Quality and Continuous Improvement: The Organizational and Strategic Significance of Japanese Quality Control Circles

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QUALITY AND CONTINUOUS IMPROVEMENT — THE ORGANIZATIONAL AND STRATEGIC SIGNIFICANCE OF JAPANESE QUALITY CONTROL CIRCLES

Administrative Studies, Vol. 7(1988): 4, 241—251

Flexibility and adaptability have been significant features of the post-war Japanese economic development. Quality improvement and institutional arrangements such as Quality Control Circles (QCC) are discussed as an aspect of corporate-level flexibility.

Quality was the most important strategic concern for Japanese manufacturing companies in the post-war period. To support quality improvement, systematic efforts were made to educate workers to be able to inspect the results of their work by themselves, and subsequently become capable of improving product and process quality. The major social vehicle for this was the QCC.

The organizational essence of QCC activities is that they form a hybrid parallel organization that works for the goals of the formal organization but is autonomous from ordinary line control and internally resembles workers' informal organizations. Such and organization was developed in order to integrate maintenance and improvement, dependable and spontaneous behavior that in traditional organizations have been regarded as incompatible on workers' level.

Keywords: Japanese economic development, Quality Control Circles

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Saap. 19. 8. 1988
Hyv. 21. 10. 1988

1. INTRODUCTION: THE JAPANESE SUCCESS IN OVERCOMING CRISES

The progress of the post-war Japanese economic miracle has not been smooth sailing. Rather it has been rough going from crisis to crisis. As soon as the Japanese economy had recovered from the war by the late 1950's, it faced market liberalization as a condition of for joining the OECD and the advanced nations' club. Japanese companies responded with capital investments and quality improvements to emerge from the crisis as budding global competitors. The first oil in 1973 caused a panic in the oil import dependent economy and for the first time since the war negative economic growth was registered in 1974. The Japanese responded with massive investments in energy conservation and emerged from the second oil crisis as an economic superpower, admired for its Japanese style management which only a decade earlier had been regarded as feudal and outmoded. The success bred new problems in the form of trade frictions with the West. The Plaza agreement in November 1985 sent the yen soaring from 246 to 125 against the dollar in less than two years. For a time it seemed that the Japanese miracle was over, but in the latter half of 1987 the Japanese economy again showed double-digit growth figures for the first time in over ten years and registered a 9.2% increase in industrial output without any major increase in labor input (Sanwa Economic Letter 1988).

The ability of Japanese industries to very rapidly adjust themselves to changing conditions has a number of explanations: an industrial policy put together by the powerful Ministry of International Trade and Industry (MITI); aggressive targetting of growth industries; financial arrangements that enabling Japanese companies to take a long-term view; and cultural explanations such as the loyalty and commitment

of the Japanese workforce (for the recent discussion, see Prestowitz 1988, Dore 1986 and 1987).

The explanations are complex with no single factor offering a complete account. It is apparent, however, that the ability to quickly react to changing conditions must be present at both macro and micro levels. The purpose of this paper is to examine the concepts of continuous improvement, quality, and the related administrative mechanisms that have contributed to this remarkable flexibility on the corporate level.

2. QUALITY AND THE STRATEGIES OF JAPANESE INDUSTRIES

The strategic constants of the Japanese economy, as determined by geography, are based on the fact that Japan has no significant natural resources. In the post-war period the conclusion has been that the economy must be export-driven. In order to export, Japan has had to rely on its only abundant resource: a well-educated, hard-working people. It is no coincidence therefore that the core of Japanese style management is human resources management (Abegglen 1975).

On the crowded Japanese islands domestic competition is very harsh. Because of the existence of industrial groups, rather common cartelization, price fixing and relational contracting, competition has not always been on price. Quality, delivery, after-service and the »sincerity» of long-term supplier relations have been equally important (Dore 1987).

On a macro-level the post-war industrial policy took a conscious step away from the most »reasonable» option of concentrating on labor-intensive light industries that could have utilized abundant cheap labor, but would have doomed the population into an »Asian pattern of poverty» (Abegglen & Stalk 1985). Instead, government planners embarked on long-term investment programs in heavy and chemical industries that created the foundation for the current economy (Uchino 1983). Thus the most significant macro-economic development has been a long-term strategy to achieve the merits of scale in basic industries. This has been followed by the aggressive targetting of certain industries. This has been followed by the aggressive targetting of certain industries considered strategically important such as automobiles, machine tools and integrated circuits (see Johnson 1982, Prestowitz 1988).

Quality is perhaps the most significant concept in post-war micro-level Japanese development. Historically, the modern Japanese concept of quality is closely connected with the post-war Japanese life-line of exports. Quality was the condition for both survival and future prosperity. Without quality products the Japanese could not hope to export, without export earnings there would be no cash to buy food for a hungry nation. The realization that »Made in Japan» was equivalent to »cheap and shoddy» meant that without drastic changes Japan would be doomed to third world status for a long time to come. The improvement of quality summed up the essence of the corporate policies pursued.

The first consideration was to reduce the number of defective products and to create a production system that could produce to specifications. Consequently, the early definitions of quality were manufacturing based with conformance to specifications being the most important indicator to watch and the first methods of quality control being inspection and statistical quality control (SQC).

As technologies developed and competition grew in an economy that slowly had changed from sellers' to buyers' market, the question of proper specifications arose: it was not enough to get the product out of the factory without defects; the product had to perform in the field as expected and not cause troubles to the users. As reliability became the new measure of quality, and the emphasis shifted from manufacturing based to product based definitions of quality. Product performance became the new indicator to watch. Now the principal method of quality control became workers' self-inspection and the building of quality into the production process, as exemplified by the slogan »Do it right the first time». The main economic reason was that the competitive advantage of Japanese leading industries had shifted from cheap labor to mass production and the economies of scale. An increase in the number of inspectors would simply have been uneconomical. Process control became the main tool of quality control, and the Plan-Do-Check-Action (PDCA) management control cycle became the leading catchword.

After this the question arose of what users really want to buy. The answer »products that

satisfy the customer» became the new leading principle of Japanese quality control. Product and manufacturing based definitions of quality were complemented with an user based view of quality, where customer satisfaction is the main indicator to watch. The development of the concept of »Quality Deployment», signifyies that not only manufacturing, but also R & D, Engineering and Marketing departments should be involved in the definition of what customers consider high quality and its design into the product. For companies that manufacture products based on copied ideas, the quality of manufacturing, i.e. the adherence to product standards and specifications, is the most important consideration. As a firm becomes the market leader it cannot rely on others for product ideas but has to develop new concepts. Thus the quality of design and the quality of new product development become the most important concerns (Yoneyama 1979, Ishikawa 1985, Kogure 1988). The development of Japanese quality control is summarized in Figure 1.

The change from a sellers' market with a »product-out» philosophy meaning that anything produced can be sold to a buyers' market with a »market-in» philosophy meaning that demands from the market must come into the production and design process has led to a number of changes in competition. The competitive edge that used to be mainly one of cost has shifted to quality in many product categories. After high product quality and reliability become matters of »must-be quality» (Kano

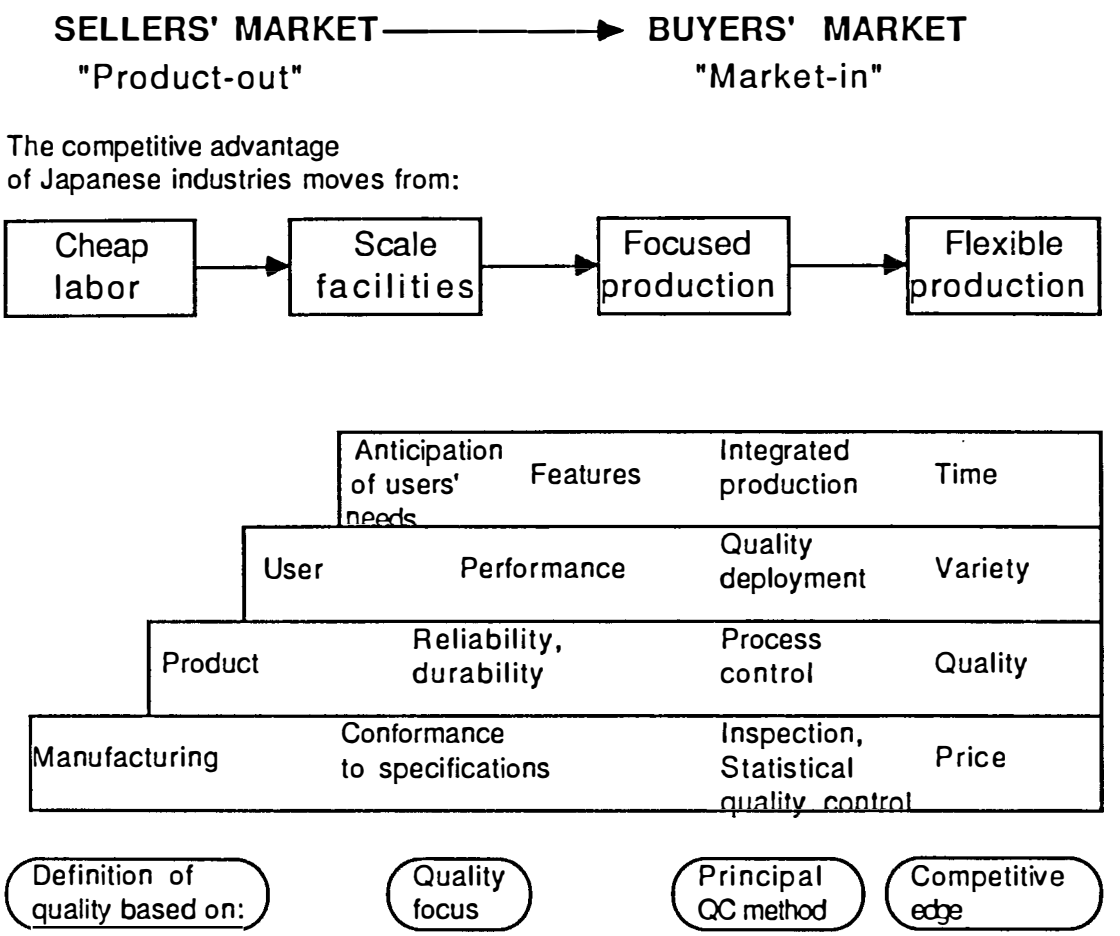

Figure 1: The Development of Japanese Quality Control.

1984) the competitive edge may shift to product variety, i.e. an abundance of versions, accessories and tailor-made products, with quick delivery and response time becoming increasingly important. »Time-based competition» becomes the new catch-word with the time it takes to respond to a customer order or to design, manufacture and deliver a new product becoming a management indicator of equal importance as cost or quality (Stalk 1988).

It should be noted that the effects of the application of these concepts are accumulative and do not exclude each other. Quality can become the competitive edge only if it can be produced within reasonable costs. In a similar manner, variety and response time will hardly become the leading edge if quality is not sufficiently assured.

Quality control has received much more attention from the top management in Japanese companies than in most Western firms (Ikezawa & al. 1983). The major reason is that quality and other operational aspects of management have been treated as strategically significant matters. Japanese thinking about strategy has been operations-oriented (Okumura 1986). Until very recently, the Japanese have not been very good at taking completely new courses of action but have been content to follow the lead of Western firms and concentrate on doing a little better and cheaper what has been done before. In the process the Japanese have discovered management techniques that seem to be applicable even in Japanese manufacturing operations in the West (Morita 1987, Ohmae 1987, Karatsu 1984).

There are a number of Japanese institutional arrangements that enable corporations to concentrate efforts and resources on operational effectiveness or in other words on the fundamentals of business (Peters & Waterman 1982). Shareholding is usually long-term and stable and debt is more common than equity financing. These are no nervous shareholders demanding quarterly profits, no take-over artists lurking ready to gobble upp troubled companies. The absence of casino capitalism in Japan enables managers to concentrate on fundamentals (Uchino 1983). Many Japanese companies have a »bias for growth» (Abegglen & Stalk 1985) so that they tend to invest in both physical and human resources well ahead of demand and to use times of downturn for retooling and improving their operations.

The concern for quality and the continuous improvement of operations has had three major consequences. Firstly, the emphasis on the building of quality into the production process led, probably quite unintentionally, to the discovery of the new competitive advantages of product variety and delivery time that were in accord with increasingly affluent customers. Since the days of Frederick Taylor and Henry Ford, the fundamental logic of production has dictated a trade-off between unit cost and product variety. The development of process control led to the discovery that this trade-off can be bypassed and that a flexible production system can produce a large number of models and versions without losing the cost-merits of mass production. Toyota's now famous *Kanban* system and Just-in-time (JIT) inventory management system was a pioneer in this field.

Secondly, the pursuit of JIT, the aim of which is to reduce the capital costs of Work-in-process (WIP) inventories, exposed a lot of problems in process control that could be tackled with the organizational arrangements for quality improvement such as QCCs (Quality Control Circles), and further speeded up the improvement process (Schonberger 1982, 1984). Little by little this led, to the total control of even the smallest aspects of production processes and the development of explicit algorithms, which built a basis for computer integrated manufacturing (CIM) and unmanned factories. The case of Toyota illustrates how the ability to continuously improve and to gain control over the production process through the use of ordinary technology leads to competitive advantages and builds the basis for automation. Nissan, which tried to solve its problems by throwing in flashy new technology too soon, has been continuously outperformed by Toyota (Cusumano 1984).

The third consequence is connected with the building of a permanent institution for continuous improvement. The flow of operations can be thought of as a value chain (Porter 1980) consisting of the flow of physical things (raw materials, sub-assemblies, parts) in parallel with the flow of information on how and when to process the material (specifications, schedules, orders). The permanent institution of improvement which includes all the people who plan or operate these two flows constitutes a third parallel flow aimed at continuously improving both of the other flows. The most widely known and systematized institution is the QC circle.

3. ORGANIZATION FOR QUALITY AND FLEXIBILITY

3.1. TQC, Japanese Quality Control

The broad definition of quality implies that Japanese quality control is not an engineering speciality but a management concept. The Japanese use of the term »quality» *(hinshitsu)* comes close to the term »excellence» (Peters & Waterman 1982). This is systematized under the concept Total Quality Control (TQC), which signifies a management philosophy with quality as its core. TQC comprises a number of key elements.

Company-wide activity. Quality is a matter of all echelons and all functions in a company, vertically from the top management down to the shop floor and horizontally from desing and manufacturing to marketing and after service.

All employee participation. All employees are expected to participate in the quality effort. Various organizational vehicles are devised to this end: QC circles for the shopfloor, and quality committees and project teams for specialists and white-collar employees.

QC audit. Top management performs regular QC audits inspecting the quality of operations at various levels, emphasizing that quality performance is a key criteria in management appraisal.

Use of data and statistical methods. All quality improvement should be based on facts about the current state of affairs and defectives, which are compared to ideal states. The difference between current and ideal states of affairs constitutes a problem that should be solved.

QC training and education. All employees are given extensive training in QC methods and principles.

National quality movement. The Union of Japanese Scientists and Engineers (JUSE) coordinates a national movement and provides education, literature and discussion forums, where companies can learn from each other. Quality management is considered an »invisible asset» (Itami 1984) that must be painstakingly developed in each company and cannot be simply copied so that even competitors companies openly discuss quality matters (see Ishikawa 1985, Kogure 1988).

3.2. Definition of QCC Activities

The scope of QC circles is limited to a rather small part of the total quality efforts and problems of a company. Production workers and foremen are not responsible for more than 10 to 20% of all quality problems (Juran 1980). The significance of QCC, however, does not lie in the direct results from the activity, but rather in systematizing a form of participation, job enrichment and a permanent institution for continuous improvement.

The authoritative definition of Japanese QC circles is given in the *QC Circle Koryo* (1980). The defining principles can be grouped into those defining the content and the organizational form of the activity.

The content of QCC is systematic and rigorous (1) quality improvement (2) using statistical methods and data with the purpose (3) of managing and improving the workshop, while (4) informing and educating its members in matters of quality and work and social skills.

The form is a (5) small group of employees (6) from the same workshop that (7) operates on a voluntary basis and (8) as a part of a company-wide quality effort, (9) working continuously, and (10) involving everybody in the workshop.

Functionally, QC circles are part of a company- and nation-wide movement for quality improvement. Structurally, they are permanent small groups attached to the smallest units of an organization. The QCC activity is supported by a promotion organization comprised of secretariats and coordinators on various levels that provide the circles with education and training, arrange department- and company-wide QCC presentation conferences, suggest ideas about what kind of themes to work with, and screen the improvement proposals made by the circles. QCCs in Japanese companies are not a stand-alone program, but integrated into a total quality effort and supported and guided by management. In this respect Japanese Quality Control Circles are different from Western Quality Circles which often consist of more casual approaches to one-time quality improvements.

3.3 The Organizational Nature of QCC

From the point of view of ordinary logic, the *Koryo* definition of QCCs according to which the activity is voluntary but everybody has to participate is built upon an apparent contradiction, that involves the development of a new form of organization: I have described it as as a hybrid parallel organization for the improve-

ment and maintenance of workshop standards (Lillrank 1988).

This new form of organization has emerged as a solution to two fundamental dilemmas:

1) QCC activity has to be systematic and rigorous, using QC methods and problem solving tools. In other words, »dependable behavior». At the same time QCC activity is supposed to be voluntary, drawing on the ideas and local expertise of workers. In other words, »spontaneous and innovative behavior» (Katz & Kahn 1978).

2) QCC members have to simultaneously maintain and improve workshop standards. The QCC activity is undertaken by employees whose main task is to do normal routine work, that is to say to follow rules and maintain established work standards. The problem is how to make sure that ordinary work is done and performance standards are maintained while these standards are continuously improved. These fundamentally different organizational functions require distinctive mind-sets, as illustrated in Figure 2.

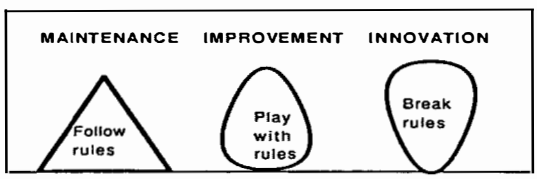

Figure 2. Maintenance, Improvement and Innovation.

Maintenance requires thoroughness, obedience and compliance to rules. It is like a triangle standing steadily on its base. Improvement requires playing and tinkering with the very same rules, and the constant questioning of why rules are followed and of what would happen if they were changed. Innovation goes a step further and often requires the radical breaking of rules.

The various behavioral requirements of QC circle activities can be summarized as in Figure 3.

What kind of organization and management can handle such a wide range of requirements? Traditionally, in classical organization theory and Scientific management, this question has been answered by assigning the maintenance and improvement functions to different categories of people because many managers are afraid that improvement and innovation may loosen discipline and harm the performance of required tasks. Improvement is the task of managers and staff specialists who, due to their training and competence, are supposed to be able to simultaneously handle these two functions. As a consequence, the improvement and enthusiasm potential of workers is lost.

	DEPENDABLE BEHAVIOR "FOLLOW RULES"	SPONTANEOUS AND INNOVATIVE BEHAVIOR "PLAY WITH RULES"
MAINTENANCE	Follow new rules and standards	Identify problems while performing ordinary work -> problem consciousness
IMPROVEMENT	Test the ideas using data and systematic methods (7 tools). Develop new rules and standards.	Find new ideas how to solve problems and improve operations.

Figure 3. The Behavioral Requirements of QCC Activities.

In order to utilize the hidden potential of workers and to assure that standards are not only maintained but improved, the QC circle is organized as a separate organization parallel to the ordinary formal organization, as illustrated in Figure 4.

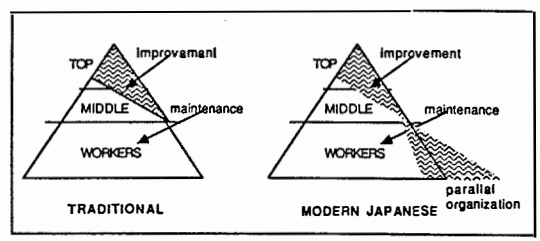

Figure 4. Traditional and Modern Solutions to the Maintenance Improvement Problem.

The organizational form that has emerged can be described as a hybrid organization incorporating elements both from the formal and the informal organizations. The QCC activity is highly organized, but not as a part of the formal structure. Instead, the improvement activity is established as an organization essentially outside and parallel to the formal organization, which at least on a short perspective is left intact. The hybrid parallel organization, which has a structure of its own, operates under rules and

principles different from the formal organization and incorporates aspects of the informal organization. The QCC members are able to set their own style, goals, pace of work, and to use methods typical of the informal organization such as group pressure. The QC circle constitutes an »autonomous island» close to the »mainland» of the formal organization. Thus, the meaning of the term »voluntary» as used in the *Koryo* is that QCC activity operates outside the line of command of the formal organization. This means that formal orders, authority relations and rewards and punishments do not apply within the parallel structure. Management has to rely on the internal motivation of workers being supported by example, enthusiasm and encouragement.

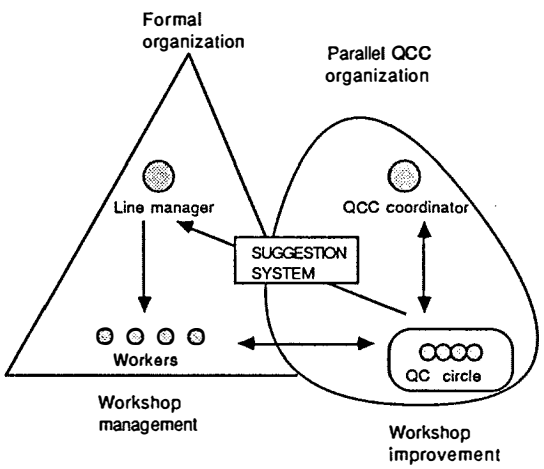

Figure 5. The Suggestion System and QCC.

The function of the suggestion system, as shown in Figure 5, clarifies the process flow of QCC activities. Within the formal structure, the relationship between managers and workers is based on formal authority and the necessities of the production system. The daily work has to be done, schedules kept and standards maintained. Therefore it is not easy to incorporate improvement activities in this setting. The improvement ideals that occur to workers while doing their job in the formal organization may be »ad hoc» random ideas which might be impossible to implement. Inexperienced suggestion makers often tackle problems for which they have insufficient competence. The two most common mistakes are to forget to consider the possible system consequences of a small change in a complicated production process, and to propose solutions that simply would cost too much.

To overcome these difficulties QC circles are established outside the formal organization. The line manager has the role of the coordinator of the QCCs. Within the parallel organization the relationship between QC circle members and their manager is not of a superior and a subordinate but rather of a coach and a performer. In the QC circle the employees can work on themes that might have originated as *ad hoc* ideas, but here they go through a systematic procedure in which the ideas are refined and tested.

After a theme has been completed, it is written on a suggestion form and submitted to the suggestion system at which point it crosses the boundary between the parallel QCC organization and the formal organization. As the parallel organization is separated from the formal line of command, decisions concerning suggested changes the formal structure and standards cannot be made by the parallel organization. The suggestion must be finally evaluated by line managers in their formal capacity. If it is accepted, it will be made a part of the rules and standards of the formal organization. Thus an idea that originated among workers now becomes a part of their formal work standards, and the line management is responsible for enforcing it.

The loop from the formal organization to the QCC Organization and from there via the suggestion system back to the formal organization is devised in order to ensure the quality and feasibility of ideas and suggestions. This provides a bottom-up channel for the flow of initiative from workers to management. The essential point is that the channel is formalized, eliminating much of the interpersonal randomness and uncertainty that otherwise might inhibit communication. In other words, a suggestion that comes through this system has much more clout than a direct suggestion; by going through ali the formalities, the workers can get the management's ear more easily than directly during the daily work.

The two-way communication link between the QC circle and the QCC coordinator constitues the top-down flow of guidance from management to the circle. Use of this channel management can help inform the circles of pressing quality problems and corporate targets and provide other information that may

help the circle to see their efforts as a part of a larger whole.

3.4 How to Manage the Parallel Organization

The above conceptual description of Japanese QC circles is an ideal model. The actual practice and results vary from company to company. In a survey of 20 Japanese companies (Lillrank 1988), three management points were found to be essential for a successful QCC activity.

1) *Proper guidance on the workshop-level.* In Japanese companies a style of very close guidance of the circle work produces the best results.

2) *Interface.* The single most important arrangement that differentiated the successful companies from the less successful ones was the management of the suggestion system interface. The key issue was whether there was a time limit for giving feedback to the circles about their suggestions. Workshops where there were clear rules that management must give an answer to a circle within a fixed time clearly outperformed workshops without such rules in both the quality and quantity of circle activity. The length of the time was of no consequence (for details see Lillrank 1988, 141—146).

3) *Top support.* QCC must be seen as a part of the improvement of the total value added chain in a company. If not, its value is reduced to that of minor, incremental improvements. Although QCC activity is voluntary and dependent on the internal motivation that arises from the joy of problem solving, the activity also has a tedious aspect of rigorous problem definition, data collection and analysis, which may be frustrating. For this reason countinuous management support Is necessary in order to keep the activity going. Large companies usually have a director-level manager overseeing the activity, supported by a promotion secretariat with several middle-level executives spending all their time on QCCs. On the shopfloor the average QCC coordinator in the above mentioned survey (Lillrank 1988, 96) spent 9.4 hours a month guiding about 4 circles.

In spite of massive support for QCC activities, they are not uniformly active. The common wisdom among Japanese QC managers has it that one third of the circles are permanently active, one third are active sometimes, and one third exist only on paper.

4. QCC AND JAPANESE MANAGEMENT

The above discussion makes it possible to examine the question »What is Japanese in the QCC activity» from a new perspective. The content of the QCC activity is directly influenced by the logic of modern industrial production which calls for the involvement of all employees in building quality into the production process and the establishment of institutions to assure continuous improvement and flexibility. The Japanese ability to capture and implement the most advanced ideas, such as workers' self inspection, continuous improvement, the building of quality into the production process, just-in-time inventory management and time-based competition can be explaine simply by the fact that Japan is a latecomer in industrial development. The Second World War was a breaking point which showed much of the old management systems to be obsolete and brought a new generation of managers to the helm. Thus Japan could start its post-war industrial expansion without much of the traditional problems of adversary labor-management relations and Taylorian doctrines of industrial management. This situation allowed the Japanese to borrow selectively from Western countries and quickly »leap-frog» to the frontline of industrial development (Dore 1973). Consequently the content and function of QCC is not necessarily dependent on Japanese culture. The work of Kanter (1983, 1987) illustrates that continuous improvement and change can be institutionalized by using organizational arrangements that are different from the Japanese QCCs.

The social form of QCC, a small group based parallel organization, bears the marks of Japanese organizational practices and traditions, which becomes apparent when comparing Japanese Quality Control Circles to the Western applications, commonly called Quality Circles.

Lawler (1986) in his discussion about employee participation describes Quality Circles in the U.S. as a parallel structure that does not significantly affect rewards, knowledge, power and information flow. He argues that if a participative program does dot put these elements in place at the lower levels of an organization, there will be limited or no results (Lawler 1986, 43).

Employees as circle members enjoy problem solving, studying, and are given the opportunity to discuss and present their results to management, thus increasing their individual

skills and confidence. As the ordinary work and rewards thereof remain the same, a discrepancy develops between life in the circle and in ordinary work. Circle members may demand higher compensation for their newly acquired skills and more say in daily workshop matters. To the extent that management is not willing to respond to these demands, the circle program is bound for self-destruction; ironically, the more successful the QC program, the more likely it is to self-destruct (Lawler 1986).

The situation in Japan is rather different, as exemplified by the difference in name: Japanese QCCs are Quality *Control* Circles while in the Western versions the term »control» has been dropped as offensive. The term »control» *(kanri)* in Japanese comes close to the meaning of »management». QCCs are expected to contribute to the management and improvement of their workshops. Japanese Quality Control Circles are not primarily a participative mechanism. The main thrust of the program is to push quality control and continuous improvement to the lowest levels of an organization. The participative and human relations aspects were, in fact, discovered only in the late 1970's, when the »blue collar blues» became a serious problem in the U.S. auto industry and Japanese mass manufacturers feared that the same problem would also land on their shores. (Cole 1979).

Why Japanese QCCa as parallel organizations do not self-destruct to the same extent as those in the West? The answer can be outlined as follows.

First QCC are part of the total quality management effort and therefore receive a substantial input of management time, material resources, education and attention.

Second QCCs are allowed to influence the ordinary work. Although management prerogatives, and power and authority structures are not affected, changes are allowed in work procedures. Access to information improves substantially due to QCC activities.

Third the Japanese have the social capacity to accept parallel realities. There is no need for »I call a spade a spade» -type of uniformity of behavior across situations. Thus QCCs can exist as a separate reality without implying the need for changing the work environment. QCCs are seen mainly as an institution to contribute to the »enlargement of the pie», i.e., increase company profits. The question about how to »divide the pie» is handled by different institutions: labor-management joint consultation and the annual collective bargaining. Thus demands for more rewards, knowledge, power and information can be channeled through different institutions. The acceptance of separate social realities also leads to the earlier mentioned situation where a large number of the circles exist only as a matter of formality in compliance with management expectations. In more straightforward Western companies a voluntary activity that does not inspire or motivate people is simply allowed to die (for a detailed discussion, see Lillrank & Kano, in press).

Fourth, the Japanese corporate environment makes it possible to make employees participate in non-paid voluntary activities. Japanese workers can be asked to sacrifice their private time because Japan is still an authoritarian society: management expectations work, even without direct commands. The authority is backed by the fact that regular Japanese workers are paid monthly salaries and annual bonuses that reflect the company's performance. This kind of long-term systems reward tends to bring about a sense of fairness and diminish the demand for spot rewards of QCC activities. Further, seniority based salaries and a captive labor market inhibit labor mobility between companies, thus tying the fate of an individual to that of this company.

In spite of the popular myths about Japanese management and the loyalty and commitment of Japanese workers (see Pascle & Athos 1981, Vogel 1979, Ouchi 1981), comparative surveys have constantly failed to produce hard evidence to support the myth (see Cole 1979, Luthans, MacCaul & Dodd 1985, Lincoln & Kalleberg 1985, Ohmae 1987). Quite to the contrary, a recent survey by the All-Japan Federation of Electric Machine Workers' Union Reveals that American electric machine workers are more satisfied with their work and more loyal to their companies that their Japanese counterparts. Only 30% of the polled Japanese workers agreed with the statement »I want to put my best efforts toward the company's success», while 63% of the Americans agreed (JEJ 1988).

There is no reason to believe that Japanese culture explains the existence of QC circles or to believe that the Japanese QC managers have got a free ride on their culture. The evidence suggests that even though QCCs exist because management is convinced that they are necessary and is willing to make the necessary investments to support them, only roughly a third

of the employees are genuinely enthusiastic about the activity.

Rather than envying the Japanese for their QCCs and their work-oriented culture, the question could be put in another way: why have the Japanese opted for a rather cumbersome parallel organization? Couldn't quality control and improvement be handled in some other way? The major reasons are that when QC was introduced in the late fifties, the country was poor and could not afford to train cadres of QC specialists. It was considered more cost-efficient to involve everybody in the QC process. Furthermore, Japanese company structures and human relations allow a great deal of communication between levels in the hierarchy (Dore 1973) but the tone is still authoritarian. Within the ordinary company structure it was quite difficult to elicit any novel ideas from junior workers who were afraid of offending seniors who tend to dominate all discussions. For this reason it was essential to have the workers to engage in the activity by themselves in a peer group without the direct inference of line managers.

5. CONCLUSION

QC circles are not a stand-alone trick that works by itself. Rather, QCCs should be seen as an indication of the general concern for operational effectiveness, continuous improvement and the philosophy of regarding human resources as a key to achieve competitive advantage. Even though QCC activities are voluntary, they require a significant input of management effort in order to keep the activity going.

The long-term, systematic investment in establishing a parallel organization for continuous improvement certainly has paid off. Many Japanese companies now possess a though and flexible organization that can respond quickly to the new challenges brought by new technology and time-based competition. The accumulation of problem-solving techniques and knowhow enables employees to make more production control decisions on the factory floor thus speeding up product cycles.

In leading Japanese companies product quality has already advanced to the point where no further competitive advantage can be extracted from added improvement. The Japanese find themselves forced to aggressively pursue new advantages: computer-integrated manufacturing (CIM), time-based competition, design and R&D. The operations-oriented strategy of incremental improvement of existing systems has come to a crossroad and the Japanese are bound to go for more drastic innovations and breakthroughs. However, the Japanese example does show that small, increamental improvements, when accumulated, can lead to breakthroughs of enormous consequences. QC circles as a social institution may already be past their peak. But the lesson about the importance of continuous improvement is certainly valid even though in different cultures and changing environments new social forms may have to be invented for its support.

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