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Authors

Tachiki, Dennis
Hamaya, Satoshi
Yukawa, Koh

Publication Date

2004-02-01



Diffusion and Impacts of the Internet and E-Commerce in Japan¹

February 2004

DENNIS TACHIKI
Faculty of Business Administration
Tamagawa University
tachiki@bus.tamagawa.ac.jp

SATOSHI HAMAYA
Economic Research Center
Fujitsu Research Institute
hamayas@fri.fujitsu.com

KOH YUKAWA
Economic Research Center
Fujitsu Research Institute
yukawak@fri.fujitsu.com

¹This research is part of the Globalization and E-Commerce project of the Center for Research on Information Technology and Organizations (CRITO) at the University of California, Irvine. The material is based upon work supported by a grant to CRITO from the National Science Foundation (CISE/IIS/DST, Grant No. 0085852). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.



ABSTRACT

Our analytical concern is the extent e-commerce does and does not diffuse across industries and within establishments, and the consequent impacts on firm performance. We begin with the Center for Research on Information Technology and Organizations (CRITO) research framework, which examines the forces for globalization and e-commerce readiness as the pre-conditions for the diffusion and adoption of e-commerce. In Japan, these factors are embedded in the social organization of corporate groupings (*keiretsu*) and its political economy (iron triangle). Thus, we extend the baseline CRITO model by adding these “relational” factors. We believe this provides more understanding of the configuration of e-commerce diffusion and adoption and its subsequent impacts on business.

The main data source for this study is a telephone survey conducted in Japan by the International Data Corporation during the period February 18, 2002 – April 5, 2002. Establishments were selected from three major industry sectors that are known to be more advanced users of e-commerce—that is, manufacturing, distribution (wholesale and retail), and finance (banking and insurance). The number of respondents is 227 establishments, evenly split by industry as well as establishment size (from 25 to 249 and 250 or more employees). In addition, we use primary data from the Fujitsu Research Institute and other secondary sources in order to draw out the relational side of the diffusion and adoption story.

- Overall we found that *keiretsu* firms play an important role in adopting business-to-business technologies, but the small and medium-sized enterprises in the retail sector and companies in the bank and finance sector are more active in adopting business-to-consumers technologies.
- These differences in the diffusion of e-commerce across industries, on one hand, reflect the ability of companies to overcome the barriers and inefficiencies in the existing political economy. As liberalization loosens the grip of the iron triangle on the Japanese political economy, there is a leveling of the playing field for e-commerce.
- The uneven adoption of e-commerce within establishments, on the other hand, reflects how well information technology applications speak to the strategic priorities in a company’s business plan. As IT technologies speak to the “voice of the customer” (total quality management), there is greater adoption of e-commerce into the business plans of Japanese companies.
- Consequently, the relational context in Japan partially explains the variations in performance—that is, efficiency, coordination, and commerce—of adopting firms.
- A case study of the convenience store industry provides a prism for illuminating the various components driving this mixed transition towards a new economy.

INTRODUCTION

The 1990s is often referred to as the “lost decade” in Japan, where the bursting of the asset “bubble economy” left it mired in a prolonged recession. In contrast, the “new economy” in the United States and Europe was taking off, spearheaded by highly innovative dot-com companies and fueled by a strong bull market. An International Data Corporation report (IDC 2000) paints a more mixed picture, however. Japan’s overall information society index score still ranks among the developed countries, but its Internet infrastructure and informatization scores are closer to those found in developing countries. The main research problem driving our analysis, then, is whether Japan lags behind other countries in the diffusion of e-commerce, and what implications does this have for the flagging Japanese economy?

In answering this question, the Global E-Commerce 10-Nation Survey Database (GEC10 Database) makes it easy to compare Japan with the global average of nine other countries. This approach biases us toward a convergence model of economic development, however. If the United States is the exemplary model, for example, how would we account for the rapid rise of mobile commerce in Japan? Rather than assuming a strictly exogenous imperative, a recurrent question we ask is to what extent are endogenous factors also affecting the diffusion of e-commerce? We argue that somewhere in the interaction between exogenous and endogenous factors are more nuanced explanations of the unfolding of e-commerce activities in Japan.

To draw out this local contextual story but maintain our cross-national comparative perspective, we assume that in a market economy, companies are profit-seeking organizations. Based on this common goal confronting managers, we argue the solutions they adopt to achieve profitability in each country may differ. Take the notion of productivity, a key to profitability. In the American case, the baseline definition of productivity is a function of increasing production volumes while decreasing labor costs. The Japanese challenged this conventional wisdom by showing that another way to increase productivity is by simply reducing the defect rate while keeping production volumes and labor costs constant (Tachiki, 1990). American managers overlooked this viable “functionally equivalent” alternative. Yet this simple notion became the basis for Japan’s renowned total quality management (TQM).

The common goals confronting companies in the GEC10 Database is improving firm performance through e-commerce—that is, increasing efficiency, improving coordination, and expanding commerce (Kraemer et al., 2003). We note that these were the same goals confronting Japanese managers in the early post-war era that led them to develop a TQM strategy. The empirical challenge in this paper becomes teasing out how the existing TQM practices interact with the new information technology (IT) practices in explaining the diffusion of e-commerce across industries and within companies, and the resulting impact on firm performance.

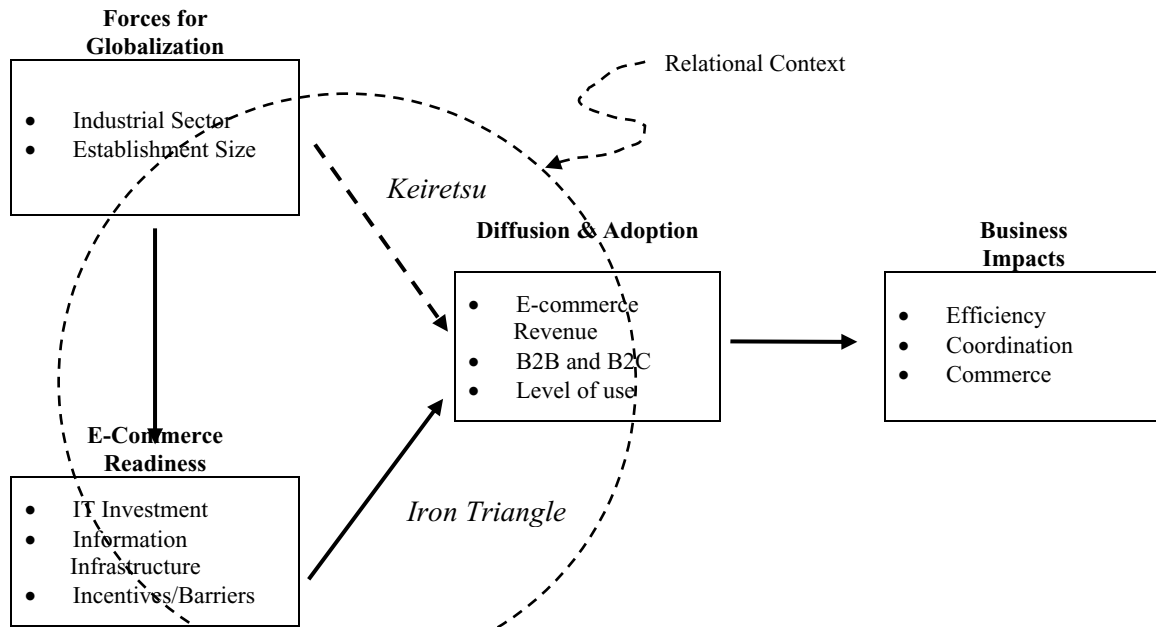
These antecedent factors are embedded in Japan’s social institutions, such as its political economy (iron triangle) and *keiretsu* (corporate grouping) business practices, framing its path to economic development. This picture contrasts with prior research asserting that the Internet and e-commerce diffuse rapidly across countries, reducing the role of the state and bringing equal opportunities for the largest and smallest firms across all industries—that is, a leveling hypothesis. Adding a relational context prevents us from too quickly assuming that the absence of e-commerce implies a low growth economy and backward business practices. The grounded results we uncover should provide practical business insights into what went wrong with the formerly heralded Japanese style of management and some hints as to how companies can escape from the prolonged domestic recession.

BACKGROUND AND *A PRIORI* EXPECTATIONS

We use the CRITO analytical framework in Figure 1 below to model our story of e-commerce in Japan

(Kraemer et al. 2003).

FIGURE 1. Analytical Framework



Source: Modified from Kraemer et al. 2003

Among the possible antecedent factors, we limit our exploration to (1) the forces for globalization and (2) the e-commerce readiness of firms before describing (3) the configurations of e-commerce adoption and diffusion and (4) its impact on firm performance.

Factors Affecting the Diffusion of E-Commerce

We begin with our expectations about the role played by the forces for globalization and e-commerce readiness in shaping the diffusion and adoption of e-commerce.

Forces for Globalization

There is macroeconomic evidence that countries with more globally oriented economies (open in terms of trade and foreign investment) have higher levels of information and communications technology (ICT) investment (Caselli and Coleman, 2001; Shih et al., 2002). Because we are investigating impacts at the firm level, we do not attempt to measure the process of globalization directly but rather the degree to which companies are global, in terms of the internationalization of their operations, revenues, and the competitive pressure they face (Kraemer et al. 2003). On these measures, Encarnation (1999) finds Japanese companies are not very global compared to American companies, nor is the Japanese economy reciprocally open to foreign trade and investments. Thus, we would expect to find the forces for globalization to blow lightly over Japanese industries compared to the global average in the GEC10 Survey.

One of the defining features of the industrial organization in Japan is the *keiretsu*—corporate groupings (Gerlach, 1992). These are large, leading companies with extensive business linkages across national borders and industries, creating potential channels for the diffusion of e-commerce. When we factor in the relational role of the *keiretsu* in the Japanese economy, then, we would expect to find the forces for globalization to blow stronger in industry sectors where these companies have a high presence, and

among large companies more than small- and medium-sized enterprises (SME).

E-Commerce Readiness

Empirical studies also support the argument that the most globalized firms are more likely to shift towards online business models in order to remain competitive (e.g., Dedrick et al., 2001). We would thereby expect the *keiretsu* companies to make the biggest investments in information systems and use a broader variety of e-commerce technologies than companies oriented towards the domestic market. This begs a more fundamental question: what is the adoption of e-commerce technology replacing? Even in countries most advanced in e-commerce we do not find every business function online. In the Japanese case, Internet-based business solutions must show a clear benefit over existing TQM practices and electronic data interchange (EDI) systems. Rather than assuming one best solution to a business practice, we would expect to find functionally equivalent solutions that reflect local circumstances.

Furthermore, as the current World Trade Organization negotiation so vividly demonstrates, the national and policy environment confronting managers can buffer or speed the forces of globalization. In the case of Japan, this political economy is embedded in an iron triangle—that is, the three-way institutionalized interaction among political parties, the bureaucracy, and business (Tachiki et al., 2002). We would expect this relational context to shape the trade-offs between drivers for, and barriers to e-commerce that informs management decisions whether to adopt it or not.

Extent and Character of Diffusion

Variations in the forces for globalization and extent of e-commerce readiness in Japan suggests that e-commerce should diffuse unevenly across industries and within companies. As the most globally oriented and organizationally ready segment of the industrial landscape in Japan, we would expect e-commerce to diffuse initially to the *keiretsu* affiliated companies across the three sectors in this study. On the other hand, we would expect less e-commerce activities in sectors unaffiliated with *keiretsu* companies, especially in the wholesale and retail sectors.

Within companies, our discussion suggests e-commerce activities would be evident in those segments of the value chain that are most exposed to global competitive pressures. Consequently, we would expect companies in the manufacturing sector to use the Internet for business-to-business (B2B) activities in the operations management functions, but engage in significantly less business-to-consumer (B2C) activities. For the wholesale sector we would expect companies to use the Internet in upstream B2B activities (purchasing goods for resale) and for small and medium-sized enterprises (SME) in the retail sector to use the Internet in downstream business functions (marketing, sales, etc.); and for the bank and finance sector, we would expect the *keiretsu* main banks to use the Internet for B2B (corporate banking) and the companies in the other sub-sectors—securities and insurance—to use the Internet for downstream (mostly customer sales) B2C activities.

Business Impacts of E-commerce

Where e-commerce has diffused across industries and within Japanese companies, Internet-based business transactions should replace business ties based on interpersonal relations for access to factor inputs—that is, capital, land, and labor. Moreover, as companies go online, previous research (c.f., OECD, 1999; Timmers, 1999; Wigand & Benjamin, 1995) has found e-commerce improves the performance of firms in three ways. The first is operational efficiency, which refers to more efficient processes and greater staff productivity. The second impact is improved coordination, which includes both lower procurement and inventory costs and closer coordination with suppliers. The third type of impact is expansion of commerce, in terms of increased sales, wider sales area, improved customer service and competitive

position. To the extent Japanese companies are moving online, we would expect improvement in their performance along these three dimensions.

METHODS

The primary data source for this study is a telephone survey conducted in Japan by the IDC during the period of February 18, 2002 – April 5, 2002. Respondents were primarily the chief information officers, chief executive officers, or information systems (IS) managers who are responsible for making the firm's IT-related decisions. The questionnaire was designed by the Center for Research on Information Technology and Organizations at the University of California at Irvine, and reviewed and critiqued by IDC consultants and the GEC Japan country experts (CRITO 2002).

For this study, the unit of analysis is the establishment, defined as the physical location of the company. Establishments were selected from three major industry sectors that are known to be more advanced users of e-commerce—manufacturing, distribution (wholesale and retail), and finance (banking and insurance). A predetermined number of interviews were completed from a stratified random sample (without replacement) for each establishment size and industry category to ensure an adequate sample for achieving a 95 percent confidence interval. Table 1 shows the GEC Japan Database consists of 227 establishments categorized by industry as well as establishment size.

TABLE 1. Survey Sample

Establishment Size ^a	Industry Sector ^b			Total
	Mfg.	WRD	B/F	
Large (250+)	54	29	20	103
SMEs (24 – 249)	41	37	46	124
Total	95	66	66	227

Source: CRITO Global E-Commerce Survey, 2002

Notes: ^a **Estab.** = Establishment; **SME** = small and medium sized enterprises are those with 25-250 employees; Large establishments are those with more than 250 employees.

^b **Mfg.** = Manufacturing and includes all establishments classified as SIC 20-39; **WRD** = Wholesale and Retail distribution and includes all establishments classified as SIC 50-54, 56-57, 59; **B/F** = Banking and Finance and includes all establishments classified as SIC 60-65.

We use the analytical framework in Figure 1 to guide us systematically through the GEC Japan Database in order to evaluate our initial expectations. A convenience store case study is presented in the appendix based on data from the Fujitsu Research Institute to provide further insights into the mechanisms driving and hindering the diffusion of e-commerce in Japan.

FORCES FOR GLOBALIZATION

Weighing in at a GDP of 507.46 trillion yen in FY2001, Japan is the second largest economy in the world and represents over half of the combined economic activity in East Asia (METI 2002). Consequently, the potential diffusion of e-commerce in Japan has significant implications for not only the domestic economy, but also the regional and global economy. We begin with a brief description to establish where the forces for globalization are strongest across three industry sectors and different establishment sizes. This should establish the major globalization fault lines across industries and within companies to use as a benchmark later in the paper to interpret the results of the GEC10 Database against the leveling hypothesis.

Industrial Sectors

Overall, Table 2 shows that Japan is low on all of the globalization indicators except on the “degree affected by competitors from abroad.” This latter indicator shows the extent Japan is open to the global economy whereas the other indicators show the extent Japanese companies reach out to the global economy. On this count, the latter result is due to the structural impediments for doing business in Japan—for example, high operating costs, complex distribution networks, and “closed” business practices (Encarnation, 1999).

TABLE 2. Industrial Structure in Japan, 2001

	Estab. Size ^a		Industry Sector ^b			Total	
	SME	Large	Mfg	WRD	B/F	Japan ^c	Global ^d
Gross Domestic Product^e			25.9	12.2	5.0	5.03	100.0
Employment^f			21.4	32.2	3.2	53.59	
Globalization Indicators, 2002							
Percent of companies with establishments abroad	17.7	49.3	48.2	9.7	3.9	18.7	23.9
Mean percent of procurement from abroad	13.4	10.9	31.6	8.4	0.1	13.3	20.3
Percent of companies with headquarters abroad	2.2	15.5	9.7	0.4	1.0	2.7	8.5
Mean percent of total sales from abroad	5.2	12.0	16.6	1.9	0.2	5.4	12.1
Degree affected by competitors abroad ^g							
<i>Low</i>	83.6	48.0	52.6	91.1	92.9	82.4	68.3
<i>Moderate</i>	8.6	17.0	10.9	8.4	4.9	8.8	15.7
<i>High</i>	7.8	35.0	36.5	0.4	2.2	8.7	15.2

Source: JSBRI 2002; MPHPT 2002; CRITO Global E-Commerce Survey, 2002

Notes: ^a Estab. = Establishment; SME = small and medium sized enterprises are those with 25-250 employees; Large establishments are those with more than 250 employees.

^b Mfg. = Manufacturing and includes all establishments classified as SIC 20-39; WRD = Wholesale and Retail distribution and includes all establishments classified as SIC 50-54, 56-57, 59; B/F = Banking and Finance and includes all establishments classified as SIC 60-65. See notes a-c for Table 1.

^c Responses were weighted based on the total number of establishments by employee size within the sector for each country. Survey sample sizes for Japan by sector are 95 establishments in manufacturing, 66 in wholesale & retail distribution, and 66 in banking & insurance; by size 124 establishments are classified as SME and 103 as large.

^d Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan. “Global” sample sizes by sector are 743 in manufacturing, 701 in wholesale/retail distribution, and 695 in banking & insurance; by size are 1,088 establishments classified as SME and 1,053 as large.

^e Establishment size and Industrial Sector figures for are in percentage of GDP. The total figure is the actual GDP in units of 100 million yen. Data is for the latest fiscal year, 2001.

^f Estab. Size and Industrial Sector figures for are in percentage of total labor force. The total figure is the number of workers in the labor force in units of million. Data is for the latest fiscal year, 1999

^g Exact question wording: “Using a 5-point scale where 5 is significantly affected and 1 is not at all affected, please tell me how much your establishment is affected by competitors from outside your country.” Scores of 1 and 2 were classified as low, a score of 3 as moderate, and scores of 4 and 5 as high.

Although this initial description of the Japanese economy shows it is not very permeable to the forces for globalization in general, we can further refine our understanding where in particular this impact is most evident in the industrial landscape of Japan by providing close-up snapshots of three industries known to be advanced users of e-commerce.

Manufacturing

The manufacturing sector accounts for 26 percent of GDP and 21 percent of the labor force. Table 2 indicates it is the most globally oriented sector in the Japanese economy: nearly half of the companies

have establishments overseas, a third procure from abroad, and nearly half report moderate to high foreign competitive pressures. They are less likely to have overseas headquarters (10 percent) or conduct overseas sales (17 percent), however, these percentages are slightly higher than the global averages (9 percent and 12 percent respectively). The statistical picture shows the sales of Japanese companies are mainly in the domestic market (83 percent). Nevertheless, exports play a major role in key sub-sectors such as electric/electronics, automobile, machinery, and etc. A more nuance picture of the manufacturing sector, then, would portray a dichotomy between a small export driven sub-sector and a large domestic market oriented sub-sector.

The major manufacturing sub-sectors include electric/electronic, precision equipment, automobiles, general machinery, and chemicals. The dominant players in these sub-sectors are large companies belonging to either a horizontal and/or vertical *keiretsu*. A horizontal *keiretsu*, such as Mitsui, Sumitomo and Mitsubishi, is an *inter-industry/inter-firm* grouping that consists of a main bank and large, leading companies. In contrast, a vertical *keiretsu* is an *intra-industry/inter-firm* grouping organized around a major lead company, such as Toyota Motor or Hitachi Ltd., and three or more distinct layers of SME suppliers (Gerlach, 1992). The *keiretsu* companies and affiliated SMEs drive Japan's export-oriented economy and employ workers across all occupational categories mainly under a lifetime employment and age-based seniority personnel system.

Wholesale and Retail Distribution

The wholesale and retail sector accounts for 12 percent of GDP and 32 percent of the labor force. The picture from the globalization indicators in Table 2 reveals some overseas activities, but these figures are much lower than the global average. In particular, less than 10 percent of the wholesale and retail companies in the GEC Japan Database have overseas establishments and procure from abroad, and 91 percent feel little foreign competitive pressures—that is, this sector is primarily oriented towards the domestic market. What little globally oriented activities they engage in tends to be found in upstream business functions (procurement) but not much in downstream business functions (sales).

Among wholesalers, food and medicine are the largest sub-sectors. A key characteristic of this sector is a complex multi-layered distribution system of intermediaries between producer and domestic customers. The gradual liberalization of the Japanese economy is opening up the distribution channels and forcing some wholesalers to procure goods overseas for sale in the domestic market (METI 2002). In the GEC Japan Database, it is the wholesalers who are becoming globally oriented. In contrast, the retail sector consists of many independent small-scale (between 1 – 4 employees) establishments with direct domestic customer contact. By number of stores, the 100-yen shops, drugstores, and casual wear are the largest retail sub-sectors. Although a few other retailers have made forays overseas, the retail sector in the GEC Japan Database is correctly portrayed as predominately oriented toward the domestic market. The workforce in the wholesale and retail sector consists of a high percentage of clerical and sales employees, many of whom are part-time and female employees with few opportunities for lifetime employment and job promotions.

Banking and Finance

The bank and finance sector accounts for five percent of GDP and three percent of the labor force. It is the least globally oriented sector in the GEC Japan Database—4 percent of the bank and finance companies have establishments abroad but virtually none are engaged in overseas procurement or sales activities. We need to qualify this statistical outcome, however. Historically banks have been very active overseas in support of the foreign direct investments of *keiretsu* companies, however this business activity shows up predominately on the domestic side of the ledger (Mason 1999). Thus, the banking and finance sector does have an international dimension in support of the export-oriented companies.

A few large banks, insurance companies, and securities brokers rise above a larger number of smaller players in these sub-sectors. The banking sub-sector has recently consolidated into five major *keiretsu* main bank groups—Mizuho Holdings Inc., Sumitomo Mitsui Banking Corp., Mitsubishi Tokyo Financial Group, Inc., UFJ Holdings, Inc. and Resona Group—and a scattering of smaller regional banks and financial institutions (trust banks, credit unions, etc.). A notable characteristic of this market is the dominance of the *keiretsu* “main bank system” and the government postal savings and insurance system in intermediating 40 – 60 percent of the domestic capital flows (Gerlach, 1992). Their dominance of the capital market is reinforced by government policies favoring debt over equity financing, giving them a stranglehold over the corporate banking market and forcing other financial services players to the periphery of the retail financial market. In this connection, although market leaders Nomura Securities in securities and Dai Ichi Insurance in insurance are relatively independent companies, most of the remaining midsize security brokers and major insurance companies have an affiliation with one of the *keiretsu* banks. The workforce in the bank and finance sector consists of core professional, managerial and technical employees, and a large number of clerical employees.

Establishment Size

There are 6.18 million establishments employing 67.4 million workers in Japan (JSBRI 2002). Across the three main industry sectors active in e-commerce, the wholesale and retail sector accounts for 43 percent of the establishments, the manufacturing sector 11 percent, and the bank and finance sector two percent.

The Japanese government defines the dividing line between a large company and SME as business establishments with 300 or fewer employees (100 or fewer employees in the wholesale and service sectors, and 50 or fewer employees in the retail and service sectors). Under this classification, there are 6.14 million SMEs in Japan, with 38 percent operating in the retail sector, 11 percent in the manufacturing sector, six percent in the wholesale sector, and two percent in the bank and finance sector. Among SMEs, the Japanese government reports data for a category of small-scale business, which is defined as an establishment with 1 – 19 employees (1-4 employees in the wholesale, retail, food service and service sectors). These establishments constitute 85 percent of the SMEs in the manufacturing sector, 78 percent in the banking and finance sector, and 67 percent in the wholesale and retail sector (JSBRI 2002). We note that the GEC Japan Database only includes SMEs with 24 to 249 employees, leaving out not only a large number of miscellaneous small-scale businesses unrelated to this study, but also the e-commerce related start-ups.

The SMEs in the GEC Japan Database are less globally oriented than large establishments across the globalization indicators in Table 2 except on the overseas procurement measure. This last finding draws our attention to the fact that SMEs in the wholesale sector and a few notable cases in the retail sector (e.g., Fast Retailing) are shifting procurement towards overseas sources, especially to China for low price goods and to Europe for luxury goods (JSBRI 2002). In addition, if we also add to this pool the SMEs indirectly involved in international trade as suppliers to the *keiretsu* companies, especially in the manufacturing sector, and the banks financing the overseas operations of *keiretsu* companies, this relational context brings into sharper relief a greater number of “globalized companies.” This picture provides a sharper definition of the major fault lines between global-oriented and domestica-oriented establishments in the industrial landscape of Japan.

E-COMMERCE READINESS

We use this more grounded picture of the globalization fault lines in the GEC Japan Database to examine the extent companies are ready for e-commerce—that is, the level of IT investment and information

infrastructure. The forces for globalization should lead to more investments in information systems and an inclusive e-commerce infrastructure, easing the diffusion of Internet-based business activities.

Business IT Investment

The current key economic indicator for capital spending in Japan is based on the number and amount of machinery orders, especially for factory production. In contrast, corporate spending for information systems (IS) represents a new type of capital spending for Japanese companies. The extent that companies increase capital spending for IS and web-based initiatives, then, is one indicator of their shift towards adopting e-commerce activities.

Information Systems

One dimension of firm e-commerce readiness is the level of IS spending in total revenues. In this connection, Table 3 shows that only 10 percent of the companies spend more than 10 percent of their total revenues for IS. Oddly, we note that the “don’t know or refused” category is the next largest response (29 percent). Since the survey respondents are in a position to answer this question, either this type of information is not centrally collected or they are withholding IS investment information for strategic competitive reasons, especially for the bank and finance sector where the refusal rate is the highest. Moreover, the GEC Japan Database strangely reports there is no IS spending in the manufacturing sector. With these caveats, Table 3 shows subdue corporate IS spending, where 12 percent of the wholesale and retail sector and two percent of the bank and finance sector report spending 10-50 percent of their revenues for IS. Only a few special cases in the bank and finance sector (0.7 percent) and the wholesale and retail sector (0.2 percent) report spending more than 50 percent on IS. Small and medium-sized enterprises (9 percent) are more likely than large companies (1 percent) to spend 20-50 percent of their revenues for IS.

TABLE 3. Investment in Information Technology

	Estab. Size		Industry Sector			Total	
	SME	Large	Mfg.	WRD	B/F	Japan	Global
IS as percent of Revenues ^e							
<10 percent	62.2	58.8	61.5	62.7	41.5	61.9	
10 – 20 percent	0.2	0.0	0.0	0.2	1.6	0.2	
20 – 50 percent	9.1	0.0	0.0	12.1	0.0	8.8	
>50 percent	0.2	0.7	0.0	0.2	0.7	0.2	
Don't know/refused	28.6	40.6	38.5	24.8	56.3	28.9	
Operating Budget (\$0000)	6,321	8,366	1,499	7,634	410	6,361	
Web as percent of IS Revenues ^f							
<10 percent	36.5	24.3	33.4	37.2	31.5	36.1	
10 – 20 percent	3.5	5.4	12.8	0.6	0.0	3.5	
20 – 50 percent	13.1	18.1	14.9	13.0	1.8	13.2	
>50 percent	15.0	10.4	22.7	12.2	18.2	14.9	
Don't know/refused	31.9	41.9	16.2	37.1	48.5	32.2	
Operating Budget (\$0000)	1,527	1,085	505	1,886	77	1,517	

Source: CRITO Global E-Commerce Survey, 2002

Notes: See notes a-d for Table 2

^e Actual wording: “What would you estimate was your establishment’s total IS operating budget as a percentage of your establishment’s revenues in 2001?”

^f Actual wording: “What percentage of your establishment’s IS operating budget in 2001 was devoted to Web-based, that is, Internet, extranet and intranet initiatives, including systems, software, IT services, consulting and internal staff?” Also includes internal and external spending.

Before concluding that Japan’s low level of globalization is the causal link to these findings, we call attention to several alternative endogenous factors. First of all, Japan has been mired in a prolonged

economic recession. The bursting of the asset bubble in 1990 continues even today to weigh heavily on the domestic economy. Consequently, most *keiretsu* companies are still in the process of paying down corporate debt and addressing their overcapacity situation, handicapping them in diverting organizational resources for new Internet-based IS. In addition, the *keiretsu* main banks, saddled with a mountain of non-performing loans from the post-bubble years, have been issuing fewer and fewer loans over the past decade in order to maintain their legally required capital adequacy ratio, an indicator of their financial solvency. Given the relative absence of alternative financial intermediary options in Japan and limited access to capital markets abroad, this has hurt the SMEs, particularly those that have survived the recession and are ready to make IS investments in order to respond to competitive pressures and consumer demands (JSBRI 2001).

Another endogenous factor is Japanese personnel practices. Among the most globalized companies, there are few chief information officers in *keiretsu* companies to promote web-based initiatives (METI 2002). Instead, the technical staff is usually in charge of introducing such initiatives but they must report to a senior manager to gain budgetary approval. Since Japan's aged-based seniority system (*nenko joretsu*) and lifetime employment (*shin shu koyo*) means older non-technical executives are making these budget decisions, the survey results suggest a possible psychological and age factor in understanding firm e-commerce readiness—that is, the more older executives are aware and understand the Internet, the more likely they budget for web-based initiatives. This type of senior manager is a distinct minority in Japanese companies. Therefore, as the Japanese economy improves and a younger generation of managers move into executive positions, we should witness a greater corporate propensity for cost effect IS spending.

Web-based Initiatives

Another dimension of firm e-commerce readiness is spending for web-based initiatives—that is, Internet, extranet and intranet initiatives, including systems, software, IT services, consulting and internal staff—as a percentage of a company's IS budget. As expected, Table 3 shows that around one-third of the companies spend less than 10 percent of their IS budget for developing web-based initiatives. Consistent with the contours of the global fault lines in the Japanese industrial landscape, the manufacturing sector (28 percent) is taking the lead in spending 10 – 50 percent of their budget on web-based initiatives, followed by the wholesale and retail sector (14 percent), and finally the bank and finance sector (2 percent). By establishment size, large companies (24 percent) are more likely than SMEs (17 percent) to invest in web-based initiatives.

When we focus on the companies spending more than 50 percent of there is budget for web-based initiatives, the contours of the industrial landscape changes a bit. The manufacturing sector (23 percent) is still the most active investor, however, the bank and finance sector (18 percent) jumps into the second slot followed closely behind by the wholesale and retail sector (12 percent). Spending for web-based initiatives in the bank and finance sector is motivated by new competitors (nonblank banks) from unexpected quarters entering this recently deregulated sector. For example, the major retailer Ito Yokado (IY Bank) and well known electronics maker Sony Corporation (Sony Bank) have been relatively successful in attracting customers to their online banking and financial services. By establishment size, another role reversal finds SMEs are slightly more likely to invest in web-based initiatives (15 percent) than the large companies (10 percent). Both results bring into relief the downstream sales activities of small wholesalers, securities and insurance companies as some possible sub-sectors active in spending for web-based initiatives (JSBRI 2002). If these types of companies continue to take the lead in increasing IS spending along their entire value chain, it is possible that differences by industry and establishment size could begin to diminish.

Company Information Infrastructure

The types of e-commerce technologies that companies use and how they are integrating it with business functions provide additional details on how the forces for globalization and endogenous factors influence the ways companies allocate their IS operating budgets.

Types of E-Commerce Technologies

A third dimension of firm e-commerce readiness is the type of e-commerce technologies used by companies. Table 4 shows that Japanese companies have adopted most types of e-commerce technologies despite tight corporate budgets. Indeed, Japan exceeds the global averages for intranet, extranet, EDI, and call center technologies, and stands even on the use of e-mail and websites. Only for EFT (electronic fund transfer) use is Japan slightly lower than the global average. Actually EFT is quite common in Japan, but normally a company's main *keiretsu* bank handles such business transactions on its behalf (IAJ 2001). In short, despite a late start in getting online to the Internet, Japan has made up some of this temporal lag by adopting many of the pre-requisite technologies necessary for e-commerce.

TABLE 4. Use of E-Commerce Technologies

Percentage using . . . ^e	Estab. Size		Industry Sector			Total	
	SME	Large	Mfg.	WRD	B/F	Japan	Global
E-mail	99.8	98.9	100.0	100.0	95.2	99.8	98.5
Intranet	80.7	84.2	74.4	83.1	80.6	80.8	63.6
Web-site	72.5	100.0	86.1	67.9	91.1	73.4	74.1
EDI	63.8	66.3	71.4	64.0	20.8	63.8	44.3
<i>Over private networks</i> ^f	34.8	14.4	9.9	44.4	10.2	34.1	19.4
<i>Internet-based EDI</i> ^f	7.8	9.0	29.2	0.4	4.4	7.9	8.4
<i>Both</i> ^f	21.1	42.5	32.2	19.1	6.2	21.8	15.9
Extranet	50.2	34.6	33.1	57.3	19.8	49.7	32.7
<i>Supplier/business partner access</i> ^f	26.3	28.3	11.0	32.7	6.2	26.4	20.9
<i>Customer access</i> ^f	21.6	19.5	16.1	24.4	5.7	21.5	17.8
Call Center	39.9	39.9	15.3	49.5	20.0	39.9	32.3
EFT	7.3	18.0	25.9	0.8	16.3	7.6	43.4

Source: CRITO Global E-Commerce Survey, 2002

Notes: See Notes a-d for Table 2

^e Exact wording of question: Does your establishment use . . . ? Percent answering Yes.

^f Percent based on total sample

The adoption of efficient e-commerce technologies should correspond with a decline in the existing EDI networks. In the Japanese case, the use of EDI (64 percent) still far exceeds the global average (44 percent). Most of the EDI are over private networks (34 percent) or both private and Internet-based networks (22 percent). Only a few companies (8 percent) have moved their EDI activities online to the Internet. The private EDI networks are a legacy of information systems (e.g., CALS, strategic information systems, etc.) dating back to the 1970's. Some exemplary examples include the Seven Eleven Convenience Store stocking system, Yamato Transport overnight delivery system (*takkyubin*), and Toyota Motors just-in-time delivery system (*kamban hoshiki*). In addition, the presence of Internet-based EDI networks shows a recent convergence on the EDIFACT standard for international trade and commerce (JEDIC 2001; ECOM 2002). The overall picture that emerges portrays EDI networks co-existing with the other e-commerce technologies in many companies.

An examination of the differences by industry sector and establishment size gives us further understanding of this hybrid outcome. Table 4 shows that the wholesale and retail sector is the most likely to use private EDI networks (44 percent), whereas the manufacturing sector uses Internet-based EDI networks (29 percent) or both private and Internet-based EDI networks (32 percent). More specifically, the manufacturing sector uses a mixture of open and closed networks to coordinate its

domestic (private EDI networks) and overseas production (EDIFACT and Internet-based EDI networks), whereas the wholesale sector is essentially dependent on the existing domestic private EDI distribution networks (JEDIC 2001). In the GEC 10 Japan Database, the bank and finance sector is the least likely to use EDI networks.

Complementing these respective EDI networks, we find in Table 4 that more than three-fourths of all companies in the three industries use e-mail, intranet, and website e-commerce technologies. These three form the core e-commerce technologies that most Japanese companies initially adopt. The companies diverge on the remaining e-commerce technologies—extranet, call centers and EFT—by industry, however. The wholesale and retail sector is more likely to use extranet (57 percent) and call centers (50 percent) than the other two sectors. JSBRI (2002) cases studies suggest it is probably the wholesalers that are using the extranet in parallel with their private EDI networks, and the retail sector, and the retailers using call centers in addition to their EDI networks. The manufacturing sector, in turn, is the biggest adopter of EFT (26 percent) and the second biggest user of the extranet (33 percent), especially for customer access, however it is the least likely sector to use call centers (15 percent). Thus, this sector primarily adopts e-commerce technologies to complement its EDI networks in the operations management functions but less so in its downstream customer contact sales and marketing functions. Finally, the bank and finance sector nominally uses e-commerce technologies for corporate and individual customer service functions, drawing equally upon call centers (20 percent), extranet (20 percent), and EFT (16 percent) e-commerce technologies.

By establishment size, Table 4 does not show much difference between large companies and SMEs except in two e-commerce technologies. Large companies (100 percent) are more likely than the SMEs to use websites, but at a 73 percent adoption rate the SMEs are also a big user of websites. However, SMEs (50 percent) are more advanced users of the extranet than the large companies (35 percent). Based on a JSBRI (2002) report, these particular companies are probably SMEs in the wholesale and retail sector using the extranet to give preferred suppliers and business partners secure but limited access to their information systems. A more nuance picture shows a widespread adoption of e-commerce technologies either to complement an existing EDI network (creating a hybrid open/closed e-commerce information infrastructure) or enhance a specific business function.

IT and Web Integration

A fourth dimension of firm readiness is the extent companies are electronically integrating their business functions. This should provide a clearer picture whether the relatively high adoption of the technological building blocks for e-commerce are strategically incorporated into the daily business practices of Japanese companies.

Table 5 shows Japanese companies are less likely to report their Internet applications are electronically integrated “a great deal” (14 percent) with their *internal* databases and information systems than the global average (24 percent). Given the high adoption rate of most e-commerce technologies, this outcome suggests there is relatively modest company-wide coordination in its use across the different business units. By industry, the manufacturing sector (25 percent) rises above the national and global averages, but the wholesale and retail sector (11 percent) and the bank and finance sector (7 percent) lag behind. By establishment size, large companies (19 percent) are slightly more likely than SMEs (14 percent) to electronically integrate their internal databases and information systems. Fujitsu’s motto in this connection, for example, is “everything online.” Consequently it is the large companies in the manufacturing sector that have taken a modest lead in electronically reorganizing their standard operating procedures.

TABLE 5. Enterprise Integration Strategy

Extent Internet application electronically integrated with ...	Estab. Size		Industry Sector			Total	
	SME	Large	Mfg.	WRD	B/F	Japan	Global
Internal databases and information systems^e							
Percent little to none	57.2	44.8	44.5	59.8	72.7	56.7	52.5
Percent some	28.9	36.0	30.2	29.5	20.2	29.2	23.6
Percent a great deal	13.9	19.2	25.3	10.7	7.1	14.2	23.9
External suppliers and business customers^f							
Percent little to none	81.6	68.8	58.0	89.4	78.4	81.1	72.1
Percent some	16.4	20.5	33.8	10.3	19.1	16.6	18.3
Percent a great deal	2.0	10.7	8.2	0.2	2.5	2.3	9.6

Source: CRITO Global E-Commerce Survey, 2002

Notes: See notes a-d for Table 2

^e Exact wording of question: "Using a 5-point scale where 5 is "a great deal" and 1 is "not at all", please rate the extent to which your Internet applications are electronically integrated with your internal database and information systems. Scores of 1 or 2 are categorized as "little to none", a score of 3 as "some" and scores of 4 or 5 as "a great deal"."

^f Exact wording of question: "Using a 5-point scale where 5 is "a great deal" and 1 is "not at all", please rate the extent to which your company's databases and information systems are electronically integrated with those of your suppliers and business customers. Scores of 1 or 2 are categorized as "little to none", a score of 3 as "some" and scores of 4 or 5 as "a great deal"."

Japanese companies are also less likely to report their databases and information systems are electronically integrated "a great deal" (2 percent) with those of their *external* suppliers and business customers than the global average (10 percent). By industry, manufacturing (8 percent) is the most likely sector to electronically integrate with their suppliers and business customers, followed by the bank and finance sector (3 percent). This much follows the globalization fault lines in the Japanese industrial landscape. Interestingly, the wholesale and retail sector is the biggest adopter of extranet, but it is the least likely to electronically integrate with its suppliers and business customers (0.2 percent). Given a large percentage of this sector uses private EDI networks, these contrasting findings suggest that online transactions are concentrated within business units but enterprise integration across business units is conducted predominately through closed networks. The large companies are more likely to electronically integrate with suppliers and business customers (11 percent) than the SMEs in general (2 percent).

The pattern of *internal* (database and information systems) and *external* (suppliers and business customers) enterprise integration essentially maps the presence of the vertical and horizontal *keiretsu* in the industrial landscape of Japan. The low level of enterprise integration, especially externally and to a lesser extent internally, highlights the continuing importance of secure EDI networks and interpersonal relations in the daily business activities of *keiretsu* companies. Consequently, the Internet electronically mediates some intra-firm relationships, but very little of the existing inter-firm relationships among Japanese companies. Toyota Motors, for example, places a premium on securing its proprietary technology (e.g., eco-friendly and luxury car product lines), and thus chooses to stay off-line and conduct its business through trusted networks. Given that the e-commerce technology building blocks and hybrid enterprise integration strategies are basically in place, e-commerce among Japanese companies should grow as the merits of online Internet-based transactions address their business challenges.

Key Drivers and Barriers

A company's readiness for e-commerce gains forward momentum the more it speaks to market demands and public policy challenges. The GEC Japan Database measures these challenges as drivers and barriers to e-commerce. The drivers provide insight into the demands for Internet use in business and

the barriers the trade-offs companies make in selecting business solutions.

Drivers

Table 6 shows the top factor driving the use of the Internet is customer demand (37 percent). This is consistent with a quality function deployment (QFD) approach primarily found in the large, leading companies. The QFD is a series of embedded matrices translating the “voice of the customer” into design targets and then moves upstream to establish quality assurance checkpoints throughout the different segments of a company’s value chain (Akao, 1990). A recent significant change in the buying habits of customers is their ability to express their demands to producers through the growing popularity of second generation (2G) mobile devices, especially those using i-Mode, and more recently, third generation (3G) broadband enabled devices (MPHPT 2002). The reverberation of customer demands back into the chain of QFD matrices accounts for the concurrent emphasis on entering a new business or market (34 percent) and improving coordination with customers and suppliers (33 percent) as the next two top drivers—that is, the marketing and manufacturing segments of the value chain.

TABLE 6. Drivers For Internet Use

Percent indicating a significant factor ^c	Estab. Size		Industry Sector			Total	
	SME	Large	Mfg.	WRD.	B/F	Japan	Global
MARKET							
Customers demanded it	32.2	57.5	48.5	34.1	18.8	36.9	36.9
Suppliers required it	26.1	32.8	32.0	25.3	11.1	26.3	22.3
Required for Government procurement	4.4	14.6	18.3	0.1	4.7	4.7	15.2
STRATEGY							
To enter new businesses or markets	33.7	31.1	11.2	41.5	29.3	33.6	42.0
To improve coordination with customers and suppliers	32.8	46.1	54.5	25.8	37.4	33.3	43.7
To reduce costs	26.9	42.6	55.7	17.5	32.5	27.4	35.7
To expand market for existing product/services	22.6	51.6	37.4	17.4	47.3	23.5	47.9
Major competitors were online	18.7	39.1	21.7	17.5	36.5	19.4	31.3
POLICY							
Government provided incentives	1.8	2.7	7.8	0.0	0.0	1.9	8.3

Source: CRITO Global E-Commerce Survey, 2002

Notes: See notes a-d for Table 2.

^cExact wording of question: “Using a 5-point scale where 5 is “a very significant factor” and 1 is “not a factor at all,” please rate how significant each of the following was to your organization’s decision to begin using the Internet for business. A score of 4 or 5 was classified as “a significant factor.”

Among the remaining drivers in Table 6, major competitors (19 percent), public procurement (15 percent), and government incentives (2 percent) are relatively less important factors. In short, the overall clustering and rank ordering of the factors for Internet use, underscores that customer-related market and strategic factors are greater drivers for e-commerce than competitors and public policy. Indeed, the access rate by personal computers and mobile devices to the Internet in Japan has nearly reached the saturation point, and so most companies cannot ignore the growing potential for online sales, leading to the realignment of their value chains in order to respond to customers in real time (Hamaya, 2001).

Table 6 suggests the use of the Internet by industry sector is not systemic, however. Instead, the manufacturing sector is realigning its production segment of the value chain to reduce cost (56 percent) and improve coordination with customers and suppliers (55 percent) in response to price and style sensitive customers. In the wholesale and retail sector, the main driver for Internet use is for entering

new businesses or markets (42 percent), shifting the spotlight to the marketing and sales segments of the value chain, in response to potential customers beyond their traditional markets. This driver is marginally more important for the SMEs (34 percent) than large companies (31 percent). Companies in the bank and finance sector, in contrast, began using the Internet primarily to expand the market for existing products and services (47 percent) and to improve coordination with customers and suppliers (37 percent), in a defensive response to online competitors (37 percent) luring traditional customers. We note that these different characteristics of customer demand correspond to segments of the Japanese economy that have undergone liberalization (Tachiki et al., 2002). Moreover, our earlier finding shows that web-based integration proceeds the fastest where market entry barriers have been deregulated. These iterative findings suggest measuring the forces of globalization at the firm level is necessary but not sufficient in the Japanese case. The forces for globalization affect the level of B2B transactions but the opening of economic space through liberalization or deregulation is an endogenous factor stimulating the level of B2C transactions. A closer examination of the forces for globalization and the liberalization nexus in future research may provide us with further understanding when and where customer demand drives companies to use the Internet in their business.

Barriers

The key factors in Table 7 inhibiting the use of the Internet in business is privacy and security issues (55 percent) closely followed by the cost of implementation (53 percent). Both factors are significantly higher than the global averages, reflecting the strong public suspicions toward Internet transactions (IAJ 2001) and the business concerns about its cost. In general, companies place government policies towards the bottom of their list. Nevertheless, the position of Nippon Keidanren (2003), the peak business organization in Japan, shows companies are becoming more concerned about policy issues as online transaction replace their existing off-line business practices. Finally, the use of credit cards (9 percent) is not a factor hindering companies from doing business online. Indeed, Japan has a number of alternative payment systems for online purchases using financial institutions, transport companies, and convenience stores, making credit cards use significantly less problematic than in other countries.

In Table 7, there is a near consensus among companies across industry sectors and establishment size that privacy is the top reason they are unable to smoothly conduct business online. Although Japan has privacy laws on the books for public transactions, this law does not extend to private transactions (MPHPT, 2002). Moreover, although some Internet Providers are gravitating towards different security standards, they handle only a minority of all Internet transactions (IAJ, 2001). In the absence of comprehensive privacy and security protection in e-commerce, then, Japanese companies rely on existing EDI networks and interpersonal relations. The inter- and intra-firm *keiretsu* relations with customers, for example, effectively locks-out unauthorized third parties from business transactions. For just this reason, foreign companies cite these close interpersonal business practices as a structural impediment for foreigners doing business in Japan. Within this context, the need for face-to-face customer interaction emerges as the second (bank and finance sector) or third (manufacturing sector and wholesale and retail sector) most significant barrier not as a cultural imperative but as a business necessity.

TABLE 7. Barriers/Difficulties

Percent indicating a significant factor ^e	Estab. Size		Industry Sector			Total	
	SME	Large	Mfg.	WRD	B/F	Japan	Global
BUSINESS ENVIRONMENTS							
Concern about data privacy or security issues	54.9	64.1	70.0	50.2	65.0	55.2	44.2
Need for face-to-face customer interaction	42.6	45.4	40.9	42.0	60.6	42.7	33.8
Customers do not use the technology	30.2	26.2	22.4	33.0	19.6	30.1	31.4
Prevalence of credit card use in the country	9.0	13.1	10.1	8.5	16.1	9.1	20.3
ORGANIZATIONAL RESOURCES							
Costs of implementing an e-commerce site	53.0	44.3	54.6	54.3	19.7	52.7	33.6
Level of ability to use the Internet as part of business strategy	30.8	35.3	46.1	25.9	40.1	31.0	24.8
Finding staff with e-commerce expertise	28.9	26.7	38.7	25.6	32.7	28.8	26.5
Making needed organizational changes	27.8	22.4	37.9	25.1	22.6	27.6	23.9
Cost of internet access	24.5	23.5	26.3	24.6	14.7	24.5	15.1
GOVERNMENT POLICIES							
Business laws do not support e-commerce	21.3	32.3	38.1	17.1	16.2	21.6	24.2
Inadequate legal protection for Internet purchases	20.5	29.6	32.4	17.2	22.3	20.8	34.1
Taxation of internet sales	15.3	11.2	11.6	16.7	6.7	15.2	16.5

Source: CRITO Global E-Commerce Survey, 2002

Notes: See notes a-d for Table 2

^e Exact wording of question: "Using a 5-point scale where 5 is "a very significant obstacle" and 1 is "not an obstacle," please rate how significant the following obstacles are to your establishment's ability to do business online. A score of 4 or 5 was classified as "a significant obstacle."

The manufacturing sector (55 percent) and wholesale and retail sector (54 percent) emphasize the cost of implementation as one of its top two significant obstacles to doing business online. This inhibiting factor grows in importance for SMEs (53 percent) more than the large companies (44 percent). In contrast, the bank and finance sector, having already taken a lead in IS spending, has moved on to concerns about how to use the Internet as part of its business strategies (40 percent) as the third factor inhibiting their ability to conduct business online. A common link to all these concerns gravitates around the 6Ms. When Japanese managers examine the cost effectiveness of a new idea, they immediately break it down into not only the money aspect (initial direct cost), but also the manpower, machine, materials, methods, and market aspects (total direct and indirect costs). From this broader implementation cost perspective, business strategy (31 percent), staff expertise (29 percent), and organizational change (28 percent) cluster together as an organizational factor inhibiting a company's ability to do business online. Although consultants make eloquent arguments about the cost-savings realized from implementing e-commerce technologies, in the Japanese case, these building blocks have not conclusively proven more efficacious than the broader organizational foundations supporting existing EDI and TQM practices. As Internet-based e-commerce addresses the above proprietary concerns and organizational issues, then, it should fare better against the existing off-line business practices of Japanese companies.

DIFFUSION OF E-COMMERCE

The variations in the forces for globalization and Internet readiness effects the diffusion of e-commerce at the industry and company levels. Our measure of e-commerce diffusion is based on revenues generated online over the Internet (CRITO 2001). The comparative merits and demerits of e-commerce against the existing Japanese style of management suggest it will diffuse unevenly across industries and within

companies.

Current E-Commerce Revenues

TABLE 8. Market Size of E-Commerce, 1998 - 2005 ^a

	1998 ^b	1999	2000	2001 ^c	2002 ^c	2003 ^c	2004 ^c	2005 ^c
Total (million yen)	8,685	12,656	22,414	35,511	46,781	66,304	90,925	141,727
B2B ^d	8,620	12,320	21,590	34,027	43,950	61,270	78,430	125,430
<i>B2B Ratio</i> (percent) ^e	99.3	97.3	96.3	95.8	93.9	92.4	86.3	88.5
<i>EC Rate</i> (percent) ^f	---	---	4.1	5.0	6.6	9.2	11.5	14.1
B2C ^g	65	336	824	1,484	2,831	5,034	12,495	16,297
<i>B2C Ratio</i> (percent)	0.7	2.7	3.7	4.2	6.1	7.6	13.7	11.5
<i>EC Rate</i> (percent)	---	---	0.3	0.6	1.1	1.9	3.1	4.5

Source: ECOM 2002

Notes: ^a The definition of e-commerce used for the ECOM study is “*the conduct of commerce*” (e.g., exchange of goods, services, information and money between suppliers and buyers, associated with the commercial transfer of assets between economic units.) *through computer network systems using the Internet technology* (i.e., using the TCP/IP protocol. Network lines include the Internet, extranet, Internet VPN, and dedicated IP lines), *the transactional values of which can be identified* (i.e., giving quotations, providing information and other pre-order conduct are included, as long as it is clearly identified that the conduct has led to purchase and/or sales order).

^b First year of survey.

^c Projected figure

^d B2B E-commerce is where businesses/government bodies pay businesses in exchange for commodities (goods, services, information, etc.). Includes B2G where government bodies pay businesses in exchange for commodities (goods, services, information, etc.) and E-marketplace where B2B E-commerce on platforms used by multiple selling/buying enterprises.

^e B2B or B2C percent of total e-commerce

^f The proportion of e-commerce against the total interim demands and final demands for the applicable segment

^g B2C E-commerce is where households pay businesses in exchange for commodities (goods, services, information, etc.). Mobile E-commerce using mobile terminals. E-commerce involving pre-order stages (quotes, commissioning, etc.) for automobile, real estate, etc.

N.A. = data not available

For the past three years, the ECOM (Electronic Commerce Promotion Council of Japan) has been improving the definition of and data collection on e-commerce to create a reliable database (ECOM 2002). Although the annual ECOM survey is getting better at capturing current trends, its future forecasts often fail to foresee emerging trends. Moreover, the future forecasts look suspiciously similar to the government policy goals of the e-Japan Strategy. Taking into consideration these caveats, it is still a bit more reliable than many of the consultant generated forecasts.

According to this annual survey, Table 8 shows the projected size of the e-commerce market in Japan in FY2002 should amount to nearly 47 trillion yen (ECOM 2002). This is a five-fold increase over the amount of e-commerce transactions in 1998, when this survey first began. By FY2005, the ECOM forecasts the e-commerce market should triple in size to 142 trillion yen. During this period of time, the B2C market should account for 12 percent of total revenues, up from 6 percent in FY2002. In the following sections we disaggregate the B2B and B2C data to examine first the diffusion of e-commerce across industries, and second the nature of Internet use within companies.

Diffusion Across Industries

We seek evidence that the *keiretsu* fault lines across the industry sectors ease and channel the flow of B2B and B2C e-commerce. In addition, since the GEC Japan Database does not include “small-scale businesses” (1-19 employees), we elaborate on the rise of Internet companies to flesh out this side of the diffusion story.

Users of E-Commerce

According to a Ministry of Economy Trade and Industry (ECOM 2002) survey, since the 1990s, the diffusion of the Internet to Japanese companies has increased from less than 10 percent to 96 percent for “enterprises” (>300 employees) and from 6 percent to 45 percent for “establishments” (<300 employees). Table 9 orders these individual companies into their industry sub-sectors and type of e-commerce (B2B or B2C) to examine the spread of e-commerce across industries.

Business-to-Business

In Table 9 the manufacturing sector accounts for most of the e-commerce transactions across the B2B market in FY2001. The top three manufacturing sub-sectors are electronic and information products (44 percent) automobile (40 percent) and industrial and precision machinery (3 percent). The wholesale/retail sector is difficult to separate from the manufacturing related component in the ECOM data, but at face value, the textile and sundry goods (2 percent), food (2 percent), and paper and office products (<1 percent) are the most obvious candidates. That is, wholesalers more than retailers. In the bank and finance sector, the financial and insurance services account for a nominal 0.03 percent. Since the GEC10 Survey uses the standard industrial classification (SIC) to define the range of industries for inclusion in this study, we note that missing from Table 14 are the wood products, furniture, leather, and ceramics industries. These sub-sectors correspond roughly to companies falling outside the inter-firm boundaries of the horizontal and vertical *keiretsu*. In short, the diffusion of B2B e-commerce roughly follows the contours of the horizontal and vertical *keiretsu* relationships and spills-over into recently liberalized sectors. Combining these findings with our previous discussion suggests where establishments have weak ties to a *keiretsu* group and/or where market entry is still regulated, we find nominal e-commerce activities.

Where the ECOM data becomes more problematic is in its future forecasts of e-commerce trends. By FY2006, the ECOM projects the electronic and information products (25 percent) and automotive (19 percent) sub-sectors should continue to top the B2B market. In addition, the industrial and precision machinery should grow to seven percent, joined by the chemical products (7 percent) and iron and nonferrous metals (8 percent). This scenario suggests a greater integration of the supporting industries—that is, the cluster of companies in the materials industries, material processing industries, and associated industries (dies and molds, machine tools, founding and forging machinery, industrial furnaces, etc.)—at the foundations of the vertical *keiretsu* production networks. These sub-sectors are relevant to an export-oriented economy, however it is already clear that China and the other Asian economies will come to dominate the low and middle-technologies in these sub-sectors, pushing Japan to move up the technological ladder to more knowledge-intensive technologies. This suggests the ECOM forecast underestimates the potential growth in the service sector as an important B2B player in the future.

Our quasi-measures for the wholesale and retail sector also suggest greater growth in the textile and sundry goods (9 percent), food (7 percent), and paper and office products (4 percent). These are the sub-sectors where intense competition and consumer preferences require companies to pursue greater rationalization of their distribution channels. Although bank and finance business should increase as the economy improves, the ECOM projects only a nominal 0.03 percent growth in its online business.

TABLE 9. Users of E-Commerce ^a

Sector	2000	2001	2006
B2B			
Electronic/Information Products	55.5	44.3	24.7
Automotive	33.6	39.7	18.7
Industrial/Precision Machinery	0.5	2.8	5.6
Iron/Nonferrous/Raw Materials	1.8	2.6	6.6
Textile/Sundry Goods	2.7	2.4	8.8
Food	3.2	2.4	6.5
Transportation/Travel Services	1.3	1.6	5.1
Chemical Products	0.1	1.3	5.7
Info Processing/Software Related Services	NA	1.1	1.8
Construction	1.3	1.1	11.5
Paper/Office Products	<0.1	0.4	4.1
Utility Related Services	NA	NA	0.7
Communications/Broadcasting Services	NA	<0.1	0.1
Financial/Insurance Services	NA	<0.1	<0.1
Total	21,590	34,027	125,430
B2C			
Automotive	24.5	23.4	14.2
Real Estate	21.4	22.0	8.7
PC and Related Goods	11.0	10.0	3.5
Travel	7.4	8.0	14.6
Entertainment	7.2	7.4	6.9
Other Products Sales	6.6	6.6	6.5
Other Services	3.8	4.7	15.6
Financial	5.3	4.3	3.8
Clothing and Accessories	3.3	3.9	8.2
Food	4.0	3.8	7.3
Hobbies/Misc./Furniture	2.7	3.3	6.5
Books and Music	2.4	2.3	3.3
Gifts	0.5	0.5	1.0
Total	824	1,484	16,297
(Digital Contents)	50	93	---

Source: ECOM 2002

Notes: Total percentages do not add up to 100 percent due to rounding errors.

NA = data not available

Business-to-Consumers

In Table 9, across the B2C market in FY2001, the retail and wholesale sector accounts for significantly more of the e-commerce revenues than the other two sectors in this study. The top wholesale and retail sub-sectors are automotive (23 percent), PC and related goods (10 percent), clothing and accessories (4 percent), food (4 percent), hobbies (3 percent), and books and music (2 percent). This list of sub-sectors essentially covers all the segments in the wholesale and retail sector, but the depth of this diffusion is shallow. In contrast, the bank and finance sector, the financial services account for four percent of B2C total revenues, and the manufacturing sector a nominal amount.

By FY2006, the ECOM projects travel (8 percent → 15 percent) will move near the top of B2C list and

replace real estate (22 percent → 9 percent) as the top services sub-sector generating B2C revenues. The automotive (23 percent → 14 percent), PC and related goods (10 percent → 4 percent) and finance services (4 percent → 4 percent) sub-sectors will contract, but the clothing and accessories (4 percent → 8 percent), food (4 percent → 7 percent), hobbies (3 percent → 7 percent), and books and music (2 percent → 3 percent) should continue to grow. While the ECOM forecasts are becoming more accurate, it tends to miss nascent trends. We note that these are youth-oriented markets, but the rapid aging of Japanese society suggests other types of B2C services will emerge in the near future. This fundamental demographic trend is virtually ignored in the ECOM forecast. Thus, we expect further growth in the above industries; however, the major players five years down the road may look very different.

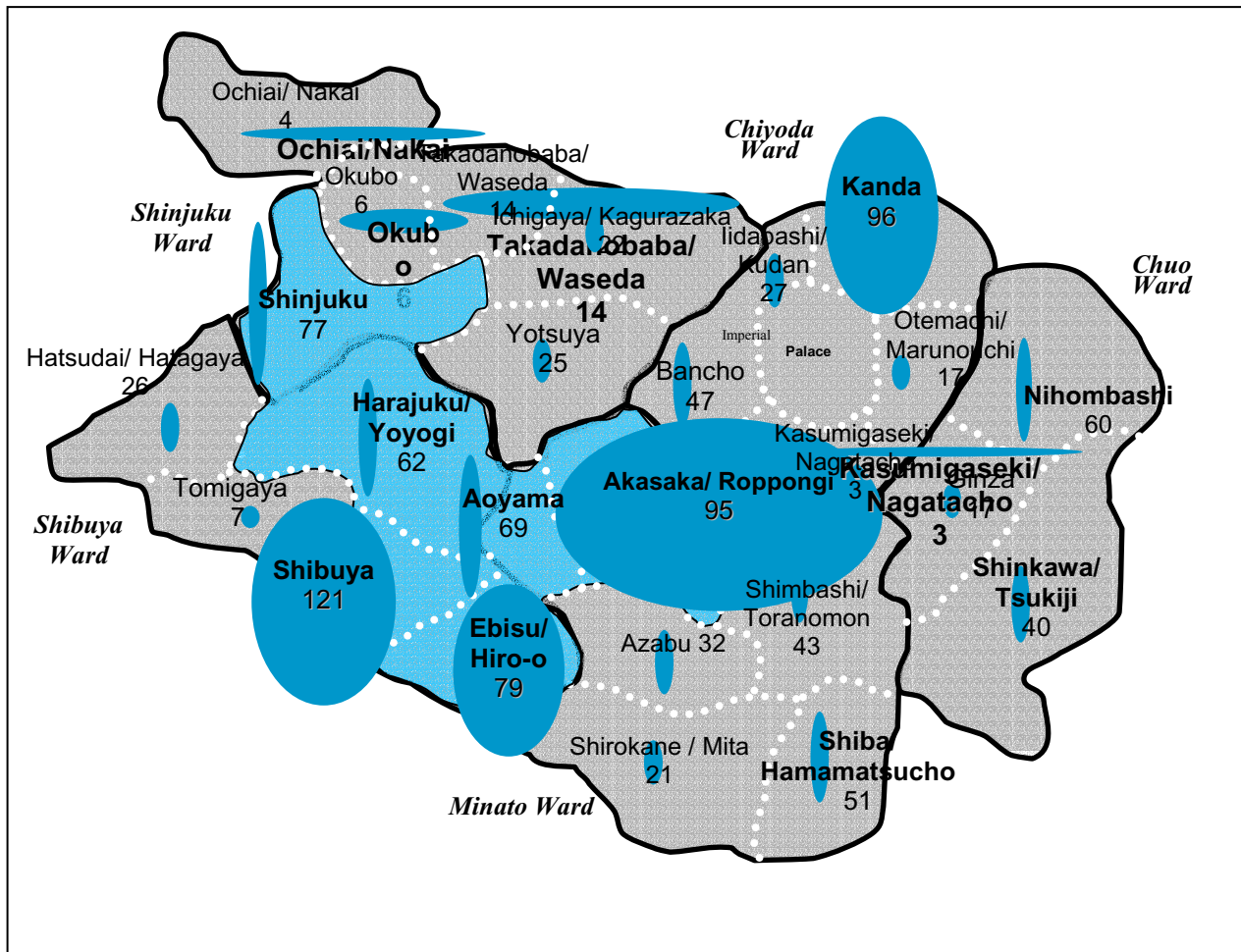
Locations and Structure of E-commerce Companies

In this section, we turn to the dot-com companies challenging the established brick-and-mortar business models of Japanese companies. Dot-com companies came from nowhere in the 1990s to become a nominal part of the industrial landscape over the past decade. In this connection, we ask, “Where do dot-com companies come from?” If you ask a knowledgeable person in Japan what is a prototypical e-commerce company, most close observers would mention one associated with the Bit Valley. We examine the geographical location and organization of these e-commerce companies in this section.

Clusters of Innovation

From 1999 a hot topic among Internet business people in Japan was the Bit Valley scene, a community of the Internet entrepreneurial companies situated in the Tokyo ward of Shibuya. One reading of the Chinese characters for Shibuya is bitter valley, leading to the moniker Bit Valley. The word bit is meant to convey the obstacles these entrepreneurs have had to overcome (bitter), their aspirations to create a Japanese version of Silicon Valley (valley), and the geographical location (Shibuya). Bit Valley led to the birth of the Bit Valley Association (BVA), a non-profit organization aimed at promoting personal contacts between people engaged in Internet businesses.

Figure 2. Clustering of Internet Companies in Tokyo



Source: Yukawa, 2003

A Fujitsu Research Institute survey reveals that there are 1,541 Internet companies in the 23 wards of Tokyo at the end of February 2001 (Yukawa, 2003). Figure 2 shows the detailed breakdown of the wards with the highest density of Internet companies. Out of the 1,061 companies responding to the survey, 426 are located in the five central wards of Tokyo, especially Shibuya-ku, Shinjuku-ku, Chiyoda-ku, Chuo-ku and Minato-ku.

The increasing concentration of Internet companies in the Akasaka-Aoyama-Shibuya corridor of Bit Valley fame from 1994 is mainly explained by the unique social amenities catering to the lifestyle of young entrepreneurs. Yukawa (2001) has found that some attributes of the locations where Internet companies cluster include (1) the fulfilling social amenities for the young generation; (2) the existence of affordable spaces; (3) the existence of artists; (4) the existence of related educational institutions and (5) existing industries as the clients and the sources of human resources for Internet companies. These characteristics have developed in other parts of Tokyo, leading to a revival of declining urban areas. For example, the Kanda area, with the third large concentration of Internet companies in Tokyo, has become identified with the animation (*anime*) industry, where Japanese entrepreneurs have leaped to international fame in game software and animated pictures.

Other clusters of Internet companies are located in Sapporo in northern Japan and Fukuoka in southern Japan. The increasing numbers of clustering cases bring into relief the classical importance of

private-public partnerships, involving the government, universities, and businesses, as another contributing factor to these clustering of Internet companies (Yukawa, 2001). In addition, this geographical dispersion of industry clustering outside the Tokyo and Osaka corridor is a healthy example for stimulating economic activity in the less urban areas of Japan.

Organizational Structure

Approximately 24 percent of the Internet companies were founded before 1990, and the remaining 76 percent thereafter. Table 10 shows that the average Internet companies are capitalized at less than 30 million yen. Most have less than 10 full-time employees and less than four part-time employees. By capitalization and establishment size, these Internet companies would be classified as small-scale businesses. Since this type of companies are not covered by the GEC Japan Database, we add this section to flesh out this emerging segment of the e-commerce economy.

The main business activity of these companies is concentrated in the area of Internet application companies (55 percent). Consulting companies, website developers, search engine applications, multimedia applications, and software and databases applications for the Internet are the main types of businesses. Intermediary companies providing products and services is the next largest category, accounting for 22 percent of the cases. For the B2C related business activities, market-makers providing online brokerage, travel services, advertising, and etc. characterizes this category. The infrastructure (10 percent) and e-commerce (8 percent) companies, the last two categories, bring into relief the supply side of the story—the local capacity to implement e-commerce. The low level of business activities in the last category is due to the low level of enterprise integration activities among Japanese companies.

TABLE 10. Organizational Characteristics of Bit Valley Internet Companies

Establishments		Business Activities	
Founding (year)	Percent	Business	Examples
<1990	23.7	Infrastructure 9.5 percent	Telecommunications
1990 – 93	12.8		ISP
1994 – 97	30.4		Security provider
>1998	33.0		Hardware for networking Data Center, ASP, Payment System, etc.
Capital (million ¥)	Percent	Application 54.5 percent	Consulting
<10	8.9		Creation of websites
10 – 29.9	39.5		Search engines
30 – 49.9	8.7		EC and multimedia applications
50 – 99.9	11.0		Software and Databases for the Internet
>100	31.9	Intermediary 22.3 percent	Market maker
Employees (#)	Percent		Online broker, travel agency
Full-time			Portal
<4	20.8		Content provider
5 – 9	20.4		Internet advertising
10 – 24	28.4		Content aggregator
25 – 49	13.6	Research, etc.	
>50	15.1	E-Commerce 7.8 percent	Online shopping
Part-time			Auctions, etc.
<4	58.3		
5 – 9	19.5		
10 – 19	10.4		
>20	11.7		

Source: Yukawa 2001

E-commerce Companies Established

It is difficult to enumerate the number of domestic Internet companies established from 1994, which is the year the commercial use of the Internet is claimed to have started on a full scale in Japan. There are many websites that connect buyers and sellers, such as online recruitment. These intermediary businesses often times run their websites from community sites and in many cases their source of revenue cannot be easily identified. In the absence of data on all Internet companies in Japan, we limit our discussion to a survey of Internet companies in the Kanto region of Japan (Yukawa, 2003).

Local vs. Global Companies

According to a survey by Yukawa (2003), most new Internet companies are actually hybrid domestic companies. There are few pure domestic dot-com companies that dominate the local market like Amazon.com or e-bay does in the United States. For example, the auction site operated by Yahoo Japan and the online bookstore, Amazon.co.jp are the most popular websites in Japan. But Yahoo Japan is not regarded as a pure domestic company because of Yahoo (US) large equity stake, and Amazon.co.jp is a Japanese website of its American parent company. In addition, Japanese dot-com companies tend to base their business models on those found in successful American Internet companies. Many of the Internet companies established by the pioneer Softbank Company, for example, are American versions adapted to the Japanese market.

As for the types of domestic Internet companies established from 1994, Yukawa (2003) finds most Internet companies conduct B2C transactions. Table 11 shows these companies are mainly in the wholesale and retail sector and the bank and finance sector, but almost none in the manufacturing sector. In the travel industry, market reorganization accompanies the diffusion of e-commerce. For example, Kokunaisen.com, which was jointly established by three large airline companies in 2000, deals with domestic air ticket bookings for all three companies. Given the rigid divisions separating the major *keiretsu*, this type of intra-industry cooperation was virtually inconceivable before the diffusion of e-commerce. Moreover, the bank and finance sub-sectors are fairly well represented. In the field of finance, most of the major finance companies have taken large equity states in online brokers such as E*TRADE Securities and MONEX rather than establish their own subsidiary.

The major brick-and-mortar companies are now conducting e-commerce in such sub-sectors as online shopping and securities brokerage. Most of established convenience stores (CVS), for example, have built their own website to start online shopping since the late 1990s. The *keiretsu* companies, especially the *sogo shosha* (general trading companies) and financial services companies have been particularly active in this regard. For example, the largest CVS, Seven-Eleven Japan, established 7dream.com in 2000 through joint capital investment from six large companies, such as NEC and the Sony Corporation. In the same year, Family Mart established Famima.com, a joint venture with other large companies such as Toyota Motor and NTT Data. The other CVSs are now following Seven-Eleven and Family Mart's click-and-brick business model by building their own website for e-commerce. This business model is now spreading throughout the retail sector, especially among department stores and various other types of retailers trying to fend off on-line competitors.

TABLE 11. Major Newly Established dot-com Companies (partial list)

	Year of Establishment			
	<1998	1999	2000	2001
B2B	Info Mart	EC-COM	MetalSite Japan Kouzai.com Smart Online Corp. Food Net	
B2C				
MANUFACTURING				
WHOLESALE and RETAIL				
Auction		DeNa Price-down Engine		
Books		e-Shopping! Books cbook24.com	Book1.Inc	
Car		Autobytel	MPEC	
Flower		Flowerfarm		
Food	Oisix (97)		Winetsu.com	
Games				GameOn
Cyber Mall	Rakuten (97) ARSeed (97)	Bizseek Netprice eLady	e-seikatsu CURIOCITY	
Photo Printing	Digipri (96)			
Pharmaceuticals	Online Store (95)	INDI		
Publishing			Book-ing Digi-Book, Japan	
Toy		e-Shopping!Toys		
Travel	ComNet (97)	Enterprise	Tavigator Skygate Kokunaisen.com	tabini
BANKING and FINANCE				
Bank		Web Lease E-LOAN Japan		Sony Bank
Securities	E*TRADE	MONEX kabu.com JET Securities		
Commodity Futures			e-Commodity	

Source: Yukawa 2003

Independent vs. Subsidiary

By fiscal year 2000, Sotec Company became the first Japanese company to surpass ¥10 billion in online sales. Notably absent from Table 12 are dot-com companies such as Rakuten and others that have attracted media attention. Instead, the list consists of well-known companies such as Sofmap, a PC (personal computer) and peripheral retailers in the Kanto region (Tokyo/Yokohama). A drawing card to their website is that consumers can earn points that can be used for future purchases. Rounding out the list are well-know companies such as Cecile, Japan Air Systems, Prince Hotels, Yodobashi Camera, Kinokuniya, and etc. In short, the top 20 companies deriving revenue through the Internet all share one common characteristic: they are relatively well-known brick-and-mortar companies that have established

click-and-brick business models.

Most of the new Internet companies are not independent because the entrepreneurial environment in Japan is not well developed (Tachiki et al. 2002). In the absence of bank loans and alternative financial options, entrepreneurs finance their new companies from personal resources. For cash strapped entrepreneurs, this leads to large cash drain on parents and relatives or an excessive financial dependence on large companies. This is a major reason that the Bit Valley area has not become a full-fledged cluster like the Silicon Valley, where venture capitalists play active roles to coordinate the innovation by matching people and new technologies. Moreover, the large companies themselves tend to establish their own subsidiaries to start new Internet businesses, squeezing out some of the smaller players.

TABLE 12. Leading Users of E-Commerce, 2000

	Company Name	Sales (¥ mil)	URL	Main Items
1	Sotec Company	10,279	www.sotec.co.jp	PCs, peripherals
2	Sofmap Company	9,536	www.sofmap.com	PCs, peripherals
3	Xing Inc. (JOYSOUND)	5,000	www.xing.co.jp	Online music distribution, cell phone call melody
4	Cecile Company	4,283	www.cecile.co.jp	Clothing, sundries, etc.
5	Japan Air Systems Company	3,654	www.jas.co.jp	Airline tickets
6	Entertainment Plus Inc.	3,600	eee.eplus.co.jp	Various tickets
7	Prince Hotels, Inc.	3,511	www.princehotels.co.jp	Hotel reservations
8	Yodobashi Camera Company	3,421	www.yodobasi.com	Consumer electronics
9	Kinokuniya Company	3,000	www.kinokuniya.co.jp	Books
10	Nissen Company	2,427	www.nissen.co.jp	Clothing, sundries, etc.
11	Sega Corporation	2,153	www.d-direct.ne.jp	Game software, toys, amusement goods
12	Giga Networks Inc.	1,837	www.giga.co.jp	Online music distribution, cell phone call melody
13	Freeway Company	1,800	www.freeway.co.jp	PCs, peripherals
14	Book Services Company	1,694	market.bookservice.co.jp	Books
15	Murauchi Company	1,619	www.murauchi.co.jp	PCs, peripherals
16	Nikkei Business Publications, Inc	1,479	store.nikkeibp.co.jp	Books
17	Mytrip Net Company	1,087	www.mytrip.net	Hotel reservations
18	Fancl Corp.	1,000	www.fancl.co.jp	Pharmaceuticals, cosmetics
19	Laox Company	1,000	www.laox.xo.jp	PCs, peripherals
20	Nihon Ryokou Kurabu Tomonokai Co.	1,000	www.jtam.co.jp	Travel

Source: Nihon Keizai Shimbun 2002

The company listings on the MOTHER (Market for the High-Growth and Emerging Stocks) Board should provide one indicator of the maturity of Internet companies in Japan. The MOTHER board was created in November 1999. Compared to the rules for listing on the first (large companies) and second (SMEs) sections of the Tokyo Stock Exchange (TSE), the basic idea motivating the MOTHER board is to ease the minimum capitalization and number of profitable year requirements before an entrepreneur can list on a stock exchange. Conventional wisdom suggests a new stock exchange should have a critical mass of around 50 listed companies; but, by 2001, only 26 companies had listed on the MOTHER Board (TSE 2001). Moreover, the NASDAQ Japan has withdrawn from its collaboration with the Osaka Stock Exchange because the market has not grown as fast as originally anticipated. These developments will hinder the creation of Internet companies that are independent from the pull of the *keiretsu* companies.

Diffusion of E-Commerce

The diffusion of e-commerce across the three industry sectors essentially follows two paths. First, the most global-oriented *keiretsu* companies are the major carriers of B2B e-commerce across the manufacturing sub-sectors and then spreading to the vertical *keiretsu* in the wholesale and retail sector and the bank and finance sectors. Second, the domestic-oriented wholesale and retail sector emerge unexpectedly as the most active in B2C e-commerce. By this connection, we found that the liberalization and deregulation of specific sub-sectors creates economic space for SMEs, especially Internet companies, to flourish online. After an initial euphoric take-off period, access to capital has been a constraining factor in their further growth, forcing them into the orbits of the *keiretsu* companies.

Diffusion Within Companies

We seek further evidence about the ways e-commerce technologies are replacing or complementing existing business practices to meet online B2B and B2C customer demands. We use the CRITO GEC Japan Database to develop this analysis one step further to reveal the hybrid diffusion of e-commerce within companies.

Value Chain

If customer demand is the main driver of Internet use in Japan, the “voice of the customer” is the point of departure for understanding the adoption of Internet use within Japanese companies—that is, starting with the sales and after-sales segments of the value chain closest to the customer in contrasts to the conventional wisdom of new product development beginning with R&D (Akao, 1990). Since the CRITO survey does not cover all segments of the value chain, we only focus on customer services, sales, distribution channels, and procurement segments.

Customer Services

One common definition of a customer in Japan is “the person(s) or organizational unit that is the next step in your process for taking a product or service from concept to market” (Tachiki, 2000). Table 13 shows Japanese companies (15 percent) are half as likely to provide both B2B and B2C online services to customers than the global average (33 percent). Moreover, they are slightly more likely to provide only either B2B (14 percent) or B2C (19 percent) services to customers than the global average (11 percent and 13 percent respectively).

For those companies that conduct B2B or B2C, the percentage of online transactions for business services (15 percent) and customer services (6 percent) respectively is roughly similar to the global averages (11 percent and 8 percent). These rather unremarkable findings become more insightful when we consider that in the manufacturing sector, the customer is the next business unit in going from the forging of raw materials into parts and then assembling the components into a final product (i.e., supplier-assembler relationship) and in the wholesale/retail sector and the bank/financial sector it covers essentially the individual consumer. Consistent with these sector definitions of a customer, the adoption of online services across the industries follows the globalization fault lines in the Japanese industrial landscape: B2B online services are more likely in the manufacturing sector (54 percent) followed by the wholesale and retail sector (22 percent), and finally the bank and finance sector (19 percent), whereas B2C online services follows the reverse pattern beginning with sectors with the most direct consumer contact (bank and finance (35 percent) and wholesale and retail (23 percent) and then manufacturing (4 percent). Moreover, large companies are more likely to provide online services than SMEs. This overall pattern of online services underscores that the B2B and B2C stories are different and re-confirms our earlier general finding that Japanese companies use the Internet for special purposes within business functions

rather than systematically integrating it across business units.

TABLE 13. Online Services

Percent indicating a significant factor	Estab. Size		Industry Sector			Total	
	SME	Large	Mfg.	WRD	B/F	Japan	Global
Type of Online Service ^e							
Percent B2B only	29.3	45.4	53.6	22.3	18.5	29.8	23.1
Mean percent of online business services ^f	14.1	22.5	37.6	0.7	2.0	14.5	11.0
Percent B2C only	18.6	21.2	3.8	23.0	35.4	18.7	12.9
Mean percent of online consumer services ^g	5.6	14.3	1.1	10.6	7.0	6.0	7.6
Percent both B2B and B2C	14.5	33.4	24.0	11.7	27.0	15.2	33.3
Percent of Mfg. websites which support ^h							
Product specification	94.0	83.7	93.3			93.3	79.9
Product configuration	74.6	76.1	74.7			74.7	54.7
Service and technical support	47.3	54.4	47.7			47.7	54.4
Account information	24.6	12.3	23.8			23.8	17.0
Order tracking	27.4	14.0	26.6			26.6	21.5
Percent of WRD websites supporting ^h							
Product catalogue	99.1	60.1		98.1		98.1	69.8
Gift certificates and/or registry	49.3	31.3		48.8		48.8	20.6
Product reviews	1.2	53.4		2.6		2.6	48.6
Account information	0.3	38.0		1.3		1.3	21.7
Individual customization	0.3	11.1		0.6		0.6	21.3
Percent of B/F websites supporting ^h							
Online services (e.g., filing applications, claims, paying bills, transferring funds)	65.3	87.7			67.8	67.8	53.9
Access to account information	65.3	87.7			67.8	67.8	57.3
Online tools (ex. research & planning tools, etc.)	39.8	36.0			39.4	39.4	52.0

Source: CRITO Global E-Commerce Survey, 2002

Notes: See notes a-d for Table 2.

^e Percents are based on the full sample (all establishments). Exact wording of question: “Are these online services to other businesses or to consumers or to both?”

^f Percents are based on the full sample (all establishments). Exact wording of question: “What percent of your establishment’s total services to businesses are conducted online?”

^g Percents are based on the full sample (all establishments). Exact wording of question: “What percent of your establishment’s total services to consumers are conducted online?”

^h Percents are based on only those establishments that have a website and conduct business within the specified sector.

Table 13 distinguishes the types of online service use by industry sector, allowing us to understand why it is more segmented than integrated in Japanese companies than the global average. The manufacturing sector uses its website more for B2B procurement transactions (release information on product specifications (93 percent) and product configuration (75 percent)) than for back office functions such as service and technical support (48 percent), account information (24 percent), and order tracking (27 percent). The wholesale and retail distribution sector focuses particularly on the marketing side of B2C transactions (product catalogue (98 percent) and gift certificates and/or registry (49 percent)), but noticeably less so for sales functions such as product review (3 percent), account information (1 percent), and individual customization (1 percent). The bank and finance sector packages online services (68 percent) with access to account information (68 percent) for sales functions, but less so for marketing functions such as providing online tools (40 percent). The story that emerges from Table 13, regardless of industry sector, is that companies provide online services to meet their immediate customer demands, but they are less likely to provide online services where privacy is paramount, elaborating on our earlier findings about the defining factors dividing the drivers for and obstacles to e-commerce.

This story changes somewhat by establishment size. SMEs in the manufacturing sector clearly conduct more of their customer services online, both for procurement and back office functions, than larger

companies. For the wholesale and retail sector, the SMEs are more active in conducting sales related to product catalogue and gift certificates, but the large (wholesale) companies provide greater access to product reviews, account information, and individual customization. In the bank and finance sector, the SMEs (regional banks, trust banks, securities) are less likely than large *keiretsu* banks to conduct customer service over their websites, but they are slightly more likely to provide access to online tools. For SMEs in the manufacturing sector and to some extent in the bank and finance sector, they are moving online to allow the voice of the customer to reverberate electronically further back into their value chain, whereas in the wholesale and retail sector they use their web-sites to reach out to new customers. Anecdotal evidence suggests these are SMEs falling outside a *keiretsu* nexus and/or falling within a segment of the economy undergoing liberalization or deregulation, but further research beyond the GEC Japan survey is necessary to development this storyline (see appendix case study).

Sales

Moving the voice of the customer electronically back into the sales segment of the value chain, Japanese respondents report less online sales to both businesses and customers (13 percent), to businesses only (7 percent), or to customers only (1 percent) than the global average (15 percent, 13 percent, and 7 percent respectively). Nevertheless, when we limit the sample to only those Japanese companies actually conducting B2C, they are almost twice as likely to conduct sales online than the global average (36 percent versus 19 percent). Turning to the B2B story, Japanese companies (15 percent) are just as likely as the global average (15 percent) to conduct business sales online. In addition, 94 percent of the Japanese companies support online payments through their websites compared to 34 percent for the global average. This suggests a bimodal split in the use of e-commerce among Japanese companies: a large majority of companies conducting very little B2C and B2B sales online as opposed to a distinct minority of companies intensively conducting on average a third of their B2C sales online with a strong link to their accounts receivable system.

The industry sector and establishment size data provide some insight into where online sales activities are most advanced. Table 14 shows that when the sample is limited to only those doing B2C or B2B sales online, the wholesale and retail sector conducts a greater percentage of B2C (40 percent) and B2B (20 percent) than the other two sectors. The wholesale and retail sector (64 percent) also reports a high percent of website support for online payment. In contrast, the manufacturing sector conducts only 16 percent of its B2C and 9 percent of its B2B sales online, but backs it up 100 percent with an online payment system. This suggests these two sectors are reorganizing their sales and payment activities to an online system: the wholesale and retail sector for both sales and payment, whereas the manufacturing sector uses hybrid EDI and Internet networks and payment systems. In particular, the SMEs are more likely to engage in such activities than large companies. Thus, it is the SMEs in the wholesale and retail sector that are the most active minor players using Internet-based networks for B2C online sales.

TABLE 14. Online Sales

Percent indicating a significant factor	Estab. Size		Industry Sector			Total	
	SME	Large	Mfg.	WRD	B/F	Japan	Global
Type of Online Sales ^e							
Percent both B2B and B2C	12.8	13.0	2.1	16.3	16.0	12.8	15.0
Percent B2B only	7.0	14.1	28.5	0.5	0.2	7.2	12.9
Percent B2C only	1.3	5.1	1.7	0.5	13.3	1.4	7.1
B2C							
Mean percent of total consumer sales conducted online (all establishments) ^f	5.0	1.4	0.6	6.6	0.7	4.9	3.8
<i>Mean percent of those only doing B2C sales online^f</i>	36.6	8.9	16.1	39.6	3.2	35.6	18.6
B2B							
Mean percent of total business sales conducted online (all establishments) ^g	3.0	2.7	2.6	3.3	0.1	3.0	4.0
<i>Mean percent of those only doing B2B sales online^g</i>	15.2	11.4	8.5	19.8	1.2	15.1	15.1
Web Payment							
Percent of web-sites that support online payment (only those doing online sales)	96.6	71.1	100.0	64.2	31.6	94.1	33.6

Source: CRITO Global E-Commerce Survey, 2002

Notes: See notes a-d for Table 2.

^e Percents are based on the full sample (all establishments). Exact wording of question: "Are these online sales to other businesses or to consumers or to both?"

^f Exact wording of question: "What percent of your establishment's total consumer sales are conducted online?"

^g Exact wording of question: "What percent of your establishment's total business-to-business sales are conducted online?"

Distribution Channels

Japanese companies report "completing directly with traditional distribution channels" (38 percent) as the main reason for using the Internet to sell products and services, followed by another 29 percent indicating they plan to use the Internet to replace traditional distribution channels. In other countries this is known as "channel conflict," but in the Japanese context it is a way of getting around channel bottlenecks. The distribution system in Japan is quite hierarchical, consisting of more than three intermediaries between producer and customer. Indeed, foreign companies often cite the complex multi-layered distribution system as a major structural impediment to doing business in Japan. The remaining companies strive to enhance their traditional distribution channels only (22 percent) or expand their distribution channels using the Internet (12 percent). In this segment of the value chain, then, the voice of the customer becomes a function of improving *quality*, reducing *cost*, and decreasing *delivery* time (Tachiki, 1990).

TABLE 15. How Establishments Use The Internet To Sell Products and Services

Percent indicating Internet used to ... ^e	Estab. Size		Industry Sector			Total	
	SME	Large	Mfg.	WRD	B/F	Japan	Global
CHANNEL CONFLICT							
Compete with traditional distribution channels	37.2	37.8	23.6	47.9	19.2	37.2	27.4
Replace traditional distribution channels	30.0	18.5	3.0	47.5	16.6	29.4	13.2
ENHANCE or EXPAND CHANNELS							
Address traditional distribution channels only	21.4	29.5	48.8	3.7	31.5	21.8	44.1
Address new markets only	11.4	14.1	24.6	0.9	32.7	11.5	15.3

Source: CRITO Global E-Commerce Survey, 2002

Notes: See notes a-d for Table 2.

^e Exact wording of question: "Which of the following statements best characterizes how you are using the Internet to sell products and services?"

Among the three sectors, the manufacturing sector has the greatest number of distribution layers between a company and its customers. This sector primarily uses the Internet to enhance traditional distribution channels (49 percent) but it is less likely to replace traditional distribution channel (3 percent). Consequently, the EDI supplier-manufacturer networks remain relatively intact but they are moving towards the use of the Internet in the downstream segments of their value chain to distribute products and services. When we look downstream to the retail side of the story, you have supermarkets and department stores dominating the sector, followed by specialty stores, convenience stores, and cooperatives. The supermarkets and department stores are using the Internet to procure fresh and/or reasonable priced products directly from producers for consumers. For example, Aeon. (formerly Jusco Company), a leading retailer, by-passes wholesalers and orders goods directly from domestic and overseas producers. Specialty stores, once a vibrant sector, finds younger consumers are turning to discount stores or the Internet for computers, music, books, etc., forcing them to adopt a click-and-brick business model.

Squeezed between manufacturers and retailers, then, is the wholesale sector that is responding the strongest to the channel conflict questions. The biggest threat to wholesalers is “disintermediation” from the distribution process. In this connection, not only do online purchases pose a threat to their intermediary role, but also the liberalization of this sector (e.g., Large and Small Store Law) has led to the emergence of competitive challenges from direct marketing (telephone call centers, catalogue orders, etc.) and large mega-stores (e.g., Carrefour, Costco, etc.). In response, wholesalers are increasing purchases of private-brands by importing from China and other overseas vendors to by-pass high cost domestic producers (JETRO 2003).

The bank and finance sector reports less channel conflict than the other two sectors, however the “big bang” financial liberalization of the sector in the mid-1990s has opened the door to market entrance from non-bank bank competitors. The Japanese government policies have historically favored debt financing over equity markets and thereby restrict market entry through its monetary policies. Subsequent to the liberalization of this sector and the rise of the e-commerce after 1994, non-bank banks, such as IY Bank and Sony Bank, have been making headway in the area of retail banking and securities, requiring traditional banks and financial services to protect and expand their market share. Consequently, companies in this sector are more likely to use the Internet to enhance traditional branch distribution channels (32 percent) or expand into new markets (33 percent). Overall, the initial impact of the Internet and liberalization has led to a chain reaction spreading across the three sectors and gradually flattening and internationalizing the previously hierarchical domestic distribution channels in Japan.

Procurement

When we move further up the value chain, Table 16 shows customer demand for Internet-based transactions is weaker in Japan than the global average: only 33 percent of the Japanese companies purchase online compared to the global average of 51 percent. Much of this lag in downstream B2C purchases and integrating suppliers in B2B purchases. Whereas in upstream online purchasing, the manufacturing sector is the most active in procuring online, nearly half of which is parts for production. At the center of a manufacturing company’s procurement segment of the value chain is some derivative of Toyota Motor’s just-in-time (JIT) and *kamban* delivery system (Monden, 1983). Under this procurement system, companies decide whether to use an open or closed procurement system depending on the product architecture. For products with a modular design—that is, products using standardized, mass-produced components—online procurement is an option. But for integrated product designs—that is, products with high tech core components—a closed EDI system is the most secure way to protect intellectual property (Fujimoto, 2002). Japanese companies tend to use closed EDI networks for integrated product designs, but are more catholic about modular product designs. The subdued pattern

of online procurement activity is thereby due to the existence of hybrid EDI and Internet-based networks for procuring parts for production.

TABLE 16. Online Procurement

	Estab. Size		Industry Sector			Total	
	SME	Large	Mfg.	WRD	B/F	Japan	Global
Percent doing online purchasing	32.4	45.4	54.5	25.9	26.4	32.8	50.8
<i>Mean percent spent on parts for production^e</i>	21.1	7.5	20.0	---	---	20.0	8.3
<i>Mean percent spent on goods for resale^f</i>	0.0	1.4	---	0.0	---	0.0	6.8
Mean percent spent on supplies and equipment for business is ordered online ^g	0.1	0.5	0.0	0.0	1.6	.01	8.3

Source: CRITO Global E-Commerce Survey, 2002

Notes: See notes a-d for Table 2.

^e Question asked only to those in the manufacturing sector; percent based on all manufacturing establishments. Exact wording of question: “What percent of the money your establishment spends on direct goods for production, such as parts and components, is ordered online?”

^f Question asked only to those in the wholesale/retail distribution sector; percent based on all wholesale/retail establishments. Exact wording of question: “What percent of the money your establishment spends on goods for resale is ordered online?”

^g Percent based on all establishments. Exact wording of question: “What percent of the money your establishment spends on supplies and equipment for doing business is ordered online?”

The wholesale and retail sector (26 percent) and bank and finance sector (26 percent) are half as likely as the manufacturing sector to purchase online. The outcome for the wholesale and retail sector is consistent with our earlier finding that it is a heavy user of EDI networks. Nevertheless, the GEC Japan Database unaccountably shows no online purchasing for resale goods. For the bank and finance sector, in contrast to its active use of the Internet to reach external customers, its nominal online orders for supplies and equipment suggests less intra-firm online business activities.

Nature of Internet Use

The *keiretsu* form of business organization has been one of the key elements contributing to the success of the Japanese economy (Gerlach 1992). Our discussion suggests the *keiretsu* is also important to the e-commerce story. Nevertheless, the diffusion of e-commerce within companies is changing the balance of power between producers and customers. In this regard we shift our analytical tack to examine the extent Internet use is changing the traditional organizational boundaries of Japanese companies.

Establishment Internet Use

Table 17 shows Japanese companies are using the Internet for exchanging operational data with business customers (58 percent), advertising and marketing (58 percent), and exchanging operational data with suppliers (58 percent). These levels of Internet use compare favorably with the global average. In contrast, Japanese companies are less likely to use the Internet for online purchases (36 percent), after sale support (26 percent), online sales (23 percent), and integrating processes with suppliers (18 percent) than the global averages. These divergent outcomes highlight that Japanese companies are incorporating the Internet at their traditional customer-organization boundaries, however, this integration does not extend very deep into the organization.

There are some interesting variations by industry sector. The manufacturing sector emphasizes upstream business activities such as exchanging operational data with business customers (71 percent) and suppliers (69 percent), and online purchases (36 percent) as its most important reasons for using the

Internet. In contrast, the bank and finance sector primarily emphasizes the importance of downstream activities such as advertising (70 percent), after sales (41 percent) and online sales (39 percent) as their reasons for using the Internet. The wholesale and retail sector is split between emphasizing downstream activities such as advertising (63 percent), and upstream activities such as exchanging operational data with suppliers (55 percent) and business customers (55 percent). This pattern is consistent with our earlier discussion of variations in the value chain: the manufacturing sector is motivated to use the Internet to support B2B activities, but the bank and finance sector are motivated to use the Internet to support B2C activities.

TABLE 17. Uses of the Internet

Percent indicating a significant factor ^e	Estab. Size		Industry Sector			Total	
	SME	Large	Mfg.	WRD	B/F	Japan	Global
UPSTREAM							
Exchanging Operational Data with Business Customers	58.1	62.2	71.0	54.9	38.8	58.2	50.7
Exchanging Operational Data with Suppliers	57.6	57.9	69.0	55.0	33.5	57.6	48.1
Making Purchases Online	35.4	45.8	58.3	28.0	35.0	35.7	46.8
Formally Integrating the Same Business Processes w/ Suppliers or Other Partners	17.7	23.8	18.6	18.4	4.0	17.9	33.9
DOWNSTREAM							
Advertising and Market Purposes	57.8	60.6	41.6	62.9	69.9	57.9	57.6
After Sales Customer Service and Support	25.3	44.2	43.7	19.0	40.8	25.9	43.7
Making Sales Online	23.1	28.8	34.0	18.6	39.4	23.3	29.9
Heard of Internet marketplace^c							
Yes	72.5	80.7	88.1	67.1	79.7	72.8	80.0
Establishment's Participation in an Internet Marketplace^e							
No, does not participate	86.1	76.5	81.6	86.4	99.3	85.7	
As a seller	13.6	8.8	17.4	12.8	0.0	13.5	12.2
As a buyer	0.3	7.0	0.6	0.5	0.0	0.5	6.7
As both a buyer and seller	0.0	6.7	0.4	0.1	0.7	0.2	16.9
Don't know/No answer	0.0	1.3	0.0	0.1	0.0	0.0	
Organizations Plans to Provide Content or Services for Mobile Customers Access^h							
No, have no current plans	68.6	67.5	75.7	66.8	57.1	68.5	
Already available	16.2	21.8	9.7	16.9	41.6	16.4	13.7
Plan to add within year	15.3	9.2	14.4	16.2	1.2	15.1	18.2
Don't know/ No answer	0.0	1.5	1.0	0.0	0.0	0.1	

Source: CRITO Global E-Commerce Survey, 2002

Notes: See notes a-d for Table 2.

^e Exact wording of question: "Does your establishment use the Internet for ... Using a 5-point scale where 5 is "a very significant factor" and 1 is "not a factor at all," please rate how significant each of the following was to your organization's decision to begin using the Internet for business. A score of 4 or 5 was classified as "a significant factor."

^f Exact wording of question: "Have you ever heard of the concept of an Internet marketplace, exchange or trading community, through which multiple businesses buy and sell goods and services?"

^g Percents based only on those establishments that have heard of the concept of an Internet marketplace.

^h Exact wording of question: "Today it is possible to access content or services from various mobile devices such as mobile phones and hand-held Palms or Pocket PC devices. Does your organization provide or plan to provide content or services that mobile customers can access?"

Internet Marketplace

Since most inter-firm B2B transactions are conducted within EDI networks in Japan, the emergence of an Internet marketplace promises to change some aspects of existing business models. Table 17 shows that 73 percent of the Japanese companies are familiar with the Internet marketplace concept, only slightly lower than the global average of 80 percent. Companies in the manufacturing sector (88 percent) are more likely to have heard of an Internet marketplace idea than the bank and finance sector (80 percent) and wholesale and retail sector (67 percent), but more than 80 percent of all companies neither buy nor sell in the Internet marketplace. Despite the high level of awareness, the functional merits of an Internet marketplace do not overshadow the existing organizational framework supporting EDI networks, one of the key inhibiting factors identified earlier in this paper.

When they do participate in an Internet marketplace, the companies in the manufacturing sector and wholesale and retail sector are primarily sellers and to a lesser extent buyers. Companies in the bank and finance sector nominally participate as both buyers and sellers. The SMEs tend to participate as sellers (14 percent) and the large companies as buyers only (7 percent) or buyers and sellers (7 percent). These patterns of buyer and seller participation suggest some Japanese companies are modifying their brick-and-mortar business and going online. In particular, the SMEs in the manufacturing sector and wholesale and retail sector are trying to enter new markets and large companies in the bank and finance sector sectors are going online to expand their market share.

Mobile Customer Access

The popularity of i-Mode and the advances in other forms of ubiquitous commerce in Japan is creating a large mobile customer base. According to a Mobile Computing Promotion Consortium (2003) study, more than 70 percent of the population own mobile phones. Table 17 asks whether companies provide or plan to provide mobile customers access to content or services. Currently only 16 percent of the companies are currently participating in m(obile)-commerce, with another 15 percent indicating they plan to add this service within a year. Interestingly, two-thirds of the companies have no current plan. Despite Japan's high diffusion of mobile devices, it is only slightly more likely to already provide content or services for mobile customers than the global average (14 percent).

The bank and finance sector is the most advanced in allowing mobile users to access their websites (42 percent), with the wholesale and retail sector a distant second at 17 percent, and the manufacturing sector at 10 percent. By establishment size, the large companies (22 percent) are more likely than the SMEs (16 percent) to provide content or services for mobile customers, however the SMEs are more likely to say they plan to add such content and services within the next year. Despite the high potential consumer demand for mobile access to companies and the widespread adoption of e-commerce technologies, the privacy and organizational constraints on what a company can actually provide comes through on this issue.

E-commerce Development and Support Activities

It is easy to neglect discussing the rise of e-commerce support activities given the slow movement towards outsourcing of business functions in Japan. In 1985, the liberalization of the telecommunications sector allowed non-common carriers to enter this market. A noticeable spillover effect from liberalization and deregulation is the recent emergence of business support activities. We note that restricting our empirical measures of e-commerce readiness to firm characteristics provides only half of the story. The GEC Japan Database does not ask about the use of e-commerce development and support activities; however, we include a brief discussion of the emerging availability of these services for companies to outsource their brick-and-mortar operations. The topology of business support services in Japan includes data centers (DC), application service providers (ASP) and payment intermediaries (e.g., physical distribution and other services).

Data Center

The data center market emerged in the spring of 2000, with the establishment of Internet Initiative Japan, Crosswind Communications, and Japan Telecom. The types of services include (1) non-carrier DC, (2) carrier DC, and (3) equipment-related company DC. The data center market has been expanding since 1999 because various IT vendors such as ISPs (Internet service providers) and hardware vendors continue to enter the market of Internet data center business. These vendors expect a further growth in this market on the back of the growing popularity of broadband use. By 2003, data centers are expected to provide 100,000 square meter of floor space in the Tokyo Metropolitan Area, enhance their host services, and expand into the application service provider (ASP) business. In a relatively short period of time, the data center market has become a growth industry.

Application Service Provider

Towards the late 1990s, the idea of ASP (Application Service Provider) began to enter the business vocabulary of Japanese managers. Initially ASP meant “packaged” applications available online, but it now means all businesses using the Internet to provide services. Dataquest survey classifies ASP into four market segments: (1) Back Office (12 percent), (2) Front Office (40 percent), (3) E-commerce ASP (20 percent), (4) Specialized Business ASP (20 percent), and (5) Collaborative ASP (47 percent). As our findings suggest, front office ASP services (40 percent) accounts for the largest share of business. Given two-thirds of the companies have a server installed on their premises, however, as they begin to outsource more functions, the potential market for the other ASP support services should growth accordingly (IAJ 2001).

Payment and Physical Distribution Intermediaries

Among the business support activities, the payment and physical distribution segment is relatively more advanced in Japan than the other countries in the GEC10 Database. Japan has a particularly well-developed transport industry. Most packages sent by the evening can be delivered almost anywhere within Japan the next morning. Companies such as Yamato Transport Company, Nippon Express Company, Fukuyama Transporting Company, and Seino Transport Company compete fiercely to provide overnight door-to-door delivery services for both corporate and individual customers.

Japan has been historically a cash society, however, electronic fund transfers (*furikome*) has become widespread in Japan. The post office, banks, and other financial institutions accept payments on behalf of utilities, retailers, and other companies at any number of their branches spread throughout Japan. During the last decade, convenience stores now perform the same function. Unlike many countries, the post office and transport companies have developed a payment system (*shuukin*) where their employees collect money on behalf of the seller for items they deliver to customers. Consequently, the efficient and safe transport and payment systems in Japan are key services stimulating online sales.

Consultant Services

As for e-commerce related consulting, the Boston Consulting, McKinsey, Accenture, and other foreign companies are the major players. The major electric/electronic makers and IT vendors such as NTT, NEC and Fujitsu, have started to provide consulting services. Since consulting services are normally part of the service a company provides with its product, the idea of separately charging “for services rendered” is not a widely accepted business practice. Using this strategy, the big domestic players are edging out the smaller enterprise that got a head start on consulting business. In recent years, Japanese

companies have been seeking business solutions that can merge or integrate their EDI systems with Internet-based web applications. In this regard, the consulting market should expand to the extent consultants can provide organic solutions rather than off-the-shelf packaged software solutions.

Adoption of E-Commerce

E-commerce has diffused within companies in segments of the value chain closest to the customer. However, companies that spend the most on IS and are ready for e-commerce are not necessarily the biggest adopters of the Internet. Harnessed to their EDI legacies, the large *keiretsu* companies have adopted a hybrid open and closed network. Moreover, in the relative absence of privacy and security for Internet transactions, the large *keiretsu* companies have not integrated the Internet across their business functions. The organizational boundaries of Japanese companies still map the *keiretsu* intra- and inter-firm relationships, except at the customer interface and distribution segments. The rise of Internet support services and company interest in outsourcing business processes could possibly drive some change in *keiretsu* relationships in the future, however.

IMPACTS OF THE INTERNET AND E-COMMERCE

The globalization and liberalization of the Japanese economy provides a good picture of the fault lines in the industrial landscape. In this section, we discuss the impacts of the Internet and e-commerce on the performance of Japanese companies falling on either side of these fault lines, especially in the areas of efficiency, coordination, and commerce.

TABLE 18. Impacts of Doing Business Online

Percent indicating a significant factor ^e	Estab. Size	Industry Sector	Total				
	SME	Large	Mfg.	WRD	B/F	Japan	Global
EFFICIENCY							
Internal processes more efficient	28.6	31.5	40.5	25.2	20.7	28.7	33.9
Staff productivity increased	24.3	22.7	25.7	24.6	11.5	24.3	27.2
COORDINATION							
Procurement costs decreased	3.9	12.3	16.2	0.3	0.8	4.2	17.7
Inventory costs decreased	5.4	4.3	20.3	0.3	5.0	5.3	14.0
Coordination with suppliers improved	34.0	27.9	40.4	33.2	10.5	33.8	29.8
COMMERCE							
Sales area widened	3.1	12.3	9.3	0.8	12.3	3.4	31.4
Sales increased	1.1	6.9	1.4	0.4	13.5	1.2	20.5
International sales increased	5.0	5.8	20.6	0.0	0.0	5.0	19.5
Competitive position improved	10.1	9.1	14.6	8.8	6.1	10.1	29.8
Customer service improved	10.9	17.9	42.3	0.8	6.9	11.2	34.8

Source: CRITO Global E-Commerce Survey, 2002

Notes: See notes a-d for Table 2

^e Exact wording of question: "Using a 5-point scale where 5 is "a great deal" and 1 is "not at all", please rate the degree to which your establishment has experienced the following impacts since it began using the Internet for business. A score of 4 or 5 was classified as "high impact"."

Efficiency

Japanese companies are less likely to experience efficiency in internal processes (29 percent) and staff productivity (24 percent) than the global averages of 34 percent and 27 percent respectively. By

industry sector, the manufacturing sector beats the global average on internal process efficiency (41 percent versus 34 percent). In our discussion of the GEC Japan Database, the manufacturing sector uses the Internet to rationalize operations management functions. We would have expected a higher degree of improvement in internal efficiencies of the distribution channels for the wholesale and retail sector, and for the back room operations in the bank and finance sector. The bank and finance sector is low on both internal process efficiency (21 percent) and staff productivity (12 percent). The large companies (32 percent) are more likely to achieve internal process efficiency than the SME (29 percent), but the SMEs (24 percent) are slightly more likely to report increases in staff productivity than the large companies (23 percent).

Coordination

On the coordination measures, Japanese companies are less likely than the global average to report decreases in procurement costs (4 percent versus 18 percent), decreases in inventory costs (5 percent versus 14 percent), but it does report more improvement in coordination with suppliers (34 percent versus 30 percent). This is an area where the manufacturing sector has made improvements, and this shows up when we examine the data by industry. The manufacturing sector equals the level of the global average on procurement costs and clearly exceeds it on inventory costs and coordination with suppliers. We attribute this result to the hybrid closed and open networks—that is, Japanese companies have only adopted open e-commerce technologies to the extent they improve on existing business practices. Where this is not the case, they still rely on closed EDI networks. The wholesale and retail sector only outperforms the global average on the coordination with suppliers measure, a segment of the value chain we documented large changes with the introduction of e-commerce technologies. The bank and finance sector reports low results on all three measures. Nevertheless, internal coordination is not a significant issue in this sector. Instead, the more pressing issue is meeting new competitive challenges from non-bank banks (e.g., Sony Bank, IY Bank, etc.). The SMEs are more likely to report decreases in inventory costs and coordination with suppliers than the large companies.

Commerce

Japanese companies have not benefited as much as the companies in the global average on the measures of commerce: widening sales area, increased sales, increased international sales, improved competitive position, and improved customer service. Only the bank and finance sector shows improvement in widening sales area and increasing sales, a key reason companies give for adopting e-commerce. The wholesale and retail sector reports improving its competitive position and improving customer service. Since the wholesale and retail sector and bank and finance sector focus their e-commerce in downstream activities, we would have expected more improvement in these sectors. Perhaps a combination of their domestic oriented market focus and the poor state of the Japanese economy has muted the potential positive impact of the Internet. The manufacturing sector exceeds the global average on improved customer service and increased international sales. By establishment size, large companies have benefited more than the SMEs; however, none of the measures exceed the global averages. Because the diffusion of e-commerce tends to correct the inefficiency of each trade, large company's full-scale entry into e-commerce is promoting the market reorganization of each trade.

CONCLUSION

First, we began with the assertion that the Internet and e-commerce diffuse rapidly across countries the more it is integrated into the global economy, reducing the role of the state and bringing equal opportunities for the largest and smallest firms in all industries—that is, a “leveling hypothesis.” In this connection, we found that although the forces of globalization blow lightly over the Japanese economy, the diffusion of e-commerce across Japanese companies is comparable, and on some measures exceeds,

the global average. The diffusion of e-commerce partially equalizes opportunities for some SMEs. It has led to the reorganization of the distribution channels in the wholesale and retail sector; it has broadened the SMEs sales channels and extended their reach to provide customers greater access to their services. Where the government has liberalized regulations and public procurement, this trend seems to have advanced the furthest. Thus, how well companies can overcome the barriers and inefficiencies in the political economy affects the extent they can take advantage of new business opportunities utilizing the Internet as much as the forces of globalization.

Second, we expected companies facing strong global competition to make the biggest investment in information systems—that is, an “e-commerce readiness hypothesis.” We found there are great strides in adopting a wide variety of e-commerce technologies, but the level of spending for information systems is subdued compared to the global average. This has led to the image that Japanese companies lag behind in getting online. Nevertheless, our analysis suggests the interaction between exogenous “forces for globalization” and endogenous “business practices” has led to this uneven diffusion of e-commerce within companies. It is not always clear to Japanese managers that e-commerce represents a better business model than their existing style of management. Thus, we found Internet-based information systems often co-exist with EDI systems, suggesting a hybrid approach to e-commerce in Japan.

Third, Japanese companies are sensitive to consumer and market pressures; however, we found they pay more to the general business environment in setting the course for their competitive strategies. Consequently, the survey respondents rank government policy as neither an incentive nor a barrier to the adoption of e-commerce. When we turn to specific issues, the number one concern is over security/privacy, issues under the purview of the government. Moreover, when we examine the implementation of the e-Japan Strategy, the government’s role in procuring goods and social services and in liberalizing markets are opening new business opportunities. In addition, SMEs are particularly sensitive to the issue of taxation. In short, policy matters. A key finding in our study is that liberalization and deregulation policies matter the most, opening economic space for unaffiliated *keiretsu* companies to develop new business models. Contrary to the leveling hypothesis, then, we found the state has some role in setting the rules of the game in order to promote e-commerce.

Fourth, we found that each industry plays a different role in the economy and has different ties to the global economy. The manufacturing sector is more involved in upstream business functions, the wholesale and retail sector in distribution business functions, and the bank and finance sector in capital intermediation functions. These functions are the most international in the manufacturing sector and most domestic-oriented in the wholesale and retail sector. The fact that we find e-commerce activities in both the global and domestic In short, industry sectors or sub-sectors with the longest global reach are more likely to be in a position to take advantage of emerging opportunities. In the Japanese case, the *keiretsu* play an important role. Some may argue the days of the *keiretsu* are over; however, a finding of this study is that they are reconstituting themselves and their survival will depend on how well they segment what should and should not get online.

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APPENDIX

Industry Sub Sector Case Study Japanese Convenience Store (CVS) Industry

INTRODUCTION

The case of Japanese convenience stores (CVSs) provides a good example of how Japan raced into the lead in using information technology (IT) applications and why this technological choice hindered its embracing Internet based IT applications. Now, once again, Japanese CVSs have merged these two legacies.

Japanese Retail Industry and E-Commerce

The retail and wholesale sector accounts for 12 percent of GDP and 32 percent of the labor force. In the GEC Japan Database, the retail sector consists of many independent small-scale (between 1 – 4 employees) establishments with direct domestic customer contact. By number of stores, the 100-yen shops, drugstores, and casual wear are the largest retail sub-sectors. The workforce in the retail sector consists of a high percentage of clerical and sales employees, many of whom are part-time and female employees with few guarantees for lifetime employment.

Although a few other retailers have made forays overseas (e.g., the 100-yen shops, Fast Retailing), the retail sector in the GEC Japan Database is correctly portrayed as predominately oriented toward the domestic market. Table 1A shows the globalization indicators for ten countries in the wholesale and retail industry that use the Internet. As we can see in Table 1A, Japanese distribution companies are not very globalized.

TABLE 1A. Globalization Indicators

	Jpn.	Bra.	Chn.	Den.	Fra.	Ger.	Mex.	Sing.	Tai.	U.S.	Aver.
Percent of companies with estab. abroad	9.7	4.3	28.6	46.1	23.1	41.6	7.5	56.8	35.0	21.4	22.2
Mean percent of procurement from abroad	0.4	4.2	11.4	12.6	3.7	7.6	7.0	26.3	19.2	4.6	6.4
Percent of companies with HQs abroad	1.9	1.8	21.8	22.4	13.5	14.8	7.8	80.3	58.7	3.1	11.4
Mean percent of total sales from abroad	8.4	9.8	32.0	49.6	24.7	23.6	43.4	81.1	34.4	8.9	20.8
Degree affected by competitors abroad											
<i>Low</i>	91.1	95.1	62.2	72.5	80.2	64.1	86.4	34.7	25.4	86.2	77.2
<i>Moderate</i>	8.4	0.2	26.0	13.1	15.8	15.4	6.4	38.7	49.6	7.7	14.2
<i>High</i>	0.4	4.6	11.8	14.4	3.9	20.5	7.2	26.6	25.0	6.2	8.6

Source: UCI/IDC (2002)

There were many regulations in the Japanese distribution system, such as the large-scale retail store law, leading foreign companies to often argue that it is difficult to enter the Japanese market because the system lacks transparency. However, in recent years, this situation is changing rapidly with the liberalization of the economy. Some foreign retail companies such as Toys R Us (U.S.), Carrefour (France) and Costco (U.S.), have entered the Japanese market, as well as Wal-Mart who tries to deploy their operation in Japan by collaborating with a local super market chain called Seiyu. Because of these new foreign companies, market entrant and deregulation competition in the Japanese retail industry is getting tougher.

Consumer spending has been weak during the past decade, and over the past two years, as the total sales in the retail sector has decreased by 6.1 percent. By sub-sector, Table 1A shows that the sales of department stores has decreased 17.4 percent. On the other hand, the sales of drug stores increased 66.9 percent.

Drug stores, which sell drug and cosmetic items, is a pretty new player in Japan and getting popular among young female consumers, but its market share is only 1.8 percent. The CVS, which has the second largest growth, has a market share of 5.0 percent. As we will mention in the next section, although the CVS is still a new category in the Japanese retail business, it is now becoming a kind of lifeline for Japanese consumers, especially in urban areas.

TABLE 2A. Annual Sales of Japanese Traditional Retail Stores

Store Types	Annual Sales				
	1999		2002		2002/2001 (percent)
	¥ million	Percent	¥ million	Percent	
Department Stores	9,705,460	6.7	8,021,190	5.9	-17.4
General Merchandise Stores	8,849,658	6.2	8,916,962	6.6	0.8
Specialty Supermarket Stores	23,121,207	16.1	23,631,616	17.5	2.2
Convenience Stores	6,126,986	4.3	6,713,652	5.0	9.6
Drug Stores	1,495,041	1.0	2,495,690	1.8	66.9
Other Supermarket Stores	7,561,624	5.3	6,808,212	5.0	-10.0
Specialty Stores	62,643,494	43.6	52,166,804	38.6	-16.7
Semi-Specialty Stores	23,958,394	16.7	26,141,486	19.3	9.1
Other Retailers	370,688	0.3	229,712	0.2	-38.0
Total	143,832,551	100.0	135,125,323	100.0	-6.1

Source: METI (2003)

When the commercial use of the Internet became available, users were limited to young male engineers. Many managers of traditional retail companies did not understand that the Internet could be an important sales channel. It was small start-up companies that opened websites and began to sell goods through the Internet. One such company is Rakuten, which is a virtual department store or shopping mall. It has the largest and most prominent share in the Japanese B2C electronic commerce market. It was about 1998 when traditional retail companies realized the value of the Internet. Many ordinary consumers began to use the Internet, and many retail companies started to invest a lot of money in Internet shopping services. However, for companies such as general merchandise stores or CVS chains, which have nation wide physical store networks, selling the same goods over the Internet and in their physical stores does not appeal to consumers at all because many consumers have very easy access to those stores. Since website sales are still very low with little growth potential in the future, many traditional retail companies changed to the so-called “click and mortar” strategy. They do not expect many sales from the Internet, but they do try to enhance their existing strengths by using it.

Outline of Japanese CVS Industry

CVSs originally developed in the United States and then spread to Japan. From this common beginning, the Japanese CVS industry has its own history of evolution and now has the most sophisticated operational system in the world.

The U.S., National Association of Convenience Stores (NACS) defines a convenience store as the following:

"A convenience store is a retail business with primary emphasis placed on providing the public a convenient location to quickly purchase from a wide variety of consumable products (predominantly food or food and gasoline) and services."

In the U.S., the NACS identified the characteristics of CVSs as the following:

- While building size may vary significantly, typically the size ranges from 1,500-5,000 square

feet (140m² – 465m²), with the majority between 2,000-3,000 square feet (185m² – 280m²).

- Off-street parking and/or convenient pedestrian access.
- Extended hours of operation, with the majority open 24 hours, seven days a week.
- Product mix includes grocery items, and also includes items from the following groups: dairy, bakery, snack foods, beverages, tobacco, health and beauty aids, and confectionery.
- Product mix may also include prepared foods to go, frozen foods, meats, deli items, produce, publications, general merchandise and gasoline.
- The store may offer various services, including, but not limited to, automated teller machines (ATMs), check cashing, money orders, movie rentals, lottery tickets, film processing, and video games.

This definition is almost the same in Japan, except that many Japanese CVSs do not sell gasoline. Table 3A shows several definitions of CVS.

TABLE 3A. Definitions of CVS: U.S. vs. Japan

	Shop Area	Shop Hours	Sales Method	Product Mix
United States NACS	1,500-5,000 square feet (140m ² – 465m ²)	Extended hours of operation, with the majority open 24H/7days a week	Self service	Product mix includes grocery items and prepared food
Japan METI	From 50 to 500	Opens more than 12H/day or Opens at night after 21:00	Self service	---
Nikkei	Less than 200	Opens more that 16H/day	---	Share of fresh foods are less than 30 percent.
MCR	From 66m ² to 215m ²	Opens more that 16H/day and > 340 days/year	Self service	Foods >50 percent and any specific non-food <50 percent

Source: METI 2003; Nikkei Shimbun 2002; MCR 2002; NASC 2002

Notes: **NACS** = National Association of Convenience Stores; **METI** = Ministry of Economy, Trade and Industry; **Nikkei** = Nikkei Shimbun (*Nikkei* newspaper); **MCR** = name of a private research company.

Based on Table 3A, we note that the typical Japanese CVSs are much smaller than American CVSs, and many Japanese CVSs (especially in urban area) do not have enough parking space and do not sell gasoline. Although there are some independent stores and small size chain stores, most of the Japanese CVSs are franchise stores of large chains like 7-Eleven Japan, Lawson, and Family Mart. Another important characteristic of Japanese CVSs is that the number of items in stores is more than 2,000. Since there are many kinds of products in a small shop space, space for inventory is very limited.

2. EVOLUTION OF CVS INDUSTRY AND KEY PROCESSES

Evolution of CVS Industry

The early 1970s is the dawn of the Japanese CVS industry. The major CVS chains like Family Mart, 7-Eleven, and Lawson started their operation during this period. Table 4A presents the main milestones in the history of the Japanese CVS industry.

TABLE 4A. Main Topics in the History of Japanese CVS Industry

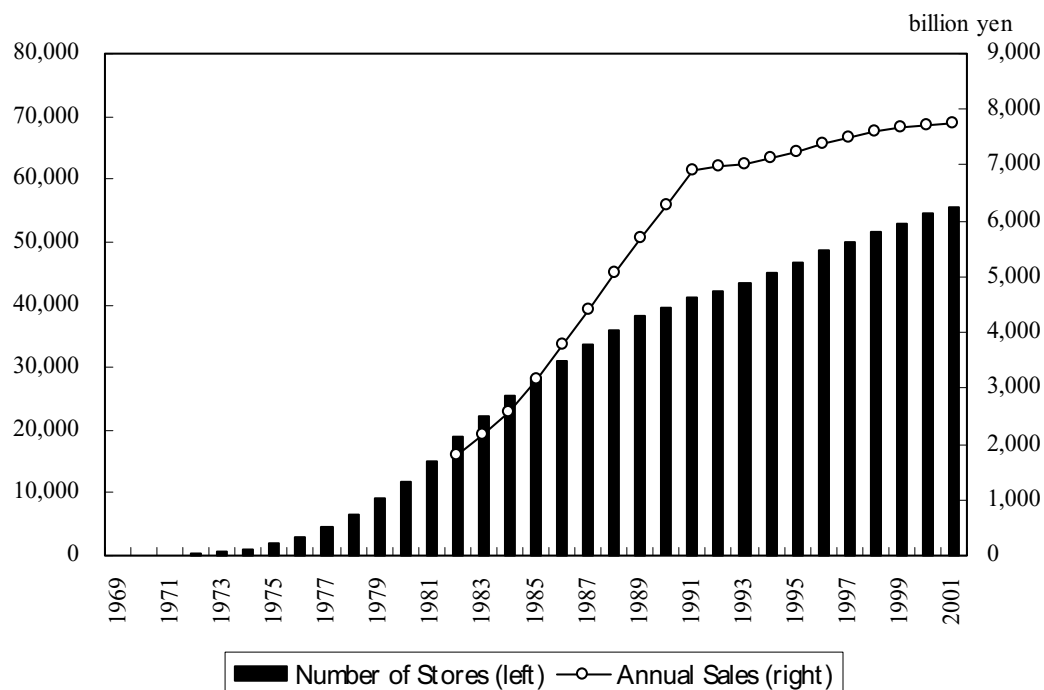
1927	Foundation of Southland Ice Company at Dallas, Texas
1939	Southland expanded to 60 stores.
1946	Southland changed its store brand to “7-Eleven”
1960	Number of CVS reached 2,500 and began to grow rapidly.
1969	First Japanese CVS “Myshop” opened at Osaka.
1973	Seiyu opened an experimental store of “Family Mart” at Saitama. Ito Yokado founded “7-Eleven Japan” in alliance with Southland.
1974	7-Eleven Japan opened its first store at Tokyo.
1975	Daiei opened the first store of Lawson at Osaka.
1977	Yamazaki Baking Co. opened the first store of “Sun Every”.
1976	7-Eleven reached 100 stores.
1980	GMSs (Jusco, Uny and Nagasakiya) opened their first CVSs. 7-Eleven reached 1,000 stores.
1982	7-Eleven installed POS system.
1988	Lawson launched POS system.
1989	7-Eleven Japan bought Hawaiian operation of Southland. Family Mart launched POS system.
1991	Ito Yokado bought Southland.
1992	Small CVS chains like “Topmart” ceased their operation.

Source: Compiled by author from various sources

The late 1980s is the era of new entrants. New companies like Yamazaki Baking, Jusco, and Nagasakiya opened their first CVSs during this time. There was a rapid growth in 1980s, and information systems of major CVS chains made great progress in this period. They developed and launched electronic ordering systems (EOS), POS systems, and high-speed network systems in 1980s.

Since the emergence of the CVS industry, both the number of stores and annual sales continued to grow, but the increase in annual sales dropped rapidly during the 1990s. Figure 1A shows the growth and sales of Japanese CVS industry.

FIGURE 1A. Growth of Japanese CVS Industry



Source: MCR (2002)

Table 5A shows the current situation of Japanese major CVS chains.

TABLE 5A. Outline of Major CVS Chains

	7-Eleven Japan	Lawson	Family Mart	Sunkus
Sales (million)	¥2,114,013	¥1,282,300	¥898,651	¥860,441
percent growth	103.3	100.4	106.5	105.7
Profit (million)	¥83,209	¥16,100	¥9,676	¥11,304
percent growth	106.2	98.1	110.7	140.2
# of shops	9,060	7,734	5,856	5,894
percent growth	105.3	100.7	100.8	106.8
Parent Company	Ito Yokado	Daiei	Seiyu	C & S Group
Location Strategy	Selected areas (Main Strategy)	Located almost throughout Japan	Almost all over Japan	Few shops in Kyushu area
Foundation	1973	1975	1981	1980
Average Daily Sales at a Store	¥690,000	¥490,000	¥500,000	¥520,000

Source: Annual Reports

Notes: Numbers are at the end of fiscal year of 2002.

The major CVS chains built new stores in effective areas all over Japan in the 1980s, but Table 4A shows that the efficiency of new stores built after 1990s has been declining. The 1980s was a period of strong revenues for CVSs and the number of store openings kept pace. From 1991, however, sales started to decline faster than the number of new store openings. Currently there is a shakeout in the industry as the major players try to cope with the deflationary economy. Major CVS chains now try to increase the

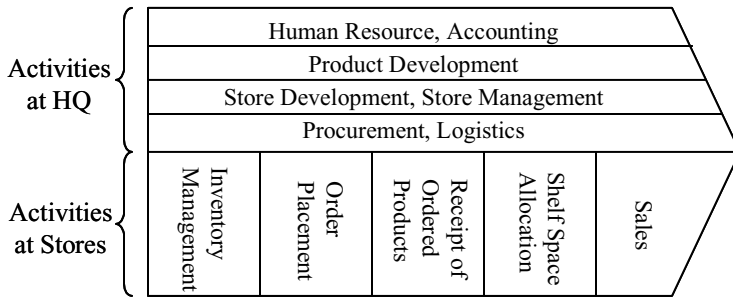
sales and cut the operation cost of existing stores by such means as the renovation of stores, new product development, and investment to IT rather than to develop new stores.

Key Processes

The most important characteristic of the CVSs’ value chain is that IT is used very effectively in all activities at stores. Figure 2A shows the value chain of CVSs.

FIGURE 2A. Value Chain of CVS

Source: Compiled by the Fujitsu Research Institute



Activities at Stores

In order to maximize the sales from a small shop area, item level stock control using point-of-sale (POS) systems has been introduced in Japanese CVS since 1980s. There are several special keys on POS terminals in major CVS chain stores like Seven-Eleven. These keys represent customers’ demographic characteristics like age and sex. Shop clerk push those keys every time customers check out. Therefore CVS chain can collect very valuable data about “who bought what in what time.” In contrast to ordinary POS systems that can collect data only about “what was sold in what time,” by adding several special keys on POS terminals, CVS can have information that manufacturers and other retailers can never collect.

These data can be utilized for product development. For example, Seven-Eleven analyzed their POS data and estimated that there are pretty strong consumer needs for small-sized soda with fresh fruit juice late at night after drinking among adult male businessmen. They proposed to develop such kind of a product to a drink manufacturer, and the newly developed juice became a smash hit. In major CVS chains, every shop sends inventory data to headquarters through a high-speed communication line. Some CVS chains use-communication satellites for transmission of inventory data.

Another important characteristic of the CVS’s value chain is the stock ordering system. For the effective use of small shop, even if best selling items are sold out, it is not enough. If the shop has more inventories, the sales may be higher. On the other hand, too much inventory means rising inventory cost. High quality inventory management system is necessary to minimize both opportunity loss and inventory cost. Thus, once purchase patterns are identified through the POS, it is possible for a CVS to make orders just about equal to anticipated sales. Zero or low inventory is a distinct advantage, however, there is also the big possibility to make opportunity loss when demand unexpectedly surges. Therefore, the stock ordering system in major Japanese CVS chain is based on managers’ hypothesis. Managers of each shop make hypotheses about the expected sales of each items based on local information. For example, when there is an entrance exam in a university near a shop next week, the manager of that shop orders such items like lunch-boxes and bottled tea more than usual. After making an order, managers test the hypothesis and try to improve their hypothesis. Ordering systems based on managers’ hypothesis is one of the most important characteristics of Japanese CVS’s value chain.

Activities at Headquarters

One of the most important activities in headquarters of CVS chain is shop development, where GIS (Geographic Information Systems) are widely used. Information systems including POS system, ordering system and GIS are critical for the success and growth of Japanese CVS. One company, Seven-Eleven Japan, first introduced most of these innovations based on IT. Seven-Eleven is a real innovator in the Japanese retail industry. Other major CVS chains including Lawson, Family Mart and Sunkus Associates have basically been followers of Seven-Eleven. Other small and medium sized CVSs cannot afford the large amount of IT investment, and the gap between major CVS chains lead by Seven-Eleven and other small and medium sized chains are getting larger and larger.

KEY ENVIRONMENT AND POLICY FACTORS INFLUENCING DIFFUSION

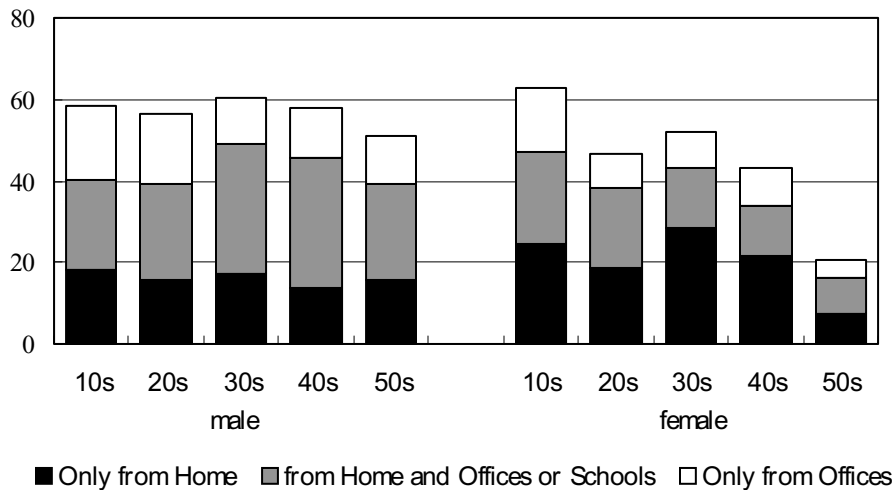
Business Environment

The key business environment for CVSs is consumer-buying preferences. Once customers are in the story, CVS offer a range of Internet services (1) products, (2) delivery, and (3) payment.

Demographics of Japanese Internet Users

Figure 3A shows the ratio of Internet users categorized by sex and age. Most heavy Internet users from home are both female and male of age between 10s and 30s. These generations are also heavy users of CVS. As CVSs are very popular and have very strong brand equity among most of Internet users, these consumers can be users of CVSs' websites, too.

FIGURE 3A. Ratio of Internet Users by Sex and Age

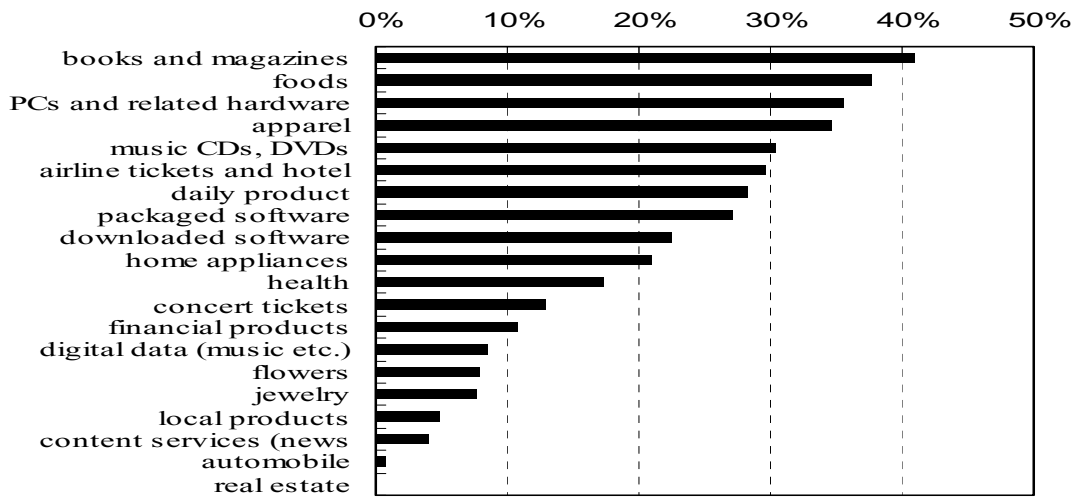


Source: NRI (2002)

Popular Products for Online Shopping

Figure 4A shows the ratio of active Internet users who shop online.

FIGURE 4A. Product Bought by Active Internet Users



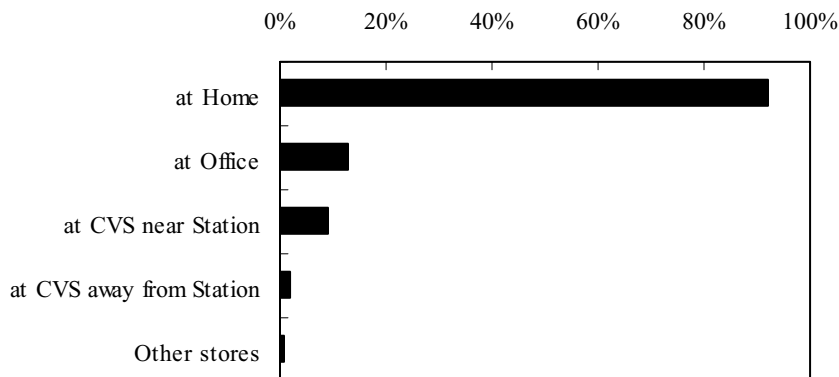
Source: Nikkei Net Business (2002)

We can see that such products like books, magazines, foods, drinks, PCs, and apparels are very popular for online shopping. However, most books or magazines sold online are not best sellers but those that are very difficult to find in bookstores. Consumers can buy best sellers easily at bookshops, and they do not have to pay the extra shipping fee. Likewise, foods and drinks sold well though the Internet are not daily food but local foods or drinks that are very difficult to buy at shops nearby. Since consumers do not have to use the Internet to buy daily products that are sold in shops nearby, websites of CVSs have to have different product mix from their ordinary physical shops.

CVS as Delivery Points

Postal services for consumers in Japan were originally monopolized by the government, but with the trend toward deregulation, some private courier companies including Yamato Transport entered the market and services have improved very much. E-commerce companies can deliver products to any consumer anywhere in Japan, including small isolated islands, for a very reasonable shipping fee. Major courier companies provide tracking information of each parcel on their websites and develop new services like collection of payment from consumers for e-commerce companies.

FIGURE 5A. Location of Receipt for Online Shopping

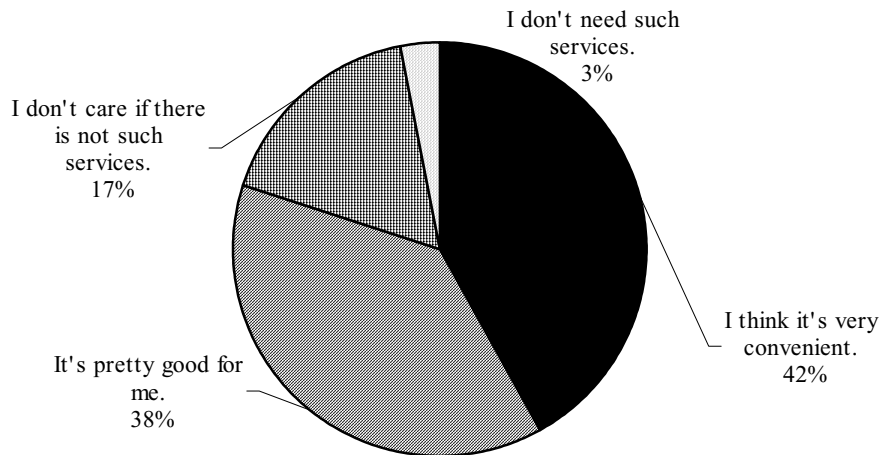


Source: Japan.internet.com (2000)

A well-developed delivery networks is an encouraging factor for the diffusion of e-commerce in Japan. However, any courier service has to pass packages directly from hand-to-hand unless the recipient's house has special equipment to receive packages while absent. Since most of online shoppers work in an office and do not stay at home during the day of weekdays, they cannot receive products even if they are already delivered to the office of courier companies nearby. Figure 5A shows the popular location to receive products ordered through the Internet.

As we can easily imagine, the most popular location to receive a package is at home and receiving at the CVSs is still a small percentage. One of the reasons CVSs are not currently as popular as the receiving point is that since the shop area of CVS is very small and such small space is already used very efficiently, there is very little extra room to keep packages. If CVS keep packages for such consumers, however, they can pick it up on the way home from a late night at the office. Figure 6A shows that consumers regard CVSs as a very convenient receiving point.

FIGURE 6A. Opinion for the Delivery Service at CVS



Source: Japan.internet.com (2000)

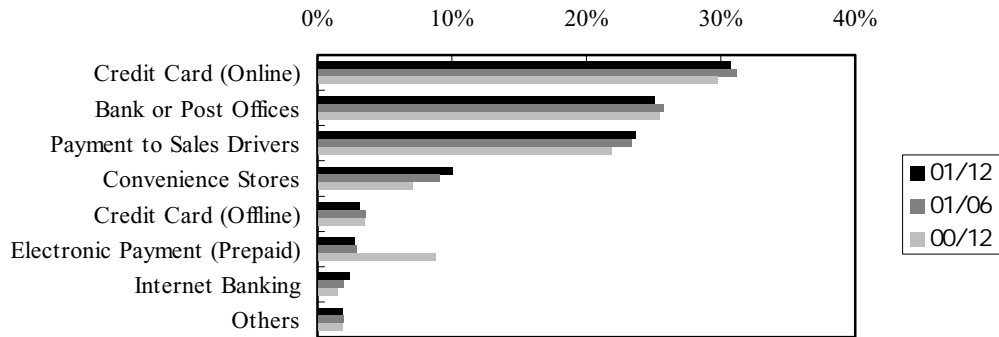
Consequently, CVSs are now regarded as a very important delivery point for B2C e-commerce in Japan, and many e-commerce retailers have made alliances with the CVS chains for the delivery of their products. Currently, e-commerce companies which can use CVSs as delivery points are limited to those of CVS's own e-commerce sites and companies which made alliance with CVS chains. Although payment at CVSs is already very popular and estimated to be more and more popular in the future, receiving products at CVSs can not be so popular unless CVS chains solve such problems like space and education of shop clerks handling e-commerce orders without causing congestion at the check out counters.

Payment Method for Online Shopping

As explained above, more than 40,000 franchised CVSs are spread all across Japan. There are more CVSs than bank branches (about 15,000) and postal offices (about 25,000). In these CVSs, consumers can pay online orders as well as utilities bills including telephone, water, and gas. Payment at physical

stores is another important e-commerce function of CVSs as well as selling goods via websites. Figure 7A shows payment methods for e-commerce that active internet users actually have used. Payment at CVS stores is the fourth most popular method, and users are steadily increasing.

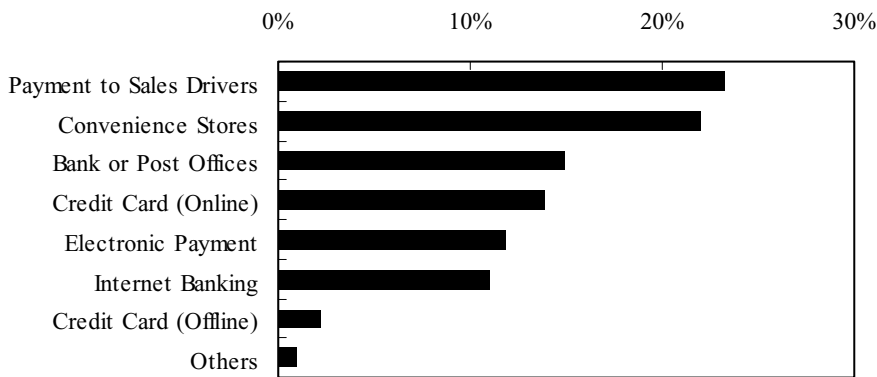
FIGURE 7A. Payment Method Used by Active Internet Users



Source: Nikkei Net Business (2002)

Figure 8A shows the answer of active Internet users to a question: “Which payment method is best for you?” We can see that payment at CVS are second best next to payment to service drivers of courier companies.

FIGURE 8A. Desirable Payment Method for Active Internet Users



Source: Nikkei Net Business (2002)

Policy Environment

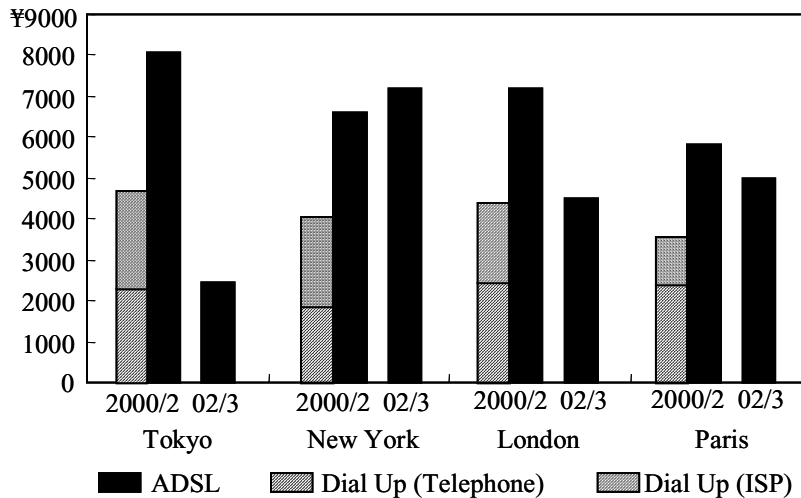
One of the biggest barriers for B2C e-commerce in Japan used to be the high cost of Internet access. Since telephone cost is proportional to access time in Japan, consumers have to care about Internet access time when using a modem and can not afford to surf the websites of online retailers for a long time. Retailers have to reduce the quality of pictures of products and they cannot use sophisticated technologies like animations if consumers access the Internet using analog modems.

Since the Japanese government announced the e-Japan Strategy whose goal is to build a high-speed Internet infrastructure and began to privatize NTT, Internet access in Japan has been drastically improved. The number of subscribers of ADSL services in December 2002 was more than five million. It is as much as 500 times of the number in December 2000 (9,723). The reason for this astonishing growth is the rapid drop of access charge as well as the expansion of the ADSL services area. Figure 9A compares the access charge of four major cities in the world. In February 2000, dial-up access to

Internet for 20 hours charged ¥4,725 per month and the charge for ADSL services was ¥8,050 per month in Tokyo. Internet access charge in Tokyo was the highest of four cities at that time. In March 2002, the charge for ADSL services in Tokyo was ¥2,453 per month and the lowest of four cities. According to a study by Impress (2001), the number of Japanese accessing the Internet using broadband services, including ADSL, CATV, or FTTH, was about 1.6 million in February 2003, or about 40 percent of the households with Internet access.

FIGURE 9A. International Comparison of Monthly Internet Access Cost

Source: MPHPT (2000,2002)



Notes: The cost of 'dial up' is the monthly cost to access Internet for 20 hours. All costs are converted to yen by the exchange rate.

Therefore, the Internet access charge is not a serious barrier for Japanese B2C e-commerce any more. As many people do not shop online because they are anxious about security, policy issues such as electronic signature are still important. However, since new technologies like SSL are widely available in Japan and some laws have been and plan to be amended to promote the diffusion of e-commerce, current important issues of B2C e-commerce in Japan will be solved by the effort of private sector rather than government.

E-COMMERCE READINESS

Information Infrastructure

As discussed earlier, the CVS industry is equipped with some of the most sophisticated information systems and information infrastructure. Electronic ordering systems, point-of-sales (POS) systems, high speed network systems among headquarters and stores, and in-store ATMs and MMKs (Multi Media Kiosks) are examples of such information infrastructure.

Types of Technologies and Applications

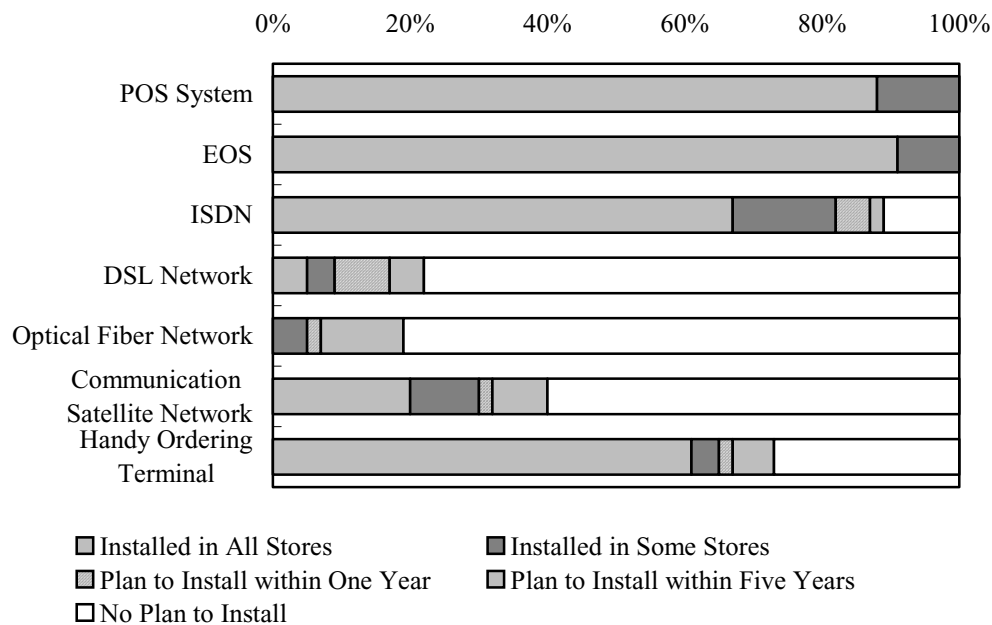
Electronic ordering system (EOS) was first developed by Seven-Eleven Japan in June 1979, followed by other major CVS: Lawson in February 1980, and Family Mart in April 1980. With EOS, unskilled clerks can place orders almost automatically and skilled managers can concentrate on making hypotheses. Seven-Eleven also launched the first POS system in February 1983. It took more than seven years until Lawson and Family Mart launched their POS systems in 1990. As mentioned earlier, POS terminals at

Seven-Eleven was innovative because they have special keys that capture the demographics of customers. In the traditional relationship between manufacturers and retailers, manufacturers usually take the lead in product development. Seven-Eleven changed the locus of innovation, however, by using the POS system. Retailers can lead innovations by proposing the development of new products to manufacturers based on data collected by their POS system which cannot be collected by manufacturers. Manufacturers can have information about aggregated sales of their own products but cannot have information about the sales of other companies and information about the demographics of customers. Information collected by POS systems of CVS chains can be a source of innovation and can change the relationship between manufacturers and retailers.

Internal and External Integration

Communication network systems of CVSs were based on ISDN in the 1980s, and major CVS chains began to install new network systems based on communication satellite since the late 1990s. Using communication satellite networks, CVS chains began to send richer information like pictures of products and motion video. For example, store managers can receive the commercial films of new products from headquarters and make them available to consumers before they can see them on TV. By not only anticipating consumer needs, but also creating customer demand, store managers can improve their hypothesis about what new products to stock. Figure 10A shows the diffusion of typical information systems.

FIGURE 10A. Installation of Information Systems at CVS Chains



Source: Nikkei Marketing Journal (2002)

In-store ATMs is another IT equipment that major CVS chains compete to launch. Since the number of CVSs is greater than bank branches and these stores stay open until late at night, it is expected that there will be strong demand to withdraw money from in-store ATMs, especially among young people. Table 6A shows the number of ATMs installed at major CVS chains.

TABLE 6A. Number of In-Store ATMS (end of 2001)

Rank	CVS chains	Total # of ATMs	percent ATM to Total Stores
1	7-Eleven	2,754	30.2
2	Family Mart	2,581	48.8
3	Lawson	1,922	24.9
4	am/pm	1,010	92.2
5	Mini Stop	457	32.8
6	Circle K	291	11.3

Source: Nikkei Marketing Journal (2002)

MMKs (Multi Media Kiosks), special in-store terminals by which customers of CVSs can search information and buy some services like tickets for music concerts, is another large investment for major CVS chains. Larger CVS chains developed their own MMKs: “Seven Navi” of Seven-Eleven, “Loppi” of Lawson. However, smaller chains like Family Mart, Sunkus and Mini-Stop made an alliance to develop a common MMK to lower the amount of investment. CVS chains expect MMKs to be another engine to improve the sales of existing stores, but consumers are not so enthusiastic about MMKs so far. Young people do not hesitate to stay a long time in front of the ATM or MMK, but they do not spend so much money. Older generations including 30s and 40s do not tend to withdraw large amounts of money from in-store ATMs of CVSs nor do they stay long to search for information using MMKs. For some of those people, CVS is a busy and unsafe place in comparison to the bank or post office, and so they are reluctant to use in-store ATMs of CVSs.

IT Investment

IT is a critical infrastructure for CVS business, and major CVS chains invest lot of money for IT. Table 7A shows the amount of investment of the major CVS chains in Japan.

TABLE 7A. 2001 Investment at Major CVS chains (¥ million)

Rank	CVS Chains	Total Investment	IT Investment
1	Seven-Eleven	51,419	NA
2	Lawson	35,191	10,045
3	Family Mart	28,675	10,913
4	Circle K	13,584	3,374
5	Thanks Associates	9,619	1,992

Source: Nikkei Marketing Journal (2002)

Lawson, for example, invests more than 10 million yen to IT including the new MMK called “Loppi” which will be equipped in 7,400 stores all over Japan. Although Seven-Eleven does not disclose its IT investment, investment of Seven-Eleven as a whole exceeds other major CVS chains. Seven-Eleven generates more than 100 billion in cash flow, which is much more than other chains, and it is a leader for IT investment as well as other innovations. This level of IT investment as a percentage of revenues is considerably higher than the national average in the GEC survey. On average, one-third of total investment goes toward IT applications and technologies. We do not have a breakdown of the percentage of web-based investment, but the shift towards Internet-based services suggests this budget item will increase in the near future.

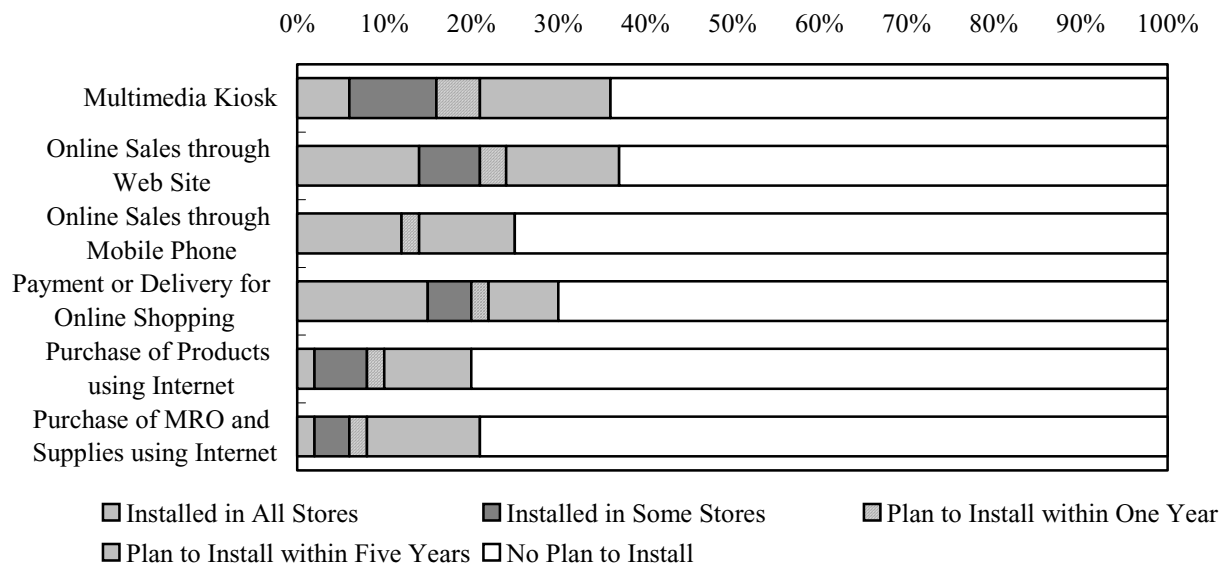
DIFFUSION OF E-COMMERCE

The e-commerce related business of CVS chains fall into three areas:

- (1) Internet: selling goods through websites,
- (2) Antennae: selling and providing various services and information through MMK at shops, and
- (3) Intermediary: providing E-commerce related services like payment and delivery.

The Internet can be used for the procurement activity of CVS chains, but actually, as shown in Figure 11A, e-commerce is not popular for buying goods in CVSs. For CVSs, the Internet is primarily a new channel to sell products and provide information for consumers and an important infrastructure to develop new services and enhance their existing strengths.

FIGURE 11A. Diffusion of E-Commerce Related Services (Survey of 75 CVS Chains)



Source: Nikkei Marketing Journal (2002)

Every major CVS chain has their websites and sell a variety of products to consumers through websites. Seven-Eleven opened “7dream.com” website (<http://www.7dream.com/>) in alliance with NEC and other companies. Lawson has “@Lawson.com” (<http://www.at-lawson.com/>), and Family Mart has “Famima.com” (<http://www.famima.com/>). Although they have very strong brand for in-store sales, they are still struggling for online sales via websites. In Japan, the most popular B2C sites for online shopping are Rakuten (<http://www.rakuten.co.jp/>), which is a shopping mall with about 10,000 shops and 3.5 million items. Consumers can buy almost anything from Rakuten’s site. It is very difficult for CVS chains to differentiate their website from other B2C sites like Rakuten. CVS chains try to add value to their websites by allowing consumers to pick up products at their stores, but their effort does not seem to appeal to consumers yet. We believe that CVSs’ main use of the Internet will be to develop new services like payment or delivery and to enhance their existing strengths like brand or physical store network rather than to increase sales through websites.

BUSINESS IMPACTS

Efficiency

Since CVSs are based on a very sophisticated and almost completed business system, diffusion of

e-commerce cannot have big impacts for the value chain of CVS. Efficiency cannot be radically improved by e-commerce, either. We believe that the most important impact of e-commerce on the business of CVSs is not efficiency, but development of new market and new services like e-commerce payment and delivery.

Industry Structure

As online shopping is based on different business systems with a mix of products from CVSs' traditional business at physical stores and sales via websites are very small in comparison with sales from physical stores; online shopping does not have a big impact on the existing industry infrastructure. In-store ATMs and MMKs are expected to increase the sales of existing stores, but consumers do not accept these new machines entirely yet. Other e-commerce related services are basically based on the existing infrastructure of CVSs and do not change the industry structure largely. Therefore, we believe that the impact of e-commerce on the industry structure of CVS is very limited.

Competition

Some CVS chains recently closed inefficient stores and the growth rate of CVS is decreasing. Many CVS chains started e-commerce business for further growth, but e-commerce business needs large amounts of investment for information systems like MMK and websites. Since only major CVSs can afford such investment, CVS industry tends to be polarized into two groups: less than ten major CVS chains led by Seven-Eleven and other small and medium sized CVSs. In that sense, e-commerce has a big impact on the competition structure of CVS industry.

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