paired with a Japanese consumer electronics firm and as a result of this collaboration, launched a suggestion scheme in October 1994.

With the change of management in early 1994, new policy directives were announced. The key objectives for the company were identified as tightening communications among departments, to increase 'professionalism' among employees (this could be interpreted as more shipyard-trained personnel), to 'rationalizing' working hours (that is, to revert to a six day working week in line with the practice in other shipyards in Singapore and this was implemented in the third quarter of 1994). Aeco would capitalize on Repco's repair and building facilities and link its job training programme with that of Repco's. According to one of the managers, the other objective was 'to put a stop to the constant changes'; and to prepare the company for a stock exchange listing in two to three years time.

5.2.4 Aeco's QCC programme

The first attempt at setting up QCCs was made in January 1992 when management decided to launch Work Improvement Teams (WITs), the acronym given to QCCs in

the public sector in Singapore. A WITs Committee was appointed chaired by the Divisional Manager of the Finance Division to promote and coordinate WITs activities in the shipyard. It was a large committee with representatives from almost all the fourteen departments in the company. The committee began monthly meetings to feed back information and coordinate the implementation of WITs in the various departments. However, no team was formed and according to the HRD Manager committee meetings became a channel for airing inter-departmental complaints and grievances.

In early 1993 the executive chairman decided to revive the QCC programme and initiated a number of QCC appreciation sessions. These included: a Singapore Navy presentation of their WITs (QCC) activities to the staff of the shipyard; a talk by an external QCC consultant; and a visit by Aeco employees to the naval maintenance base for project presentations by WITs' members from the navy.

Following these sessions, in April 1993, a new QCC programme was launched with the formation of a QCC Steering Committee headed by the executive chairman, with the other members being the deputy general manager, two divisional managers, the HRD manager and the Quality Assurance manager. (In 1994, the non-executive chairman, Mr Tan headed the committee, and Mr Yang, the general manager, a committee member). The HRD manager was assigned the responsibility for monitoring and reporting the progress of the circles to the senior managers on a fortnightly basis.

The QCC Steering Committee, decided that 24 circles should formed based on the total number of workers in the shipyard and that worker participation in these circles would be compulsory. Circles were required to meet weekly for an hour on Friday afternoons from 1.00 pm to 2.00 pm. The idea was that all QCCs would meet at the same time each week at this assigned hour so that all would be aware that QCC activities were taking place at that time. (On completion of my fieldwork sessions at the shipyard one afternoon on Friday, I noticed that at 1.00 pm, music was played on

the public address system and I was informed that this was one of the productivity tunes promoted by NPB).

A QCC consultant from the NPB was engaged to conduct an in-house seminar for QCC facilitators, leaders and steering committee members.

The QCC Steering Committee also set specific targets for the 24 circles with every circle expected to complete one project by end of 1993 and two projects by the end of 1994. Cash awards of between S$10 and S$100 per project were set aside for completed projects. The average dollar value of the award per project at end 1994 was about $50.

5.2.5 Tracking circle progress

By the end of December 1993, the original 24 circles was reorganized into 18 circles due to staff turnover and changes in the departments' staff strength. Of the 18 circles remaining, 17 circles presented their projects to the QCC Steering Committee, managers and staff in December 1993. Of these, two circles had completed three themes, one circle two themes, and nine circles had completed one theme. The remaining six teams still had on-going projects. The best team award was won by a team from the Accounts department. In all, 16 presentations were conducted by QCC teams in 1993.

By April 1994, the number of circles fell from 18 to 15. The three circles that dropped out were from afloat[1] repairs. As 90% of the working time of workers from this section was spent at sea, meetings were difficult to arrange, especially at the designated time. A new target was set for each of the 15 teams to complete two themes (projects) by end 1994.

[1] These were ship repair jobs performed while a ship was within Singapore waters but not docked in the shipyard. This meant that once the workmen were dispatched to the vessel, they would remain there for the whole day for the job. They were as such working outside the company's premises. In such situations it would have been difficult for these workers to find places to hold meetings.

By October 1994, 13 of the 15 circles had completed at least one 'theme' (circle project) and of these, six circles had presented two themes. The two remaining circles have since its formation in 1993, failed to complete or present any theme.

Around this time, the HRD manager, as the manager responsible for QCC activities in the company came under some pressure from the general manager who wanted the circles to show tangible results in terms of cost savings or tangible quality improvements, especially as he held the view that much time and effort had been invested in circle activity. In September 1994, an audit carried by the external consultant appointed to prepare the company on ISO 9002 certification also pointed out the slow progress in circle process outcomes. This increased the pressure on the HRD manager to show results as one criterion included in ISO 9002 certification was evidence of teamwork.

In the HRD manager's view, although he was responsible for monitoring the progress of the circles, he could not be made responsible for circle outcomes as these were beyond his control. As a consequence of these pressures, he sought the advice of NPB's principal QCC consultant. The manager then implemented measures such as the use of visible charts to track circle themes; circle members recording of the progress of QCC meetings and allocating budget expenses for each circle to use 'in promoting QCC activities'.

It is interesting to note that at about the same time, Shipco was in the process of implementing its own QCC programme. In the case of Repco, QCC activities were attempted much earlier in the 1980s but were no longer operating. A suggestion scheme implemented by Repco had also been discontinued. However, the January /February 1994 issue of Repco's in-house newsletter reported that a Quality Improvement Course was conducted at the parent company by an external trainer associated with a petroleum multi-national company The newsletter reported that the

course consisted of 'tools and techniques which could be used by employees for work improvement'.

5.2.6 QCC activities

Four circle groups were studied, of these, three had been rated as the 'performing' teams by the QCC Evaluation Committee. One of the three 'performing' teams was the Finance division while the other two were from the production departments. The fourth circle studied had not completed or presented a single project. The members from three circles were interviewed in small groups of two or three persons, all belonging to the same circle. Unfortunately, I was unable to attend the actual circle sessions as the interviews were arranged by Aeco's HRD manager who was reluctant to accede to my request to attend the actual meetings (although this was not conveyed to me directly). Of the fourth circle, I had specifically asked to meet them as there had been reports of their circle activities in the local newspapers and also the NPB newsletter. However, this was not possible for various reasons and I had to rely on secondhand accounts from the manager, the news reports and from the NPB consultant involved in 'hand-holding' this group.[2]

S-11 QCC

The eight team members in this circle were from the Finance department and were all female accounts clerks and accounts assistants. The leader was also the accounts supervisor and the facilitator was the manager in the department. The circle was formed in early 1993 and met every Friday.

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2 One of the arrangeents made was for me to meet the members of this circle when the local television station was doing a feature on them regarding their circle project. However, the television filming did not take place (no reasons were given) and I was unable to meet them.

They won the best circle award in 1993 and was placed second in the August 1994 presentation. Their leader reported that they would complete their second theme (project) for 1994 by the end of December. All team members were comfortable with the use of the QCC statistical tools with the major tools being the fish-bone diagram, the Pareto and bar charts. All members were allocated data collection tasks that were performed outside the QCC meeting times. However, the leader reported that it was 'quite hard to get all members talking (to talk) during brainstorming sessions'. In her view it may be that some members 'had nothing to say', as these members did carry out the data collection duties allocated to them. On the presentations to the QCC Evaluation Committee, circle members reported that they had practised their presentation about five times. In reply to the query on whether the presentation and the incentive awards should be scrapped, two team members felt that if these were absent, 'the urgency would not be there'.

Theme selection was made by majority vote although the circle leader noted that some modification of the theme subject did occur during the course of the project as a result of data collected. She also voiced some frustration with the growing emphasis by the Evaluation Committee on costs savings:

> Our work process is very standardized so improvements are not as obvious as in the case of production QCC teams. It is very hard to quantify our improvements and there is a lot of emphasis on cost reduction. For example, one theme we worked on was to improve the monthly accounts closing date and another was to reduce late payments to suppliers by 20%. How do we quantify this? We try to look at costs savings but many of the things we do are intangibles. If we improve our work process, it is improving coordination, better planning, less overtime work. All this improve our work process, but it is intangible.

I pointed out to her that her team had won the best presentation award in December 1993 for the theme on 'improvement to the closing of the monthly accounts'. She did

not reply to this. However, she mentioned that the circle's current project was based on cost reduction and the theme was titled: 'To reduce printing costs'.

[I then recalled that this interview had taken place shortly after an in-house QCC presentation in which a circle from one of the administrative departments was not awarded high points by the QCC evaluation committee. In the opinion of the HRD Manager this was because the theme that the circle was presenting, resulted in mainly intangible benefits. The theme in question concerned the re-organizing the workers' daily transport arrangements. The HRD Manager had thought that it was a good effort on the part of the circle members. The top award in that presentation went to the *Hi-Tech QCC* (see below).

Circle members reported that they were beginning to face problems in selecting new themes and with regard to this, the leader commented that they 'can survive for another year, after that (I) don't know. If we have problems we'll go and see our facilitator.'

Hi-Tech QCC

The seven-team members (including the leader) were from electrical section of the maintenance department. The team leader was also the supervisor in charge of the workgroup and the facilitator was the manager of the department. The team was regarded as one of the top production QCCs. Meetings were conducted in English as all team members were able to converse in the language. According to the leader, the only time they had problems with language was when there were two Iban (from Sarawak) labourers attached to their section who joined in the QCC activities.

In 1993, they won the award in the August 1993 presentation and was placed second in the September 1993 presentation. In the June 1994 presentation they were not ranked but in the October 1994 presentation they won the top place again, which according to

their leader, 'we never expected to win'. They seemed very pleased that they had won the top award again.

They had completed five themes by October 1994. According to the circle leader, at an initial brainstorming session in 1993 when the circle had just been formed, they came out with seven possible themes. Theme selection was rather random, as the member remarked, 'it is like throwing a dart'. However, their most recent theme, for which they won the best presentation award, was taken up as a result of the general manager's remarks that too many of the printed circuit board (PCB) cards in the welding sets were being replaced.

The leader and members were very pleased that their circle themes (for which they won awards) were money saving. For example, the leader pointed out that their project, 'to reduce dock spotlight damage' resulted in costs savings through manpower saved, lower cranage usage and less delays in night work at the dockside'. A member pointed out that their recent theme on 'reducing the damaged caused to PCB cards in welding sets' resulted in savings in PCB cards, less work delays due to welding set breakdowns and savings in manpower costs to repair sets.

The circle members said that they were surprised that this project won the top award because they had not followed the usual presentation style observed in QCC conventions and which they considered as being of a very high standard. Instead, they had presented this theme without much statistical data analysis except for a simple bar chart of the number of PCB spoilage over three months; some cost savings based on prices of PCB cards and a very simple fish-bone diagram. According to the leader:

> We were more practical. We just do a simple fish-bone, show pictures of the welding sets, explain what are the problems and causes of damage and describe our PDCA steps.

A team member who was a shipyard electrician commented:

> When you present too many graphs and things like that, the worker feels out of place. If you (try to) use the seven tools, talk about tangibles and intangibles, graphs and figures, the worker (gets) bored.

According to members interviewed, the presentation itself was a source of anxiety and in one case, one of the speakers did not return from the men's room to present his part in the presentation. Unlike the accounts staff, they did not attempt to practice their presentation. When asked if presentations should be done away with, the circle leader replied, 'if you don't have this (the presentation), there will be no competition. (It) may not be good for the group'.

In response to a query as to whether they (QCC leader and members) would participate in QCC activity if it was not compulsory, both shook their heads and laughed, and the leader replied:

> (The) worker want(s) to work only - as long (as there is) no problem - after work, go home.

The members nodded in agreement.

Translift QCC

The QCC Evaluation Committee considered this team as one of the poorest performers, as they had not presented or completed any theme by October 1994, more than one and half years after formation. The HRD manager attributed this partly to the high turnover amongst employees in the cranage and transportation section (whose workers were members of this circle), and partly to the resignation of the previous supervisor who was also the circle leader. For a spell, until a new supervisor was recruited, there

was no circle leader. When the new supervisor took over as leader of the circle, he changed the circle name from *Three plus One* to *Translift.*

Like the top QCC team *Hi-Tech QCC*, this team was also from the Maintenance department and shared the same facilitator. The members who were crane drivers, were not proficient in English and based on the team's QCC record file which one member had brought along to the interview to show me, there seemed to be some problems with understanding the basic QCC tools. The fish-bone diagram drawn up for the current project was incomplete and very rudimentary. The idea of cause and effect was poorly linked in the diagram. According to Ismail, a senior crane driver who was a member:

> This is (the) first time I use the fish-bone. Very frankly, I (have) only work for contractors[3] before I come here. Where got learn about this? But I like here - very convenient working place.

Ismail is considered by the human resource manager to be a 'long service' employee of the shipyard having worked there for more four years.

The team has worked at two themes both of which were incomplete. The first theme was on 'fabricating a T-crane for dumping of rubbish'. This theme was suggested by the former supervisor and required the purchase of some equipment, namely an electrical chain block and railing metal, and the fabrication of the crane arms. As the circle members were crane drivers, they would have to ask other workers, such as welders in the department to carry out the fabrication job. This, and the equipment purchase would require the works (maintenance) manager's approval. This project was not completed and was abandoned after the leader/supervisor left the company.

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3 He was referring to the sub-contractors who are a common feature of the ship repair industry in Singapore. These contractors only employ workers on a daily basis depending on their contracts with the shipyard.

The current project was suggested by the new supervisor and involved another fabrication job, this time, the construction of a water tank to function as a water weight for testing the tonnage of cranes. The idea was to build a very large container capable of being filled with water equivalent to the tonnage being tested. If successful, this could ease the problem of transportation as the container could be moved when empty. By the third quarter of 1994, the team had reached the stage where rough sketches of the container had been drawn on pieces of paper (this was also shown to me) but no scaled drawings were made. For this, and other issues such as water weight and stress calculations, welding specifications, etc., they need the help of the draught technicians and engineers. When I asked how they were going to get the technical drawings done, Ismail replied that he might get a draughtsman friend to help, if he (the latter) had the time. However, team members were planning to meet the December deadline for presentations. According to a member, 'We only give (the) idea. Until management approve, we will not build tank, but we will present our planning'.

Full Bodied QCC

As part of the NPB's QCC consultancy for Aeco, a NPB consultant was assigned to work with a QCC and the circle chosen was *Full Bodied QCC.* The NPB consultant worked closely with the circle and took them through the PDCA cycle for one theme. This theme when it was completed, was nominated, and later won the national *The Straits Times*/NPB Circle Awards Competition 1994 (*The Straits Times*, 29 August, 1994; 25 November, 1994). The nine members of this circle were from the steelworks department of the ship repair division and circle members were either welders or welding technicians. The theme that won them the nomination and award was 'to reduce hot work[4] in the engine room'. Their facilitator was also the section manager. The circle developed a portable clamp as a lifting devise for moving heavy equipment from a ship's engine room, thereby eliminating the need to weld eyelets to the engine

[4] 'Hot work' refers to torch welding which when done in confined spaces such as the ship's engine room in conjunction with other work such as painting, create potential fire hazards. If the number of 'hot work' carried out in the engine room is reduced, it thus reduces the potential for fires.

room wall as attachments for lifting chains. As lifting chains are used for lifting equipment out of the engine room, this use of the clamp instead of chains would reduce the need for hot work in the engine room. This theme also won them second place in the June 1994 in-house QCC presentation.

By October 1994, the circle had presented their second theme for the year . The newspaper reported that circle members mentioned that they came to know each other better through the weekly meetings, and their manager observed that 'the team has become more outspoken about work problems. They voice out their problems and we try to solve them together' (*The Straits Times*, 29 August, 1994:25).

However, when I checked with the HRD manager in September 1994, this solution had not been implemented in all of Aeco's production divisions. The use of the clamp was confined to the ship repair division even though it would have reduced the frequency of welding work in the ship's engine room. He attributed this to the problem of 'different work cultures' (between the ship repair and ship building divisions):

> The company is still very young and we have people coming from all over - small shipyards, from the big shipyards, from locally-run shipyards and those owned by government-linked companies.

In separate discussions with a manager of the shipyard and with an NPB consultant involved in Aeco's second QCC programme, I felt that the new general manager was lukewarm in his support of the QCC programme. Thus by the end of 1994, two years after the activation of the second QCC programme at Aeco, the future of the programme seems uncertain. However, in early 1995, Aeco achieved the ISO9002 certification.

5.2.7 QCC activities at Aeco - a structurational analysis

The influence of organizational actors

The key sponsor of the two QCC programmes in Aeco was the chairman of the company who viewed QCC practice as a means of improving employees' work attitudes and of decentralizing the responsibility for quality and productivity in the company. He saw the problem as one of human relations, namely, communications and motivation and this implied a underlying belief that once these process issues were resolved, employees would be able to participate meaningfully in QCC activities.

The general manager who took over the daily operations of the shipyard from the chairman in 1994 saw the QCC programme in another light. His implicit assumption seemed to be that given the resources allocated to QCC activity in the company, the primary justification must be tangible outcomes. As such, he focused on the means-ends aspects of QCC activity.

As QCC participation was compulsory, most of the employees saw QCC problem-solving as additional work imposed on them by management. Consequently, employee participation in circles was based very much on 'pull' factors (Lillrank and Kano 1989). This demonstrates the existence of different sets of interpretive schemes between top management and other employees insofar as QCC activity was concerned and that management had relied entirely on its formal authority and power in generating QCC activities in the organization.

For shipyard employees, QCC presentations became the focus of QCC efforts. Presentations were viewed with a high degree of anxiety because of the 'face' element involved. On the other hand, it was evidence of their compliance to management rules and a platform for inter-departmental competition. Hence the pre-occupation with the form of presentation and with winning the top awards.

This interpretive gap between the top management and employees on QCC practice, and the difference among top management itself, meant that the reality of QCC practice differed from the original ideals of the sponsor.

QCC practice as a medium of human action in the organization

As the QCC practice was viewed as an additional chore that employees had to undertake however reluctantly, its potential as an work enabler and a problem solving tool for employees is limited. Further, the lack of self-motivation in much of the employees' circle activities may have in fact hindered innovation among some employees.

However, it is also recognized, that in the case of *S-11 QCC* and *Hi-Tech QCC*, circle practice did facilitate their work through the implementation of their project winning awards. The issue remains as to the proportion of circle practice that enables and facilitates ordinary work in the shipyard and whether such facilitation is continuous or sporadic.

QCC tools and techniques in certain circumstances could constrain action as the pre-occupation with 'perfect' presentations might actually detract effort from innovation and practical problem solving, given the time and concern regarding presentations.

Institutional properties shaping people - QCC interactions at Aeco

The institutional properties of the organization contributed to the failure of first QCC programme (the WITs programme) to take off. Firstly, the top management had assumed that all managerial staff operated on the same interpretive scheme with regard to QCC practice. That is, the chairman assumed that there was consensus on the meaning and role of WITs. The fact that committee members used the WIT meetings as an avenue to air inter-departmental conflicts suggested otherwise. Such use of

WITs meetings also suggests that existing structural arrangements such as coordinating and integrating mechanisms have not catered to the resolution of inter-departmental conflicts.

Aeco's second attempt at QCC was based on NPB's quality programme and its model for QCC activity. Consequently, a hybrid organizational structure for QCC activities was set up comprising mainly the steering committee and the evaluation committee. The emphasis was on problem solving based on a standard set of QCC tools and techniques. However, the nature of shipyard work and the education, skills and work backgrounds of many of the shipyard employees limited the extent to which the standard set of QCC tools and techniques could be applied with full understanding by circle members. Too much an emphasis on structured statistical methods in QCC problem analysis could prove a serious barrier to circle involvement by the skilled and semi-skilled tradesmen in the shipyard. As their work form the basic core of a shipyard's business operations, the exclusion of these employees from innovative problem activities would narrow the scope of such activities.

The lack of focus in the first programme, the reliance on managerial authority alone to implement the second programme and the changing fortunes of the programmes under different managers, all underlined the power and authority vested in the position of the chief executive of the company. Arising out of this organizational characteristic, the rapid changes in ownership and hence, chief executives in the company, created a highly unstable setting for the introduction of QCC.

A further consequence of this use of formal authority by top management, is the resultant employee focus on QCC presentations rather than the QCC problem solving process. This high level of anxiety over QCC presentations is a consequence of a cultural trait of 'face' among Singaporeans, and the fear of public failure resulted in an inordinate stress when making presentations. This cultural trait results in the unforeseen consequence of ritualism in QCC activity, and the emphasis of form over

substance. The outcome is the neglect of the processual aspects of QCC activities such as quality awareness and teamwork.

The impact of QCC activities on institutional properties

Given the brief period of QCC operation, and that the two top managers differed on the efficacy of the circle programmes, QCC outcomes has had very little impact on the institutional properties of the organization. The programme was closely linked with the chairman and when he relinquished his executive role, the rationale for the programme was implicitly questioned by the general manager. This underlined to employees, the impermanence and perhaps the inconsequentiality of QCC as an organizational practice.

5.2.8 Aeco's QCC programme from a systems perspective

Although the chairman seemed aware of the importance of group processes in QCC activities and his approach showed evidence of systems thinking, his successor, the general manager, was clearly of a means-ends orientation. If the latter orientation prevailed, then the emergent processes sought by management, such as quality awareness, continuous learning and the decentralization of QC responsibility would not arise.

Furthermore, although the second QCC programme was conceived as part of a total quality (TQM) programme, it was not integrated into the other aspect of the TQM programme, which is the implementation of procedures for ISO 9002 certification. They were operated as two separate programmes without any systemic linkage between them.

Some degree of closure (in systems terms) of QCC activity was observed, such as the implementation of QCC projects of *Hi-Tech QCC* and *S-11 QCC*. However, it did not

occur in the case of *Full Bodied QCC's* project. Further, the interpretation of the role of QCC presentations could also prevent its effective use as a bottom-up communication channel.

Finally, as the programme was totally dependent on formal authority for its continuing operations, in terms of Lillrank and Kano's model of QCC as a continuous improvement activity, it could be said that although the hardware and the software functional sub-systems were to some extent in place, the humanware sub-system remained poorly developed. As such, it was unlikely that the programme would be able to tap on the creative and innovative energies that arising from the dynamics of informal organization.

5.3 CASE #02: BUSCO LTD

5.3.1 Company Background

Busco is a public transport company with a fleet of more than 2300 buses operating more than 190 bus services. It was set-up as a result of a re-organization exercise of public transport system in Singapore conducted in the early 1970s. This re-organization involved the merging of a loose network of several bus companies to form a large transport company, listed on the Singapore Stock Exchange. Although Busco is relatively a 'young' company, its roots stretch back to the earlier transport companies and a sizable group of Busco employees were from these earlier firms. Since its re-organization, the Singapore Government through various organizations, is the major shareholder of the company.

Despite the fact that another public transport company, Transco was set in the 1980s, up to 1994, Busco remains the major public bus company in Singapore. It serviced 85% of total passenger trips made per day, operating 123 trunk and 74 feeder bus services.

Transco, which ran 20 trunk services and 10 feeder bus services, collected an average of 410,000 passenger trips a day as against Busco's average of 2,407,000 passenger trips a day (*Business Times*, Thursday 25 August, 1994). However, in August 1994, the Singapore Government announced that it had approved a number of new bus routes for Transco to operate and would transfer several of Busco's routes over to Transco. The move was to build up Transco as a stronger competitor for Busco on the premise that a more viable and effective competitor for Busco would ensure a more efficient, safer and more reliable public bus service. Despite this move, industry observers expect Busco to remain the major bus operator in Singapore (*Business Times*, 25 August, 1994).

5.3.2 Manpower issues

In September 1994, the total Busco staff strength was 7,800 of which, about 5,000 were drivers and 1,000 were bus workshop employees. Increasingly, Busco has had to recruit Malaysians as bus drivers. According to the general manager (operations), younger Singapore as workers are not keen to be bus drivers because of the shift duties. Younger Singaporeans have high career expectations and are put off by the low image of bus drivers in Singapore. There was a high attrition rate among bus drivers with about 60 drivers resigning each month resulting in an annual staff turnover of about 700 drivers. The general manager (operations) also observed that:

> Yes it is a stressful job and we are sometimes faced with difficult customers...it's (driving a bus) not an easy job because we have young officers who are graduates and they are supervising drivers. The driver is driving a very modern bus and he is operating a micro computer itself on the bus.

All Busco bus services operate on an One-Man-Operator (OMO) system, which means that the bus driver is also the fare collector. Over the years, the fare collection system

has been refined and now every Busco bus is equipped with a computerized ticketing system.

In many service routes, bus drivers are rostered on a 'split shift' systems, which required them to work during the morning peak hours and then again in the evening peak hours. The company has a range of financial allowances to make the split shift roster more attractive for drivers. However, according to a union representative of Busco employees,[5] the problems faced in recruiting bus drivers was due not only to the nature of work but also the pay of bus drivers. He stated that the union was negotiating with the company for higher wages for bus drivers and in his assessment, the likelihood of better wages for drivers was good as the company had reached its legal quote of a maximum 20% of foreigners out of the total workforce.

Due to its past history and the pace of growth of the company and the Singapore economy over the last 20 years, there is a distinct pattern in the employee age distribution in Busco : although no figures are made available, there is a high concentration of drivers of over 40 years old. These are bus drivers and former bus conductors from the old bus network. The other cluster of employees are young drivers in their 20s, who were mainly from Malaysia.

In the 1980s, manpower requirements to meet the expanding bus services were obtained mainly through the shift to a OMO system for the buses and by retraining bus conductors as drivers. However, in the last five years, with further expansion of bus services, recruitment of bus drivers has been stepped up. Both Busco managers and the union representatives confirm that it is increasingly difficult to attract young Singaporeans to work as bus drivers.

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5 All bargainable employees in Busco are members of the National Transport Workers' Union (NTWU) and the company pays the union membership fees of all employees who are union members.

Busco's general manager (operations), the key focus was on operational efficiency and customer service. This was expressed in the an average bus replacement rate of about 10% per year while the measure for customer service targeted indices such as number of breakdowns and bus frequency. With regard to customer service, the major focus was on safety, service reliability and to a lesser extent, air-conditioning of buses. As the major bus company with a total of 2.4 million passenger trips per day in 1994, Busco also operated a 'hotline' for customer enquiries and feedback.

A Driver Performance System was being finalized in 1994, which in the words of the general manager, would mean 'a report card for each driver'. This would augment the point system for safety record and work attendance that was already in use in 1994. The general manager recognized that drivers operate modern equipment including a micro-computer on board the bus and yet suffered from a lower than expected self esteem which accounts for the difficulty in attracting young Singaporeans to the job. In his view, the problems of low self esteem among drivers could be resolved by giving the drivers more recognition, treating them better, including better supervisors, and improving their salaries and benefits. By year end 1994, the company and union had concluded a new collective agreement for Busco employees that raised the average bus driver's wages to between S$1,500 and S$1,700 per month.

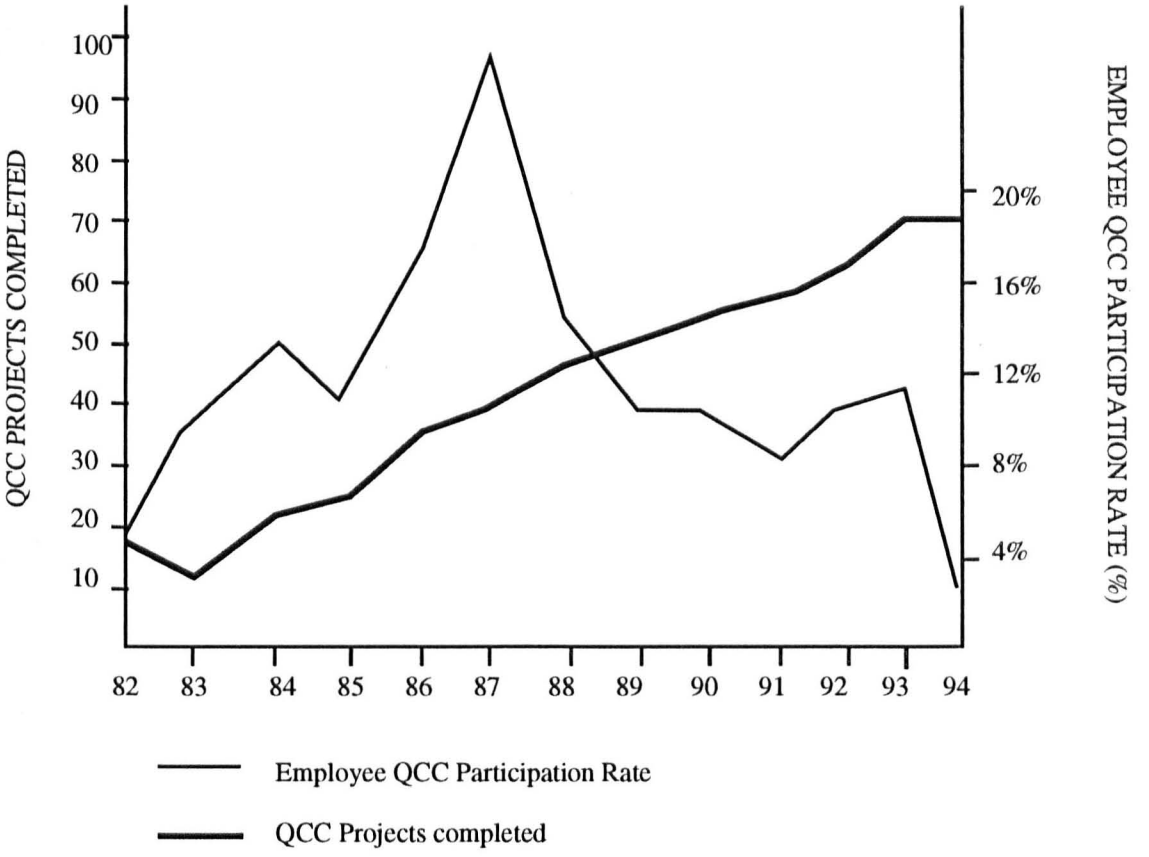
By the end of 1994, the general manager considered that the operational efficiency and the comfort level of the bus fleet, such as 'better buses, better ventilation, noiseless buses...padded seats...computerized scheduling system', much would have been achieved. He felt that the focus has to shift to the quality of service, which he defined as providing a 'safe, reliable, comfortable, user friendly and affordable' bus service. He acknowledged that the human aspects, by which he meant the 'values' of employees, especially the bus drivers, would be a key factor in the achievement of the 'operational aspects' of a quality service.

5.3.3 Busco's QCC programme

The QCC movement in Busco was initiated by the managing director in 1981 soon after the launch of national productivity movement by the government. A number of employees were sent for training in QCC concepts and practices, including QCC facilitator training programmes. Soon after this, in 1982, the first 22 pilot circles were started involving employees from the vehicle workshops and administrative staff, with 149 employees participating or 4.4% of the work-force. Initially, the drivers were not involved in the QCC programme as it was then perceived by management that the shift work nature of the bus driver made it difficult for QCC activities to be conducted.

However a few years later, there was a change in management's thinking and, in 1985, QCCs were started among the bus crew. The union was coopted into a working group called the 'Bus Crew QCC Promotion Working Group' to encourage the formation of circles among bus drivers. At the bus depots, the QCC facilitator (a depot manager) would approach the union route representatives (the equivalent of shop stewards in a factory context), to recruit members to form circles. These route representatives had been sent to QCC leaders' training course organized by the company.

Figure 5-2 : Busco's QCC projects and participation rate



Source : Busco QCC Statistics as at April 1994

Over a period of 12 years, the QCC movement in Busco grew from 22 circles in 1982 to 260 circles in April 1994, and membership rose from 149 employee participants in 1982 (4.4% of the total work-force) to 1,418 employees in April 1994 and an employee participation rate of 18.2 % (refer to Figure 5-2). In terms of projects completed, it was interesting to note that the highest number of projects completed was in 1987, five years after the introduction of QCCs in Busco and two years after circles were introduced among the bus crew. According to the training manager, top management was fully supportive of QCCs and the general manager (administration) attended all QCC/QSC presentation sessions.

However, in the early 1990s, some changes in QCC participation and presentations could be discerned. Although QCC participation rate was 18% in 1993, only 40 projects were completed compared to 49 projects in 1984 when the participation rate

was 5.5%. According to the general manager (administration), in the early years, many employees were interested in QCCs but in later years, theme selection became difficult, as circles seem to be running out of theme ideas. The QCC Secretariat then began building a data bank of themes to help circles in this area.

In 1992, a variation of QCC, the Quality Service Circle (QSC) was launched and targeted at the bus crew with the specific aim of improving the quality of customer service. The brief of the Bus Crew QCC Promotion Working Group was extended to include the promotion of QSC among bus crew.

According to the training manager, groups of five to six bus drivers were sent to attend a ten-day QCC appreciation course (QCC clinics) conducted by external trainers. During these sessions, drivers were trained in QCC techniques and presentation skills. QSC groups were also formed and they would work on group project related to customer service. To the training manager, the main objective of the QSC and the clinics was to

> help foster team work. For example, drivers need to be considerate to other drivers and not absent themselves too often. It is an avenue for drivers to promote service quality.

The aim of the QSC according to the training manager, was to promote 'positive work attitudes' among bus drivers.

By the third quarter of 1994 about 40 QSCs had been formed. The management's aim for the programme was to have at least one QSC formed per bus service. With more than 200 services running in 1994, about 20% of the services had formed QSCs. According to the union representative, the union was pushing very hard but there were some problems:

> With very little schooling, they (the drivers) are reluctant to go for training...so it is hard to give them the basic training. Also there is no interest because of the nature of work. They work quite independently and the work hours make it hard for them to meet together because everyone's working times are not the same. Some of them may have to be assigned standby duty so that they can have their QCC meetings. Because of working times such as split shifts they also have very little free time especially...because of the shortage of drivers. Another problem is that some drivers see QCC as a management move to spy on them...

The general manager (operations) was 'personally not too sure about the effectiveness of the QSCs' in addressing the problem of service quality and in improving reliability of the service, such as reducing absenteeism among the drivers. The training manager reported that 'operational staff found it (the 10-day clinic sessions) disruptive (for the daily work schedules)'.

5.3.4 QCC organization

QCC activity at Busco was headed by a QCC steering committee. Initially, the Chief Executive Officer chaired this committee but a few years later, the general manager (administration) took over as chairman of the committee. The role of the steering committee according to the company's public announcement was to direct, promote and implement a company-wide QCC movement. This would include the development of an overall action plan for the implementation and monitoring of QCC activities based on the recommendations of the QCC Working Committee and the evaluation and reward of circle recommendations.

At the next level was a QCC working committee which according to the training manager, served as a communication channel between the divisions/depots QCC promotion committees and the QCC steering committee. This committee's role was to

monitor and assist divisional and depot QCC activities and to standardize and follow-up on QCC completed projects.

Each division and bus depot would have its own QCC promotion committee to promote and implement QCC activities and to execute policies and guidelines set by the QCC steering committee. The promotion committee was also responsible for appointing QCC facilitators, leaders and members and would provide assistance to the circles in their division or depot when needed.

A Bus Crew Promotion Group was formed with union participation to encourage bus crew participation in QCC and to resolve problems faced by bus crews in forming QCCs.

A permanent QCC secretariat was set up in 1984 to coordinate and promote QCC and QSC activities and the training officers attached to the secretariat also functioned as QCC facilitators. The secretariat organized quarterly presentations and annual dinners for QCC participants and maintained a hotline and a data bank to support circle activities. It also planned and coordinated the various QSC and QCC training programmes. The general manager (administration) was in charge of the secretariat.

The company had an annual training budget of S$300,000 set aside for QCC courses for all levels of staff. A monitoring system was also in place to track the progress of QCCs. This included a progress report system and a QCC activity points evaluation system. To encourage QCC participation, the company also sponsored top circles to international QCC conferences and on overseas study missions.

5.3.5 QCC/QSC Activities

In Busco, the older workers were more likely to be the employees participating in circles. They were also likely to be the longer service employees. At one in-house

presentation of the QSC/QCCs held in the third quarter of 1994, most of the circle members were above 40 years old. In fact, very few young employees (except for office staff) were observed among those attending the convention. In one circle(*Smooth and Swift QSC*), one of the members remarked that 'two members have already taken out their CPF (Central Provident Fund Savings) twice'. This meant that they must have been above 55 years old since in Singapore, employees are only able to withdraw their provident fund account on reaching 55 years of age. In two QCCs studied, (*Sentosa QCC* and *Key QCC*) the youngest member in each team was in his forties.

The high turnover rates among younger employees was cited as a reason by the managers and the union representative for the lack of interest in QCC activity. Many of the younger bus crew were also Malaysians who were living in Johor Baru (state capital of the Malaysian state closest to Singapore) and commuted daily to Singapore. One bus driver interviewed remarked that these Malaysians were mainly Cantonese-speaking Chinese while the common Chinese language dialect among local Chinese bus crew was Hokkien. He also felt that they were less careful in their driving.

There also seemed to be more problems with themes amongst QSCs rather than QCCs. For one circle, *Key QCC*, project selection was initially problematic but as this twelve year-old QCC team developed, they were able 'to look at some of the problems that we see in our depot and see if they are suitable as a QCC project'. As for the QSC teams, because of the focus on quality service and on the bus crew, the same problems/themes tended to be repeated. This was noticed at the in-house presentation, where all four bus crew circles were presenting themes dealing with accident prevention. As a member of *Key QCC* commented:

> The most common cause of accidents is the traffic conditions, the bus driver and the pedestrian. When you have heard the tenth circle present the same causes and effects - its all the same. That is why after one or two projects, they run out of themes. But

it is good that the drivers have QSC training to give them exposure to the problem solving methods.

Bus drivers who were members of circles also had problems in arranging QCC meetings because of the different driver work schedules. Hence QSC problem solving was most likely to occur only during the ten-day external course, and the continuity of individual circles would seem quite problematic.

Added to this, as most of the longer service drivers were in their forties or fifties, with very little formal education, many were reluctant to 'go back to school' which is how they viewed QCC courses. Thus, although a practical course on forklift driving organized by the union was well subscribed, a union representative observed that, 'for the theory courses (such as QCC tools and techniques), the response is quite poor - they (the bus drivers) do not want to study'.

Yet, these various problems did not prevent one bus crew QCC the *Key QCC* from surviving for 12 years.

5.3.6 Profile of *Key QCC*

All members of this circle were from the Bedok Bus Depot. The team comprised a depot supervisor (the facilitator); a depot assistant supervisor (the circle leader) and four circle members, three of whom were bus drivers and the fourth, an assistant supervisor. All were long service employees and aged above forty years. In 1994, three of the circle members were founding members while the others joined three or four years after the circle started.

The circle was formed in 1982. According to the facilitator:

NPB was starting the QCC programme and someone in the company asked us to start a circle. So we did. We went for the training and then started the projects. When we started out we were only *'moh moh lah'* ('groping in the dark' in Mandarin).

Initially, circle members faced some resistance from other bus drivers:

When we started to collect data for our projects, we had a hard time with our fellow drivers. They were very suspicious and would scold us for asking them for feedback. The other drivers called QCC ' *kiu si si'* (a good pun as, it sounds like a Hokkien term meaning to pull or grip tightly until the person dies' - a metaphor for tight controls). We had to prove to them that our solutions would also benefit them. Now it is very different. They are very willing to give us the feedback. We can show them that maybe we are better than management in solving the problem.

Over a period of 12 years from 1982 to 1994, this circle completed eight themes, of which two were implemented throughout the island bus network. They were very proud of their achievements and when I first met them, they brought with them an award plaque that they had received from the NPB for having earned ten stars.[6] The themes they had worked on covered a wide range of projects from communication among drivers, frequency of bus services, problems of bus breakdown, addressing commuters' complaints and reducing driver injuries. They claimed there was only one other circle in the company that 'was like them' and that 'the rest were all sleeping'.

One of the two themes from this circle which had contributed to their ten-star award was: *'To improve sending of messages to drivers.'* The project concerned the communication of company matters to bus drivers.

'Very often circulars (from the management) pinned on notice boards are not read by the bus drivers - even after one year. Because of this, the management decided to

6 This is a national QCC award given to circles that have distinguished themselves.

introduce a system where important circulars would be hand-delivered to all drivers and all drivers have to sign receipt of such notices. We decided to see if we could improve on this procedure. Our investigations showed that there were several reasons for drivers not receiving messages - some cannot read, some do not look at notice boards, some just throw away the pieces of paper received. We looked at the possible solutions and finally recommended the use of taped messages played over a public address system with the speakers placed at the depot point where the bus crew gathered for their daily schedule. We tried this at our depot and it worked quite well. We got better information about traffic conditions - for instance for those driving double decker buses - information about fallen branches of trees etc. which may cause obstruction to movement of bus and possibility of accidents. With this public address system all bus crew will get to know of the situation quickly. This system of messaging the drivers has now been adopted by all the depots.

Key QCC members developed their understanding of QCC activities gradually over the last twelve years. The circle leader observed that

With the QCC, we can tell management what we think about a problem and use the QCC methods to present our findings to them. For example, when management asked (the depot supervisors) to circulate messages by asking each driver to acknowledge receipt by signing - if we were to tell them that this is not the best way, they could question us as to 'who is the manager here and who are we ?'. With the QCC, we could work on the problem and present them our recommendations. Since the QCC is implemented by management and we are using all the QCC tools, they are happy to accept our suggestions. So the QCC allows us to try and solve some work problems and for management to accept our solution. We have proof of why our solution works. We also find that we can use the QCC analysis to help solve our work problems (especially for the depot supervisor and assistant supervisor) and sometimes our personal problems (all members).

For example, in the project to resolve the problem of disseminating messages to bus driver, the circle members felt that through their QCC activity bus drivers avoided having another a irksome administrative rule imposed on them as their circle had discovered a way for messages from the company to be received by employees without additional rules being imposed.

In another circle project, '*Addressing the problem of buses breaking down due to fuel running out*' this two-pronged outcome was also evident. For this project, the members looked into past records and checked on cases where lack of fuel was the cause of bus breakdowns. They also collected mileage and petrol consumption data on such buses. The main cause according to their analysis was that the fuel tanks of older buses were less efficient and with the changes in the length of service routes, older buses were caught short of petrol whilst in service. Their recommendation was to use such buses for split shifts as there would be time for re-fueling in such schedules. This recommendation was also implemented in all the depots. *Key Circle QCC* members, thus resolved the problem faced by drivers of older buses, when they run out of fuel enroute. For the management, the solution improved the reliability of the service without having to scrap these older buses before their scheduled time.

The circle leader observed that on the theme of old buses running out of fuel, 'maybe if the circle members were all bus drivers, the drivers would have thought that since the company had money, the recommendation would be to buy new buses and scrap the old ones'. The facilitator added that the supervisory staff present were able to give their views about depreciation, 'I used the example of old but working TV sets - why should we scrap them when they can still be used'.

The commitment of members to the circle was quite evident. When I met with the team, five of the six team members were present. The sixth, joined us about half an hour later, on completion of the morning segment of his split shift. He had been at

work since 5.00 am but instead of heading home at 11.30 am for a rest before his evening shift, he came to the meeting. One of the members commented:

> Supposing a meeting date is fixed, we cannot say this is not suitable for me, lets change the date. Also we cannot take the attitude that we can only talk about the QCC project during the meeting. Many times, we discuss our project wherever we can.

According to other team members, another ex-member who had retired from work, still joined in their QCC meetings. They also met outside the regular QCC meeting times for social gatherings at each other's homes or dined out together. Despite this strong commitment to the circle, the members were quite firm about the voluntary nature of the activity:

> You cannot force people to be QCC members or force them to start QCC teams. For example, the company is trying to branch out into QSCs - all drivers team. They want 200 QSCs. The drivers in the depot are asked to form teams. This way the quality of the QCC will go down. The teams will be of 'no standard'. Some of the QSC present proposals are actually suggestions. Some have their proposals turned down. They get disheartened. That is why after one year the number of QSC is less.

> Not all work problems should use the QCC method. Some problems can be solved quite fast without using QCC method. No need for QCC project. Also we do not think that every QCC must do at least one project a year. You cannot force a QCC to do a project. If you do not have a project, you cannot just do one. If you do what happens is that people do projects for show, and then a *hao de dong xi* ('a good thing' in Mandarin) becomes a thing no one respects.

> There was another QCC presenting a theme - an English speaking circle. They were doing their data analysis wrongly...we all (in the audience) know that is was not correct

but they only want to get at the results. They were really off the mark. The judges should have corrected them but they were too polite.

Key Circle members did not see the need to be constantly working on a circle project. Their approach to theme selection was to look at some of the problems at their depot and assess their suitability as a QCC project. Their leader summed up their position: 'Some years we may work on two projects, other years, none'.

5.3.8 QCC activities at Busco - a structurational analysis

The influence of organizational actors

The senior management of Busco saw QCC adoption as essentially an implementation of a key element of its major shareholder's productivity agenda. The QCC was perceived as a mechanism to involve employees in workplace decision-making to bring about greater employee commitment to organizational goals, better work attitudes and ultimately, improvements in productivity growth rates. Given this agenda, Busco's management proceeded to create a comprehensive machinery for QCC activity in the company.

On the side of the 'users', there were some variations in the employees actions regarding QCC. For some circle members such as those in *Key QCC*, circle activity enabled them to exercise their problem solving skills and exert some measure of influence on workplace issues. They responded to the opportunity provided by QCC and the positive impacts generated demonstrated the reflexive nature of QCC activities. However, there are others, who regarded QCCs with suspicion and associated circles with increased managerial control. This has led to their rejection of the QCC as a mechanism for employee problem solving and participation in decision-making. The strong commitment of top management to the QCC programme and the presence of a

small group of employees who viewed QCC positively has resulted in a programme that has endured for more than 12 years.

In terms of employee QCC participation rate, the number and percentage of employees who are QCC members have increased steadily since 1982. However, as the data provided are cumulative and do not account for inactive circles, a more representative indicator would be the number of projects completed by circles. This have declined from its peak in 1987 with 95 projects completed to only 40 projects for the whole of 1993 (refer to Figure 5.1).[7]

QCC practice as a medium of human action in the organization

In Busco, QCC practice was a mechanism for local innovation as evidenced by the number of systems improvement projects and cost saving projects that circle activities have generated in the company over a period of 12 years. Insofar as these projects represented the employees' solutions to the problems at their workplace, the QCC facilitated their work performance. However, given the large employee base, the number of sustained and active circles might be rather small, therefore, the aggregated impact could be limited.

On the other hand, as some employees perceived the QCC as another control mechanism and circle members as 'spies'; this might put off other employees from joining the circles and further constrain problem solving via the QCC.

Although the range of QCC problem solving tools has also facilitated the problem solving process among effective circle groups, among groups which have poor understanding of the tools or are unable to apply the tools in their themes, the effect might have been to put them of workplace problem solving via the QCC methods.

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7 Two possible reasons are offered for the decline. Firstly, the QCC programme began in 1981 might be in the plateau or decline stages of its life cycle (Dale 1990); and/or, the QSC programme which began in 1992 was not generating as many projects to make up for the decline in QCC projects.

Institutional properties shaping people-QCC interactions

Busco is the largest public bus transport company in Singapore and is listed on the Singapore stock exchange with the Singapore Government as the company's largest shareholder. It is also one of a handful of companies in Singapore which has more than 7,000 employees. As such, Busco's corporate policies are subject to close scrutiny by the government, the public and the news media in Singapore. These facts were instrumental in the management's immediate response to the government's call to set up QCCs as part of the 1981 national productivity campaign.

Busco is the result of the amalgamation of a number of bus companies some of which dated back to the 1950s. A good number of the company's employees worked in these smaller bus companies prior to their merger and transformation into Busco. For instance, the senior managers, including the managing director, general manager (operations) and the general manager (administration), have been working for the company for at least twenty years. Similarly, among the middle managers, supervisors and older group of drivers, many had worked for the company for more than 10 years. Hence one key contextual feature present in Busco that was lacking in Aeco was the possibility of continuity in the implementation of organizational policies. There was also a more stable and stronger corporate identity which was a key factor in the QCC implementation process.

Unlike the original firms that created the Japanese QCC, Busco is not a manufacturing firm but is part of the service sector of the economy. Therefore it was not surprising that when QCCs were first introduced into Busco, the focus was on establishing circles among the workshop and office staff, thus excluding about two-thirds of the employees who were bus drivers. The problems faced by Busco in a specially created circle programme for drivers (the QSC programme) based on the QCC problem solving

approach reflects some of the problems encountered in transferring a tool created for the manufacturing sector, to the service sector.

Another contextual factor which has had major operational implications for Busco is the manpower constraints faced by the company. Due to the expansion of the Singapore economy over the last 20 years, and the increase in numbers of young persons pursuing higher secondary and tertiary education, the recruitment of drivers has been a major problem. This was further aggravated by the fact that the government limits the number of foreign employees in a company to 20% of the total work-force. This increased additional overtime work by existing employees, thereby aggravating the problem of finding time for circle activities. In addition, the nature of the bus driver's work with the presence of split shifts and varying roster duties, made arranging QCC meetings rather difficult.

The impact of QCC activities on institutional properties

In terms of longevity, the company's QCC programme has been quite successful. Few companies in Singapore or even in Britain could claim that their QCC programme has been in operation for more than twelve years. The relative success of the earlier QCC programme became the template used by corporate management when designing a programme to promote safety and courtesy/service quality among bus drivers. In this sense, circle activity was accepted by senior management as the basis for organizing the mass promotional campaign for bus drivers. Therefore QCC practice had reinforced the management norms regarding the structuring of promotional activities.

The dynamics of Key QCC and the issue of interpretive flexibility

The members of the circle were a composite 'workgroup', comprising bus drivers and their supervisors. All of them were above 40 years old and have been working for the company for more than 20 years. The composite team worked in this instance in that

the job roles aided the circles problem solving activities. Strong social bonds also existed among circle members. Although it is difficult to know if this existed prior to circle activities, it seems quite evident that circle activities has reinforced these bonds.

These individual and group characteristics facilitated the problem solving process and enabled the circle to have feedback from supervisors of the implications of corporate policies and also from drivers in the depot. This has contributed to the extension of shared knowledge between drivers and supervisors and between the circle members and other employees at the depot. The shared knowledge helped shaped the interactive rules between the circle members and circle practice and through a reflexive process, these dynamics contributed to the success of the circle projects by enhancing the problem solving resources and ability of the circle, and reinforcing the social bonds among circle members.

Part of the group's shared knowledge was the awareness of the QCC as a potent mechanism for exerting their practical interests *vis-a-vis* the management hierarchy, without seeming to threaten the formal organizational arrangements of authority and control. Insofar as *Key QCC* members were able to exert these interests, some degree of their emancipatory interests were also addressed. Hence their insights on the problem solving tools and the presentation rituals.

Their understanding of the circle process had also made them skeptical of the indiscriminate application of QCC concept to the QSC programme, and the condition of continuous problem solving activity on the part of circles. In this they reflected an intuitive understanding of the dynamics of the informal organization at work in circle activities.

Yet, the semi-formal status of structural arrangements for QCC was an essential contextual feature for the performance of their QCC activities. Managerial sanction of employee problem solving activities was essential for the formation of the circle.

Managerial agency is needed for the provision of resources such as training courses, facilities, time and money to enable circle activities; and in the creating the necessary mechanisms for bottom up feedback and the integration of circle generated work ideas into the routine operational cycle of the organization. As these mechanisms were in place in Busco, it enabled the across the board implementation of the circle's project recommendations and in doing so served as a powerful reinforcement of the efficacy of the QCC in the eyes of the employees.

Thus this combination of group and individual characteristics the success of the early problem solving efforts and the growing awareness of the utility of the circle as a means of asserting their influence, was critical in shaping QCC outcomes of this particular circle group.

5.3.9 Busco's circle programme from a systems perspective

Busco's QCC programme underlined the importance and the limitations of a systemic approach in QCC activities. Insofar as Busco's QCC programme emphasized feedback channels and the integration of circle recommendations into the routine operational work cycle, it completed the QCC activity cycle and allowed for closure with regard to circle efforts.

The functionalistic underpinnings of the QCC system at Busco rested on goal congruence of all involved in QCCs and assumed that once the appropriate structural arrangements were in place, employees would be motivated and the 'humanware' (Lillrank and Kano 1989) sub-system could be activated. Busco's experience prove that the functionalist systems model was inadequate as it failed to account for the interpretive flexibility of the QCC.

The QCC's role as a mechanism for bottom up communications was demonstrated in the case of *Key QCC* and the outcomes produced by this circle group confirmed the

efficacy of systems thinking (as applied by the management in implementing QCCs and in the circle problem solving approach), in contributing to total factor productivity.

In the case of *Key QCC*, the systemic characteristics of emergent processes of productivity awareness, continuous learning and organizational commitment were evident. However, despite this fact and the presence of feedback and integrative structures, teams such as *Key QCC* did not emerge as normal outcomes of Busco's QCC programme. This underlined the central role of human agency in the determination of QCC activity, and of the need to factor in this human element in quality management systems in general.

5.4 CASE #03 : PRINTERS INC.

5.4.1 Company background

Over a period of 20 years this firm evolved from a small general printing company to become in 1994, a publicly listed corporation in the printing and publishing business.

The company's staff strength rose from over 200 in the early 1980s to more than 600 in late 1994. Over this period of time, the company had also acquired several other companies both locally and abroad. In 1994, in the face of the continued strength of the Singapore currency and rising wage costs, the company set up a printing plant in Malaysia. It also acquired an Australian printing firm as part of its strategy to move into export niche markets.

By the late 1980s, the export market became a major element in the company's growth strategy and besides the traditional export markets such as the United States, Australia and the United Kingdom, efforts were directed at developing new markets in European and Scandinavian countries.

In the 1990s, the firm faced keen competition both locally and internationally. In the local context, excess capacity in the printing industry resulted in low margins, while recession in Europe and Australia, led to intense competition with home-based printers in these markets.

Based on data provided by the company, staff turnover in 1994 was 28% of manpower strength, mainly among the younger production work-force. On the other hand, more than 40% of the company's employees have been in the company for more than ten years. In fact, from information in the company annual reports (since 1986), turnover among senior managerial staff was very low.

In late 1994, the firm was restructured resulting in a holding company with three major arms: commercial printing, security printing and publishing.

5.4.2 Quality Management at Printers Inc.

At Printers Inc., the push for export markets especially in Europe, resulted in the company's focus on the International Standards Organization (ISO) certification as its major quality management initiative.

In 1991, the company engaged an external consultant to develop a quality management system to meet the requirements of the ISO, with the objective of preparing the printing plants for ISO 9002 certification. The quality assurance procedures and standards were finalized and documented by the company in February 1992 and in the following month, the system was launched in the company.

To assist in the ISO implementation process in the company, in March 1993, a position of director in charge of quality assurance (QA) was created. In the company newsletter (January/February 1993) it was reported that the director (training, QC and Safety) 'will be giving more attention to the implementation of the ISO 9002 quality

management'. During the year, a series of talks for production employees, on ISO 9002 implementation was conducted by the newly appointed director. The company newsletter (March/April 1993) reported that the talks were aimed at creating an awareness of the importance of quality. It also quoted the director as saying that:

> the company has been very tolerant in the past towards employees who made errors (in their work), resulting in reprints, compensations or discounts being offered to customers in order to appease them...this may not be tolerated any further. The company may have to take disciplinary action against these staff in the form of lower or no salary increases and bonuses. Such staff could also face more serious penalties....In short ... attitudes must change.

Besides the series of talks to production workers, a training course on the ISO 9002 quality management system was conducted for supervisory and quality assurance staff by an outside consultant. In his address to employees in the company's 1992 annual dinner and dance, the chief executive officer dwelled in some length on the issues of quality and competition. With regard to ISO 9002, he noted that:

> Many of us may see this (the on-going ISO 9002 quality management project) as merely an exercise on counting defects and keeping records. Such an attitude will not lead us anywhere. We must accept the ISO 9002 project as a process of achieving consistency in quality. Record keeping allows us to measure our quality performance. What we cannot measure, we cannot improve. Only when we feel that achieving higher goals will give us the job satisfaction and self-esteem, can we say that we have the right attitude and approach. We must view the process of improvement as part of our self-development.

In September 1993, two years after the ISO 9002 quality initiative was launched, the company obtained ISO 9002 certification from the Singapore Institute of Standards and Industrial Research (SISIR). In reviewing the state of the ISO 9002 quality

management system in the company, the chief executive officer was reported in the company newsletter (July/August 1994) as stating that:

> all the efforts (regarding the ISO 9002) would go to waste if they are not complemented by the cooperation and support of the staff. From the monthly quality reports by the QA department, 'man' seems to be the major reason for products defects and rejects...attitudes of staff must change if the company is to survive well and we are to keep our jobs.

At an in-house management seminar (for top and middle management staff) in October 1994 which I attended as an observer-participant, the issue of ISO procedures was raised in one of the group presentations.[8] One group reported that some employees perceived ISO 9002 as a paper-based bureaucratic process mainly to do with 'black and white' documentation. As a means to improve communications flow and a more 'open feedback system', this group also recommended the setting up of QCCs.

5.4.3 QCC activities at Printers Inc

First QCC programme

The first attempt to set up QCCs was in 1983. According to the director (training, QC and safety) the first QCC programme involved both the factory workers and the office staff. The programme was started as a result of the nation-wide campaign launched by the NPB. There was a lot of publicity and activities launched to promote QCCs and the programme followed very closely the model recommended by NPB, with heavy focus on presentations, conventions and awards for best teams.

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[8] There were eight presentations each made by a group of managerial staff, on issues relating to human resource management in the organization.

Another senior manager remembered that there was tremendous enthusiasm at that time and almost every department and even the supervisors were involved in QCC activities. She thought that it was the competition and awards that fired up the enthusiasm of the employees. However, a year later, employees lost interest in the competition and the QCCs died quietly.

A projects manager recalled being a QCC leader in a circle set up in her department. She was in the typesetting department and remembered that it was her boss who was very anxious for the circle to win a gold award at the national convention as 'he saw the team winning the gold as one of the final things before retiring (from the company)'. She remembered the effort that her circle put into their first project, with many meetings and discussions and time spent outside of the circle meetings for data collection and preparations for the presentations. Her team achieved their manager's objective and won a gold award at the national QCC convention. However, after this, the team did not proceed to the next project. As she left for an overseas course soon after the first project was completed, she could not tell what happened to the group but thought that it might have been a case of the members being burnt out.

In analysing the reasons for the programme's failure, the director of training, QC and safety, thought that one problem faced by the company was that the educational level of factory workers was too low for them to be able to conduct QCC activities fruitfully. Many of the production workers, especially the older ones, had very little formal education. He also felt that time was a critical factor as the company was then operating a seven day work week because of work volume. There was also a shortage of circle leaders although some staff were sent for QCC training. He added that:

> There was a bit of success here and there, but after a period, teams reported that there were no more problems for them to solve. Management don't believe this. I think people got stale. Their enthusiasm was lost. The whole place is so pressurized and yet you want to get people to sit around at a QCC for fifteen minutes or half an hour - it

> cannot work. Maybe with engineers and managers (it is possible). There is the problem of data collection, what data to collect, also data analysis. Not all workers are confident of themselves and you wonder about whether the data collected is useful. You also need manpower for data collection....Time was also a problem as workers frequently worked twelve hours a day (increased hours were for overtime work) as most of the jobs were time sensitive such as annual reports and books....Fear of failure (was another problem). Some teams see other teams speak about the large sums of money saved by the teams and they are afraid they can't have the same amount of savings.

Thus, the personnel manager recalled that by the time she joined the company in 1985, the QCC programme had lapsed.

Second QCC (WITs) programme

After a break of almost ten years, the company made another attempt at QCCs in 1993. One of the criteria for maintaining the company's ISO 9002 certification was the formation of QCCs. Thus the second initiative was driven by the QA department and was managed by the director in charge of the ISO 9002 certification. In differentiating the new teams from those in the first programme, he said:

> We now have Work Improvement Teams (WITs) although we did try to implement QCCs some years ago. QCC is more Japanese, our WITs is more for taking corrective action.

The circles were given a new name to distinguish them from the failed QCC programme. According to the director in charge of QA, the focus of the new teams was also different. As a result of the ISO 9002 certification, WITs would focus on non-conformance situations and reducing defects.

As at October 1994, two teams were formed, one in each of the two printing plants in Singapore. The team composition comprised mainly the supervisors, senior production workers from the same department/section and facilitators from the QA department. The QA representative's job was to sort out problems and to coordinate inter-department matters. They were also responsible for coopting other department/section personnel for assistance where necessary. The reason for the new team composition, according to the director in charge was because:

> Language is a problem. In the plant, we have quite a large group of Malay workers and a group of older Chinese workers (with very limited English language proficiency) so we have to use oral feedback. We tried encouraging the older workers to participate but they come in and leave it up to the supervisors to talk. They do not talk openly. When the QA staff sits in as observers, (we) cannot obtain feedback. With supervisors, it is better. We get more input from them. They can be quite keen to tell us the problems.

According to the personnel manager, because this second programme was a criterion for ISO 9002 certification, since 1993, the QA department has been trying to get the WITs running. In late 1994, with the audit for maintenance of ISO 9002 certification due soon, there was much pressure 'to get something going'.

A WIT meeting

I attended one of the WITs team meeting as an observer participant. There were five members present, two of whom were from the QA department. The other members comprised a production department manager, his assistant, the second shift manager, and the union representative in the section who was also a senior production worker. The meeting was conducted in English and was convened to review the data that the production department had collected on printing jobs where print runouts had occurred.

The member that seemed to be leading the discussion was the production department manager.

The group members used the fish-bone principles of the four causes of problems: Material, Man, Machine and Method, as the basis for data analysis. The main problems in runouts were also discussed. Many of the runout cases were attributed to 'man' as the main causal factor, such as skills, attitudes and experience with machine and printing ink used. In my view, in some cases, the 'method' seemed to be the more likely cause than 'man', as the work flow process could have been responsible for some of the runout cases discussed.

Some of the production members, seemed to imply that the planning section also contributed to the shortfall in the number of copies printed. The production members mentioned that if the planning section had taken some of the production constraints into consideration rather than worked on the 'best case scenario' when calculating production material requisitions, the number of print runouts could have been reduced. The two QA facilitators were conspicuously silent on this matter.

After running through the data list for about one and a half hours, the members agreed that they should collect more data. The section manager agreed to a suggestion I made that besides collecting more data on runouts occurrences, other alternatives should be found that would be better able to trace the source of the fault. He added that, 'sometimes we have many data you don't know where to look.'

When I broached the topic of the first QCC programme, the members laughed and replied that at that time, they were all only interested in winning the award. After the first project, most of them lost interest.

On the feasibility of having more workers being involved in the WITs, the production members thought that this could be a problem in the printing industry in general as they

felt the workers manning the printing machines had to be at their work stations when the machines were operating. Even after the normal working hours it was difficult for the production workers to meet as many of them had to work overtime. Also, the low educational level of workers made it difficult for them to use the problem solving tools. This was especially the case in the firm's production section as quite number of workers were in the older age group, that is, above forty years old.

Perhaps because of the presence of an outsider (the researcher), the production members also used the meeting to complain about the defective air-conditioning system on the shop floor. The union representative mentioned that there should be some incentive for membership so that workers would be motivated to join such groups. He felt that most workers 'only want to work then go home', so unless there was an incentive, workers may not be keen to participate.

5.4.4 QCC activities at Printers Inc - a structurational analysis

The influence of organizational actors

The company's first QCC programme illustrated the interpretive flexibility of the QCC concept and practice. It was implemented as a result of the 1981 Productivity Movement and was initially well received by the employees. Judging by the recollections of some of the employee-participants, it generated a fair amount of enthusiasm in its first year of operation. On hindsight, it would seem that the enthusiasm was a consequence of a shared perception among many of the employees that the presentations as the *raison d'être* of QCCs. This meaning accorded to the QCC programme either invoked or stoked inter-departmental rivalries and the QCC programme was perceived as a contest. Following this initial burst of energy in the preparation for the first presentation, and after the 'victors' were named, the enthusiasm dissipated once the contest was over and employees lost interest in the QCC. These

experiences shaped the employees' interpretations of the QCC concept and practice and affected reception of the second programme.

The second QCC programme was initiated as a consequence of the top management's plan for ISO 9002 certification. The management decision to change the name of the circle programme from QCC (the first failed programme) to WIT was an attempt to change the employees' interpretive schemes of employees on QCC practice.

However, the difficulties faced in developing even two circles in the second programme, revealed that the employees' interpretive schemes on QCC were not easily modified.

QCC as a medium of human action in the organization

In this case study, the QCC made no impact as a medium of human action in the organization as employees had chosen not to use it as a vehicle for their work activities.

In the second circle programme only one team appeared to be active and the composition of circle members in this team was a departure from the usual QCC membership as it included managers from a major production department. It was not a 'true' circle but rather, a task force since some of the members could be considered middle management level employees in the organizational hierarchy. This development reinforced an implicitly held perception that the 'conventional' QCC as a form of group-centred organizational form was not a relevant medium of human action in the company.

Institutional properties shaping people-QCC interactions

As a company which has the Singapore Government as a major shareholder, and with several board members from government agencies, the top management of the company

responded immediately to the National Productivity Campaign in 1981. This reflected shared norms among government linked companies regarding corporate support for the government national development policies.

The business environment provided an indirect reason for the introduction of the second QCC programme. The company's business strategy for the 1990s was the expansion of its export markets, including to European countries, and this was a major factor in its decision to seek ISO certification. The second QCC programme was set up principally to satisfy the requirements necessary for ISO certification rather than from any conviction regarding the efficacy of QCC as an organizational intervention.

The impact of QCC activities on institutional properties

Given the generally negative perceptions of QCC practice originating from the first programme and the difficulty of changing these perceptions, QCC has had little impact on the institutional properties of the organization.

5.4.5 Printers Inc's QCC programmes from a systems perspective

There was very little evidence of any systemic linkage between the WITs programme (the second attempt at circle activity) and the other quality programme in operation, namely the ISO certification programme.

5.5 CASE #04 : YAS SINGAPORE PTE LTD

5.5.1 Company background

YAS is a wholly owned subsidiary of YHQ, a Japanese manufacturer of control equipment for processing industries. The parent company, YHQ, was established in

1915 as a manufacturer of instrumentation products. The company grew steadily so that by 1994, YHQ was a global company with operations in 23 countries and a world wide annual sales turnover in excess of US$2 billion. In Japan, it has a 40% share of the control instrumentation market and is involved in joint ventures with General Electric, Hewlett Packard and Johnson Controls. Its main lines of business were the manufacture of instruments, meters and equipment for industrial control automation; and, the management of turn-key projects related to industrial control systems.

Incorporated in 1974, the Singapore subsidiary YAS began as a manufacturing facility for measuring instruments and a sales office. In the 1980s, the Singapore operations was expanded as the Japanese parent company's first overseas engineering centre. The expansion of production facilities included the manufacture of a sophisticated distributed control system - a micro-processor-based system for plant-side control, monitoring and integration. YAS became the strategic control centre for the parent company's expansion into the ASEAN[9] region. Growth was rapid and the Singapore subsidiary's annual turnover grew from S$18 million in 1986 to S$120 million in 1991.

The build-up of YAS as one of YHQ's regional headquarters was part of the Japanese company's long-term strategic plan to establish a 'quadripolar international business organization,' the four poles being: Japan, Singapore, Holland and the United States.

In the early 1990s, with a stagnant domestic market in Japan and a high exchange rate for the Japanese currency, YHQ began a reassessment of its strategic directions. The parent company underwent an organizational restructuring and cost cutting process and decided to focus its resources on the fast growing ASEAN and China markets. The outcome of this strategic re-positioning was that the Singapore operation was earmarked to play a more pivotal role in implementation of this strategy. With profits

9 This is the Association of Southeast Asian Nations which includes Singapore, Malaysia, Thailand, Indonesia, Philippines and Brunei.

stagnant in Japan, and the ASEAN region identified as a high growth area, YAS was expected to yield a higher rate of return for the parent company.

Another critical factor in YHQ's strategic re-positioning was the technological changes confronting its key markets. By the early 1990s, the market had moved from proprietary systems into an 'open system' concept in control system design. Prior to this, the Japanese company and its Singapore subsidiary had relied on its proprietary dedicated systems design in marketing its products and services. However, customers were demanding better interface and communications between systems and sub-systems, forcing YHQ to break with its previous policy of marketing solely proprietary design systems and to move to open system designs.

With this change, the centre of technological know-how began to shift away from the parent company as the company adopted a more global approach in acquiring and developing the new technologies needed for open systems. YAS as the ASEAN headquarters was expected to be more independent and less reliant on the parent company in this technological change process . The engineering centre at YAS which had worked on the proprietary systems of the parent company, was thus thrust into a major technological change situation.

5.5.2 The Organization of YAS Singapore

In early 1994, YAS was organized along functional lines into five major divisions: Planning and Administration; Regional and Singapore Sales; Engineering and Services; Quality; and Production (refer to Figure 5-3). Except for the Planning, Administration and Quality Management divisions or departments, all other divisions were regarded as profit centres. The manufacturing arm was located in Bedok and the engineering, services and sales arm was located in a new building in Tampines New Town. These two groups had operated more or less independently of each other in the 1980s. However, in the early 1990s, top management decided to integrate the two operations

and by 1994, these moves were finalized and operationally, the two divisions were merged.

In 1994, almost a third of YAS total work-force of 600 were involved in some aspect of engineering work while another third were employed in the manufacturing arm. It was a fairly young work-force, with the average employee age being 30 years old. About 30% of staff were degree or diploma holders. By Singapore standards, the turnover rate was low, averaging 1.5% per month, and was mainly from the production and administrative departments.

Turnover amongst the engineering staff was very low. When the engineering centre was set up in 1986, YAS recruited mainly young engineering graduates and diploma holders. Many of these were sent to Japan for product and technical systems training and also for socialization into what was called the 'YHQ way' of operations and management. Many of these engineers was still with YAS in 1994, and they formed the core of technical talent that the company has been building up since the mid 1980s.

At the time of the study the company was in the process of re-assessing its organization structure in respond to the new strategic directions from YHQ and by late 1994 (after this study was completed), a new structure was finalized and implemented.

5.5.3 Quality management at YAS

As a subsidiary of a major Japanese manufacturer of control equipment, YAS's experience with quality management was based on the Japanese model. At the parent company, statistical quality control was introduced during the period 1958 to 1965. In 1962, a quality division was set up, headed by Mr Hiraku, to take charge of quality control activities in the company. Mr Hiraku was among the first wave of Japanese corporate pioneers in quality control and YHQ was among the first companies in Japan

to experiment with QCCs in the early 1960s. In an interview for a quality magazine in 1992 (*Quality Asia* December 1991-March 1992), Mr Hiraku recalled the company's experience with quality control in Japan:

> We did not have any concrete concept in the beginning, but we decided to begin with the 'bottom-up level' concept. We now have a clear-cut concept and understanding of the system we started.

YHQ's Company Wide Quality Management involved two basic sets of activities: quality assurance and quality improvement. Mr Hiraku defined quality assurance as maintaining contractual commitments to quality and quality improvement as continuous quality improvement. Therefore, ISO certification was viewed as a quality assurance activity as it provided the minimum requirements to ensure a certain level of quality control. Thus, the company requested suppliers to improve quality through specifying defects in terms of 'parts per million (ppm)' rather than 'acceptable quality level (AQL)' as with 'ppm' there was a greater emphasis on continuous improvements in product quality through continually reducing the number of defective parts per million.

In 1990, Mr Hiraku was seconded to Singapore as the managing director of YAS. He soon drew up a strategic plan for the implementation of a 'quality-oriented' culture at YAS.

He introduced the concept of 'Quality Productivity Improvement (QPI)' as the basic philosophy of the company. This was in effect a version of the Japanese TQC concept and in YAS and comprised four major sets of activities: a) quality improvement activities which was to be implemented by a strategic process he called *hoshin kanri*[10] which was essentially a systemic approach to the strategic planning process based on the PDCA cycle; b) quality assurance activities such as obtaining ISO certification;

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[10] *Hoshin kanri* is composed of two Chinese characters: *hoshin*, meaning method or form ,and *kanri*, meaning a shiny needle or compass. Together, they refer to 'a methodology for strategic direction setting'.

c) the promotion of QCCs as an essentially bottom-up process; and d) the development of human resources in the organization.

The principle of *hoshin kanri* was central to YAS's 'step-by-step' strategic planning process (refer to Figure 5-3). According to the QA (engineering) manager:

> The process involved participation by all managers, exercising individual initiative and responsibility, following the PDCA cycle, focusing on root causes (not symptoms) and keeping the *hoshin* process separate from the performance appraisal exercise. In *hoshin,* the focus in on process and quality.

The manager in charge of human resource management at YAS commented that:

> The company like most Japanese firms, is very concerned about process....Process orientation means assuring conformance to process, standards, and to rules. It means to go for consistent, repeatable, reliable and maintainable work behaviour all the time. We own the process, we do not own the outcomes - this is what drives our company....At times we feel frustrated by this focus on process because it spells out very clearly how things must be done and leaves very little room for the individual. I'll give an example. There was an engineer in the systems engineering department who asked for a transfer to software engineering because he thought it would give him a better chance to express his creativity. When he found out that in software engineering he would also be faced with all this process oriented way of doing things, he changed his mind.

He was not alone in this observation, for the quality assurance manager in the engineering division thought that a major problem among staff in the engineering group was 'to get away from group-based and process-based activities'.

With this focus on process, YAS had a strong emphasis on consultation and consensus decision making. In the various interviews with YAS managers, I sensed an underlying tone of long-suffering silence on the subject of this process orientation. A manager in charge of one of the systems engineering department expressed frustration with the group consensus decision-making process, in particular, at the need 'to compromise on decisions and the decisions reached are not always the best ones but we are expected work towards consensus. Ideally, it should be collaboration between departments, but this point has not been reached yet.'

On quality improvement activities, Mr Hiraku adopted the 'top-down' style (*Quality Asia*: 1992). For such a style to work, according to Mr Hiraku, 'visible control is needed'. At the manufacturing arm the result is *Just-In-Time* (JIT) manufacturing and a *One-By-One* production approach based on the small lot/multi-products manufacturing that characterized YAS production process.

On the strategic focus on QA, YAS obtained ISO 9000 certification in 1993, about a year after the company began working towards the certification. According to a manager heading one of the systems engineering departments:

> We try to maintain the spirit of ISO9000 while at the same time have a degree of latitude built into the procedures. (The) ISO certification people are very aware of the problem of uncertainty . Ours is a very uncertain external environment especially with open systems. There is always a participative element when we face new problems. What is laid out (in the ISO procedures) are the broad problem solving procedures and approaches.

Mr Hiraku (*Quality Asia*: 1992) acknowledged that it was more difficult to inculcate process-orientation in YAS sales and engineering departments than on the production floor. This was to be expected in a functional profit-centre based organization where the sales departments were focused solely on selling. Similarly, given the projects

nature of engineering services at YAS, the staff in these departments tended to be more inclined towards outcomes such as delivery and completion dates rather than on process improvement.

YAS introduced human resource development as a major strategic focus in 1994, shortly after Mr Hiraku returned to Japan for another assignment. According to the YAS's personnel manager, the company started to pay more attention to human resource development as a means of further motivating the younger engineers:

> Even in the Japanese headquarters, young employees do leave their jobs and are demanding to be rated properly (that is based on their individual performance). Recently, we have been looking around (externally) for competence measures, that is, programmes that measure individual performances.

YAS was beginning to experience relatively higher turnover among the newly recruited employees. According to the personnel manager, younger employees were impatient with the emphasis on process, and on the slow and group based performance appraisal system as they wanted more flexibility in performance evaluation, namely a more precise and individual based system of performance assessment. They were also ones most impatient with the focus on conformity to process in the organization.

The quality management programme at YAS based on Hiraku's 'Quality Productivity Improvement' philosophy was essentially a top-down approach despite the heavy emphasis on managerial participation in *hoshin kanri.* This was made clear by Mr Hiraku and was also confirmed by the managers interviewed.

The emphasis on quality management permeated all divisions in the organization, with every division (except sales) having at least one employee responsible for quality assurance, implementing the quality policies of the management.

The only exception to the top-down approach was the QCC, which was perceived as a mechanism for 'bottom-up' activity in continuous improvement. To Mr. Hiraku, it served as a counterpoint to the essentially top-down approach of the other quality improvement activities at YAS.

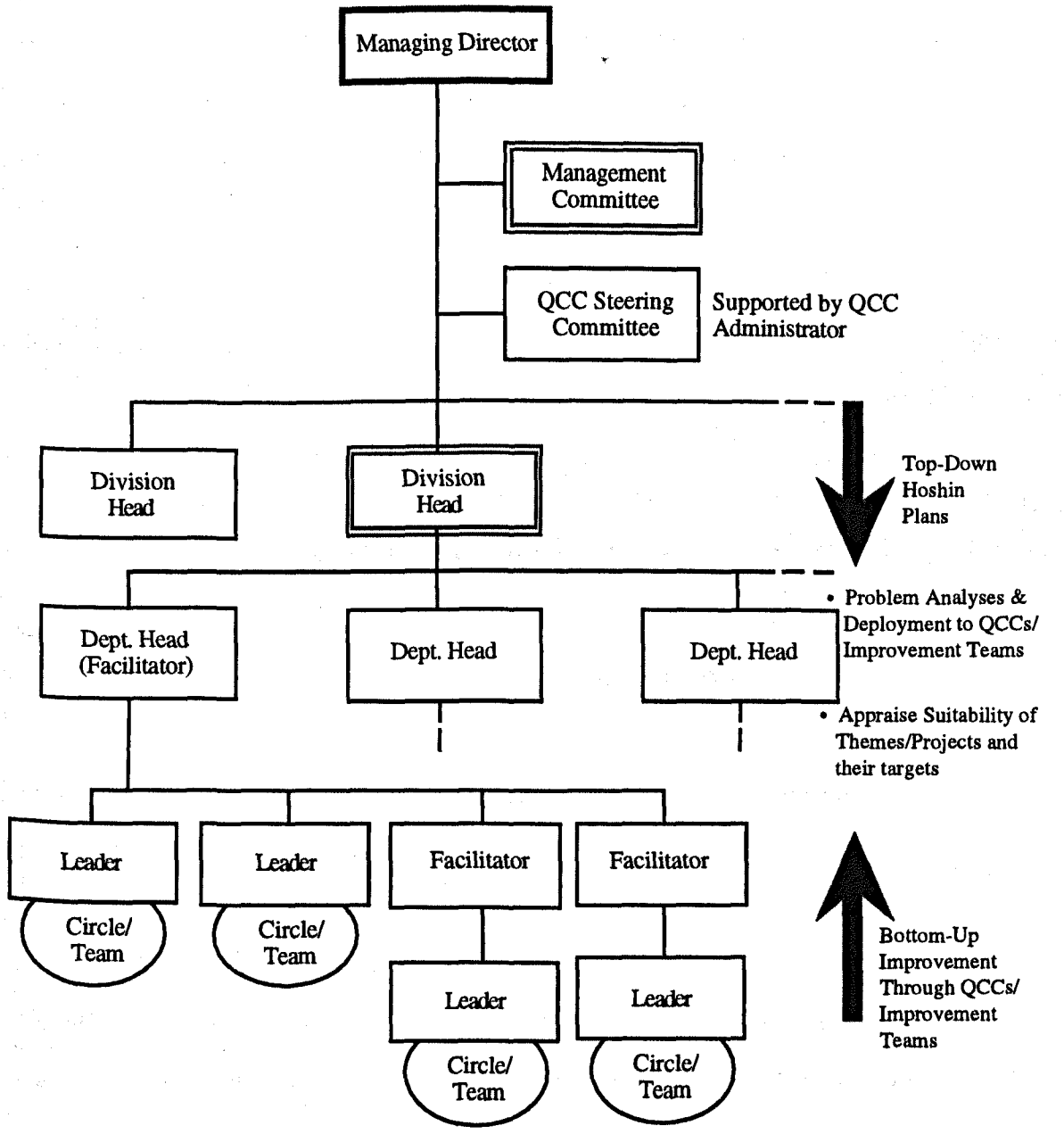
5.5.4 QCC activities at YAS

The QCC programme in YAS was implemented in 1980, a year before the national QCC launch. YAS was essentially an offshore production facility for the Japanese parent company and as such the Singapore subsidiary was implementing a quality control programme of the parent company.

Seventeen circles were formed in factory that year and 45% of factory employees participated in the QCC programme. The participation rate rose to 71% in 1982, just as the QCC concept was spreading amongst Singapore firms. Other quality and productivity systems implemented in the factory, such as JIT and one-by-one manufacturing complemented the QCC activities. QCC participation rates among the production employees reached 80% in 1986. A quality assurance professional in one of the other firms in this study, remembered YAS as having a 'very successful' QCC programme.

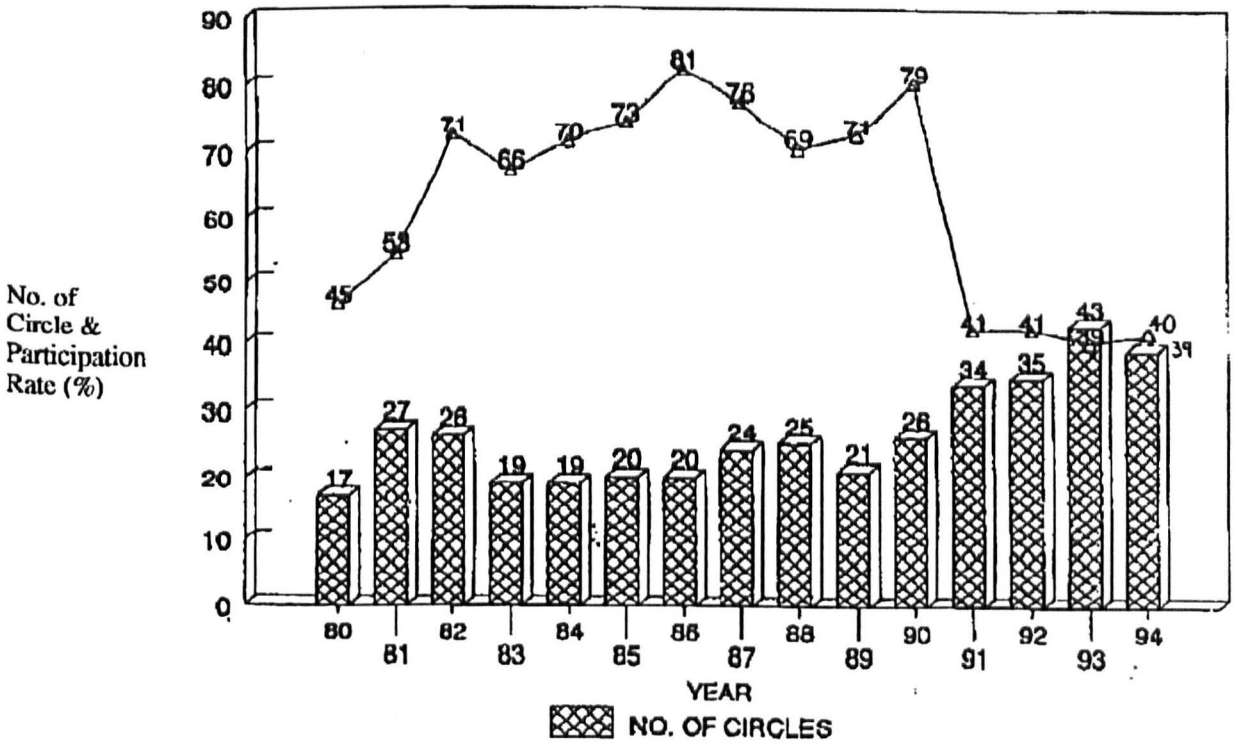
A typical Japanese-based QCC organizational structure was put in place at YAS, with the QCC Steering Committee at the top, supported by a QCC administrator whose role was to assist the Steering Committee and top management implement the QCC system. Departmental heads assumed the role of facilitators and acted as the link between top management policies and the workmen. Their role was to communicate the *hoshin* plans to the circles in their department. In this way, QCC activity would serve as bottom-up improvement process building on the problem analyses and deployment arrived at through the *hoshin kanri* process (refer to Figure 5-3).

Figure 5-2 : YAS strategic planning process and QCC activities



The QCC participation rate at YAS rose to 81% in 1986 although the number of circles dropped from 27 in 1981 to 20 in 1986 (refer to Figure 5-4). There was a dramatic fall in participation rate from 79% in 1990 to 41% in 1991 and between 1991 and 1994, the participation rate hovered at 40-43%.

Figure 5-3: QCC activities in YAS



This dramatic fall was the result of including the staff in the engineering, sales and service divisions in arriving at the QCC participation rates.

Although YAS's employees at the manufacturing facility have been active in QCC activities over the past decade but at the engineering and sales divisions, QCC activity was not adopted till much later and with poor results. New circles were formed in the non- manufacturing arm, mainly in the administrative divisions in 1994, but the sales departments had yet to form any circles. In the engineering division an attempt at circle activities was made in 1994 with 11 participants (facilitators and members). However, this attempt failed and no circles formed (refer to Figure 5-5 and 5-6).

In fact, in August, 1994, almost 80% of all QCC participants in YAS were from the two production facilities. In one production facility (MID), no theme was completed by the 20 circles in the factory in 1994 compared to 10 themes completed in 1993.

Table 5-2 : QCC circles themes achieved in 1993

DIVISION	MID	PPD	OPD	CSC	EGD	HRM	QMD	FIN	TMI	SSD	SHQ OSD MDD	APD	Total QCC
No. of Circle	21	10	7	1	0	2	1	1	0	0	0	0	43
No. of 1st Theme Comp.	10	3	0	0	0	2	1	1	0	0	0	0	17
No. of 2nd Theme Comp.	0	0	0	0	0	0	0	0	0	0	0	0	0

MID - Production Division A
PPD - Production Division B
OPD - Order Processing Department
CSC - Customer Service Centre
EGD - Engineering Division
HRM - Human Resource Management
QMD - Quality Management Division
FIN - Finance Division
TMI - Test & Management Instrument Division
SSD - Singapore Sales Division
SHQ, OSD, MDD - Overseas Sales & Marketing
APD -Administration & Planning

Source : company data

Table 5-3: YAS QCC themes achieved in 1994

DIVISION	MID	PPD	OPD	CSC	EGD	HRM	QMD	FIN	TMI	SSD	SHQ OSD MDD	APD	Total QCC
No. of Circle	21	10	3	1	0	2	1	1	0	0	0	0	39
No. of 1st Theme Comp.	0	2	0	0	0	0	0	0	0	0	0	0	2
No. of 2nd Theme Comp.	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of Members & Facilitators	156	35	12	7	11	12	4	3					240

MID - Production Division A
PPD - Production Division B
OPD - Order Processing Department
CSC - Customer Service Centre
EGD - Engineering Division
HRM - Human Resource Management
QMD - Quality Management Division
FIN - Finance Division
TMI - Test & Management Instrument Division
SSD - Singapore Sales Division
SHQ, OSD, MDD - Overseas Sales & Marketing
APD -Administration & Planning

Source : company data

Thus, the personnel manager noted that:

> QCC had been in existence at YAS for more than 10 years. There seemed to be waves of QCC activities which then died down after a few years.

He revealed that this was also the case in the parent company in Japan. His view was that the QCC programme was working quite well in the production facilities, despite

the problem of sustaining and maintaining the momentum. In production, QCC activities were integrated with other production techniques such as JIT. Despite this, there was a general decline in the level of QCC activity in 1994. In 1993, 17 themes were completed but by August 1994, on a company wide basis, only two themes were completed. This decline occurred when there was a change in managing directors (late 1993) and the implementation of a major strategic re-alignment exercise in 1994. As both were major upheavals, the status of QCC activities in YAS production facilities could only be known once these changes had settled down.

However, there were problems in implementing QCC activities in the engineering and sales departments . In 1993, an attempt was made by the engineering quality assurance department to start circle activities in the engineering division. The aim was to extend QCC activities beyond factory workers and reflected a move to 'upgrade' QCC practice by including the engineers and other technical staff in the engineering, sales and services divisions. As the outcome of this policy has interesting implications for the practice of QCC, it was explored in some detail.

5.5.5 QCC activity and the engineering division

In 1993, the manager of the YAS engineering QA department was given 'the job of selling' the QCC idea to the staff of eight departments in the engineering division. He recalled:

> I sensed initial resistance and hesitation...at the first meeting the managers and engineers were quite dismissive of QCC. When I showed them the fish-bone diagram, there were jokes like 'curry fish head!' It made me feel somehow the same way about the tools.

At the same meeting other points were raised:

> Some managers believed that it (QCC) should be a bottom-up process and the teams (circles) should be allowed to do what they wanted. Others felt that it should be like TQM which is top-down, that it should be tied to the company's *hoshin kanri*. This group felt that bottom-up would not be useful...some felt that QCCs was only good for manufacturing teams and 'physical' goals and not intangible goals. There was also the feeling that it (QCC) tends to (look at) 'trivial goals'.

Thus amongst staff of the engineering department, there was a fair amount of skepticism with regard to the applicability of QCC to their work. However, despite the initial reservations, the engineering QA manager proceeded with the QCC programme with the help of external consultants. But, even after the sessions, there were still reservations:

> There was always the feeling that work was more important. All the engineers were working on projects for which they had to work in groups but had individual responsibilities. They don't see the need to meet as groups with people outside their immediate project team to discuss improvements for their work.

The engineering QA manager also observed that the QCC analytical tools were too inflexible:

> Our responsibilities and accountability are on an individual basis. We learn as individuals and solving software problem is an individual effort. Professionals are less willing to be put in a position where they *must* use certain (QCC) tools. QCC is imposed as a format and we're already such a process driven organization.

Three engineering managers from different departments also expressed similar sentiments:

Engineering side sees QCC as a production technique for the production workers. Engineering solutions are not unique - there are many solutions of varying quality which can function and achieve the (desired) goal. The aim of an engineer is to use his (own) solution and not a standardized version. Engineering is different compared with production. It is a higher level state. There is not so much repetitive skills (as in manufacturing) and more analytical skills needed.

Engineering perception is that the teamwork (QCC) methods is below (beneath) them. Our job nature requires us to be out of the office, outstation or meeting clients, so there are practical problems in having time to meet. Also with QCC, it is hard to identify good projects to work on.

In manufacturing it (QCC) is very successful because workers have a chance of breaking from their daily routine. In engineering, we do not have this need ...the jobs are quite varied, each project is different, so even if the procedure is quite structured, there is a chance (for the engineer) to contribute his own ideas. This itself is a QCC....There is a mindset that QCC is for routine work. They (the engineers) see any work outside their immediate job problems as a burden. They must have a clear cut motivation to work on a problem. If it is a difficult systems related problem - an objective is set for them and they will be very keen to solve it. If outside such immediate work, they have to think of a problem to solve and see this as a burden. Also they see QCC as standardization over things they do - engineers don't like standardization process (because) they restrict them when it comes to execution.

However, an engineering manager observed that, 'the (QCC) methodology and tools such as brainstorming are very workable but there is a stigma associated with QCCs'. He also felt that the bottom-up approach used in QCC could not work because:

'Singaporeans are very passive. They are not very forthcoming in their relationship with peers (that is, they are not prepared to express their own opinions even among their peers). They want to know what the boss thinks and wants before doing so.

Another manager felt that the tools were too simplistic as it emphasized quantitative data analysis while the engineering information requirements were different:

For the type of feedback we need, qualitative information is more important. We need more sophisticated analytical tools.

In 1994, the personnel manager was exploring the feasibility of a training course for problem solving, the Kepner-Tregoe[11] programme, as a management training and development programme. One manager who had reviewed this programme, felt that the problem solving techniques and tools in the Kepner-Tregoe programme were more suitable and appropriate for managerial staff than QCCs.

Despite these misgivings, a group of engineering staff did attempt to work on a QCC project. This group never really took off as a circle although they did present their theme at an in-house convention. However, the theme presented by the group did not, according to the human resource manager, follow the 'usual script' of QCC problem solving, that is the QC story comprising the fish-bone, PDCA cycle etc. The unorthodox approach to the established methods of analysis in QCC activities did not go unnoticed. The corporate quality management division manager commented that it was unclear whether the group was presenting the theme in an unorthodox way as a protest gesture or because the QCC tools did not really apply in such engineering circles.

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11 This is an approach to problem solving and decision making developed by Charles Kepner and Benjamin Tregoe in the 1960s. In essence, the problem solving approach is a four-step process involving: situation analysis, problem analysis, decision-making analysis and potential problem analysis. By 1976, some 600,000 managers in the United States had undergone this training programme (Kepner and Tregoe:1979).

The result was that this group did not continue as a circle, and the problem it had presented was not included in the 'theme achievement' statistics monitored by the QCC administrator.

I made several attempts to obtain the presentation notes of this group. However, the QA (engineering) manager declined to provide the notes, said:

> I feel very embarrassed with our presentation. It is really not worth looking at.

An engineering manager who was a co-facilitator of the group commenting on the group problem solving:

> The leader was not trained, the members were not trained. We used the Pareto chart and some brainstorming. The results were not good. The objective was basically to work as a group. The members think 'why do we need another group?'.

Arrangements to meet with the ex-members of the group did not materialize. The QA (engineering) manager reported that the ex-members 'were not keen to discuss about QCCs at all anymore'.

It should be noted that these requests to see the ex-members of the group occurred when the company was working out a major re-structuring exercise using the *hoshin kanri* approach to align the structure with the new strategic directions of the firm. As many of the engineers were involved in the exercise, they might not be amenable to being interviewed about the QCC.

By the end of 1994, the new managing director had put in place a new organization structure which he felt would respond better to the dynamic business conditions that the company faced in the 1990s.

5.5.6 Structurational analysis of YAS's QCC programme

The influence of organizational actors

As YAS's parent company was a pioneer of the Japanese QC movement, there was a very strong emphasis on quality in the company and the company was among the first to introduce the QCC concept and practice in Singapore. The strong focus on quality management was reinforced when the manager responsible for pioneering the quality management effort in the Japanese parent company was appointed the managing director of the Singapore subsidiary in the late 1980s.

YAS management saw the QCC programme as a integral part of their manufacturing strategy, and circle activities were established in 1981 in the manufacturing arm where it was applied together with other Japanese based production techniques, such as JIT supply system and One-by-One production.

The application of QCC as part of the production system led to a steady rise in employee involvement in QCC, with the majority of manufacturing employees involved in circle activities. At its peak, participation reached 81% in 1986.

Among employees from the engineering and sales divisions, there was a very strong perception of the QCC as 'blue-collar' and factory based problem solving activity which was not applicable to them. Therefore although top management tried to extend the circle programme to engineers, it was rejected by the latter.

The central role of human agency in QCC activities was also demonstrated in YAS, where the QCC activities were observed to go through waves of peaks and troughs, a phenomenon that was also observed in the Japanese parent company.

QCC practice as a medium of human action in the organization

YAS's top management saw QCC as one component of the company's on-going quality improvement activities. It was designed to facilitate continuous quality improvement in the manufacturing process by providing a channel for factory workers to adapt and adjust production methods and processes implemented by the top. This ensured that production technologies and methods were tried, tested, and improved on by those who have 'hands-on' knowledge of the production processes. In this way, it facilitated production work in the organization.

However, among engineering employees, the QCC as a problem solving technique was perceived as a constraint rather than a work enabler. QCC tools and techniques geared for production-based problem solving were regarded as inadequate for the more qualitative problem solving in engineering and project work. Because of their 'projects' orientation and the nature of problems in a projects environment, software engineers, found the QCC problem solving too generic for application in their daily work problems. Furthermore, the highly structured nature of circle activity, was felt to be cumbersome and in fact was perceived to be a constraining factor in their work.

Institutional properties shaping people-QCC interactions

YHQ was one of the early corporate pioneers of Japanese quality management and consequently a strong quality culture in the company permeated the entire YHQ group, including its Singapore subsidiary. The success of Japan's economic and corporate model convinced Japanese managers in YHQ of the superiority of Japanese QC approaches, resulting in the transfer of Japanese quality practices to its foreign subsidiaries. This tradition and culture of quality has contributed to the continuing operation of QCC programme for more than 14 years. The confidence in Japanese QC approaches including the QCC system was instrumental in the management's decision to extend QCC activity to the engineering and sales divisions.

However, the longevity of the QCC programme was threatened by new developments in the external and internal environments of the company in 1994. These were firstly, strategic changes in the company's control systems business, and, secondly the major internal re-structuring and strategic change in 1994. One of the changes was greater centralization of the Singapore operations, including the integration of the manufacturing and engineering arms. The integration process inevitably resulted in upheavals, particularly for the manufacturing arm and contributed to the fall in the QCC activity level in the production division (only two themes were completed in 1994 compared to 13 themes in 1993).

New developments in markets and product/services led YAS management to address the issue of productivity among its professional staff such as the projects, sales and software engineers. Given a new business strategy emphasizing growth in regional engineering business, productivity and quality issues of this group of employees were of vital importance.

These developments led to the decision to apply the Japanese QCC as a group problem solving method to improve the performance of the engineering staff.

The status hierarchy at YAS was also instrumental in shaping the way engineers perceived QCCs. For a long time, QCC activity in the company was conducted by factory workers and was perceived by the engineering professionals as an activity performed by employees at the lower end of the formal organization. In short, it was seen as a low status activity, dealing only with trivial work problems.[12]

12 Contrast this with the engineers' perception of Kepna-Tregoe approach as more applicable to them. This problem solving approach originated from the United States in the 1960s and is marketed as a managerial problem solving tool.

The success of the QCC programme in the manufacturing arm reinforced management's belief in Japanese quality management methods. On the other hand, the failure of the QCC programme among the engineers and sales personnel has led YAS's local management to acknowledge the limitations of this Japanese problem solving method, and YAS QCC activities with its strong emphasis on process reinforced a strong bias towards consensus that was already present in the organization.

5.5.6 YAS's circle programme from a systems perspective

From a systems perspective, YAS's QCC programme was an integral part of a well developed and comprehensive quality management system established by the company. In the manufacturing arm, the QCC programme was implemented together with the JIT supply system and the *One-by-One* production system. This in turn was part of a quality improvement system, which together with a quality assurance system, and supported by a human resource development plan, constitute the quality management system of the company.

The quality improvement system was an integral part of a corporate strategic management system called *Hoshin Kanri*, which was a methodology for strategic direction setting based on continuous improvement through continuous disseminating and deploying of the directions, targets, and plans from top management to all employees for evaluation, study, and feedback while continuously performing the PDCA cycle.

Hoshin Kanri as an essentially top-down process, was an expression of the formal organization, with the emphasis on the formal flows of authority, responsibility and accountability. Within this larger system, the QCC was conceived as a mechanism for bottom up communications, to garner the energies of the creative and innovative forces

that belong to the local and the informal organization. It was therefore an attempt to regulate and systematize the dynamics of the informal organization.

5.6 CASE #05: MESA ELECTRONICS

5.6.1 Company background

Mesa was established in Singapore in 1977 as one of 20 global factories of the audio division of the Japanese parent company. The Mesa plant was then involved in the manufacture of radios and cassette recorders using on labour intensive production methods.

By the end of the 1980s, Mesa had shifted to the production of higher end audio equipment. This was an inevitable development given the unrelenting rise in the value of the Singapore currency and in the cost of labour (relative to that of neigbouring countries). As such, Mesa had to re-align its manufacturing and product strategies if it was to continue to maintain its manufacturing facilities in Singapore.

In 1989, the managing director of Mesa set about to re-organize the Singapore subsidiary so as to put the company in a position to meet the changing environmental conditions. The objective was to re-vitalize Mesa as a manufacturer of innovative audio products for the competitive global market. With this in mind, Mesa adopted a two-pronged strategy: firstly, to commence in-house manufacture of critical parts of the products such as the intricate electronically controlled mechanisms that drive audio equipment; and secondly, to implement advanced automation technology to the manufacturing process at the Singapore plant.

According to the managing director, the in-house manufacture of critical parts of the finished products would allow the company to differentiate its products from those of

its competitors and provide better quality assurance of such parts and ultimately the quality of the final product. Furthermore, it would also improve cost effectiveness as well as widen the engineering base of the company. By the end of 1989, Mesa in implementing the technology transferred from its parent company, was able to commence production of these mechanisms at its the Singapore plant.

The company then focused its attention on automating the manufacturing process, investing more than S$100 million in automation technology, especially programmable robots, of which the company installed 1,000 units. Within a period of one year, the plant was automated and the high speed robots put in place. According to the manufacturing manager:

> The decision to speed up the substantial investment in the Singapore plant was made for business reasons. We were automating the manufacturing process and putting in the high speed robots all within a year. Time was a luxury and there was a poor fit between the humans and the machines. For the production workers it was like an earthquake. There were many day-to-day problems with the new technology and the production system (as they knew it) was changed overnight....At the time I was contacted (by Mesa) for this job (manufacturing manager), things were so bad. Their production people had reverted to using the old system because they were not sure of the robots. Additional people, about 500, were in fact hired to stand by the robots, to make sure that the production flow was smooth.

Thus in the face of serious production problems, Mesa, a subsidiary of a Japanese multi-national company, took the unusual step of recruiting an 'outsider' to trouble shoot the operations. The newly recruited manufacturing manager had worked for American multinational companies and an American-owned consultancy firm prior to joining Mesa:

> One of my conditions when I accepted this job was that I should be given full authority to make changes, including human resources. I promised to reduce the work-force by 500 within a year but managed it in nine months. This was the first time the Japanese had used a 'consultancy style'[13] approach in problem solving, that is attack the problem areas directly and do whatever needed to change the situation. The Japanese are more used to incremental change. It was the first time they saw that a quantum leap was possible.

He attributed the problems faced in the implementation of the new manufacturing technology as a result of a poor fit between workers and machines. That there were problems involved in the human-machine interface relating to the new technology was also recognized by the managing director. He observed that with production fully automated, the operator's role was reduced to that of machine maintenance, resulting in a decline in worker participation in the improvement of the product or production process. In his view, the challenge for the company was to design an appropriate'human-machine interface that would retain employees' involvement and improve (the employees') contribution to quality.

5.6.2 Quality Management at Mesa

Mesa's management philosophy centred around a well defined and entrenched set of values established by the founder of the Japanese parent company. At its heart is a basic business philosophy which emphasized cooperation and team spirit; continuous and incremental improvement; adaptability; and management by 'common sense'.

As a subsidiary of one of the most established Japanese manufacturing conglomerates, there was immense top management commitment to quality management in the company and the managing director chaired the main quality management committee.

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13 The manufacturing manager had previously worked for an American consultancy firm in the area of manufacturing process consultancy.

In 1994, the company embarked on a total process management (TPM) programme for the whole company which included: 1) a total quality management (TQM) programme which covered the overall in-house quality system; 2) the corporate headquarters' quality audit programme; 3) a programme for ISO certification (the company had already attained ISO 9000 and ISO 9002 by the end of 1994); 4) a Total Quality Control (TQC) programme which involved non-job related quality issues such as the sports and recreation programme and job related programme such as the QCC; and 5) a quality programme which focused on the machines, particularly the 1,000 programmable robots in the company.

There was also a strong emphasis on the training and upgrading of employees. The company's 1993 training calendar included a wide range of QC courses, which included courses: QC management; basic QC knowledge; statistical methods; quality awareness for production operators; QCC leader and facilitator training; leadership, team building, and supervisory skills training; and a quality auditing course for staff involved in the company's quality management system. In that same year, the company also organized 18 in-house technical training and upgrading courses for production and maintenance employees, including courses on programmable logic controller, manufacturing resource planning, digital control, pneumatic control, die and mould maintenance and robotics.

The implementation of the TPM programme and the intense level of training and upgrading activity in the company was part of the company's strategy to solve the human machine interface problems that arose as a result of the change in its manufacturing technology.

One major obstacle to the firm's quality management programme, according to Mesa's senior and top management was labour turnover. Turnover became a serious problem when it occurred among employees with between three and five years service. Such employees would by then be well trained and able to perform at their peak, so that their

loss was more keenly felt. A problem related to this turnover could be due to relatively lower wages. As a consumer electronics manufacturer, Mesa had lower profit margins compared with other multi-national companies in Singapore, such as the disc drive makers and computer manufacturers and this meant that their cost and wage structure were major manpower constraints in the tight labour situation that prevailed in Singapore[14] in the late 1980s and early 1990s.

The managing director considered the turnover of engineering staff as one of the biggest threat to Mesa's future success, since departures led to the losses in the firm's pool of accumulated engineering experience and expertise. To address this problem, the company had to resorted to documenting all procedures and instructions, but, it was recognized that work manuals could not capture all the experience and expertise of the human being. Thus the main problem faced by the company's TQC programme was labour turnover.

5.6.3 The QCC programme at Mesa

The company launched its QCC programme in 1984 which was operated in tandem with an employee suggestion scheme. The company also participated in annual joint QCC conventions organized by the local subsidiaries of the Japanese parent company. The group's local headquarters in Singapore included a productivity centre that coordinated the Singapore subsidiaries productivity and quality programmes.

Mesa's QCC organization followed closely that of the Japanese model, with a QCC steering committee guiding the activities. However, unlike their Japanese counterparts, Mesa's QCC programme included a monetary reward system for participants, a feature that it had in common with many of its sister companies in Singapore.

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14 Between 1989 to 1993, unemployment rate in Singapore was below 3% of the total labour force (*Yearbook of Statistics*, Singapore 1993).

At its peak there were about 100 circles at Mesa. In 1993, the manufacturing manager chaired the QCC steering committee. He was of the view that the QCC programme fared quite well in the first five years of its existence. However, in the five years that followed, there was a sudden drop in QCC activity which he attributed to the introduction of the new manufacturing line which resulted in management channeling all its resources into 'getting the new system working'. This change of technology affect the problems that circles could work on. Many of the new problems faced concerned machine downtime involving the new machines based on a new technology that many of the employees did not fully understand. As a result, the manufacturing manager noted that:

> Old circles disappeared. The impact of the upheaval tied down many for more than a year. All energy was expended in solving the problems with the new technology - there was no time for QCC meetings. Some QCCs saw their previous efforts at process improvement dropped as they no longer applied to the new production processes. When things stabilized, their enthusiasm also dropped.

The manufacturing manager felt that another negative factor affecting the QCC programme was the company's pool of older workers. These workers had joined the company more than ten years ago when the production technology was different. In his view, they had failed to keep up with the technology changes as a result of which they were caught in a vicious cycle of being 'shy' and hence resistant to learning new skills, which thus limited their exposure to the new processes. Furthermore, the response of the older worker to QCC activity 'was more negative than positive'. He observed that it was the newer workers that were more energetic and prepared to give QCCs a try.

There were other unfavourable factors which affected the QCC programme. Firstly, Mesa's high labour turnover rate,[15] which affected the continuity of quality

[15] The manufacturing manager gave a verbal estimate of 6% monthly turnover.

improvement efforts. The managing director termed this problem as the 'job-hopping habits of local workers'. Secondly, the low educational level of production operators was seen by the manufacturing manager as contributing to the problems circles had with data collection approaches and sound problem analyses.

The Japanese managing director alluded to some significant differences in worker attitude towards QCC in the Mesa plant compared to a Japanese subsidiary in which he was previously attached to. Japanese workers, he claimed, joined QCC quite voluntarily, seeking nothing more than pride and job satisfaction. In Mesa, he found that he had to implement good monetary incentives[16] to attract participants. Despite these incentives, the QCC participation in the Japanese plant was 50% compared with 10% at Mesa. Furthermore, he was of the view that although circle presentation techniques used by Singapore QCC were good, the substance of the presentations, was in general, less impressive.

This impression was also expressed by another Japanese quality expert from corporate headquarters. At the 1994 QCC convention for the group held in Singapore, the QA manager of the corporate quality centre in Japan, spoke of the need for the Singapore circles 'to utilize the QCC tools more successfully' and that a deeper understanding on the use of the cause and effect diagrams could help in problem analysis.

The managing director stated that the role of top management was to bring about the changes needed to achieve breakthroughs in productivity. Once top management had decided on the changes, it would have to rely on workers to achieve the intended productivity increases. This in his view could be done by top management mobilizing and motivating employees to achieve continuous and incremental improvements. In this case, bottom-up feedback was seen mainly in the context of continuous

16 According to the chairman of the QCC steering committee, if there were no monetary incentives, employees would not be motivated to join in QCC activities. In the case of Mesa, the incentives could range from S$200 to S$2,000 provided the circle made it to the final qualifying round.

improvement in organizational processes and products. This view was reiterated by the manufacturing manager:

> In a stable situation, bottom up feedback leading to continuous improvement can work, but top down is also needed. Sometimes decisions have to be made and (there can be) no arguments (about them).

However, even with the new manufacturing technology, he was certain that bottom up feedback was needed:

> Feedback is still important as there are many machines and the 300 technicians we have will know the machines they handle better than us. Their input is valuable.

This point was reiterated by the parent company QA manager at the 1994 QCC convention for the Singapore subsidiaries. He noted that:

> Designers do drawings but do not know the details of the workshop. It is the workers who provide the details.

He also observed that during the QCC convention, there were many points raised by the QCC teams that 'could never been known by those designing the machines for the workshops'. As such, there was a need to involve workshop personnel in the quality process and that 'to realize (that) zero defect was possible'.

With the new manufacturing technology however, the level of production employees involved in circle activity had moved upwards from production operators to technicians. The chairman of the QCC steering committee commented that:

> Our QCC teams are not formed by the production operators but the next level up such as those 'in charge' or the technicians. These people are not constrained by the

> physical flow of the work the way our operators are. Furthermore, our operators may not be working on the same line everyday. We change out product lines very frequently, within a few days (notice), to suit our marketing plan. So processes and lines may differ.

In other words, the operators did not belong to permanent workgroups, which is an essential condition for circle activities. Furthermore, as the technicians and supervisors were involved only in trouble shooting work, time was available to meet and discuss work problems. This fact was confirmed during the 1994 QCC convention organized by all Singapore subsidiaries of this Japanese multi-national company. The circle that represented Mesa at the convention was made up of either supervisors or QA inspectors.

Another problem with circles comprising production operators was the high proportion of non-Singaporeans among factory operators. As a result of the growth of Singapore's industrial and economic base, foreign workers are a permanent feature of almost all manufacturing firms. According to the members of a circle participating at the QCC convention, the main problem for the circle was that many operators were not Singaporeans and did not understand the use of QCC tools. One of the circle members commented that ' for instance, one of my operators was an Iban tribesman from Sarawak who was previously a logger'. He also added that these workers usually returned home to their home country after a few years.

The managing director was also dissatisfied with the level of QCC participation among employees in 'indirect' departments, that is the non-manufacturing departments in the company, such as administration and sales.

In summing the state of QCC activities in Mesa, the chairman of the QCC steering committee noted that the original belief regarding QCC was that circles should be formed according to workplace allocation. The idea was that the workgroup must

have a sense of belonging and therefore the focus was on how such small groups could function according to management's objectives. He added that while 'the philosophy of QCC is that it should be company-wide, an employee cannot be selected to be a member'. As a result, to start a QCC programme, the inertia is very high'.

5.6.4 QCCs for research and development engineers

In mid-1994, another Japanese executive, with 31 years of research and development (R & D) experience, assumed the post of managing director position at Mesa and the manufacturing manager was transferred to head the R & D division. These corporate moves could be seen as part of Mesa's strategy to develop the firm's engineering and technological capabilities.

By 1993, the Singapore subsidiary had built up its own functional capabilities in product and manufacturing engineering. But in the opinion of the former managing director, Mesa only trailed behind similar Japanese-based sister companies, in terms of the level of technical sophistication and capabilities. Thus to him:

> The key issue in Singapore is R & D capability. As long as R & D capability is well developed and strengthened, there will be new products to be made in Singapore.

The immediate aim then was for Mesa to improve on these capabilities, especially upstream development activities, and according to the R & D manager, the background of the new managing director was ideally suited for this task.

One of the key actions taken by the new managing director was to implement the R & D philosophy which he had evolved over the years. This was a concept termed total engineering management (TEM). The basic philosophy in this approach was to move the mindset of the engineers beyond that of their specific and specialized function or area by helping them develop beyond their current job designation. It emphasized the

development of managerial skills and teamwork among R & D engineers so as to achieve continuous improvement in the R & D function, such as shortening the cycle time for specific development projects.

In connection with TEM, the new R & D manager was planning QCC type activities for some engineering groups:

> Now that I am in charge of R & D, our aim is to keep shortening the development time and increasing the range of products developed *with resources (held) at par.* That is how you can see why the price of consumer electronics keeping falling. It is because the manufacturer is constantly improving on his past performance.

To him, this was part of the Japanese focus on 'stretching' the individual and the company, in other words, continuous improvement. The QCC system with its team-centred process and a well developed set of analytical tools would help move R & D engineers towards the TEM philosophy mooted by the new managing director. The R & D manager explained that:

> When you recruit an R & D engineer, the (technical) prerequisites have to be there. The managerial skills will just have to follow the R & D requisites. So we pay a price....At the initial stage of an R & D engineer's career with the company, he is like a blockhead (in non-technical areas). QCC activity will change this, help them develop outside their current job designation. They will learn to work as a team.

This approach reflected the parent company's new global strategy of restructuring R & D operations so as to effect a quiet transformation of new technologies to products in response to fierce international competition and consequential low profit margins derived from consumer electronics (*Business Week*, 31 October, 1994).

On QCC analytical tools, Mesa's R & D manager considered the PDCA cycle and brainstorming to be useful tools for the engineers to learn. Circle activities could also improve the use of tools such as computer-aided engineering among R&D staff. In late 1994, this version of QCC, was according to the manager, 'at the take-off- stage', with one group being 'cultivated'. Unlike the standard QCC, the team need not 'present' their findings as the outcomes were for the engineers' immediate use. The aim was essentially for the circle to improve on standards, such as shorter product development times. However, in these activities, the circle members rather than management would set their own targets.

In reply to my question regarding the possibility that QCC activity might be construed by R & D engineers as a low status activity aimed at the production workers, the R & D manager replied that:

> To a certain extent, there is a status problem but it comes back to the question of whether the engineers accept the explanation for such activity. The aim is the improvement of the end result. We need to ask them whether they want to have a smoother job, with less hiccups. Do they want to respond to the market?.

According to him, small group activities were an important reference point in the employee evaluation process at Mesa, particularly for professional and managerial staff. Involvement in group activities were used as a means of assessing the behaviour of the staff, and employee behaviour as well as results were key elements in the performance appraisals of Mesa employees.

5.6.5 QCC activities at Mesa - a structurational analysis

The influence of organizational actors

Mesa's top management were Japanese employees of one of the largest and best known Japanese consumer electronics conglomerate. They were steeped in the corporate culture which was characteristically Japanese,[17] with a strong emphasis on quality management. This Japanese corporate giant has more than ten wholly owned subsidiaries in Singapore and there is even a Singapore-based corporate headquarters which coordinates the training, productivity improvement and human resource development activities of the Singapore subsidiaries. Therefore, Mesa's management manifested a strong quality culture and there was much management support for the QCC programme which was implemented as part of the company's quality management programme in 1984. However, by 1993, the QCC steering committee was not chaired by the Japanese managing director but by the local manufacturing manager.

In this Japanese-owned local company, QCC membership was voluntary. Local employees, in the absence of formal rules governing membership, behaved differently from Japanese employees in the parent firm, and declined to participate in circles. Hence various pull factors such as monetary incentives had to be applied to get the circle programme started. The previous managing director felt that the expectations of rewards for circle participation was not in keeping with the spirit of the Japanese QCC movement. Yet, the fact that the incentives were awarded attested to the different normative systems between the Singapore worker and the Japanese worker, and to the extent that such payments changed the essence of QCC practice, it reflected the role of workers in changing the rules.

The R & D manager's intention to apply QCC type problem solving to the R & D engineers, was an attempt by Mesa management to modify the QCC concept and

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17 The parent company is often cited as possessing the characteristics of a typical Japanese management style and culture.

practice. The engineers' QCC programme was aimed at releasing group creativity in addressing R & D problems such as the reduction in development cycle times of specific projects. Hence, the engineers' QCC was to be used to promote group dynamics and develop the engineers skills and creativity (the R & D manager referred to this process as 'stretching') in coordinating and integrating the various aspects of their R & D projects. Although the broad outline of the circle task has been drawn, targets were to be set by the circle members. In this sense, the company had hoped to rely on the motivational elements within the group, that is, the informal group mechanisms, to generate the commitment and enthusiasm to achieve new targets. Presentation was not regarded as essential for such circle groups, implying that bottom up feedback was not the driving force behind the circle activity. Here the circle was designed as a human resource development programme cum an *alternative* management-by-objective programme, where the objectives are *self-managed.* Its only resemblance to the conventional circle was that targets are determined by the group and not externally set.

QCC practice as a medium of human action in the organization

The Japanese managers at Mesa saw circle activities as opportunities for practical innovations and adaptations of technology and equipment to suit local conditions of the workshop. According to the corporate headquarters personnel, this was a critical element in improving the productivity and quality levels of the organization. Although this might have been the case for Mesa in the earlier phases of the company's QCC programme, by 1993, due to changes in production technologies, QCC practice was no longer an enabler of human actions in the company.

Institutional properties shaping people-QCC interactions

The most significant influence shaping people-QCC fortunes at Mesa in recent years has been the changes in competitive forces in the company's product markets. The decline in the growth of demand for consumer electronic products; the rising labour

costs in Singapore and the presence of alternative locations with cheaper labour; have all quickened the pace of changes in production technologies at Mesa. The new production technology overturned many of the incremental changes to the production process that factory workers had made through circle activities, resulting in new perceptions of the limitations of incremental improvements and hence the futility in putting much effort into circle problem solving. Furthermore, some of the workers were unable to comprehend the logic of the new production technology, let alone, attempt to improve on it. The speed at which the new production process was implemented left many employees unprepared and Mesa's QCC programme was an early casualty.

The new production process had a deskilling effect on some groups of factory workers and created a group of unskilled workers, without permanent workgroups. Thus, these workers could not be involved in circle activities. The change in the production logic had profound effects on the constitution of the meaning of work for employees and affected the employees' response to continuing QCC activity in their workplace, such as 'the negative responses' of older and longer-serving employees to QCC activities, and resulted in the 'downgrading' of QCC activity as a quality management approach in the company.

However, the Singapore based regional headquarters of the parent company continued to promote productivity and quality programmes such as the QCC among local subsidiaries. This action reflected a strong ethnocentric bias originating from the Japanese parent which was contingent on the shared norms of the Japanese management in these local subsidiaries. Hence, Mesa as one of these subsidiaries continued to promote QCC activities and to send teams to the annual conventions organized by the Singapore based corporate headquarters.

Given the speed at which previous circle projects were rendered invalid by the new technology, and given the resultant low response to QCC activities, it could be said that circle activities at Mesa have had very little impact on institutional properties.

5.6.7 Mesa's QCC programme from a systems perspective

Mesa's QCC experience underlined the systemic basis of QCC activities in that the change in production technology changed the relationships between the different parts of the production system. Changes in process technology led to work re-design and new production logic. The new production processes changed many of the work rules and assumptions of employees in the organization as the new technology changed dramatically the logic of the production process. The new technology also changed perceptions regarding employee value, such as the value of older workers and effectively de-skilling of the production operators' job. These new interpretations of the production and work system had a major negative impact on QCC activities at Mesa.

5.7 CONCLUSIONS

This chapter described the experience of five companies in Singapore with regard to their adoption and implementation of QCCs. Structurational analysis was employed to explain the consequences of their QCC implementation and QCC was viewed as a social technology which was shaped both by human agency and the institutional properties of organization, through four interacting sets of key influences. The QCC programmes were also examined for their systemic qualities, as this was an essential ingredient of Japanese quality management, of which QCC was a sub-system.

In the next and final chapter, the differences in the constitution of the Japanese QCC and the Singapore experience will be highlighted and differences in the systemic foundations of the two will also be discussed. Finally, using the QCC adoption as the vehicle, an attempt will be made to integrate systems approach and structuration. It is my firm belief that these two analytical frameworks can inform and enrich each other.

CHAPTER 6 THE TRANSFERABILITY OF THE QCC CONCEPT AND PRACTICE

6.1 THE INTERPRETIVE FLEXIBILITY OF THE QCC CONCEPT

The Japanese QCC experience

In applying the structurational model of technology to information technology, Olikowski and Robey (1991) underline that a technology used to mediate organizational processes (such as information technology) will be centrally implicated in the processes of structuration.

Similarly, as a social technology, the constituted nature of QCC can be viewed as the social product of human action within specific structural and cultural contexts; while at the same time, its constituted role is as an objective set of rules and processes, used to facilitate human action in an organizational context, and which if used might lead to its production and reproduction and the possible transformation of the context.

It is this duality of QCC practice that gives it an inherent interpretive flexibility, and the practice of QCC in organizations is a function of the different actors, the socio-historical contexts implicated in its creation, development and application.

In Chapter 3, we traced the origins of Japanese QCC and its development into its mature form. The dual nature of its creation and evolution was very evident, with the three modalities of structuration interacting to produce and reproduce the QCC as an established group-centred organizational structure and activity in Japanese firms. The table below illustrates how through the three modalities, the QCC as an organizational innovation is created and reproduced in the realms of social structure and of human action (refer to Table 6-1).

Table 6-1 : An analytical framework of the interactions o between human actors and social structure in the development and practice of QCC in Japanese organizations

REALM OF SOCIAL STRUCTURE	QCC activity is part of quality management system of Japanese factories. Through QCC, practice of continuous improvement is institutionalized.	Creation of circle groups was a response to limited resources available for transmission of QC concepts. Traditional authority and duty of foremen utilized as teachers in QC study groups. QCC involvement used as one criterion for evaluating managers. Creation of a QCC hybrid structure that is parallel to formal authority in the organization.	QCC creators draw on traditional conventions and values of Japanese neighbourhood groups and education system to structure early QC study groups in factories. QCC techniques and tools are institutionalized as problem solving and communications vocabulary for factory workers and managers. QCC participation by workers is weaved into worker's job duties.
MODALITIES	**INTERPRETIVE SCHEMES**	**RESOURCES**	**NORMS**
REALM OF HUMAN ACTION	Meaning of *jishusei* is seen as members are free to decide on the improvement projects to work on and not as voluntary participation. QCC storyboard and PDCA cycle are accepted and used as the foundation for group problem solving and quality improvement activity in workshop.	QCC problem solving, presentations and the PDCA cycle alter the power relations in firm by allowing bottom up feedback. Factory managers rely on 'leadership' skills to promote use of QCC problem solving in workshop. JUSE relied on authority of foreign experts like Deming and Juran to gain acceptance for quality management ideology.	Conventions and values from previous contexts applied in QCC activity such as the value of cooperation, consensus and the primacy of the group. Normative pressure is used to elicit QCC participation by all workers Presence of *mannerika* or ritual circles rather than deviate from norm of participation.

Hence, the Japanese QCC as an organizational form with a specific set of tools and techniques has embedded within the concept a cluster of shared knowledge. In developing a tool for quality improvement and practical problem solving, the QCC as a social technology of the Japanese organization embodies and reinforces the existing ideology and values of the social group. Its constitutive nature reinforces group norms and mediates a shared reality through similar interpretive schemes. It thus produces a

fair amount of uniformity and predictability in thought and behaviour in the workshop by providing a basic language by which all in the company can relate in terms of the vocabulary and the norms of action.

Employee participation in QCC is mediated through the existing normative system and sustained through the shared interpretive schemes. According to Garnsey (1993) through experience, participants in social processes build up knowledge which is shared and stored, and it is these shared interpretations that sustain the culture of a social system. Thus, although diverse and conflicting perspectives are common within a social system, and are contained to varying degrees, unless there is sufficient core of shared understanding and expectations, a social system is subject to potential schism and division. In the case of QCCs in Japan, there was sufficient shared interpretations regarding participation in QCCs and the role of QCC in work improvement.

In its role as a problem solving tool, the Japanese QCC facilitates problem solving at the factory level, creates quality consciousness and encourages the flow of local innovations of work processes and equipment, and is an important negative feedback mechanism in the workshop. However, as a problem solving tool it also constrains action as the approach to problem approach is defined and structured by the tools and techniques and the organization and administration of such groups. Furthermore, as a workgroup centred problem solving tool, it assumes the presence of stable workgroups and could discourage cross-departmental or cross-functional coordination and problem solving. Also, the fact that the QCC thrives in Japanese manufacturing firms but not in service related industries is a reflection that the shared knowledge embedded in its tools and structures was created in a manufacturing context, and that this shared knowledge by and large did not extend to the service related industries in Japan.

The Singapore QCC experience

The Singapore approach to QCC as an organizational innovation rests on a role for QCC that was first defined by the National Productivity Committee in 1981. The Singapore Government then saw the QCC as a mechanism that could contribute to building the associational bonds of workers and could lessen the problem of labour atomization which it felt was a serious obstacle to continuous productivity growth. To the Committee, circle activities could enhance worker commitment to his work and company by involving them in workplace decision-making. This could improve employee work values and attitudes which could translate to higher productivity. This approach was in marked contrast with the Japanese QCC experience which had relied on traditional norms and values extended from other social contexts as the basis for developing circle activities. Thus in Japan group-centred norms and values are used to promote circle formation and the maintenance of circle activities, that is, they are considered to be key inputs into the QCC system. However, in Singapore, the QCC technology is perceived as a means to promote the values of teamwork and organizational commitment, that is, they are the desired outcomes of circle activity.

In transferring circle activities into the Singapore organizational context, much attention was focused by the NPB and corporate management on the structural features of circle activities, such as QCC steering committees and evaluation committees; on the tools of QCC problem solving and analysis; and on the contingencies seen as necessary for QCC success, such as formal authority (expressed as top management support), and reward systems (monetary incentives for participation). This attempt to articulate the systemic processes of circle activities through mainly structural characteristics restricted the development of emergent properties (such as quality awareness and teamwork) as an essential outcome of circle activity.

As an organizational technology that is socially enacted, human action is essential in its production. The QCC is constituted through meaningful interaction of constitutive

processes including the mobilization of power, negotiation and acceptance of norms, and the communication of shared meaning. In the Singapore case, there was little mutual knowledge between government and corporate sponsors, on the one hand, and circle members, on the other, regarding the meaning of the QCC, so that in many cases, circle activity was sustained by the use of formal power to draw on resources to promote circle participation (refer to Table 6-2).

Furthermore, perceptions regarding the role and purpose of QCC differred among managers and workers. This points to a wide difference in interpretive schemes regarding the QCC and as such, there was little shared knowledge regarding it.

It was interesting to note that while the Japanese relied on existing norms in the wider society to facilitate their QCC system, in Singapore, the aim was to develop these norms through QCC participation. Given the foregoing discussion on the highly complex nature of the interactions between structure and action, it is highly unlikely that the desired norms could be a 'managed' outcome of the QCC system.

Therefore structurational analysis of the two QCC experiences underlines the important role of human agency in the transfer of QCC technology by showing how the interactions between the structural properties of a setting and the people involved, through the three modalities, shape the rules of QCC membership, the allocation of resources to QCC activities, the meanings assigned to QCC activity and the efficacy of QCC as an organizational intervention. Hence the inherent interpretive flexibility of the QCC concept highlight the limitations of a 'how-to' approach in the implementation of a social technology like the QCC and confirms the need for conceptual frameworks to guide such technology transfers.

Table 6-2 : An analytical framework of the interactions between human actors and social structure in the adoption and practice of QCC in Singapore organizations

REALM OF SOCIAL STRUCTURE	Government promotes QCC through NPB as part of national goal of productivity growth. Management sees QCC as means to improve work attitudes, quality and teamwork, and increase effectiveness of company (all three local companies). In Japanese MNCs, QCC is a part of manufacturing quality management system (YAS and Mesa). In situations of tight work schedules, circle activity as directed by superiors is seen as an extra workload (Aeco). Rapid technological change alter meaning of work in factory (Mesa).	Organizational sponsors of QCC uses power to draw on resources to promote QCC in firms, either through providing incentives for participation, or through direct or indirect use of formal authority (Aeco and Busco). Re-structuring leads to changes in power relationships, dislocating QCC activities in some firms (YAS).	Corporatist government through agencies use QCC as a means to developing work norms to promote productivity growth. Government-linked companies respond to QCC movement as part of government policy and implement accordingly. Japanese-owned MNCs promote QCC as an extension of work culture of parent firm (YAS & Mesa).
MODALITIES	**INTERPRETIVE SCHEMES**	**RESOURCES**	**NORMS**
REALM OF HUMAN ACTION	Employees do not see any personal benefit because of 'extra work' involved (Aeco). Not all employees are comfortable with QCC tools as basic language of communication for quality improvements and problem solving in workshop (all three local companies). QCC is rejected by engineers as not meant for them but for factory workers (YAS). Organizational change leads to changes in meaning assigned to QCC activities, and rejection (Mesa).	Employees register as QCC members in response to rules of formal organization, but number of projects moribund unless project completion part of formal rules (All). Perfunctory projects due to need to comply with directives (all three local firms). Change in top managers might cause change in response to QCC as the activity is sustained by formal authority (Aeco).	Issue of 'face' in presentation draws on normative system among workers and lead to frantic preparations (all three local firms and YAS). Group pressure not a significant factor in QCC participation (all firms studied) Expectations of rewards and incentives for 'extra work' in participating in QCCs (all local firms and Mesa).

6.2 THE TRANSFERABILITY OF QCC

The issue therefore arises as to whether the QCC as a social technology can be transferred across nations. From the above structurational analysis, it would seem that given the duality of technology, transfer of social technologies are fraught with difficulties, if not, impossible. However, as has been pointed out in previous chapters, many other social technologies have survived cross-national transfers, including the analytical tools and techniques that constitute QCC problem solving.

This thesis re-affirms Cole's (1989) stand that transfer is possible provided that the adoption of the social technology in the new context was accompanied by 'local invention', which is that the technology was adapted through a participative process involving all concerned with the invention. This implies, from a critical perspective, that there has to be inter-subjective communications between all parties and that at least two (the technical and the practical), if not three, of Habermas's knowledge constitutive interests are met. The thesis further asserts that the parties need to be knowledgeable as to the particular elements of the social technology that could be successfully transferred. This requires a methodology that provides a conceptual platform for identifying the essential elements of the technology and their relationships. Hence, while the structuration model is helpful as a meta-theoretical model to explain the issues involved in technology adoption, it is the systems approach that can enable us to identify the essential elements of the technology.

6.3 QCC AND THE SYSTEMS APPROACH

In Chapter 3, it was observed that Japanese approaches to QC possessed a strong systemic character, both in the organization of QC activities and the tools used, and that elements of both hard and soft systems thinking are evident in the Japanese quality management approach.

The evolution of the QCC is itself an example of systems thinking at work, while the QCC as a group problem solving approach is doubly systemic. Firstly, systems based problem solving is emphasized in circle activity with emergent processes viewed as the key rationale for circle activity. Secondly, the systemic property of hierarchy is evident in that the QCC is a sub-system of the firm's total quality management (TQM) system. While the flow of communications in the TQM system is essentially a top-down process, the communications flow from the QCC sub-system serves as an valuable counter balance as it facilitates bottom-up communications in the TQM system. As such it is an unique negative feedback mechanism within the organization.

Although within the formal organization, feedback mechanisms are present, it is asserted that in developing the QCC, the Japanese corporate management's aim was to tap the potential of the informal organization, to reach the 'spontaneous and innovative behaviour (which) is important practically because it smoothes the social functioning of an organization and attends to aspects that cannot be prescribed in a formal job description' (Lillrank and Kano 1989:100). This behaviour is necessary for local innovations of processes and of machinery and equipment. Thus it is not surprising that Singapore's planners saw its potential as a contributor to total factor productivity.

However it is argued that for QCC to work, it cannot be a 'one-way' process, that is the activity cannot address technical interests alone. The experience of *Key QCC* (see Chapter 5) underlines this pre-requisite, in that the success of the circle is grounded on the members' understanding of QCC as a bottom-up mechanism through which they could assert their world view to management and have their views considered and acted on.

Therefore, the 'value' of the QCC as a organizational innovation lies in its nature as an unique negative feedback channel that is outside the formal organization. In highly hierarchical organizational contexts, it thus emerges as an important means of reaching and articulating the spontaneous behaviour of small groups in organizations. In such

organizational contexts it could also serve as a means of addressing the practical interests of circle members, as stakeholders of the organization.

In terms of Flood's (1993) thesis on a new theory based approach to quality management, the case studies confirm his argument that the three pillars of 'designing', 'debating' and 'disemprisoning' are essential requirements for successful implementation of a quality strategy.

6.4 QCC IMPLEMENTATION VIEWED AS TRANSFER OF ORGANIZATIONAL TECHNOLOGY

Finally, this thesis puts forward a tentative conceptual framework for organizing our thoughts regarding the transfer of an organizational technology such as the QCC. The conceptual framework takes as its starting point, the principles of critical systems thinking as propounded by Flood and Jackson (1991a), namely, the commitment to critique, to emancipation and to complementarism, with the interpretive perspective of the framework informed by a structurational analysis of technology as developed by Olikowski (1992).

The key principle in the Japanese approach to QC rests on systemic principles, with systems analysis a fundamental step in all Japanese QC techniques. Although systems analysis is an intensely deterministic approach to problem solving, the Japanese regarded it as an essential element of their quality management ideology, given their self-perceived tendency towards intuitive thinking (Ishikawa 1985). Thus this aspect of Japanese QC, including the QCC problem solving tools, is firmly grounded in the hard systems thinking paradigm.

However, in the practical application of this quality control approach, the Japanese switched from the hard systems thinking to the soft systems thinking paradigm. In Chapter 3, the Japanese assumptions underlying QCC were shown to bear many similarities to Ackoff's (1981) *Interactive Planning* approach in its emphasis on

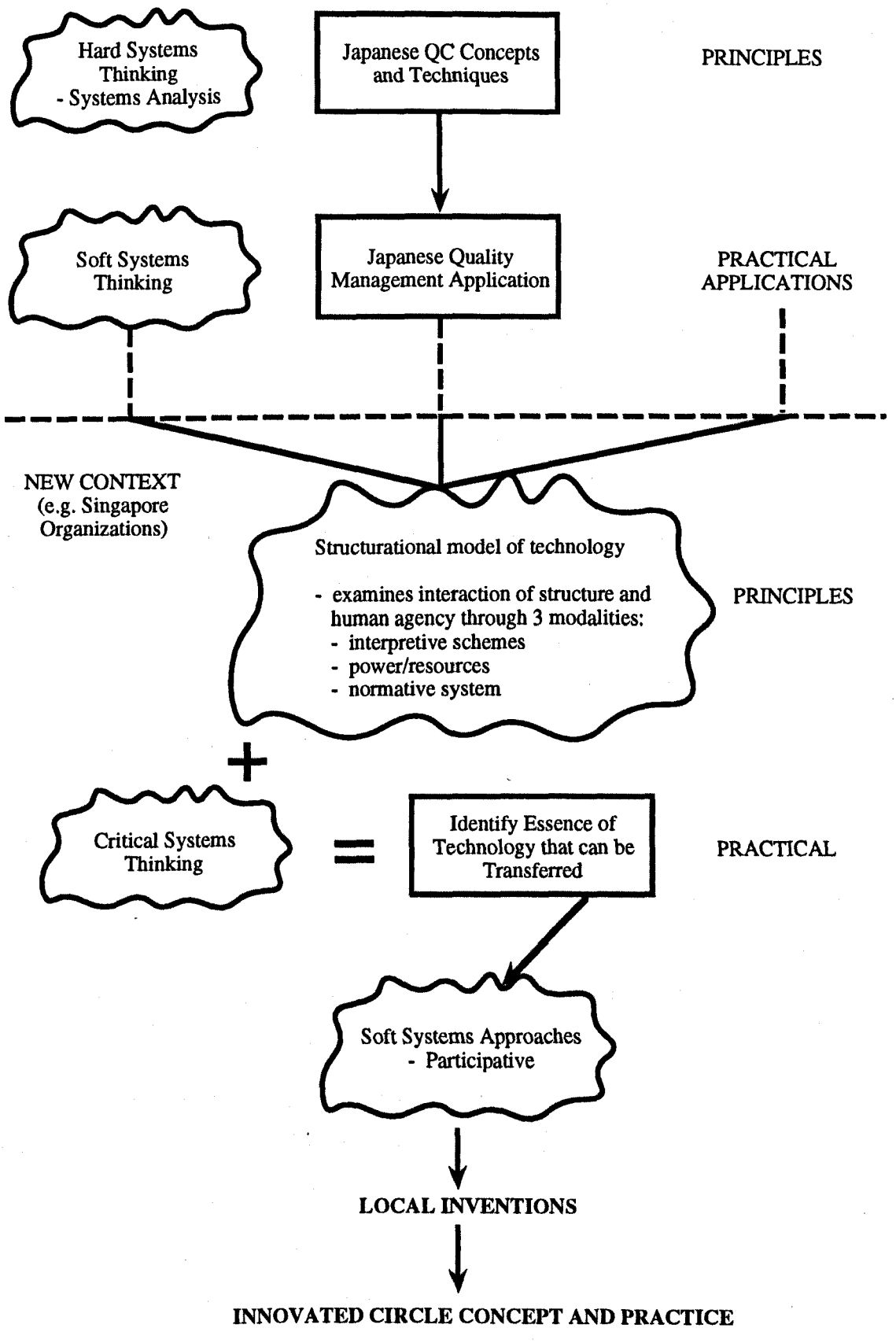
participation, continuity and holism. Ackoff's approach to problem solving of dissolving problems by changing the systems or the environment finds its analogy in the QCC's *fish-bone* and *Plan-Do-Check-Action* processes. Furthermore, both are grounded in the assumption that consensus among the stakeholders is possible.

In most transfers of QCC as an organizational technology, it is the combination of these two systemic approaches that is borrowed. However, given that these approaches were transferred without a thorough understanding the embedded socio-historical context, the cross national applications have often been unsatisfactory, with local innovations absent or primitive and clumsy.

Therefore, is argued here that an understanding of the embedded socio-historical context in which the Japanese QCC is essential for an intelligent and meaningful transfer of the QCC technology across national boundaries, and that structurational analysis, could provide the intellectual framework for such understanding. The exploration of the interactions between social structure and human action through the modalities of interpretive schemes, power relations and normative systems, provide a rich picture on which to build the necessary local inventions needed for the QCC to survive in the new socio-historical context.

The evolution of such local inventions is contingent on the participation of all concerned with the new technology, to develop a sufficient core of shared understanding and expectations with regard to the enactment of the QCC in the organization. It is argued that such intersubjective understanding can only arise when the technical interests, the practical interests and to some extent, the emancipatory interests, have been addressed. A graphical representation of this conceptual framework follows (refer to Figure 6-1).

Figure 6-1 : Conceptual mapping for the transfer of QCC technology



6.5 SELF REFLECTION AND FURTHER WORK TO BE DONE

It is recognized that the QCC as an organizational technology cannot be value free. As a form of organizational intervention, its managerialist foundations cannot be ignored. Its introduction by management implies management's interests are involved, and that the QCC serves to promote the management's agenda.

Furthermore, our interpretation of QCC as a social technology is itself an underlying admission of the instrumentality of QCCs. However, it is argued that while the technocratic solution of systemic modernism as the underlying principle should be rejected, the ideal of rational knowledge and human progress is essential in dealing with the practical issues and problems of social and organizational life. Thus, we view the critical modernist ideal of a unified theory of knowledge linked to the different human interests, with 'a network of interacting individuals' who through the common sense of ordinary discourse can reach consensus as the only other viable alternative. Given this, any formulation of organizational interventions, has to include the questioning of interests and power, and the examination of the status quo.

Yet, because of the unformed and unarticulated nature of the informal processes in an organization, it is recognized that in attempting to organize the creative forces of the informal organization, we need to adopt the post-modernist perspective of organization. The creative forces of the informal organization are often the result of unplanned interactions between structural factors and human agency, and as such are difficult to predict or control. The emergent processes involved are unlikely to be arise through deliberate acts implemented to achieve abstract values, and at best, as Jackson (1991) has observed with regard to the post modernist perspective, consensus is only possible in localized circumstances.

It can therefore be argued that such creative forces cannot be harnessed, and to attempt do so would be a contradiction in terms. However, the Japanese experience has shown

that to some extent and for periods of time, this is possible. The Japanese QCC mass movement and the generally recognized contributions to quality arising from the QCC activities of Japanese workers over the past three decades provide evidence that the workers' creative forces could be harnessed. However, the presence of *mannerika* among Japanese circles is a clear indication that it is not a consistent or unanimous phenomenon. Notwithstanding this, the Japanese QCC experience shows that with inter-subjective communications, shared knowledge and universal consensus, the energies of the informal work organization could be directed towards a shared goal, which in the Japanese experience is the superior quality of Japanese products.

In the case of Singapore's QCC experience, there was very little evidence of inter-subjective communications between those designing and implementing the circles and the workers who took part in circle activities. Stripped of its socio-historical context, the Japanese circle has been implemented as a set of structures accompanying a package of problem solving tools. The weakness of the technology transfer process was the failure to identify the essence of the Japanese QCC technology that could survive transfer and retain its applicability in a new context. The QCC also failed to take of because of the lack of local invention for which inter-subjective communications is essential to enable a organizational technology developed in another socio-historical context to be a viable organizational practice in its new environment.

Thus the learning experience derived from this research, is that in any implementation of social technologies much sensitivity and circumspection is be required, including a recognition of the inconstancy of the outcomes sought.

Furthermore, having been involved in many aspects of circle activity, I am convinced that the bottom-up communications flow is essential for the organization as it has a major impact on its performance and long-term viability. It is also a major means through which the practical concerns of employees with little organizational power and authority can be articulated.

Finally, given this stance, and based on the belief that the essential quality of the QCC could be transferred across organizations in a different spatial and temporal context, further work needs to be done before such a transfer could 'work'. The most crucial will be the exploration of possible areas for local invention, including the development of a methodology to involve all employees concerned in the process. One such methodology could be Checkland's soft systems methodology (Checkland 1981; Checkland and Scholes 1990), albeit informed with the critical systems thinker's commitment to continually question the status quo.

REFERENCES

Ackoff, R. L. (1979). 'The Future of Operational Research is Past.' *Journal of the Operational Research Society*, 30.

Ackoff, R. L. (1981). *Creating the Corporate Future.* New York: Wiley.

Ackoff, R. L. (1993). 'Beyond Total Quality Management.' *Journal for Quality and Participation.* Vol 16/ 2, Ohio: Association for Quality and Participation.

Alvesson, M. & Willmott, H. eds. (1992) *Critical Management Studies.* London: Sage Publications.

Alvesson, M. & Willmott, H. (1992). 'Critical Theory and Management Studies.' Alvesson, M. & Willmott, H. eds. *Critical Management Studies.* London: Sage Publications.

Askenazi, M. (1991). 'Traditional Small Group Organization and Cultural Modelling in Modern Japan.' *Human Organization,* 50/4 : 385-392.

Astley, W. G. (1985). 'Administrative Science as Socially Constructed Truth.' *Administrative Science Quarterly,* 30, 497-513.

Barley, S. R. (1986). 'Technology as an Occasion for Structuring: Evidence from the Observation of CT Scanners and the Social Order of Radiology Departments.' *Administrative Science Quarterly,* 31:78-108.

Barnard, C. (1938). *The Functions of the Executive.* Cambridge, Mass: Harvard University Press.

Beer, S. (1985). *Diagnosing the System for Organizations.* Chicester: Wiley.

Behling, O. (1980). 'The Case of the Natural Science Model for Research in Organization Theory.' *Academy of Management Review,* October: 483-490.

Benbasat, I., Goldstein, D. K. & Mead, M. (1987). 'The Case Research Strategy in Studies of Information Systems.' *MIS Quarterly,* September: 369-386.

Berger, P. & Luckmann, T. (1966). *The Social Construction of Reality: A Treatise in the Sociology of Knowledge.* London: Penguin Books

Bijker, W. E., Hughes, P. H. & Pinch, T. eds. (1987). *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology.* Cambridge, Massachusetts: MIT Press.

Blau, P. M. & Scott, W. R. (1962). "The Concept of Formal Organization.' J.M. Shafritz & J.S. Ott, eds. (1987). *Classics of Organization Theory.* 2nd Edition. California: Brooks/Cole Publishing Co.

Blumer, M. (1988). 'Some Reflections upon Research in Organizations.' Bryman, A. ed. (1988). *Doing Research in Organizations.* London: Routledge.

Bradley, K. & Hill, S. (1983). 'After Japan: The Quality Circle Transplant and Productive Efficiency.' *British Journal of Industrial Relations.* 29/4: 291-311.

Bradley, K. & Hill, S. (1987). 'Quality Circles and Managerial Interests.' *Industrial Relations,* 26:1: 68-82.

Bryman, A. ed. (1988). *Doing Research in Organizations.* London: Routledge.

Bryman, A. (1989). *Research Methods and Organizational Studies.* London: Unwin Hyman.

Burns, T. & Stalker, G. M. (1961). *The Management of Innovation.* London: Tavistock Publications.

Burrell, G. & Morgan, G. (1979). *Sociological Paradigms and Organizational Analysis.* London: Heinemann.

Cartwright, D. ed. (1951). *Field Theory in Social Science.* New York: Harper.

Chan, C. H. (1990). 'The Development of QCCs in Singapore' Foo, C. T. & Chan, C.H. eds. *Productivity in Transition.* Singapore: McGraw-Hill Book Co.

Chan, H. C. (1987). 'Legislature and legislators' Quah, J.S.T., Chan, H.C. & Seah, C.M. eds. *Government and Politics of Singapore.* Singapore: Oxford University Press.

Checkland, P. B. (1981). *Systems Thinking, Systems Practice.* Chichester: John Wiley & Sons.

Checkland, P. B. (1985). 'From Optimising to Learning: A development of Systems Thinking for the 1990s.' *Journal of the Operational Research Society*, 36.

Checkland, P. & Scholes, J. (1990). *Soft Systems Methodology in Action.* Chichester: John Wiley & Sons.

Cheng, S. H. (1991). 'Economic Change and Industrialization.' Chew, E. C. T. & Lee, E. *A History of Singapore.* Singapore: Oxford University Press.

Cherns, A. (1979). *Using the Social Sciences.* London: Routledge and Kegan Paul.

Cohen, I J. (1989). *Structuration Theory: Anthony Giddens and the Constitution of Social Life.* England: Macmillan.

Cole, R. E. (1989). *Strategies for Learning: Small-Group Activities in American, Japanese and Swedish Industry.* Berkeley: University of California Press.

Cole, R. E. (1979). *Work, Mobility,and Participation.* Berkeley: University of California Press.

Cooper, R. & Burrell, G. (1988). 'Modernism, Postmodernism and Organizational Analysis: An Introduction.' *Organization Studies,* 1988, 9/1: 91-112.

Crocker, O., Charney, C. & Chiu, J. S. L. (1984). *Quality Circles : A Guide to Participation and Productivity.* New York: Methuen Publications.

Cyert, R. M. & March, J. G. (1963). *A behavioral theory of the firm.* Engelwood Cliff, NJ: Prentice-Hall.

Dale, B. G. & Lees, J. (1987). *Quality Circle Programme Development: Some key issues.* Sheffield: Manpower Services Comission.

Dale, B. G. & Plunkett J. J. eds. (1990). *Managing Quality.* Hertfordshire: Philip Allen.

Dale, B. G., Lascelles, D. M. & Plunkett, J. J. (1990). 'The Process of Total Quality Management.' Dale, B. G. & Plunkett J. J. eds. *Managing Quality.* Hertfordshire: Philip Allen.

Davenport, T. H. (1993). *Process Innovation : Reengineering Work through Information Technology.* Massachusetts: Harvard Business School Press.

Debra, Y. A. (1991). *Quality Circles and Trade Unions: An Empirical Exploration.' Nanyang Technological University.* School of Accountancy and Business: Working Paper Series no. 6-91.

Deming, W. E. (1988). *Out of the Crisis: Quality, Productivity and Competitive Position.* Cambridge: Cambridge University Press.

Department of Statistics, Singapore. (1983). *Yearbook of Statistics (1982).*

Department of Statistics, Singapore. (1993). *Yearbook of Statistics (1992).*

Department of Statistics, Singapore. (1994). *Yearbook of Statistics (1993).*

Deyo, F. C. (1981). *Dependent Development and Industrial Order : An Asian Case Study.* New York: Praeger Publishing.

Dooley, D. (1990). *Social Research Methods.* New Jersey: Prentice-Hall Inc.

Dore, R. (1973). *British Factory-Japanese Factory: The Origins of Diversity in Industrial Relations.* Berkeley: University of California Press.

Dunkerley, D. (1988). 'Historical Methods and Organizational Analysis.' Bryman, A. ed. (1988). *Doing Research in Organizations.* London: Routledge.

Eisenhardt, K. M. (1989). 'Building Theories from Case Study Research.' *Academy of Management Review,* 14/4: 532-550.

Etzioni, A. (1961). *A Comparative Analysis of Complex Organizations.* New York: Free Press.

Feigenbaum, A. V. (1991). *Total Quality Control,* 3rd edition, revised. Singapore: McGraw-Hill Book Co.

Flood, R. L. (1993). Beyond TQM. Chichester: John Wiley & Sons.

Flood, R. L. (1990). *Liberating Systems Theory.* New York: Plenum Press.

Flood, R. L. & Jackson, M. C. eds. (1991a). *Critical Systems Thinking: Directed Readings.* Chichester: John Wiley & Sons.

Flood, R. L. & Jackson, M. C. (1991b). *Creative Problem Solving: Total Systems Intervention.* Chichester: John Wiley & Sons.

Flood, R. L. & Ulrich, W. (1990). 'Testament to Conversations on Critical Systems Thinking: Between Two Systems Practitioners.' *Systems Practice,* 3.

Garnsey, E. (1994). 'Enacted Social Systems: a critique of determinism' accepted for publication by *Innovation in Social Science Research.*

Garnsey, E. (1993). 'Exploring a Critical Systems Perspective'. *Innovation in Social Science Research,* 6/2: 229-256.

Garvin, D. A. (1987). 'Competing on the Eight Dimensions of Quality.' *Harvard Business Review,* Nov-Dec, 101-109.

Geertz, C. (1983). *Local Knowledge: Further Essays in Interpretive Anthropology.* New York: Basic Books.

Giddens, A. (1977). *Studies in Social and Political Theory.* London: Hutchinson.

Giddens, A. (1979). *Central Problems in Social Theory: Action, Structure and Contradiction in Social Analysis.* Berkeley: University of California Press.

Giddens, A. (1984). *The Constitution of Society: Outline of the Theory of Structuration.* Cambridge: Polity Press.

Giddens, A. (1992). *The Transformation of Intimacy.* Cambridge: Polity Press.

Grant, R. M., Shani, R. & Krishnan, R. (1994). 'TQM's Challenge to Management Theory and Practice.' *Sloan Management Review,* Winter: 25-35.

Geuss, R. (1981). *The Idea of a Critical Theory.* Cambridge: Cambridge University Press.

Habermas, J. (1975). *Legitimization Crisis.* Boston: Beacon Press.

Habermas, J. (1979). *Communication and the Evolution of Society.* Boston: Beacon Press.

Habermas, J. (1987). *Knowledge and Human Interests.* Cambridge: Polity Press.

Hackman J. R. & Oldham G. R. (1980). *Work Redesign.* Massachusetts: Addison-Wesley.

Hammer, M. & Champy, J. (1993). *Reengineering the Corporation.* New York: Harper Collins Publishers.

Hammersley, M. (1989). *The Dilemma of Qualitative Method: Herbert Blumer and the Chicago Tradition.* London: Routledge.

Handy, C. (1990). *The Age of Unreason.* Boston, Mass: Harvard Business School Press.

Hill, S. (1991). 'Why Quality Circles failed but Total Quality Management Might Succeed.' *British Journal of Industrial Relations,* 29/4: 543-568.

Hofstede, G. (1984). *Culture's Consequences: International Differences in Work-Related Values.* New bury Park, Cal: Sage Publications.

Hofstede, G. (1994). *Cultures and Organizations: Software of the Mind.* London: HarperCollins.

Homans, G. (1950). *The Human Group.* New York: Harcourt, Brace and World.

Hoover, T. (1977). *Zen Culture.* London: Arkana.

Hughes, T. P. (1987). 'The evolution of Large Technological Systems.' Bijker *et al.* (1987). *The Social Construction of Technological Systems.* Cambridge, Mass: The MIT Press.

Hutchins, D. (1985). *Quality Circles Handbook.* London: Pitmans.

Imai, M. (1986). *Kaizen: The Key to Japan's Competitive Success.* New York: McGraw-Hill, Inc.

Ishikawa, K. ed. (1981). *Kanrigijutsu no Pokettojiten* [Pocket glossary of control technology]. Tokyo: Nikkagiren.

Ishikawa, K. [translated by Lu, D. J.] (1985). *What is Total Quality Control? The Japanese Way.* New Jersey: Prentice-Hall, Inc.

Jackson, M. C. (1992). *Systems Methodology for the Management Sciences.* New York: Plenum Press.

Jick, T. (1979). 'Mixing Qualitative and Quantitative methods: Triangulation in Action.' *Administrative Science Quarterly,* 24, 602-611.

Johansson, H. J., McHugh, P., Pendlebury, A. J. & Wheeler, W. A. (1993). *Business Process Reengineering: Breakpoint Strategies for Market Dominance.* Chicester: John Wiley & Sons.

Judd, C. M., Smith E. R., & Kidder, L. H. (1991). *Research Methods in Social Relations.* 6th edition. Florida: Holt, Rinehart and Winston, Inc.

Juran, J. M. (1980). *Quality Planning and Analysis.* New York: McGraw-Hill, Inc.

Juran, J. M. (1988). *On Planning for Quality.* England: Colliers Macmillan.

Kanter, R. M. (1984). *The Change Masters: Innovation and Entrepreneurship in the American Corporation.* New York: Simon & Schuster.

Kaplan, R. M. (1987). *Basic Statistics for the Behavioral Sciences.* Boston, Mass.: Allyn and Bacon.

Karatsu, H. & Ikeda, T. (1987). *Mastering the tools of QC: learning through diagrams and Illustrations.* [translated by G. Lima] Tokyo: PHP Institute, Inc.

Kast, F. E. & Rosenweig, J. E. (1973). *Organization and Management: A Systems and Contingency Approach.* New York: McGraw Hill, Inc.

Katz, D. & Kahn, R. L. (1978). *The Social Psychology of Organizations.* 2nd edition. New York: Wiley.

Keat, R. & Urry, J. (1975). *Social Theory as Science.* London: Routledge & Kegan Paul.

Kepner, C. H. & Tregoe, B. B. (1979). *The Rational Manager: A Systematic Approach to Problem Solving and Decision Making*. Princton: Kepner-Tregoe Inc.

Kirk, J. & Miller, M. L. (1986). *Reliability and Validity in Qualitative Research.* Beverly Hills, California: Sage Publications.

Kishimoto, H. (1967). 'Some Japanese Cultural traits and Religions.' Moore, C. A. ed. *The Japanese Mind: Essentials of Japanese Philosophy and Culture.* Honolulu: University of Hawaii, East-West Centre.

Kochan, T. A. & McKersie, R. B. (1990). *Human Resources, Organizational Governance and Public Policy: Lessons from a Decade of Experimentation.* Massachusetts Institute of Technology, Working Paper No. 3184-90-BPS.

Kuhn, Thomas S. (1970).*The Structure of Scientific Revolutions.* 2nd edition. Chicago: University of Chicago Press.

Lawler, E. & Mohrman, S. (1985). Quality Circles After the Fad.' *Harvard Buisness Review,* Jan-Feb: 65-71.

Lee, A. S. (1989). 'A Scientific Methodology for MIS Case Studies.' *MIS Quarterly,* March: 35-50.

Lee, A. (1991). 'Integrating Positivist and Interpretive Approaches to Organizational Research.' *Organizational Science,* 2/4: 342-365.

Lees, J. & Dale, B. G. (1990) 'The Development of Quality Circles'. Dale, B. G. & Plunkett, J. J. *Managing Quality.* Hertfordshire: Philip Allen.

Likert, R. (1961). *New Patterns of Management.* New York: McGraw Hill, Inc.

Likert, R. (1967). *The Human Organization.* New York: McGraw Hill Inc.

Likert, R. (1967). *New Patterns of Management.* [Japanese edition] Tokyo: McGraw Hill/Kogakusha.

Lillrank, P. & Kano, N. (1989). *Continuous Improvement: Quality Control Circles in Japanese Industry.* Ann Arbor: The University of Michigan, Center for Japanese Studies.

Lim, A. Y. (1985). 'Quality Control Circles: The Civil Service Experience.' *International Exposition of QC Circles 1985,* Singapore.

Lim, C. Y. & Associates. (1988). *Policy Options for the Singapore Economy.* Singapore: McGraw Hill.

Lincoln, J. R. and Kalleberg, A. L. (1990). *Culture, Control and Commitment : A study of work organization and work attitudes in the United States and Japan.* Cambridge: Cambridge University Press.

MacDonald, J. & Piggott, J. (1990). *Global Quality: The New Management Culture.* London: Mercury Books.

MacKenzie, Kenneth D. & House, R. (1978). 'Paradigm Development in the Social Sciences : A Proposed Research Strategy.' *Academy of Management Review,* January:7-23.

Markus, M. L. (1983). 'Power, Politics and MIS Implementation.' *Communications of the ACM,* 26:430-444.

Maslow, A. (1970). *Motivation and Personality.* 2nd edition. New York: Harper and Row.

Matsushita, K. (1984). *Not for Bread Alone: a Business Ethos, a Management Ethic.* Kyoto: PHP Institute, Inc.

Mayo, E. (1933). *The Human Problems of an Industrial Civilization.* New York: MacMillan.

McGregor, D. (1960). *The Human Side of Enterprise.* New York: McGraw-Hill Inc.

Miles, M. B. & Huberman, A. M. (1984). *Qualitative Data Analysis: A Sourcebook of New Methods.* Newbury Park, California: Sage Publications.

Ministry of Labour, Singapore. (1994). *1993 Singapore Yearbook of Labour Statistics.*

Ministry of Trade and Industry, Singapore. (1985). *Economic Survey of Singapore 1985.*

Ministry of Trade and Industry, Singapore. (1986a). *Economic Survey of Singapore 1986.*

Ministry of Trade and Industry, Singapore. (1986b). *Report of the Economic Committee - The Singapore Economy: New Directions.*

Mintzberg, H. (1979). 'An Emerging Strategy of Direct Research.' *Administrative Science Quarterly,* December 1979, 24: 582-589.

Mintzberg, H. (1983). *Power In and Around Organizations.* Englewood Cliffs, N.J.: Prentice-Hall Inc.

Miyamoto, S. (1967). 'The Relation of Philosophical Theory to Practical Affairs in Japan.' 'Moore, C. A. ed. *The Japanese Mind: Essentials of Japanese Philosophy and Culture.* Honolulu: University of Hawaii, East-West Centre.

Mizuno, S. (1988). *Company-wide Total Quality Control..* Tokyo: Asian Productivity Organization.

Moore, C. A. ed. (1967). *The Japanese Mind: Essentials of Japanese Philosophy and Culture.* Honolulu: University of Hawaii Press.

Morgan, G. (1980). Paradigms, Metaphors, and Puzzle Solving in Organization Theory.' *Administrative Science Quarterly,* 25: 605-621.

Morgan, G. ed. (1983). *Beyond Method: Strategies for Social Research.* California: Sage Publications.

Morgan, G. (1986). *Images of Organizations.* California: Sage Publications.

Mumby, D. K. (1988). *Communication and Power in Organizations: Discourse, Ideology and Domination.* Norwood, NJ: Ablex.

National Productivity Board, Singapore. (1981). *Report of the Committee on Productivity.*

National Productivity Board, Singapore. (1983). *QCC Survey 1983.*

National Productivity Board, Singapore. (1984). *QCC Annual 1984.*

National Productivity Board, Singapore. (1985a). *QCC Annual 1985.*

National Productivity Board, Singapore. (1985b).*Towards Better Labour-Management Relations - An Action Plan.*

National Productivity Board, Singapore. (1986). *Report of the Committee on Productivity in the Manufacturing Sector (1985).*

National Productivity Board, Singapore. (1987a). *Productivity Survey of Singapore 1987.*

National Productivity Board, Singapore. (1987b). *Survey on Quality Control Circles 1987.*

National Productivity Board, Singapore. (1988). *QCC Annual 1988.*

National Productivity Board, Singapore. (1990a). *Report of QCC Study Mission to Japan 1990.*

National Productivity Board, Singapore. (1990b). *Productivity 2000.*

National Productivity Board, Singapore. (1990c). *QCC Annual 1990.*

National Productivity Board, Singapore. (1991). *The First 10 Years of the Productivity Movement in Singapore: A Review.*

National Productivity Board, Singapore. (1992a). *QCC Annual, 1992.*

National Productivity Board, Singapore. (1993a). *Productivity Statement : 1993.*

National Productivity Board, Singapore. (1993b). *Activist News Flash Jan 1993.*

National Productivity Board, Singapore. (1993c). *QCC Annual 1993.*

National Productivity Board, Singapore. (1993d). *Productivity Digest, August 1993.*

National Productivity Board, Singapore. (1993e). *Productivity Digest, September 1993.*

National Productivity Board, Singapore. (1994). *Productivity Digest, March 1994.*

National Trade Union Congress, Singapore. (1993). *Building the Quality Bridge.*

Ng, N. (1990). 'The implementation of Work Improvement Teams in the Singapore Civil Service' Foo, C. T. & Chan, C. H. eds. *Productivity in Transition,* Singapore: McGraw-Hill.

Pearson, E. S. (1935). *The Application of Statistical Methods of Industrial Standardization and Quality Control.* British Standards Institution, No. 600.

Oakland, J. S. (1993).*Total Quality Management.* 2nd edition. Oxford: Butterworth-Heinemann Ltd.

Oliga, J. C. (1988). 'Methodological Foundations of Systems Methodologies.' Systems Practice, 1.

Onglatco, M. L. U. (1988). *Japanese Quality Control Circles: Features, Effects and Problems.* Tokyo: Asian Productivity Organization.

Olikowski, W. J. (1992). 'The Duality of Technology: Rethinking the Concept of Technology in Organizations.' *Organization Science*, 3/3:398-427

Olikowski, W. & Baroudi J. J. (1991). 'Studying Information technology in Organizations: Research Approaches and Assumptions' *Information Systems Research,* 2/1.

Olikowski, W. J. & Robey, D. (1991). 'Information Technology and the Structuring of Organizations.' *Information Systems Research,* 2/ 2.

Reps, P. (1961). *Zen Flesh, Zen Bones: A Collection of Zen and Pre-Zen Writings.* Anchor Books.

Robbins, S. P. (1990). *Organization Theory: Structure, Designs and Applications.* 3rd Edition. New Jersey: Prentice Hall International, Inc.

Selznick, P. (1948). 'Foundations of the Theory of Organization.' Shafritz J.M. & Ott, J.S. eds. (1987). *Classics of Organization Theory.* 2nd Edition. Pacific Grove, California: Brooks/Cole Publishing Co.

Senge, P. M. (1990). *The Fifth Discipline: The Art & Practice of The Learning Organization.* New York: Doubleday.

Shewhart, W. A. (1931). *Economic Control of Quality of Manufactured Product.* Van Nostrand.

Shibagaki, K., Trevor, M. & Abo, T. eds. (1991). *Japanese and European Management: Their International Adaptability.* Tokyo: University of Tokyo Press.

Simon, H. (1960). *The New Science of Management Decisions.* New York: Harper & Row.

Steffy, B. D. & Grimes, A. J. (1992). 'Personnel/Organizational Psychology: A critique of the Discipline.' Alvesson M. & Willmott H. eds. (1992). *Critical Management Studies.* London: Sage Publications.

Strauss, A. L. (1987). *Qualitative Analysis for Social Scientists.* Cambridge: Cambridge University Press.

Swerdlow, N. M. (1993). 'Science and Humanism in the Renaissance: Regiomontanous's Oration on the Dignity and Utility of the Mathematical Sciences.' Horwich, P. ed. *World Changes: Thomas Kuhn and the Nature of Science.* Cambridge, Massachusetts: MIT Press.

Trist, E. A. & Bamforth, K. W. (1951). 'Some Social and Psychological Consequences of the Longwall Method of Coal Getting.' *Human Relations*, 1951, Vol 4, No.1.

Tsoukas, H. (1989) 'The Validity of Idiographic Research Explanations.' *Academy of Business Review.* 14/4: 551-561.

Tyabji, A. (1987). 'The economy.' Quah, J. S. T., Chan, H. C. & Seah, C. M. eds. *Government and Politics of Singapore.* Singapore: Oxford University Press.

Van Maanen, J. (1979).'Reclaiming Qualitative Methods for Organizational Research: A Preface.' *Administrative Science Quarterly,* 24:520-526.

Van Maanen, J., Dabbs, J. M., Jr., & Faulkner, R. R. (1982). *Varieties of Qualitative Research.* California: Sage Publications.

Watanabe, S. (1991). 'The Japanese quality control circle: Why it works.' *International Labour Review,* 130/1: 57-79.

Wee, B. G. (1988). 'The impact of technological change on labour relations in Singapore in the 1980s.' *Proceedings of the Asean Symposium on Technological Change and Labour Relations,* Singapore, 26-29 July 1988.

Wood, R., Hull, F. & Azumi, K. (1983). 'Evaluating Quality Circles: The American Application.' *California Management Review,* XXVI /1: 37-53.

Yin, R. K. (1989). *Case Study Research: Designs and Methods.* Newbury Park, CA: Sage Publications.

Yukawa, H. (1967). 'Modern Trends of Western Civilization and Cultural Peculiarities in Japan.' Moore, C. A, ed. *The Japanese Mind.*

Newspapers, Newsletters and news magazines

'Aeco' Newsletter, July 1993.

'Repco' Newsletter, Jan-Feb 1994.

Business Times, 25 August 1994.

Businessweek, 31 October 1994.

Quality Asia, December 91-March 92

Straits Times, 2 March 1992.

Straits Times, 13 April 1992.

Straits Times, 1 May 1992.

Straits Times, 9 December 1994.

Unpublished sources:

National Productivity Board, Singapore. 'The Singapore Productivity Movement.' *NPB Productivity Management Module* 1993 (Training material).

National Productivity Board, Singapore. *1992 Survey of QCCs* .