Development of IT in Japan amid financial difficulties

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Abstract

The Japanese bubble economy in the 1980s, one boosted by capital gains income from inflated asset prices, burst in the early 1990s resulting in strong deflationary pressure. In the face of a sluggish economy, corporate investment has been sluggish. Amid such a weak economy, investment in information technology (IT) has remained relatively strong, particularly in the telecommunications sector. The growth of the IT industry came along with the changes in its structure. Adoption of open architecture, greater use of packaged software, and increased popularity of outsourcing are examples. The adoption of open architecture in IT was in part a reflection of the openness of the systems that employed the technology. The Japanese industry that relied on close relations along the supply chain tended to maintain proprietary IT architecture within groups. The increasing power of the demand side has been instrumental in opening up the once closed supply chain and the IT infrastructure. © 1999 Elsevier Science B.V. All rights reserved.

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1. Introduction

The 1990s has indeed been a difficult decade for Japan. The inflation adjusted growth rate of its gross domestic product (GDP), which recorded 4.4% in fiscal year (FY) 1989, 5.5% in FY 1990, and 2.9% in FY 1991, suddenly fell to 0.4% when the speculative bubble burst in 1992. The bubble economy in the second half of the 1980s, i.e. inflated asset prices (particularly real estate and stock) and the capital gains they created, once boosted the income of Japanese consumers and corporations which in turn pushed asset prices even higher. Years of this upward spiral made the downward spiral steep. The TOPIX index, which reflects the total valuation of the Tokyo stock exchange, reached 2884 on 18...
December 1989, but had dropped to 1069 by 17 September 1998. This placed a strong deflationary pressure on the entire economy.

After the growth rate of GDP declined to 0.4% in FY 1992, it hovered at low levels (between 0.4 and 3.0%) until a short-lived recovery in FY 1996 (4.4%) and then plummeted again in 1997, this time going negative (−0.4%). The primary reason for the 1997 slowdown is believed to be the tax hike implemented in April 1997 aimed at restoring fiscal health.

2. Trends in Japanese IT investment

In the face of a sluggish economy, corporate investment (inflation adjusted) has also been conservative. After recording negative growth (FY 1992, −7.2%; FY 1993, −10.4%; FY 1994, −2.5%), it recovered slightly (FY 1995, 7.4%; FY 1996, 9.1%) but then dropped again (FY 1997, 0.7%).

Amid such a weak economy, corporate investment in information technology (IT) has remained relatively strong. A Ministry of Posts and Telecommunications (MPT) estimate shows that although corporate IT investment dipped in 1992 and 1993, its share in total corporate investment more than doubled from 5.9% in 1992 to 14.1% in 1996. Thus, information technology has been a safety net, if not a booster, of the economy.

Even stronger was the telecommunications industry. While the output of all industries grew only at an annual rate of 0.04% from 1990 to 1993, the telecommunications sector grew by 2.08%. From 1993 to 1996, the telecommunications industry grew 6.42% per year in contrast to industry as a whole, which grew at an average of 1.68% per year.

The two major engines of growth in the telecommunications sector have been mobile communications and the Internet. The mobile communications market jumped from US$5.2 billion in FY 1992 to US$31.2 billion in FY 1996. The number of hosts connected to the Internet increased from 23,200 in January 1993 to 1,169,000 in January 1998. The number of digital leased lines (64 kb/s–6 Mb/s) jumped from 20,145 in March 1993 to 163,080 in September 1997.

This growth of the IT industry came at the same time as key changes in its structure. One crucial change, which triggered others, was the adoption of open architecture. Until the 1990s, Japanese personal computer (PC) manufacturers maintained proprietary or closed architectures because processing of the Japanese language required specialized hardware (read-only-memories) and operating systems that were purpose-built for each manufacturer’s hardware. This in effect protected the Japanese market from the rest of the world whose open architecture was already the norm by the 1980s. Major Japanese manufacturers of PCs, including NEC and Fujitsu, maintained their proprietary architectures.

This changed in the early 1990s as the increasing capacity of the hard disk and higher speed of processing units made available software-based processing of the Japanese language. DOS/V, developed by IBM Japan, was the operating system that offered a software-based solution to the handling of the Japanese language. DOS/V enabled any AT-compatible machines sold in the United States to handle Japanese. The fierce competition around the AT-compatible machines that was already underway in the United States was suddenly introduced to the Japanese market. One of the early entrants into Japan was
Compaq, which rapidly captured a large share of the Japanese market during 1993 and 1994.

Faced with this challenge, Japanese computer manufacturers have moved away from their traditionally inward-looking market strategy and started to ship DOS/V-based machines. The smaller players in the Japanese PC market, Toshiba and Sharp, were the first to adopt the open architecture strategy. The bigger players, most notably NEC and Fujitsu, were slower to respond. By 1993, however, Fujitsu decided to jump on the bandwagon, and soon afterwards launched a major price war that was described by Business Week as the “Fujitsu shock”. NEC, which held more than a 50% PC market 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 FY 1993 sales of PCs were 2.3 million units, by FY 1997 sales had risen to 7.5 million units.

The wave of downsizing started in Japan somewhat later than it did in the United States, but it accelerated in the 1990s. While the production of PCs (in yen) increased by 111% from 1992 to 1996, the production of mainframes fell by 43% in the same period — they have reversed their positions in absolute yen terms as well.

The use of packaged software has been another major industry shift arising in part from the adoption of open architecture. Traditionally Japanese information systems departments in organizations emphasized customizing systems and tended to develop their own software. The practicality of such a policy decreased as the speed of technological change accelerated and development size increased. The introduction of packaged software became a necessity with sales increasing by 36.4% in 1994 and 34.8% in 1995.

Finally, somewhat later than in other major Western economies, the IT industry is having to adapt to the increasing popularity of outsourcing. Instead of running computer operations in-house, many firms are choosing to outsource the operation to outside firms. The financial institutions have led the way with companies transferring their employees to their outsourcing partners. The alliances between Daiwa Bank and IBM and between Hokkaido Bank and NTT Data are high profile examples that have helped set the trend. The IT community expects many more such deals to be announced.

3. The role of IT in transforming Japanese industry

The adoption of open architecture in IT was in part a reflection of the openness of the systems that employed the technology. The Japanese manufacturing and distribution systems that relied on close relations along the supply chain tended to maintain proprietary architecture in their collaborative systems. The economics of globalization, deregulation, and most notably the increasing power of consumers have been instrumental in opening up the once closed supply chain, and information technologies have been a powerful enabler in this direction.

A good illustration can be found in the toiletries industry. The event that most strongly signalled the demise of the closed supply chain occurred in 1996, when Kao, the industry leader, announced its intention to join Planet, a pan-industry computer network.
Historically Kao’s strategy has been to organize dedicated logistics and information systems nationwide and supply each retail store from its regional distribution centers. Other manufacturers typically relied on wholesalers to deliver to retail stores. While Kao’s system required the manufacturer to process an enormous amount of data, it had an advantage in allowing the manufacturer to monitor the sales of its products store by store. This allowed Kao to develop products that met customer needs.

An exclusive logistics/information network such as Kao’s required that the network carry a critical mass of sales volume. Thus, the economies of scale involved in this strategy were strong. Kao, by offering a very broad product line and maintaining a high market share, locked in its competitive advantage. The strategy of building an extensive network of exclusive distribution has thus been one of the typical ways of building competitive advantage in Japan. The auto, electric appliance, and beer industries are examples in which the dominant player established long-term advantage through the distribution channel.

The challenge to the established Kao system came from downstream: large retailers that have a large number of products in their stores. They did not want to have each manufacturer deliver to their stores, because this tended to make operation of the store chaotic. Instead, they asked for deliveries to be made to regional distribution centers (typically run by third-party distributors) where consignments from multiple vendors can be consolidated and delivered to the stores more efficiently. Kao, which had created a competitive advantage by its capabilities in serving storefronts, was suddenly told that its capabilities were redundant.

Regional distribution centers, which handled the products of many manufacturers, needed to exchange data through EDI (electronic data interchange) with a large number of manufacturers. Instead of a network dedicated to handling a single manufacturer’s products, a network was required that could connect a large number of manufacturers with a similarly large number of regional distribution centers. This was the task that Planet handled.

Kao, which traditionally relied on its exclusive computer network, decided to use Planet in its efforts to accommodate the changes in the industry structure. Moreover, once it recognised this trend, it started taking initiatives to promote it. In addition, Kao announced that it would run a regional distribution center (that handles multiple vendors’ products) for Ito–Yokado, one of Japan’s largest retail stores. Kao’s expertise in closely monitoring the storefront and organizing logistics is now applied to the new business model.

The openness of the industry structure that Planet embodies made it a strong candidate to adopt Internet technology. Thus, Planet announced its intentions to convert to the TCP/IP protocol and is currently making the transition.

The Planet case also illustrates how the “virtualization” of management is taking place. When one compares the Kao system and the Planet-based system, one notices that in the Planet-based systems, each firm along the supply chain focuses on its strength and relies on outside firms to take care of its non-core operations.

Due to the financial crisis, Japanese firms have been under pressure to improve their returns on assets. As a result, they are forced to divest their non-core operations to focus on areas of activity where they have competitive advantage. This has triggered a wave of restructuring through mergers and acquisitions, division sell-off, and outright divestiture. In the past, a move such as Nissan’s sale of its diesel truck subsidiary would have been
unthinkable given the Japanese industry’s tradition of life-long employment and paternalism. But the taboo is now broken, and restructuring has begun.

Companies that restructured their operations and focused on their core competencies have to rely on partner companies to fulfill their customer needs. Thus, alliances of companies are formed to create virtual corporations. Information technology, while not the central element in such restructuring, is nevertheless an important enabler in running the virtual corporation. Through the deployment of Extranet and supply chain management systems, firms use information technology to coordinate among their partners.

4. Recent developments

As financial turmoil spread throughout Asia in 1997, the Japanese economy, which was showing signs of recovery in 1996, fell again. The problem deepened in 1998 affecting even the IT industry which had been relatively resilient to that point—second quarter domestic shipment of PCs fell by 14% (units) from 1997 to 1998.

Against the growing gloom, portable PCs have proved to be one bright spot with sales increasing by 7% from 1997 to 1998. Japanese manufacturers have started to apply their miniaturization skills to the production of personal computers. This, combined with the thrust for mobile data communication demands, has created a growing market. Notably, the major players in the portable market are such consumer-oriented companies as Sony, Sharp, and Panasonic. This is a departure from the conventional players, such as NEC and Fujitsu, which have been focusing on the corporate use of information technology.

Currently the focus of attention is whether and how PCs will integrate with consumer electronics products, such as the TV. This will involve the integration of U.S. computer technologies with Japanese expertise in consumer electronics. Microsoft has formed alliances with Sony and Panasonic in pursuit of this market.

5. Opportunities in the future

The significance of IT in the economy lies in its capacity to enable new business models. Even under economic difficulties, innovative companies have been initiating new ways of creating value.

Electronic commerce is one of the emergent business arenas. The Ministry of Posts and Telecommunications estimates that US$629 million of goods were sold over the Internet in 1997. Considering the traditionally small size of the mail order industry in Japan (US$16 billion), one can say that electronic commerce has captured a solid foothold in a short period of time.

Electronic commerce is only a small part of the story. In the manufacturing sector, serious efforts in digitalizing product development activities are being implemented. As an example, the application of three-dimensional Computer Aided Design in product development is drastically cutting the time required to launch new products. Another example is consumer participation in product design. A watch company, for example, provides watch design software to consumers over the network permitting consumers to design their one-and-only watches for the manufacturer to produce and sell at a premium.
The organizational processes within and between firms are also changing. By 1997, 21.4% of firms surveyed by the MPT used the Intranet. This is a dramatic increase from 6.4% in 1996, which is expected to continue. While lagging behind the United States in the adoption of Internet technologies, the Japanese tradition of collaboration through information sharing is synergistic with the nature of the Internet. The current focus on this front is the research into requirements for designing knowledge-creating collaborative networks. When this task is accomplished, we can really expect IT to bring us out of our current economic difficulties.

To provide an optimistic ending to this account, the author argues that the economic downturn may help IT transform the economy for the better in the long run. IT offers sample opportunities for firms to deliver greater value to the consumers. To do so, firms need to reconfigure their supply chain and change their organizational processes. The current economic crisis is demanding that Japanese firms implement nothing less than a total restructuring. When this is over, we are likely to find very efficient firms delivering innovative products and services.