

December 1997

Information Technologies and the Transformation of Japanese Industry

Jiro Kokuryo
Keio University

Follow this and additional works at: <http://aisel.aisnet.org/pacis1997>

Recommended Citation

Kokuryo, Jiro, "Information Technologies and the Transformation of Japanese Industry" (1997). *PACIS 1997 Proceedings*. 2.
<http://aisel.aisnet.org/pacis1997/2>

This material is brought to you by the Pacific Asia Conference on Information Systems (PACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in PACIS 1997 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Information Technologies and the Transformation of Japanese Industry

Jiro Kokuryo
Graduate School of Business Administration
Keio University

Abstract

Japan lagged in the adoption of downsized computer systems and open computer networks not for technological reasons but because of its industrial structure and the management philosophies that once gave Japanese companies a tremendous advantage. The Japanese management style that emphasized long-term close relations among business partners seemed incompatible with the open network proposition. Recognizing their flaws in the network era, Japanese firms began serious efforts to adapt the Japanese management system (which in its fundamental nature is network oriented) to the open network environment. Their efforts in converting closed networks to open networks are beginning to show results, and the Japanese adoption of downsized computers and open networks is skyrocketing.

There is a broadly shared perception that Japan lagged in the adoption of information technologies. This is true at least for the diffusion of more open, downsized computer network systems for use by white-collar workers. Many visitors to Japan noted the imbalance between the advanced production floor and the less-than-productive white-collar office.

It is not that Japan lacked the technical competence or the financial strength. It has ample resources in both. Rather, the issue was that the traditional Japanese management system, which emphasized the formation of closed, long-term relations among personnel and firms, seemed incompatible with the more open communications and management styles that the present-day computer networks realize.

With the traditional Japanese management philosophies that emphasized rich communications among geographically concentrated, closed groups of individuals and firms, open computer networks are neither necessary nor useful. Japanese firms were quite successful in the 1980s with a small number of personal computers in their offices and apparently believed that PCs were irrelevant.

This attitude changed dramatically around 1993, as the slowdown in the Japanese economy became conspicuous in the wake of the bursting of the bubble. Symbolically, the New York Times in November of last year ran a special on how it was "Japan's turn to catch up." In the subsequent debate, specialists in the area now generally agree that the issue is not technological but is rooted in the managerial process.

Since then, major initiatives have been taken both by industry and the government to transform Japanese industry to meet the challenges of the network age. While much is yet to be done, some Japanese firms have been making efforts to transform their business systems and are starting to show results. The renowned Japanese management system (whose fundamental nature is in fact "network" oriented) is now evolving to leverage the open communications channels.

1. Mismatch between Japanese Management and the Open Computer Network

1.1 Rude Awakening in 1993

Table 1 shows some comparative statistics on the state of informatization in the United States and Japan. There are a number of possible interpretations of this table. One obvious feature is the wide gap in PC diffusion. Japan has indeed lagged in the adoption of PCs in the workplace and at home.

Table 1 Comparison of U.S. and Japan in Computer Hardware Investment

	U.S.	Japan	U.S./Japan
Total computer shipment (1993 Millions of US\$)	62,500	28,909	2.2
PC shipment (1994 thousands of units)	18,605	3,005	6.2
PC installed base (1993 thousands of units)	66,530	9,420	7.1
Number of WWW sites (March 1995)	8,798	306	28.8
Breakdown of expenditure on computer equipment (1992 %)	on mainframe	45	60
	on PCs	55	40

Source: Informatization White Paper 1995, Japan Information Processing Development Center (JIPDEC)

One should note that the gap is much smaller when we look at total computer shipments in monetary terms. Considering that Japan's population is about one half of that of the United States, this shows that Japan has not been reluctant to spend money on information technology (IT). Indeed, there was no perception that Japan was lagging in the introduction of IT. On the contrary, strong confidence existed that Japan was about to lead the world in the IT arena as well. As long as one viewed the use of mainframes (as opposed to open networks of downsized computers) as the key component of IT, Japan was in good shape. For most IT analysts with such a perception, Table 1 would seem terribly one-sided and irrelevant.

This is also true of computer networks. As of 1993, 58.4% of 716 firms responding to a JIPDEC questionnaire networked with their vendors, customers, and affiliated companies. The adoption of electronic ordering systems (EOS) between major retailers and their vendors was almost 100%. The adoption of interfirm computer networks has been quite extensive.

Here again, the issue was not in the size of investment but in its type. Under the banner of "strategic information systems" that pursued to lock-in customers and vendors to a system, many Japanese firms sought to construct proprietary systems that were closed to a predetermined group of firms.

1.2 The Japanese IT Industry Under Challenge

To most Japanese, the flurry of articles that increased in number around 1993 and pointed at the Japanese disadvantage in the use of IT came as a rude awakening. To be specific, doubts were raised on two aspects: (1) the lack of Japanese competitiveness in the provision of digital IT products and (2) the Japanese organization's incompetence in utilizing IT. We look at (1) in this section and (2) in the next.

Rappaport and Halevi (1991) was one of the first to point out that the Japanese strategy toward IT was unsound. They highlighted how "the computerless computer company" based on knowledge rather than hardware had an advantage in the information technology industries. They also explicitly and correctly forecast that the Japanese strategy, with heavy emphasis on hardware production, would result in the Japanese loss of competitiveness in the area. Morris and Ferguson (1993), while not mentioning Japan as explicitly, also described how leadership in the determination of architecture was the driving force in the IT industry.

These articles are significant in that they point out that the traditional Japanese source of competitiveness, i.e., the superior production process management, may not be relevant in knowledge-intensive industries. Cringely (1992), in his journalistic but nevertheless convincing account, stressed that excellence in the creation of downsized computers would not be accomplished by the Japanese consensus-seeking management.

Domestically, Oniki (1994) pointed to how, as opposed to the U.S. market in which AT-compatible machines were becoming the standard, Japanese manufacturers each maintained a closed architecture for their PCs. Oniki argued that this has led to the duplication of development cost and the high costs of computing in Japan.

Kokuryo (1995) summarized that the Japanese industry was falling behind in the global trend toward a conversion from "enclosure strategy" to "open platform strategy." Figure 1 shows the difference

between the enclosure strategy and the open platform strategy.

The traditional mainframe manufacturers with an enclosure strategy would try to have exclusive ownership of the entire value chain for a particular customer base. More specifically, their machines would have proprietary operating systems, designed for their self-developed central processing units, and use proprietary interface to use peripheral equipment. The Japanese computer manufacturers went further to try to provide customized applications development for their customers.

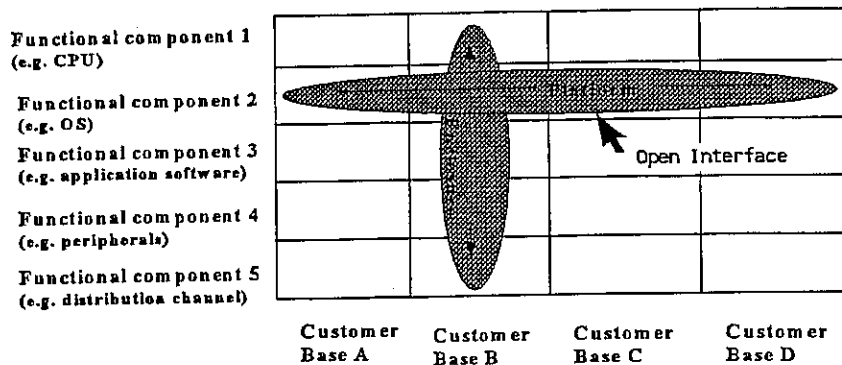


Figure . P Enclosure Strategy and Open Platform Strategy

Firms that employ the enclosure strategy form a tight web of exclusive vendors and dealers. They are either (1) vertically integrated or (2) externalized but under a keiretsu (corporate grouping) type of exclusive relations. The strength of the enclosure strategy is often in the ownership of the distribution channel. Firms that establish a strong network of dealers "enclose" end users, which are locked-in by the purchase of proprietary products that have little compatibility with other firms' products. Firms seeking to enclose customers are typically diversified to try to meet the full scope of customer needs and to provide dealers with a full line of products to expand their sales.

Such a strategy can be contrasted by today's PC supply chain in which competitive firms would focus on a particular layer but be the de facto platform provider. Instead of trying to capture the entire value chain for a particular customer base, they would try to dominate within the layer, thus trying to supply a component of a product to all customers. To win such a position, the interface to their systems is strategically kept open.

Open platform strategy allows firms to focus. They can concentrate their financial, technical, and managerial resources on their "core" operations. They would outsource whatever is not at their core. This leads to emphasis on the virtual corporation. (Davidow and Malone (1992), Imai and Kokuryo (1995))

The adoption of the open platform strategy has profound organizational implications for the traditional enclosure firms. First is the interorganizational relationships. Enclosure strategy implies the formation of long-term exclusive relationships among firms along the value chain. A Fujitsu dealer would not sell IBM products. The relationships are much more fluid under the platform structure in which a player in a particular layer would try to sell to all of the players in a different layer. Intel MPU are sold through almost every PC manufacturer's distribution channels. The sale of Windows 95 in convenience stores would be an unthinkable phenomenon in the days when exclusive dealers would visit customers to take orders for customized software.

The second feature is internal fluidity. The major disadvantage of the open platform strategy is that it forces firms to gamble and thus be quite unstable. The implication of this is that firms have a short life, leading to a mobile job market. The emphasis by the platform firms on outsource functions adds to the instability of employment.

One of the distinct features of large Japanese firms has been this emphasis on long term employment. This has been helpful in creating loyalty, enhancing internal communications, and giving employees the chance to optimize the entire firm's operations instead of just their own. It is unlikely that these features can be maintained when an open platform strategy is adopted.

The Japanese firms that showed (as IBM did) great strength when the enclosure strategy was the norm were bewildered by the new forms of competition. The Japanese management style that emphasized long-term relations with both business partners and employees was incompatible with the new mode of operating companies. They suddenly found their loyal vendors and distribution channels a burden.

Thus, Japanese firms were bound by their past success formula to make the transition. They were aware that U.S. computer manufacturers were challenging them with the virtual supply chain and open distribution channel that could operate at a much lower cost and a higher level of agility (Goldman et al. (1995)). Yet they could not bypass their loyal vendors and distributors, who had exclusively sold their products for a long time.

While the U.S. PC market shifted from the enclosure structure to the platform structure in the 1980s, the Japanese computer market, including the PC market, remained enclosed at the beginning of the 1990s. Symbolically, Japanese software stores had shelves for each major PC manufacturer. Thus, the market was fragmented, and the development cost for both the hardware and the software remained high.

1.3 The Use of Networks by Japanese Corporations

The enclosure strategy firms and the open platform strategy firms differ in their use of computer networks. By their very nature, enclosure strategy firms tend to form a closed network of personnel and firms and to employ a closed infrastructure. Because they work only with fixed members, there is no need to use open networks. Instead they tend to install proprietary systems that are tailored specifically to the enclosed group's needs.

This explains Japanese industry's reluctance to adopt open computer networks. In Japan the enclosure strategy is not only characteristic of the mainframe computer industry but also has been widely adopted in many industrial sectors. In a wide variety of industries, such as home electric appliances, cosmetics, autos, and alcoholic beverages, distributors and even retailers were organized as exclusive distribution channels by the manufacturers. Many of the major manufacturers, such as Toyota and Panasonic, constructed extensive computer networks that are closed to their groups.

Various "relationships," such as vendor-manufacturer relationships and firm-employee relationships in an enclosed structure tend to be long term and exclusive. The life long employment system of Japanese firms is one example. One might characterize them as the formation of a closed network. One distinct characteristic of such a closed network is the evolution of proprietary interface, languages and rules that are understood only by the members. As long as one assumes a long-term relationship among fixed members, the development of proprietary languages enables the members to communicate efficiently.

In the late 1980s Japanese firms were extremely successful with their enclosure strategy based on closed infrastructure. Many writers in management praised the Japanese management of vendors and distribution channels. Heavy investments were made to strengthen the mainframe-based closed computer networks. Thus, in the early 1990s Japan had numerous islands of computer networks that could not communicate with each other.

Takeda and Kokuryo (1996) found through their research on media choice in order placement of dye and mold parts that firms that have a large installed base of computer systems significantly lagged behind other firms in the adoption of standardized electronic data interchange (EDI). This shows how the Japanese were equipped with the wrong kind of systems.

2. The Opening of Japanese Industry

The Japanese economy slowed down quite substantially in the 1990s. While the initial trigger was financial i.e., the bursting of the bubble, in which the overinflated asset market collapsed the

prolonged damp economy that followed prompted analysts to study and reveal several structural problems in the Japanese economy. The loss of competitiveness in the electronics industry and the use of IT in industry discussed in the previous section were considered among the most serious issues.

2.1 Product and Manufacturing Strategies

Ogawa (1996) offers a broad analysis of how the Japanese automobile, home electric appliance, and computer industries lost competitiveness in the late 1980s. Among the various factors, a common factor given by Ogawa is the excessive variety of the product. In the auto and home electric appliance industries, the overconfidence in flexible manufacturing systems led to a higher cost of production. In the computer industry, proprietary architecture adopted by each PC computer manufacturer led to the loss of the economy of scale in the industry.

The emphasis on broadening the product line is characteristic of the Japanese corporate strategy that emphasized enclosing customers, distribution channels, the vendors, and employees. A symbolic word in Japanese is "sogo" which means general or full-line. Many industrial sectors are dominated by firms that call themselves sogo. Just to give a few examples, they include sogo-denki (electric), general constructors (which use the Japanized-English abbreviation zene-kon), sogo iyaku (medical), and sogo shosha (trading companies). In order to have the channels and the customers to rely on a manufacturer exclusively, the manufacturer had to provide a full line of services.

Recognizing the limitation of the traditional industrial structure and the organizational principles, Japanese firms have started to change policies on what kind of products to offer and how to manufacture and deliver the products. In the next section we take the PC industry as an example to see how the product policy changed.

2.1.1 The case of DOS/V PCs

The wave of downsizing and open architecture finally arrived in the early 1990s. By 1993 the production of PC (in yen) topped that of mainframes. Also in 1993 the production of engineering workstations and control devices grew (in units) by 53.8% while mainframe production (in units) fell by 24.2% (all figures according to the Informatization White Paper 95).

Most significantly, an operating system called DOS/V dramatically changed the structure of the Japanese PC market. DOS/V, developed by IBM Japan, was the operating system that offered a software-based solution to the handling of the Japanese language. Before this, specialized hardware was necessary to handle Japanese. For example, NEC's PC 98 series, which has been the dominant model in the Japanese market, carries read-only memories and customized DOS to operate.

Such necessity for specialized hardware essentially secluded the Japanese PC market from the rest of the world, (A major exception to this was the Apple machines, which were Japanese compatible a few years ahead of AT-compatibles.) This had changed with the shipment of DOS/V, which enable any AT-compatible machines sold in the United States to handle Japanese. The fierce competition around the AT-compatible machines in the US was suddenly introduced to the Japanese market. One of the first to come to Japan was Compaq, which captured a large share of the Japanese market in a very short period of time in 1993 and 1994.

Faced with this challenge, Japanese computer manufacturers have moved away from their traditional enclosure strategy and started to ship DOS/V-based machines. Toshiba and Sharp, which were the smaller players in the Japanese PC market, were the first to adopt the open architecture strategy. The bigger players, most notably NEC and Fujitsu, were slower to respond. By 1993 Fujitsu decided to jump on the bandwagon, and soon after it launched a major price war that was described as the "Fujitsu shock" by Business Week. NEC, which held more than a 50% share for a long time, was slow to respond to this trend. In 1996 it finally decided to let one of its affiliated companies ship AT compatibles.

The adoption of open architecture lowered the cost and the price of PCs in Japan and subsequently stimulated a high growth of sales. While 1993 sales of PCs were 2.3 million units, we estimate shipments of 7.5 million units in 1996.

2.2 The Opening of the Japanese Distribution Channel

The opening of the Japanese economy is seen not only in the high-technology area but also in the once notorious Japanese distribution channel. Figure 2 illustrates the trend.

Traditionally many "enclosed" industries had a keiretsu structure in their distribution system. While varying in degree depending on the industry, manufacturers typically organized small, localized distributors and retailers into an exclusive network. Home electric appliances and automobiles have been two major examples, although the system has long been decaying on the home electric appliance side.

The drivers for change have been the emerging large retail chains. Large retailers that want to sell the best product at the lowest price, resist being forced to carry only a particular manufacturer's product. Thus, they started to purchase from multiple distributors. This shift has been moving slowly (due to resistance from smaller retailers) but steadily since the 1960s.

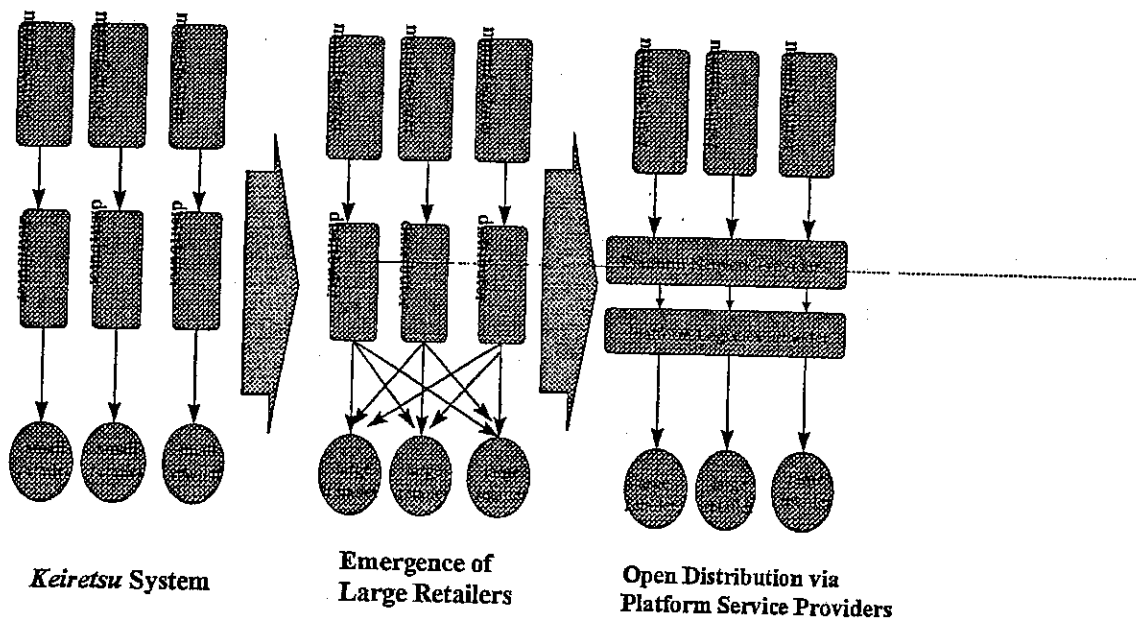


Figure 2: Opening of the Japanese Distribution Channel

The system that is noted as "the emergence of large retailers" in figure 2, has a major flaw. The distributors remained loyal to particular manufacturers, and retailers were forced to make purchases from many distributors in order to serve the end consumers a full product line across manufacturers. As a result, physical distribution between the distributor and the retailers was duplicated and inefficient.

By the end of the 1980s the bargaining power of the large retailers had become strong enough to force changes upstream. That is, large retail stores started demanding (1) one-stop shopping from the distributors, whereby distributors supply the retailers with products across manufacturers, and (2) nationwide services.

Such demands for better services from the customers are forcing the "middlemen" to consolidate. The number of whole salers with less than 100 employees decreased by 7.1% between 1991 and 1994. While the number increased by 1.8% in the same period for those with over 100 employees. This shows how the small localized distributors are being consolidated.¹ Ryoshoku is a notable distributor in this field that offers nationwide, one-stop shopping to large retailers with fully automated logistics systems.

Information technology plays an important role in the transformation. Platform logistics companies

¹ There is no sign of distributors - middlemen is a more popular word being eliminated in the Japanese grocery distribution. The graph thus represents consolidation rather than elimination.

are equipped with large-scale picking centers that utilize barcodes to automate their handling system. Without such systems, the number of SKU that typical distributors could handle was in the hundreds. With the investment in automated picking and electronic order entry, large regional distribution centers (RDCs) now handle several thousand SKU. It is this enhanced capacity that enables large distributors to handle a full range of products across manufacturers and offer one-stop shopping.

2.2.1 The Case of Kao and Planet

One notable event in the Japanese distribution system in 1996 was the announcement by Kao, the largest pharmaceutical manufacturer in Japan, that it wanted to participate in Planet, the industry-wide commerce network.

Traditionally Kao was renowned for its superior logistics system in Japan. (Yanagihar and Oze(1990)). However, they accomplished this system with an enclosure strategy. They organized an exclusive network of distributors nationwide and took the ownership (thus the risk) of all the inventory of the distributors.

Kao's enclosure served them well through the 1970s and much of the 1980s. With this tightly controlled logistics system, Kao has achieved recognition and respect in Japan as a company that is very responsive to customer needs while being much more efficient than its rivals. As the nerve system of this operation, Kao installed an elaborate but exclusive computer network within the group.

With Kao being the dominant player in the Japanese pharmaceutical industry, Planet was an alliance by Kao's rivals including Lion and Proctor and Gamble to jointly operate a logistics operation. They initially started by sharing a computer network (value-added network) between the manufacturers and the wholesalers. This alliance then evolved into the partial sharing of physical distribution.

While the enclosure system served Kao well, the company decided in 1996 that it was time to shift its strategy to go virtual. Specifically Kao announced in 1996 that it wanted to join Planet. This is regarded as an end of an era by those who have been tracking the fierce battle for leadership by the Kao system and Planet.

It was also revealed in the fall of 1996 that Kao was intending to open its physical distribution capability to other manufacturers. More specifically, it was reported that one of the largest retail chains was going to use Kao's physical distribution system to have its stores serviced. Kao's physical distribution system between the regional distribution centers and stores has long been recognized as one of the best in the country. The system, which was once used exclusively for Kao products, will now be opened for use by all manufacturers.

This series of moves by Kao is a dramatic example of how some Japanese firms are taking courageous moves to abandon their old competitive strength and reposition themselves for the future. Not all firms are as bold as Kao. One of the characteristics of present-day Japanese industry is the large variance in profitability among firms in the same industry. Those that have made determined structural reform are starting to show results, while other firms whose response is slow (usually because of inertia) are starting to lag.

3. The Adoption of Open Computer Networks

Along with the opening of the Japanese industrial structure, the adoption of open computer networks has been picking up speed.

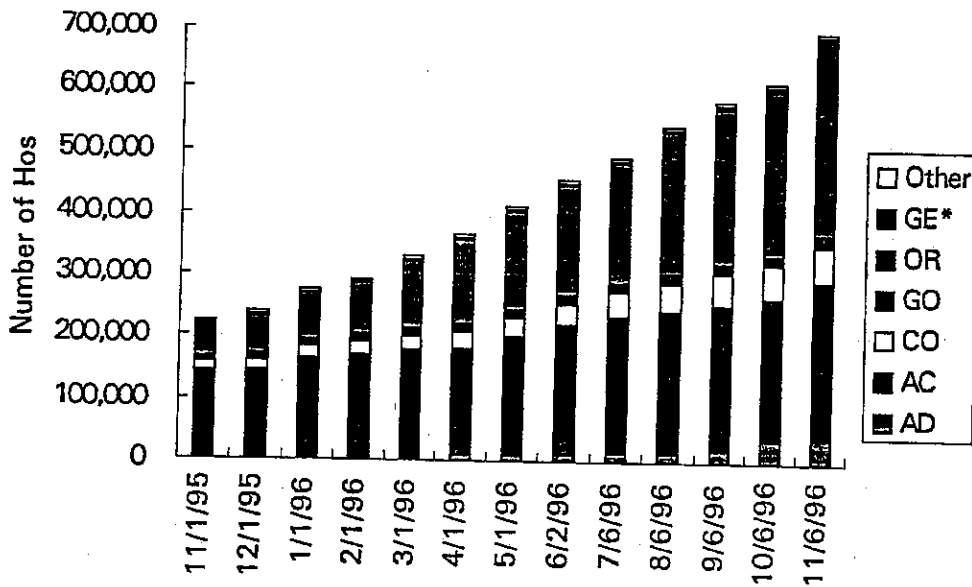


Figure 3: ".jp "Internet Hosts Excl. Hosts Inside Firewalls

Source: JPNIC

Figure 3 shows how within the short period of 12 months from November 1995 to November 1996 the number of Internet hosts has tripled. In global comparison, the world's number of Internet hosts grew by 36% in the first half of 1996², while the number stood at 79% for Japan³. As a result, the share of Japanese Internet hosts in the world grew from 2.9% to 3.8% in the period.

Most notable is the rapid increase in the .co and .or hosts. Since .or domains include many Internet access providers that service small businesses homepages, this shows that the Japanese nonacademic private-sector Internet use is starting to explode. (Figure 4)

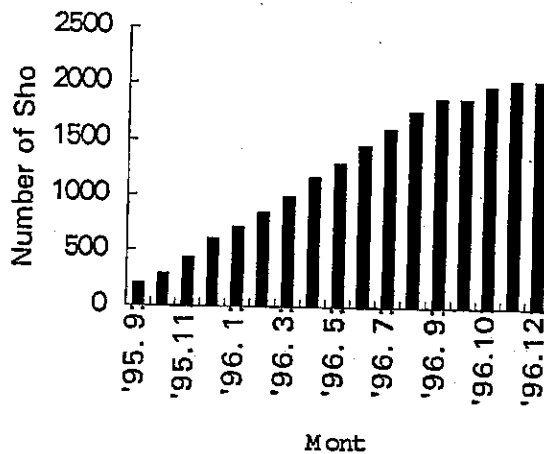


Figure 4: Number of Cyberbusinesses as Surveyed by the CCCI

Source: <http://www.ccci.or.jp/cbcb/>

² From 9,472,000 to 12,881,000 in the six months from January to July 1996; source: <http://www.nw.com>.

³ From 275,001 (January 1996) to 492,457 (July 1996); source: JPNIC.

The Internet is not the only media that has exploded. In 1996 the adoption of mobile telephones, which include cellular and PHS (personal handy systems; much like PCS) phones, increased by more than 10 million units, when the installed base was at 8 million in 1995 and the total number of households in Japan is less than 40 million. The media revolution has finally reached Japan. And as has been true for Japan throughout its history, when the course is set, the pace is very fast.

4. Toward a Renewed Japanese Management Model

One of the most interesting themes in research is the fate of the Japanese style of management. Is it dead? Are Japanese companies abandoning their renowned managerial practices to adopt global standards in management? Well, yes in some ways, but not quite. We see Japanese management methods evolving to better fit the open computer environment.

In many senses, it would be fair to say that the Japanese style of management has been the forerunner in adopting "networked organizations." It was the Japanese automobile industry, which is much less vertically integrated than the U.S. auto industry, that showed that a network of tightly coordinated vendors can work more flexibly than vertically integrated firms. The limitation of the Japanese style of management in the electronic age is that it traditionally relied on long-term facts to face communications that emphasized the accumulation of "tacit" knowledge (Nonaka and Takeuchi (1995)) that could not be shared and communicated over a computer network. Constraints in interorganizational communications are quickly being removed with the advances in media technologies. The question then becomes how to apply the elaborate intraorganizational communications skills on more open interorganizational collaboration.

4.1 The Tradition of Trusting Field Workers

A research team at Keio Business School has been making exploratory interviews to companies that are trying to recover their competitiveness through the introduction of information technologies. Saito (1997) offers an analysis of how the introduction of computer aided design (CAD) is changing the "Japanese way" of designing and manufacturing system.

One of the first things we noticed in the study of CAD adoption in Japan was the view expressed by many designers that the attitude toward drawing may be very different between Japan and Western countries. More specifically, the Japanese tend to postpone finalizing drawings to give more power to manufacturing.

The Japanese firms that have a tradition of trusting the manufacturing shop floor and assemblers apparently give only rough specification or drawings to the vendors and production floor and let them make the final versions. (See discussions on supplier proprietary parts, black box parts, and detailed controlled parts in Clark and Fujimoto (1991).) This practice is linked with the Kaizen philosophy of fine tuning in the field. We have generalized this phenomenon as the Japanese firms' inclination for ex-post coordination versus the emphasis on ex-ante definition in the West. (Note that this may not be true in all industries. See note ⁴.)

A case that Saito reports of a major electronics company is characteristic. The company makes extensive use of CAD in the design department, but its "official drawing" is not digitized. Instead the drawings are printed out, kept in the field, and minor changes are penciled in. At the present time, when supplying all the field workers with on-line CAD terminals is not practical, the requirement to have all the drawings in digital form tends to have the organizational implication of giving more power to the design department.

Viewed from this perspective, it would be fair to say that CAD has been developed to empower the design department rather than the production floor. The simulation function, for example, allows

⁴ Saito's work, which looked at (1) the mechanical and electronic department of computer manufacturing company A and (2) a major construction company, further reported that differences existed between the mechanical and electronic sectors of company A and between the electronics companies and construction company. What Saito found was that while the mechanical sector and the construction company emphasized ex-post coordination, strong emphasis was placed on ex-ante definition by the electronics engineers.

designers to do much of the testing that was traditionally implemented by the manufacturing engineers.

We can expect, however, that IT will be used for ex-post coordination. A very interesting implementation of CAD was at a construction company where the tool was used for supporting the ex-post adjustment of the original design. The company standardized file formats used within the company as well as between the subcontractors so that all of the parties involved can make alterations.

We have observed in a construction company how standardization of CAD file formats has promoted worker and subcontractor involvement in the design. While this has been implemented off-line and thus has limitations, we can anticipate that this will evolve into an on-line collaborative system among designers, workers, and subcontractors.

4.2 Management Based on Context Building

Hall(1976) characterized Japan as a high context society. By accumulating common experience, a community can establish smooth communication. The Japanese organization has been quite successful in building context within and thereby stimulating creative activities within the organization. The notion of a "knowledge creating company" that Nonaka and Takeuchi (1995) advocate is a powerful illustration of the strength of this approach.

The problem with such an approach in the open network environment is that the process of accumulating context based on long-term relations encourages the creation of a closed society in which localized and proprietary protocols (vocabulary, grammar, procedure, and norm) develop. Much of the knowledge created is tacit and cannot be shared with the outside world.

A firm (or a firm group) that relies excessively on proprietary protocols loses interface with the outside world (Kokuryo(1995)). And a firm (or a firm group) that has lost interface with the outside world cannot collaborate effectively in the open computer network environment. Open platform strategy as depicted in section 1.2 is not executable for those firms that lack the interface.

Japanese firms, which have traditionally preferred customizing systems to their needs, are now quickly learning the importance of adopting standardized interface. The process of accepting an open interface can be interpreted as the creation of an environment in which context can be accumulated socially. By exchanging messages in a standardized form, records of communication are stored in an accessible form and can be retrieved. Mailing lists on the Internet are a prime example. In many electronic communities, context is accumulated among members facilitating communications at a deeper level.

Thus we see the organizational principles of management of high context communities being transplanted in the cyberspace. While Japanese firms were initially bewildered by the openness of the new environment, the people in Japanese organizations are accustomed to the collaborative interactions that take place in a high context society.

5. Conclusion

This paper illustrated how Japan went off the track in the early 1990s, lost the sense of direction, recovered it, and then started to move forward at a high rate. We have also seen that this has been not simply a matter of purchasing computers, but a process of transforming the industrial structure and managerial processes.

Some firms are further along in the revitalization process than others. Honda, for example, is expected to renew its highest profit record by a large margin this fiscal year, while Nissan has only recently recovered from negative or virtually zero profit years. Japanese firms are still in the process of reconfiguring Japanese strength in the open computer environment. When this is accomplished, we can expect a more robust resurgence of Japanese firms in the global economy.

References

- Clark, Kim B. and Takahiro Fujimoto (1991), "Product Development Performance," Harvard Business School Press
- Cringely, Robert X. (1992), "Accidental Empires," Addison-Wesley
- Davidow, William H. and Michael S. Malone (1992), "The Virtual Corporation," Harper Business
- Goldman, Steven L., Roger N. Nagel and Kenneth Preiss (1995), "Agile Competitors and Virtual Organizations," Thomson Publishing
- Hall, Edward (1976), "Beyond Culture," Anchor Books/Doubleday
- Imai, Ken-ichi and Jiro Kokuryo (1995) ed., "Virtual Corporation," Infocom Research
- Japan Information Processing Development Center (1996), "Johoka Hakusho (Informatization White Paper), " Computer Age
- Kokuryo, Jiro (1995), "Open Network Keiei", Nihon Keizai Shimbun
- Takeda, Yoko and Jiro Kokuryo (1996), "Explicitly Defined Protocols as means of Inter-organizational Communications: How They are Adopted and Widely Shared," Paper submitted to the International Conference on "New Imperatives for Managing in Revolutionary Change"
- Morris, Charles R. and Charles H. Ferguson (1993), "How Architecture Wins Technology Wars," Harvard Business Review, Mar. - Apr.
- Nonaka, Ikujiro and Hirotaka Takeuchi (1995), The Knowledge Creating Company Oxford University Press
- Ogawa (1996), "Souzou suru Nihon Kigyuu," Shin Hyoron
- Oniki, Hajime (1994), "Personal Computer Sangyo no Keizai Bunseki," Keizai Seminar, May no.472
- Rappaport, Andrew S. and Shmuel Halevi (1991), "The Computerless Computer Company," Harvard Business Review, July - August
- Saito, Kyu (1997), "Computer Network to Kigyo-kan Kankei," Master's Thesis submitted to Keio Business School
- Yanagihara, Kazuo and Hiroshi Oze (1990), Kao Kabushikikaisha, Keio Business School case study.