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B2B E-commerce in the United States, Europe and Japan: A Comparative Study

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Abstract: This research examines the implementation and practice of B2B e-commerce in the United States, Japan and Western Europe and notes some of the major similarities and differences among these economic regions with respect to this new business environment. A brief overview of B2B infrastructure is first presented, together with a discussion of the relative degrees of utilization of B2B technologies in the three regions. Critical elements of the B2B market are also discussed, as well as projected growth trends. Finally, in this research are discussed some drivers and inhibitors of e-commerce and is made an attempt to discern some possible reasons for the differential patterns of B2B e-commerce implementation in the selected triad of economic regions. According to the findings of the research, it was determined that the United States, Japan and Western Europe are all making significant inroads into the B2B e-commerce arena, with the United States the clear leader currently. However, the first mover advantage may not last long, as it is only a matter of time before Western Europe and Japan duplicate the US success story, but without all the costs that the US had to incur.

Key words: B2B e-commerce, e-business, globalization, internet, economic regions

INTRODUCTION

The internet has greatly facilitated the globalization of the competitive business arena, spawning, among other things, the era of electronic business (e-business). With each passing year, more and more businesses move online and those already online move even more of their business activities to the Net. This migration to e-business is not only a growing trend, but also, an irreversible one. Business organizations are finding out that in order to be effective competitors in today's global marketplace, they need a solid e-business foundation. As such, many are redesigning their business processes and Information Technology (IT) infrastructures in order to cope more effectively in this new competitive environment. Such organizational redesign involves, as Kalakota and Robinson (1999) put it, 'the complex fusion of business processes, enterprise applications and organizational structure necessary to create a high-performance business model that can capitalize on the opportunities accorded by the internet as an effective medium for commercial activity.'

There are several categories of commercial activity on the internet. These include the following: (a) Business-to-business e-commerce (B2B), which refers to commercial activity between two or more business organizations; (b) Business-to-consumer e-commerce (B2C), which refers to commercial activity between businesses and consumers,

such as between Amazon.com, Schwab.com, or Yahoo.com and their respective customer groups; (c) Consumer-to-consumer e-commerce (C2C), which refers to electronic exchanges between and among consumers, typified by auctions that are mediated by third parties such as eBay.com and (d) Consumer-to-Business e-commerce (C2B), which involves the banding together of consumers who present themselves as a buyer group to businesses; such consumer groups may be economically motivated (e.g., the demand aggregator Mercata.com) or socially motivated (e.g., the advocacy groups at Voxcap.com) (Rayport and Jaworski, 2001).

The focus of this study is on B2B e-commerce, which we define as those business activities related to the actual buying and selling of goods and services among organizations over the internet. The reason for this focus is primarily because the B2B model has become the most significant, in terms of growth and financial impact, relative to the other electronic business models. We shall trace the growth, trends and practice of B2B e-commerce and discuss differential patterns among the following triad of the world economy: the United States, Japan and Western Europe (specifically, the United Kingdom, France, Germany, Italy and Sweden). Possible reasons for the observed differential patterns will also be discussed. These regions were selected based primarily on the fact that they are among the major economic regions with a real potential to significantly influence the direction of global B2B e-commerce.

B2B E-COMMERCE AND INFRASTRUCTURE

Business experts and government officials have asserted that Japanese and European e-commerce lags behind that of the US by some two to three years. Although such estimations vary from source to source, there is no question that the size of the US e-commerce market is much larger than those of Japan and Europe, as shown in Table 1 (Japanese Ministry of International Trade and Industry, 1999 and from AMR Research, 2000).

Table 2 shows the dominance of the US in both B2C and B2B e-commerce. As a percentage of Gross Domestic Products (GDP), however, Japan's total e-commerce revenues are in the same ballpark as the US Table 1 also shows that, at least in 1999, Western Europe lagged both the US and Japan in total e-commerce revenues, even though it led Japan in B2C e-commerce.

Although B2C e-commerce was the first to attract general attention, the B2B sector provides the most opportunity for exploitation, especially in the supply chain, where B2B activity is concentrated. B2B e-commerce capitalizes on inherent inefficiencies in traditional supply chains and internal operations, as well as imperfect competition. It is not surprising; therefore, that B2B e-commerce is the fastest growing business model. It has become the dominant model on the basis of its financial volume and impact alone. Table 1 very clearly demonstrates the significant differences in revenues between the B2B and B2C markets. There are equally significant differences in the relative growths of these markets and this is expected to continue. For example, the B2C sector in the US grew from \$18.8 billion in 1999 to \$25.8 billion in 2000 (ECPC, 2001), representing an increase of 37%. By contrast, the US B2B sector revenues are expected to reach \$2 trillion in 2002 (KPMG, 1999), representing an average annual growth rate of over 370% from the 1999 values. It is worth emphasizing that growth

the literature, but in each instance, the projections for the B2B market have far outstripped those for the B2C market.

As a further illustration of the magnitude of the financial transactions involved in B2B e-business, consider the following: In 1999, the big three automakers in the US, namely General Motors, Ford and Daimler Chrysler, together with Nissan/Renault and PSA Peugeot Citroen, collaborated to create an internet-based marketplace for B2B e-commerce. They called it Covisint and it went live in October 2000. By the end of July 2001, Covisint had successfully handled over \$129 billion in transactions-over 53% of the estimated \$240 billion spent annually by the Big Three automakers in supply purchases (Laudon and Traver, 2001). Today, Covisint has become the largest Net marketplace, with over 1,700 qualified suppliers at the site, which also provides inter-enterprise auction capability. Ford Motor Company claims to have saved over \$70 million in indirect procurement costs alone in 2001 as a result of its participation in Covisint (Laudon and Traver, 2001). The emergence of such B2B powerhouses as Oracle, IBM, SAP, CommerceOne and Ariba is further testimony to the growth and importance of the B2B segment of e-business. Other public e-marketplaces include: The globalNetXchange organized by Oracle, Sears and Carrefour (France) and eLabsEurope (Kaplan and Sawhney, 2000).

For e-business to be effective, there needs to be an appropriate infrastructure in place. Electronic Data Interchange (EDI) and extranets are among the basic infrastructure components for B2B e-commerce. Each has its own unique characteristics with respect to access, security and ease of use. Electronic Data Interchange is the computer-to-computer exchange of data (e.g., invoices), in a structured format, which allows for automatic processing of the data, with no manual intervention. It is based on a trust relationship between an organization and its partners or between an organization and a Value-added Network (VAN) provider who handles the access, security and other issues related to EDI transmissions on behalf of several organizational partners. Certain inherent characteristics of EDI discourage unauthorized access into the network by outsiders (i.e., non-EDI partners). These characteristics include the stringent data formatting requirements for specific industries and the dedicated--and hence secure nature of EDI transmissions between specific trusted partners.

A recent benchmark study commissioned by the United Kingdom's Department of Trade and Industry revealed that there was a general increase in EDI use between 1997 and 2000 among businesses in the regions being studied (UK, 2000b) (Table 2).

Table 1: Comparison of 1999 and commerce revenues (in \$ billions)

E-business classification	Japan	United States	Western Europe
B2C	0.6	18.8	3.0
B2B	71.8	162.5	50.0
Total	72.4	181.3	53.0
Total as % of GDP	1.8	2.0	0.6

Table 2: Trends in business EDI use (%)

Country	1997	1998	1999	2000
United States	27	22	33	32
Japan	25	33	27	38
United Kingdom	31	29	32	39
France	17	19	28	46
Germany	27	34	39	34
Italy	-	-	7	32
Sweden	-	-	-	27

The most dramatic increase in EDI use occurred in France, whose usage rose from 17% in 1997 (the lowest usage rate for that year) to 46% in 2000 (the highest usage rate for that year). Over the same period, the United Kingdom and Germany consistently surpassed the US in EDI usage, while Japan was able to catch up with the UK. In 2000, Japan's EDI usage rate surpassed that of the US and was either similar to, or surpassed, the usage rates of most of the European countries included in the study.

The extranet, a later technological development than EDI, allows an organization to grant selected suppliers and business partners access to parts of its internal internet-based network (i.e., its intranet). The term Private Industrial Network (PIN) has also been used to describe an extranet, which Laudon and Traver (2001) formally define as a series of 'web-enabled networks for the coordination of transorganizational business processes (sometimes also called collaborative commerce). Organizational members of an extranet form what is usually referred to as an extended enterprise. This typically grows out of the Enterprise Resource Planning (ERP) system--such as SAP R/3--of a single large firm and is then expanded to include the firm's major suppliers.

Being based on internet technology gives extranets an important advantage over EDI, namely ease of use. Virtually all knowledge workers today are already familiar with the World Wide Web browser interface, eliminating the need to learn a new interface in order to interact with an extranet. However, this same characteristic of extranets also makes them more vulnerable to security breaches by hackers and malicious viruses. Even though security features on the internet, such as encryption, are constantly being improved, security remains the achilles heel of the internet.

Table 3 shows that there was a dramatic increase in extranet usage by businesses in the US and Western Europe from 1999 to 2000, with the most dramatic increases occurring in the US (+14%), Germany (+13%) and the UK (+12%). During this time period, Japan's use of extranets declined by 4%. A possible explanation for this is that, unlike most of the other countries, which simultaneously developed both EDI and extranet capabilities, Japan shifted its efforts from extranets to EDI (in which it experienced an 11% increase in usage from 1999 to 2000, as indicated in Table 2). The reverse argument seems to hold true for Germany, which experienced a 5% decrease in EDI usage between 1999 and 2000 (Table 2), while experiencing a 13% increase in extranet usage during this time period (Table 3, UK Department of Trade and Industry, 2000b).

The emergence of the extended enterprise has created niche opportunities for firms, such as 12 Technologies, to

Table 3: Business extranet use (%) country

Country	1999	2000
United States	8	22
Japan	16	12
United Kingdom	5	17
France	4	15
Germany	8	21
Italy	5	8
Sweden	-	22

Table 4: Technologies used to order goods online (%)

Country	EDI	Extranet	Web	Email
United States	18	20	91	72
Japan	40	14	56	62
United Kingdom	18	9	58	77
France	27	18	61	55
Germany	13	13	85	82
Italy	7	7	61	88
Sweden	12	16	89	73

provide supply chain management systems to support these enterprises. Other solution providers include CrossWorlds, which provides Enterprise Application Integration (EAI) systems to allow disparate computer systems of different firms to communicate with each other and share relevant business information (Kalakota and Robinson, 1999).

In addition to EDI and extranets, businesses can also engage in B2B activity using the ordinary world wide web (i.e., without any customization to create unique extranets) as well as electronic mail. Table 4 shows the relative degree of usage of these technologies by businesses in the countries being investigated to order goods online. This table should be read and interpreted as follows: Of those businesses that use a particular technology, the percentage that use that technology specifically for ordering goods online. Perhaps not surprisingly, the web and e-mail dominate in this aspect, since these technologies are relatively inexpensive and do not require any significant redesign of business processes or infrastructure. In terms of percentages, Japan is by far the leader in the use of EDI to order goods online, while the US leads in the use of extranets and the web (with Sweden a close second on the web). Italy's preferred method for ordering online is via e-mail, however, it lags most of the other countries in the use of virtually all the other B2B infrastructure technologies (Table 4; below UK Department of Trade and Industry, 2000b).

The arena within which businesses conduct internet mediated B2B trade is generally referred to as an e-marketplace. Within this arena, suppliers can advertise and market their products and services and buying companies can make their requisite purchases.

Purchasing in the e-marketplace is referred to as e-procurement and it is a critical component of the supply chain for most organizations (e-distribution being another one). The e-procurement process involves several

steps, including the following, which are adapted from (Laudon and Traver, 2001): (a) Search-the ability to search online for appropriate suppliers, contacts, brochures, etc. (b) Qualify-online research of company background, credit history, comparisons with competitors, etc. (c) Negotiate-negotiating the price, credit terms, quality, timing, etc. (d) Purchase-ordering the product, initiating the Purchase Order (PO) and entering the information into the system (e) Invoicing-receiving the invoice and matching with PO, entering the information into the financial and production systems (f) Shipping-shipping and delivery of goods, entering the information into the shipper's tracking system and (g) Remittance Payment-receiving goods, verifying and correcting invoice, sending payment and entering the record into the system. It is evident from this table that in spite of its overall dominance in e-business, the US is not the clear-cut leader in e-procurement feature utilization. Rather, it shares the leadership position with the UK, which, like the US leads in three e-procurement categories, while being close to the top in several other categories. The country that lags consistently and significantly in virtually all aspects of e-procurement is Japan.

B2B GROWTH TRENDS

Here, we discuss some of the projected estimates of B2B growth that have been put forth by various research organizations. As previously stated, these estimates vary widely in the literature and can therefore be misleading-indeed, some are downright contradictory of each other. These variations in projection are, doubtless, the result of differences in the underlying assumptions used by the various research organizations. Since there is no way to know a priori which underlying assumptions will turn out to be correct, we present the projections as stated by the various organizations and where appropriate, provide our own interpretation of the data.

According to IDC Research, global B2B revenues are expected to rise from \$282 billion in 2000 to \$4.3 trillion by 2005. This is equivalent to a Compound Annual Growth Rate (CAGR) of 73% in B2B revenues during this period, with the majority still coming from the US, where the B2B revenues will reach \$1.56 trillion by 2005 (IDC Research, 2001). This is a strong indication of the expected viability of the global B2B market. Other growth projections have been even more dramatic. For example, Laudon and Traver (2001) report that, according to Jupiter media metrix, B2B revenues will reach \$12 trillion by 2001 and \$16 trillion by 2006-in the US alone. The more realistic estimate is probably somewhere between these two sets of projections.

The projected growth in B2B e-commerce in Japan and Western Europe parallels the drastic increase in the US (Barrenechea, 2001; ECPC, 2001). According to AMR Research, the amount of B2B transactions in Western Europe should reach \$4.3 trillion in 2004, compared to \$50 billion in 1999 and \$70 billion in 2000. B2B transactions should then represent about 21% of all e-commerce (AMR Research, 2000). IDC Research is more modest in its projections, estimating that B2B revenues in Western Europe will rise at a CAGR of 91% to \$1.46 trillion by 2005 (IDC Research, 2001). This latter estimate is probably more reliable since it is closer in value to another independent study conducted by the Gartner Group, which indicates that European e-commerce is growing at a rate of 87% per year and at this pace, the European internet economy could be a \$1.2 trillion market by 2004, or 15% of Western Europe's GDP (Gartner Group, 2001). We postulate that the true estimate lies somewhere between the IDC Research prediction and the Gartner Group's.

Despite these differences in prediction, the one consistent thread in all cases is for high continuous B2B growth for the next several years in the US, Japan and Western Europe (Barrenechea, 2001; Guth, 2000). This is true even in light of the fact that more recent growth estimates have been generally less optimistic, given the recent downturn in the dot-com revolution. It is interesting to note, parenthetically, that the compound annual growth rate in B2B revenues is expected to be highest in Asia/Pacific, at 109% (IDC Research, 2001).

B2B FINANCING

Effective and creative financing is crucial to the success of e-commerce. The design and implementation of e-commerce infrastructure, as well as the requisite reengineering of business processes for e-commerce all require significant investments of capital. Venture capitalists, entrepreneurs, incubators and corporate investors have been major capital sources for B2B e-commerce. Here we examines the availability and effectiveness of some of these financing options in the selected triad of economic regions.

There was an accelerated rise in the stock prices of e-commerce companies in 1998 and 1999, fuelled by a dramatic increase in venture funding during this period. Venture capital investments in seed and early stage companies amounted to \$3.4 billion in 1998 and jumped to \$11 billion in 1999 (Venture Economics News, 2000). Statistics for internet Initial Public Offering (IPO) for 1999 are even more revealing: The portion of total IPOs which was internet-related is an astonishing 50% and the average internet IPO return is a whopping 233% (Stanford

University, 2000). However, by the spring and summer of 2000, the so-called internet bubble of the dot-com revolution had burst, resulting in a corresponding decrease in venture capital funding.

The US venture capital market by far dwarfs those of Japan and Western Europe. In the third quarter of 1999, near the peak of the internet revolution, approximately 60% of the \$8 or \$9 billion venture capital fund was invested in internet companies (Barrenechea, 2001). The Japanese venture capital market is small and has not matured relative to the US several important ingredients are not sufficiently developed in Japan, including NASDAQ types of exchanges for start-ups, large-scale incubators and risk management of capital. However, there is a trend in Japan to foster venture capital infrastructure as well as entrepreneurial development (Sorenson, 2000). For example, Panasonic Venture Capital has started actively funding entrepreneurial e-commerce initiatives jointly with their US operations (Stein, 2001).

The European venture capital market is more active than the Japanese market, but nowhere near the US market (OECD, 2000). European venture capital initiatives include the European Technology Facility (ETF), which targets higher risk fund profiles for start-ups and I-TEC, which was designed to encourage early stage investments in technologically innovative small to medium sized enterprises (SMEs) (European Commission, 2001).

The US has a very well developed entrepreneurial investor market, which has helped in the financing of the B2B market. The development of Bit Valley in Shibuya, Tokyo, represents a mini entrepreneurial revolution in Japan. It resembles Silicon Valley in California, but on a much smaller scale (Takuya, 2000).

In Europe, there is a series of entrepreneurial initiatives known as the Directorate General (DG) Enterprise Initiatives. These include the following: 1) Trans-national joint ventures within the European Union, such as the Joint European Venture (JEV), which provides funding for SMEs; 2) Capital Risque pour les Entreprises d'Amorçage (CREA), which provides seed capital to cover part of the operating costs during the start-up phase; 3) Mutual Guarantee Schemes, which involve private groupings of companies, often linked to sector-specific interest groups, to provide loan insurance to banks and 4) a Roundtable of Bankers and SMEs dedicated to finding funding opportunities for SMEs. These groups of companies are playing a major role in the funding of e-commerce companies, especially during the start-up phase (European Commission 2001).

Several large incubators have emerged to finance and nurture new e-commerce start-ups. These include M

icrosoft, America Online (AOL), CMGI and the internet Capital Group (ICG). ICG alone had invested in more than 70 B2B companies in the US (e.g., Vertical Net) by the summer of 2000. It also invested in a dozen European B2B companies in 1999. However, with the bursting of the internet market bubble in 2000, most of the incubators reduced their operations drastically. Their market capitalization has shrunk to the point where their influence is now minimal (Barnet *et al.*, 2000).

The formation of incubators is accompanied by the formation of groupings or alliances of companies, referred to as e-Keiretsu or e-Zaibatsu (meaning grouping in Japanese). E-Zaibatsu (or cyber Zaibatsu) groups are a natural outgrowth of the competitive nature of e-commerce. Among the most prominent is the AOL grouping, which is vast and reaches out to the Old Economy. It encompasses: 1) AOL in foreign countries, including AOL Japan and AOL France; 2) Hardware and software companies such as Netscape; 3) Content companies such as Time Warner and 4) Numerous alliances with other companies, such as Softbank and Yahoo.

Similar patterns are occurring in Japan (Landers, 1999), where emerging internet companies include the following: Softbank, internet initiative Japan Inc. (IIJI), E-Trade Japan and Yahoo! Japan. Mergers and alliances between internet and brick-and-mortar companies include those between Softbank and Orix, Softbank and Nippon Credit Bank (proposed) and Toyota and IIJI. Some brick-and-mortar companies are transforming into internet oriented organizations, for example Fujitsu, Hitachi and Itochu. Some internet incubators are also beginning to emerge in Japan. These include the Sunbridge Group, J-speed Ventures and WebEggs (Sprindle, 2000).

There are traditional funding institutions, such as banks, in all three economic regions, which provide funding for e-commerce companies. Two such institutions in Europe are the European Investment Bank and the European Investment Fund (European Commission, 2001). Similar institutions in the US and Japan perform comparable functions. For example, in 2000, Goldman Sachs underwrote 39 deals in the US worth more than \$10 billion (Bochnowski, 2001). Other big US funding institutions include Credit Suisse First Boston, Salomon Smith Barney, Merrill Lynch and Morgan Stanley. It is expected that the top 25 US banks will continue to play a critical role in funding new ventures. The major funding institutions in Japan include the Dai-ichi Kangyo Bank (DKB), Sumitomo Mitsui Banking Corporation, The Fuji Bank and the Bank of Tokyo Mitsubishi.

GOVERNMENTAL AND REGULATORY ISSUES

There are noticeable differences in the role of government in the US Japan and Western Europe, with respect to e-commerce. In this section we look at some of these roles and the differences among them.

In the US, there is a general hands-off approach to regulating electronic commerce. In general, the government adheres to the following principles published in a 1997 White House document on global electronic commerce: 1) the private sector should take the lead; 2) government should avoid undue restrictions on electronic commerce; 3) where government involvement is needed, its aim should be to support and enforce a predictable, minimalist, consistent and simple legal environment for commerce; 4) governments should recognize the unique qualities of the internet and 5) Electronic commerce over the internet should be facilitated on a global basis.

Governmental involvement in e-commerce is more pronounced in Western Europe. For example, there is a European initiative, eEurope, whose intention is to get everyone in Europe every citizen, every school, every company--on-line as quickly as possible (Schultz and Baumgartner, 2000). The British government has also instituted cabinet-level positions, an e-Envoy and an e-Minister, to oversee the migration of their society to the internet (UK, 2000a).

The EU is currently issuing directives (the most common form of European legislation) to member states regarding e-business. On average, such directives become law in about two years. Included in the directives are the following: definition of where operators are established; transparency obligations for operators; transparency requirements for commercial communications; conclusion and validity of electronic contracts; liabilities of internet intermediaries and on-line dispute settlements. While national law and EU law are mutually dependent, EU law takes precedence over national law (Schulze and Baumgartner, 2000).

In Japan, there are many regulations that impede e-commerce implementation. For example, the large store law, which puts restrictions on the opening of large stores in various locations, inhibits speedy diffusion of e-commerce (Yamamoto and Chen, 1999). Another example comprises the restrictions that are placed on the amount of commission that can be charged in stock trading. Only recently in 1999 has the Japanese government deregulated trading fees. Moreover, Japanese commercial law and regulations governing start-ups have been very restrictive in terms of capital requirements as well as the issuing price of individual stocks (Shinji, 2000).

Antitrust laws in the triad of economic regions could also become a barrier to the formation of e-marketplaces or e-Keiretsus, which necessitate the coming together of and collaboration among, groups of business organizations. Antitrust laws are intended to protect the public from such illegal business practices as price fixing, big rigging (when businesses agree not to bid against each other for government contracts) and other anti-competitive behavior. In the US, the antitrust laws are enforced by the Bureau of Competition of the Federal Trade Commission (FTC) and the Antitrust Division of the Department of Justice (DOJ). The equivalent bodies in Western Europe and Japan are the European Commission (EC) and the Japan Fair Trade Commission (JFTC), respectively. There is a distinct possibility that these bodies would, some day, rule that certain e-marketplaces or e-Keiretsus are anticompetitive, even if they haven't ruled so yet for existing e-marketplace collaborators. Potential B2B participants might simply be waiting to assess the impact of antitrust laws on such collaborations.

In April 2000, antitrust guidelines were issued specifically for competitor collaborations in the e-commerce environment in the US (Millar, 2000). These guidelines consist of two analytical rules:

The *per se* rule: Collaboration agreements among competitors will be deemed as *per se* illegal if they fix prices/outputs, rig bids, or share/divide markets by allocating customers, supplies and lines of commerce.

The rule of reason: Agreements among competitors can also be evaluated to determine whether they are related to and reasonably necessary to achieve, pro-competitive benefits and whether the achieved economic efficiency outweighs any anti-competitive effects.

Most B2B ventures maximize their economic efficiency by bringing in the major players in the relevant market. With these two rules, many B2B ventures are likely to run afoul of the antitrust laws because the very nature of the ventures may require that they post or exchange competitively sensitive information, as well as make joint decisions regarding price, output and other critical variables (Millar, 2000). Such practices could be interpreted by the FTC as being collusive and anti-competitive in nature. B2B ventures may also reduce their participants ability or incentive to compete independently, hence causing antitrust concerns. For example, in approving the B2B venture, Covisint, the FTC expressed its concern over the exchange's possible influence on pricing and purchasing practices and planned to watch the venture as it develops. It is evident that antitrust

issues will continue to loom over B2B ventures and are likely to become a major roadblock (Macaluso, 2000).

EU antitrust laws are less stringent than those in the US and could, therefore, be less of an impediment to B2B adoption and implementation. While the EU antitrust laws also prohibit agreements that negatively affect competition, anti-competition agreements can be exempted if consumers can 'share the fruit of economic progress. Thus, practices such as price fixing and market splitting are not *per se* illegal under EU antitrust laws, if they can be demonstrated to benefit the consumer economically. Furthermore, these laws do not prohibit the existence of monopolies. Instead, they regulate the behavior and ban abusive conducts, of firms with dominant positions. These conducts include setting of unfair trading conditions and limiting production, markets, or technological development (Morton, 2002).

The antitrust environment for B2B ventures may be most favorable in Japan, as there seems to be no significant penalty for anti-competitive behavior. Indeed, certain anti-competitive behaviors that would draw the wrath of the FTC and the DOJ in the United States were actually encouraged by the Japanese government. For example, after regaining its sovereignty in 1952, the Japanese government substantially weakened its Anti-Monopoly Law (AML), which was passed in 1947 with very strict provisions; in many ways, the AML was even stricter than the US antitrust laws (Beeman, 1999; Morton, 2002). The government also legalized some types of cartels and empowered the Ministry of International Trade and Industry (MITI) to revitalize industrial growth by encouraging price and production cartel agreements and mergers in several strategic industries. With this conflict in political objectives, the JFTC relied mostly on administrative surcharge, rather than criminal prosecution, to deal with the vast majority of antitrust behaviors. Furthermore, the JFTC only has fact-finding investigative powers. That is, it can only compel violating firms to surrender relevant documents and give testimony; it does not have the power to serve search warrants. Therefore, most people remain skeptical about the effectiveness of the JFTC, even after signing an antitrust agreement with the US Department of Justice in 1999 (Beeman, 1999; Morton, 2002).

The EU is toying with the idea of slapping a Value-added Tax (VAT) onto all e-commerce transactions. In the US, there has been a moratorium on internet sales tax. This moratorium was renewed on November 29, 2001 by President George W. Bush (Reuters, 2001). Potential conflict between the US and the EU on internet tax looms on the horizon. The US government is pushing for a tariff-free e-commerce (OECD, 1997). There are

diverse tax authorities and rates operating within the US and among European countries. Agreement on a uniform tax policy on e-commerce presents a possibly insurmountable barrier.

DRIVERS AND INHIBITORS OF E-COMMERCE ADOPTION

Here, we explore some possible reasons for the varying rates of e-commerce adoption and success in the US, Western Europe and Japan. We discuss some economic, As previously indicated, venture capital is a critical source of funding for internet-based companies. There is a solid venture capital infrastructure in the US and a good one in Western Europe. The situation is significantly different in Japan, however, despite its effort to foster the development of venture capital infrastructure. There are some 200 venture capital funds in Japan. Most of these funds are controlled by the big Japanese banks and securities firms, which often shy away from risky investments associated with high-tech start-ups. In addition, in a business culture where relational contracting dominates, established business entities are less willing to give a chance to new and unknown entrepreneurs. Thus, unlike the Silicon Valley model where private venture capital often becomes a major shareholder and mentor of a young company, the Bit Valley start-up companies often prefer capital from and connections with, the well-established Japanese firms. The lack of incubating and mentoring initiatives can be viewed as one of Japan's major inhibiting factors (Seiichiro and Lynskey, 2000).

The technology for designing effective websites for either B2B or B2C e-commerce requires skilled programmers, as well as product research and development capability. The US seems to have more of the required technical personnel than the other economic regions. Moreover, the scale of economy is in favor of the US market.

A major cost-related inhibitor in Japan seems to be the giant Japanese telephone monopoly Nippon Telephone and Telegraph (NTT). In Japan, access fees are based on usage time, while most US internet service providers charge a fixed monthly fee with unlimited on-line time an economically more effective scheme for extended usage. Recently, the Japanese NTT has lowered the telephone rate, but it is still much higher than the US rate (Kunii, 1999). Europe suffers from the same problem of relatively high internet access fees, with the UK on the lower side and Germany and France on the higher side of the range (OECD, 2000).

Many e-commerce innovations originate in the US and the software language used is English. Only a small proportion of Japanese consumers are comfortable using English for e-commerce. Some European countries with less proficiency in English may have a similar disadvantage; however, multilingual Europe has the edge on the US in global e-commerce, given the variety of languages spoken world wide. environmental and cultural factors that act as drivers or inhibitors of e-commerce adoption in these economic regions.

Adoption of e-commerce requires an attitude and culture that is open to change, experimentation and innovation. The US population is typically very enthusiastic about new things and this has contributed significantly to their relatively widespread adoption of B2B e-commerce. Western European culture is similar, but to a lesser extent. By contrast, Japanese consumers and businesses are generally less open to change. Traditionally, the concept of *wa* (harmony) dominates the Japanese mainstream culture. The desire to keep things peaceful and not rock the boat or ruffle any feathers supersedes the innovative/competitive spirit. Even though the culture of Japan's younger generation is shifting toward expressing individuality, e-commerce is more of a lifestyle to them than a work or business tool. The internet, while a fertile ground for innovation, is not the most important medium for supporting the mainstream business of Japanese manufacturers, who rely on Just-in-Time (JIT) and Kanban systems for their manufacturing excellence. The inherent culture does not lend itself readily to the prevailing culture of the internet. Without a big push from its big manufacturers, Japan will most likely continue to lag the other two regions in terms of web-based B2B implementation. However, Japanese business is beginning to show some flexibility by modifying the group culture so that their JIT systems can be integrated with B2B technology.

Success in electronic commerce requires an open, flexible and non-constraining regulatory environment--at least while this medium remains a somewhat experimental one. Such an environment can be found in the US (with the possible exception of the stringent antitrust laws) and to a lesser extent in Western Europe. Although the Japanese government recognizes the need for rapid adoption of e-commerce, it still enforces many regulations that, directly or indirectly, impede the adoption and implementation of e-commerce. The afore-mentioned rules and regulations governing stock trading and the establishment of new businesses are examples of the restrictive regulatory environment that prevails in Japan. Essentially, the invisible hand of the Japanese government is everywhere. This restrictive environment

also impedes competition. For example, NTT (Japan), with large government shares, remains the dominant player in telecommunications and the regulator is the representative owner from the Japanese government (Pitchford, 2000).

The extent of e-commerce implementation and use by businesses in the US, Western Europe and Japan may be a reflection of the attitudes of businesses in those respective regions towards competition. Japan and Europe tend to have less open competition than the US due to relatively heavy regulation (other than antitrust laws) and a less conducive industrial structure. When asked their opinions about the importance of competitiveness as a driver for their business performance, the majority of business leaders in those countries that did not show any particular strength in e-commerce (i.e., Japan and France) indicated that competitiveness was unimportant (Table 5 UK Department of Trade and Industry, 2000b). By contrast, businesses in those countries that either showed a significant strength in some aspect of e-commerce or have embarked on ambitious e-commerce programs (i.e., the UK, Germany and Sweden) indicated that competitiveness was very important. The US response was a balanced one, in which roughly the same proportion of businesses said that competitiveness was unimportant, moderately important, or 'very important.

Seniority-based compensation systems and lifetime employment dominate Japanese organizations. The restrictions on stock options prevent many Japanese organizations from rewarding entrepreneurs who are catalysts for internet innovation. Additionally, the seniority-based promotion systems prevalent in Japan, as well as the less democratic style of management, do not facilitate entrepreneurial innovation. This is not the case in the US or Western Europe, where stock options are more prevalent as compensation in start-ups (especially in the US), more emphasis is placed on performance-based incentive systems and there is virtually no guaranteed lifetime employment.

The Industrial structure in Japan differs substantially from those in the US and Western Europe. While it may currently lag the US and Western Europe in overall B2B e-commerce implementation, Japan clearly has the management infrastructure to implement group-wide e-commerce, as evidenced by its well-established keiretsu grouping system. However, in terms of B2B e-commerce adoption, the keiretsu system can represent a mixed blessing. To succeed in the use of EDI and extranet links, a trusting B2B partnership must be formed first. The keiretsu grouping, which is largely based on trust, is definitely an advantage in this regard. We conjecture that

Table 5: Attitude to competitiveness as a driver for current competitiveness (%)

Country	United States	Japan	United Kingdom	France	Germany	Italy	Sweden
Very important	33	30	42	27	40	31	44
Moderately important	33	30	36	34	29	36	38
Unimportant	34	39	22	39	31	32	18

this is the reason why EDI in particular has been so well received in Japan, as shown in Table 2. However, Japanese distribution systems tend to have more layers, which are not as conducive to effective e-commerce. Additionally, some of Japan's inclusive and exclusive business practices tend to preclude wider access to the market. This could be in direct conflict with web-based e-business, which encourages broader access and flatter distribution structures. Thus, it is not a surprise that Japan lags behind the other major industrialized countries in B2B e-procurement.

Japanese media reports on the risks and insecurity of internet transactions create such a bad image for e-commerce that most consumers and companies simply stay away. In a Nikkei Business survey, more than 60% of respondents cited the high internet access fee as the primary reason for discouragement in the use of the internet (Nikkei Business, 1999). Concern about security was the second issue. Unfriendly setting and difficulty of use were other problems cited.

Security and privacy have been the main barriers to European e-commerce (OECD, 1997). One of the major reasons why Italian B2B e-commerce has been slow to take off is fear about security. Other reasons are lack of information and low PC penetration (Europemedia, 2001). A similar situation exists in Japan. Only about 38% of Japanese households own a PC. In addition, many Japanese manufacturers are found to place more emphasis on security within a closed network than on what is provided in open market exchanges (Japan Statistics Bureau, 2001). This is partly due to the prevailing Japanese management philosophy of emphasizing close supplier relationships much more so than the other two economic regions. E-commerce has the advantage of making the transaction content transparent and lowering the transaction cost. However, in an environment where supplier relationships are meticulously managed, this advantage is largely obtained through obligatory business protocols.

LEARNING FROM US MISTAKES

Although US companies have the first mover advantage in e-commerce in general, they have also suffered from mistakes made through trial and error. The Darwinian theory of survival of the fittest also means that a large number of US e-commerce start-ups will disappear.

In a way, this is wasteful. Additionally, the first mover advantage may not last long, as it is only a matter of time before Western Europe and Japan duplicate the US success story--but without all the costs that the US had to incur. The United States experimentation with e-commerce has been very expensive and lessons from this have spared Japan and Europe from repeating the same costly mistakes. The Japanese proficiency in adopting innovations from other countries is legendary. There is no doubt that if e-commerce is demonstrated to be very productive, Japanese companies will develop strategies to implement it successfully and devote resources to promote it.

CONCLUSIONS

The B2B sector of e-commerce is the most significant, in terms of financial impact. This sector is projected to continue to grow at an explosive rate, at least for the foreseeable future. The US, Japan and Western Europe are all making significant inroads into the B2B arena, with the US the clear leader at this time. The critical factors for B2B e-commerce success--including technological infrastructure, culture and financing--are currently more conducive in the US than in Western Europe or Japan. Major factors for the latter two regions to overcome include the culture and the regulatory environment, particularly in Japan. However, continued growth and success of the B2B market will no doubt prompt Japan and Western Europe to make the necessary adjustments and investments to become major players.

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