研究論文

A Historical Analysis of Japanese Manufacturing Management

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Abstract

The Manufacturing management practices such as JIT and TQM are widely recognized as major tools for creating a competitive organization, but too much emphasis has been placed upon the techniques themselves. It is not the management techniques that generate the source of strength; rather, it is a “communication and action” process for pushing these practices into a higher level creates a competitive and learning organization. This paper also examines the Japanese management practice by developing a 3-cycle management model, and discusses the invisible aspects of Japanese manufacturing organizations.

Key words: Japanese Manufacturing, JIT, TQM, Invisible side of Japanese management, 3-cycle model

Introduction

Japanese manufacturing organizations was widely reported that they are creating a new standard on the manufacturing management. During the 1980s, it seemed as though Japan was the only benchmark for manufacturing. Manufacturers around the world expressed great concern about falling behind the global benchmarks set by Japanese manufacturers. Emerging manufacturing concepts, such as just-in-time (JIT) manufacturing and total quality management (TQM), were widely accepted as the new manufacturing approach for creating competitive advantage. Japanese terms, such as Kaizen, Poka-yoke, and Kanban , even found their way into English manufacturing terminology.

Views about Japan, however, have changes drastically since then. Today, we are just likely to find the articles in the media reporting that the economic strength Japan enjoyed during the 1980s has languished as the bubble economy burst in early 1990s. Japanese researchers often argue that the source of the problem comes from structural deficiencies in the Japanese economic system, where the inefficient service sector is mixed with the relatively competitive manufacturing sector. Others argue that Japan can still be competitive because the manufacturing sector has not lost its competitiveness. While the overall Japanese economy may be struggling, many well-managed manufacturing companies such as Toyota, Honda, and Sony, still enjoy the high level of profits. Thus, despite the rather sluggish overall economy, many Japanese manufacturing firms still remain

competitive in the global marketplace.

For a manufacturing organization, the major competitive edge comes from two aspects of the products they sell. The first one is the ability to develop new products which customers' desire, and the second aspect is the ability to manufacture their products with high quality at competitive costs. The first aspect is concerned with the innovation of product development, and later is concerned with the innovation in manufacturing.

For the manufacturing aspect, management techniques such as JIT, TQM, Kaizen, and supplier networking can be regarded some forms of innovation in management. Another important aspect for manufacturing technologies was robotics, proprietary technology, and new process technology. Manufacturing organizations in Japan have been working on those two areas and have been continuously improving throughout 1960s and 1970s.

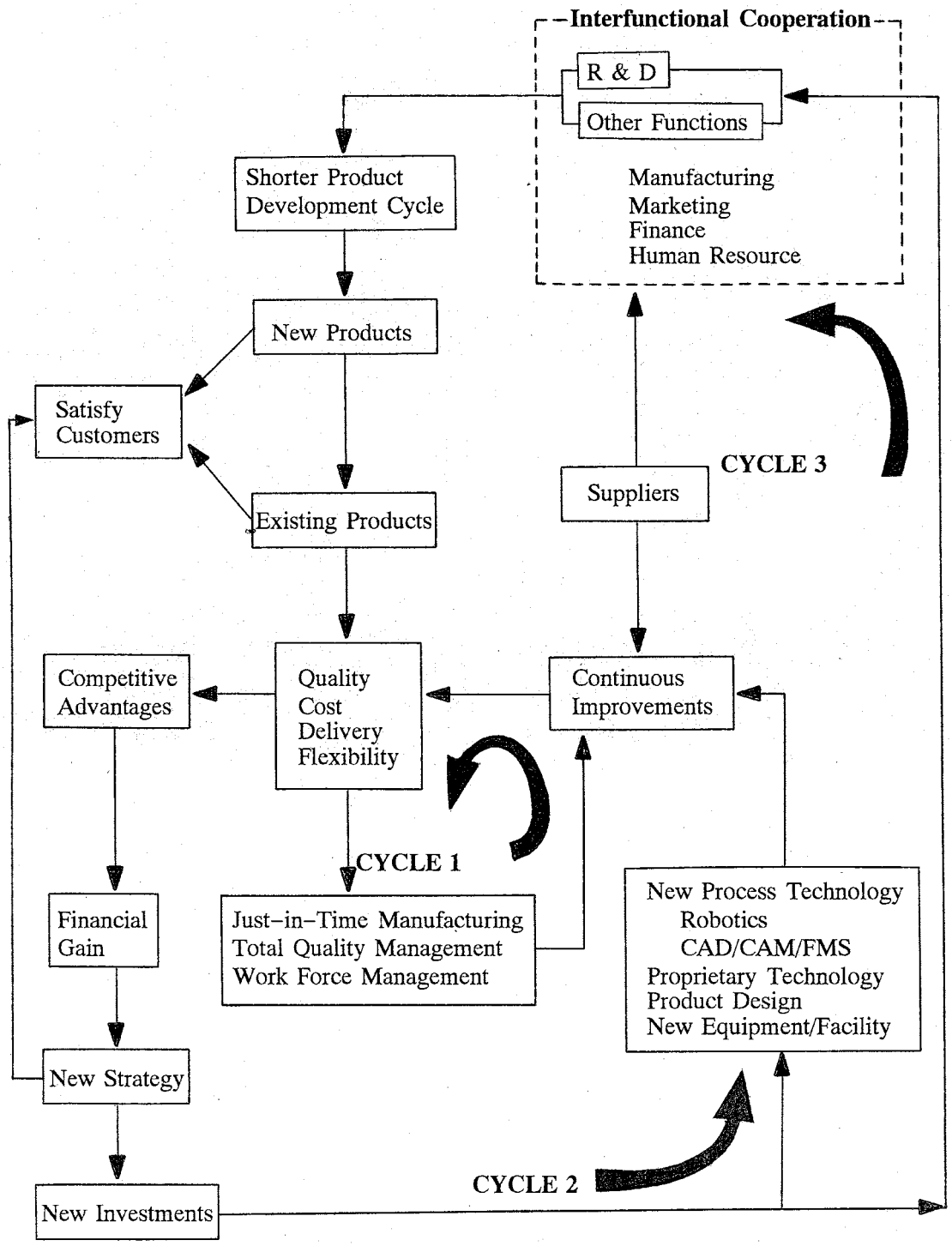
In the middle of the 1980s, however, a new wave of competition and drastic change rate forced them to compete under the condition where they can no longer make profits by solely working on quality and cost. Therefore, they started to seek a new frontier in product development. It was the 80s that many manufacturing organizations started to invest a sizable amount of money on research . R&D efforts up to this period tended to be focused more on manufacturing technology for improving quality and lowering cost, rather than for new product development. For the past fifty years, by developing a system which integrate these three steps, Japanese manufacturers have started to create a rather unique style by bringing different management approach into focus.

Historical development: A 3-cycle model.

The study of the development process for Japanese manufacturing organizations revealed that they built a manufacturing system based upon three steps or cycles (see Figure 1). The first cycles is management oriented practices such as JIT and TQM which many Japanese firms started in implement in the 1950s to 60s (Cycle 1). It took over twenty years for Japanese manufacturers to refine the techniques to the level they enjoy today. Along the way, many manufacturing organizations started to establish their own supplier networks. At the beginning, those suppliers were used simply as suppliers for parts, but were gradually assimilated into an integrated system for cost reduction and quality improvement. Furthermore, as Concurrent Engineering emerged as a new process for shorting the product development cycle, suppliers were again integrated as an important support source for product development.

By pushing JIT and TQM into a more workable level, coordinated activities through communication were developed within Japanese organizations. Along the way, Kaizen (continuous improvement) activities have been imbedded into its management system. This led manufacturing organizations to realize the importance of integration and synchronization of various aspects of manufacturing. It was in this stage that they started to sense that communication within and outside

Figure 1: Manufacturing Framework: A 3-Cycle Model



(suppliers) of the organization is the key factor for the successful implementation of any manufacturing systems. The foundation of communication based management style was developed through this process, and Kaizen activities played an important role for developing the communication network within the organization.

As Cycle 1 started to reach its maturity, many Japanese firms shifted their focus on process innovation in manufacturing (Cycle 2). It was during the 70s that a Japanese-English word called “Mechatoronics” was invented in Japan. This new word was created by combining two words: Mechanics (or Mechanical Engineering) and Electronics (computer technology). This result was the emergence of Robotics and other proprietary technologies in manufacturing during the 80s.

Another important feature related to manufacturing technology is its continuous improvement efforts on plan equipment and machinery. Often a group of process/equipment engineers is stationed at the plant floor, and is constantly wandering around the floor. They regularly communicate with workers to discover even a tiny improvement idea on existing equipment. Continuous improvement, therefore, not only plays a major role for JIT and TQM activities, but is also play critical factor for process improvement. Again, the key factor for process technology was the communication between engineers and workers, and the action resulting through the communication.

Around the middle of the 1980s, many Japanese firms shifted their efforts into new product development (Cycle 3). During this period, many research centers were established for aiming to introduce new products or seeking technologies that lead to the development of new products. In addition, the coordination, cooperation, and communication based management style led to a product development approach that is described today as Concurrent Engineering. The critical factor for concurrent engineering is, again, communication among members of different functions of the organization and also with the suppliers. With the investment of R&D and concurrent engineering approach combined, Japanese manufacturers started to maintain a reasonable strength on new product development.

Therefore, major Japanese firms built their manufacturing strength by Cycle 1 (management practices), followed by Cycle 2 (manufacturing technologies), then finally added Cycle 3 (new product development and R&D efforts) to the system. Through this process, they have developed a rather unique management style base on communication, and coordinated, cooperative activities through the communication network. World class manufacturers in Japan repeated the “communication and action” process as often, and as quickly possible at all levels of the organization. It is the speed of this process that generates the competitive edge, and simultaneously, provides adjusting capability for ever changing business environment.

The 3-cycle model can be used to describe the characteristics of major Japanese firms. For instance, Toyota, as the originator of JIT, and having a strong engineering group in production technology, her major strength lies in Cycle 1 and 2. On

the other hand, the strength of Honda lies mainly in Cycle 3, although Cycle 1 and 2 are not particularly weak, In the Electronics industry, the strength of Panasonic lies in Cycle 1 and 2, while Sony shows its power in Cycle 3 by consistently introducing new products.

One important strategic move for a Japanese manufacturer, therefore, is how to find the best balance that fits well for the business environment surrounding the firm. The importance of each cycle differs by industry. For instance, process oriented industries such as Chemical and Semiconductor industries, the strength in Cycle 2 is vital to compete. For the Automobile industry, a balance among all three cycle is expected to strive, but many Japanese firms traditionally tend to place more emphasis in Cycle 1 and 2.

Strength is Invisible

Although the emphasis on each cycle differs from company to company, major manufacturers in Japan placed their focus upon communication. All well-managed organizations, no matter which industry they belong to, find it very important to communicates vertically as well as horizontally in the organization.

Their move is strategic. Japanese manufacturers provide opportunities to communicate with each other. For instance, many Japanese companies push for Kaizen activities. Often, however, the true purpose of Kaizen activities is to force employees to communicate with each other and to take the necessary actions. For that reason, even ideas which do not seem to generate much benefit are often implemented. Companies in Japan are well aware that this process generates the momentum for change. It forces workers, managers, and engineers to communicate with each other, and to work together for the common goal.

For a company like Toyota, a drastic impact on the organization when over two million Kaizen ideas were implemented each year is not difficult to imagine. The accumulation of these tiny steps generates a dynamic and learning organization. This process differs widely from other countries. Kaizen activities in the West often place emphasis on “cost and benefit,” and ideas that cannot expect many benefits would eventually be ignored. This implies the invisible side of Kaizen activities has been discarded.

The communication and action process had another major influence on Japanese manufacturers. This process was the reason why JIT, TM and Concurrent Engineering flourished in Japan. All of those practices needed coordinated and cooperative activities through communication. In the process of pushing JIT and TQM to a more refined level, Japanese manufactures improved the communication capability as well. The communication capability becomes the foundation for an even better system, and leads to the next round of improvement. Therefore, the by-products of the communication and action process were the management practices like JIT, TQM, and Concurrent Engineering, vice versa.

The communication and action process also had an impact on the strategic aspect. The ability for the organization to communicate often provides the information where the organization actually stands for the top management. The result is that

the manufacturing strategy is more likely formulated based upon the real picture of the company. In addition, the strategy is more likely welcomed and implemented by the plant floor, simply because the strategy reflects the voice from the manufacturing floor through the communication channels developed.

Also, the communication network in the organization could have an impact on strategic alliance. The strength provided by an organization can be assimilated into its ally only when the firm has a mechanism to incorporate it. The communication network plays a role of lubricant for the mechanism. Once the firm recognizes usefulness of information or technology provided by the partner, then the network swiftly spreads the information into the organization, and followed next by coordinated activities. There are arguments that an alliance between a Japanese and foreign company often benefit more for the Japanese side. One possible explanation of this trend is the communication network exists within the Japanese firm, and allows the information to disseminate quickly into all levels of the organization. It does not stay at one division or function that is often the case for the Western counterpart.

Therefore, the true strength of world class Japanese manufacturing organizations is not JIT, TQM, or other manufacturing practices in which Japanese firms are well known for. Their strength mainly comes from their ability to communicate and take action resulting from communication. This is the unique ability of top-class Japanese manufactures which is often invisible from the outside. Management practices, any companies can copy, but the effective communication network and the action process is very difficult to copy.

Summary

An attempt of explain how Japanese manufacturers have been developing their strength over the years through the “communication and action” process was made in this paper.
The major discussions are summarized as follows:

1. A manufacturing framework by using the 3-cycle model is presented to explain the development pattern of Japanese manufacturing management.
2. The source of strength for Japanese manufacturers is not JIT, TQM, and other management practices, but rather, it is the ability to communicate throughout the organization and actions resulting from the communication. JIT and others are just by-products of the process.
3. To establish a well-designed manufacturing strategy and to implement it, communication is the key factor. The communication process provides organization with more realistic picture of their situation and allows them to develop a strategy which reflects their true condition.
4. The organization with a good structure of communication process can adapt the strengths provided by strategic alliances more quickly than others.
5. The real strength of a well-managed organization is often invisible, because it comes from the ability to communicate and its speed of action.

Business environment surrounding Japanese

manufacturing organizations has changed drastically in recent years, but the basic strength of well-managed Japanese firms remains the same. Many are, however, gradually losing its competitive edge.

Discussions provided in this paper were formulated based upon intensive discussion with over 400 managers and engineers from fifty-seven manufacturing organization in Japan. Their cooperation is very much appreciated.
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