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Description	一般論文

2C19 Information Technology and the Effectiveness of Institutional Systems in Turbulent Times: A Comparative Analysis of the U.S. — Japan

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Introduction

Surprisingly, Japan, a country usually associated with advanced technology is behind many OECD countries with respect to the utilization of information technology (IT) in most industries (OECD, 2000, Griffy-Brown, et al, 1999). The analysis presented here demonstrates that this can largely be attributed to Japan's 'inflexible' institutions and the institutional configuration of some industries. This research will illuminate key differences in institutional flexibility in the US and Japan. It will also show that Japan's institutional system is undergoing changes and some individual firms are adapting to global conditions quicker than others. Furthermore, Japan is not alone in this struggle. Many global societies are struggling to not be left behind and consequently are having to rethink the way firms operate and more importantly interact with key stakeholders and strategic partners.

In the context of Japan, this struggle is largely the result of structural differences in firms and institutions that may enable vast efficiencies in leveraging and creating manufacturing technology but do not provide an environment for facilitating the rapid incorporation of IT to enhance business processes. Manufacturing technology has been developed largely by the supply-side and product functionality is established relatively early with ongoing modification throughout the product life cycle by forces largely internal to the firm. In contrast, IT is strongly driven by the demand-side and shifts directions in extraordinary ways throughout product life cycles. This is true even in the context of business practice where the end-user must participate in the IT roll-out process. This reality continues to transform business practice and requires different institutional structures than those required in the industrialization process. However, these institutional structures take significant time to develop.

This research argues that not only is the 'flexibility' of institutions important, but the configuration of these institutions. Furthermore, IT transforms both the flexibility and the configuration in ways critical for

achieving sustainable competitive advantage. This is not a total explanation for what is observed in the US and Japan but it does provide insight into the critical role information systems now play in institutional dynamics and even more broadly in the clash of global versus local economic systems. These institutional dynamics are important for business practitioners in developed economies to succeed. In addition, these dynamics have significant consequences for developing economies since the dialectic between global and local forces continues to create a turbulent environment for business enterprise everywhere.

Section 2 will develop the notion of the 'institution' and compare the transformation of institutions in Japan and the US. Section 3 will use empirical data to compare the role of IT in this institutional transformation in the US and Japan. In Sections 4 and 5 we will show that some Japanese institutions have remained flexible primarily by connecting with the marketplace. Based on these qualitative and empirical analyses, Section 5 will discuss the broader implications and draw conclusions.

Section 2: An Analysis of Institutional Systems in the US and Japan for comparing the role of IT

For the purposes of this work we will be using the word 'institution' to mean the "humanly devised constraints that structure human interaction" (North, 1994, 1-54). They consist of formal constraints such as rules and laws, informal constraints such as norms of behavior, conventions, self-imposed codes of conduct, and their enforcement characteristics. Together they define the incentive and punitive structure of societies and economies. (North, 1994). We will be using the term in the context of an economic system which consists of multiple institutions at the national, intermediate, and corporate levels (Gao, 2001). This total system defines the multi-lateral relationships between corporations, citizens, banks as well as the bilateral relationships between trading partners, employers and employees and producers and consumers

(Gao, 2001, Hollingsworth and Boyer, 1997). Furthermore, these relationships are integrated and nations use them to determine how to organize production and distribute welfare (Gao, 2001). In the framework developed below, we will explore the institutional configuration in Japan and the US showing key differences in their flexibility and the role of IT in this context. Section 3 will then look in more detail at the utilization and penetration of IT in both countries.

2.1 Institutional development in the US

In the late 1980s, U.S. firms came to intensively invest in business sectors where they have competitive advantages, focusing on core competence management, in order to improve their profitability, or return on investment, for which shareholders are most concerned. Furthermore, they started to outsource part of their business such as data processing and invested in the development of systems to pursue efficiency. These movements induced the expansion of the outsourcing market and the mobility of labor in the U.S. This meant that rather than having a closed network or family system businesses had to standardize communication protocols and formats not just vertically but horizontally.

The dramatic advancement of IT in the 1990s further enhanced this structural change in U.S. industry. Firstly, with the advancement of network technology, business transaction cost among firms greatly decreased enabling firms to divide their business process into modules for efficient outsourcing. In this context, there emerged firms focusing on their core competence and competing against one another to make deals regardless of past relationships.

Furthermore, the rapid development of IT together with network externalities enabled IT related products and services to disseminate quickly and shortened product life cycles, resulting in the difficulty in forecasting future product trends. Facing these surging IT waves, where speedy R&D and timely introduction of products and services into the market plays a key role for successfully establishing a competitive position in the world, flexible business alliances with other firms became an efficient business strategy.

2.2 Institutional development in Japan

During the 'catch-up' period starting in the 1950s and 1960s, manufacturing technology was critical for

sustaining industrialization. Furthermore, Japanese institutional systems were in sync with this technology. Japanese business management systems, such as lifetime employment, the seniority system, lean production (e.g. TQC, JIT and Kaizen), the main bank system, and *keiretsu* where processes that enabled manufacturing firms to match technology with institutional systems. Thus, the highly efficient closed network among related entities thrived and leveraged technology for strategic advantage (Watanabe, 2002; Katz, 1998; Gao, 2001).

For example, in the lifetime employment system and the seniority system, Japanese firms invested in training their employees for improving their skills specific to each firm. The *Keiretsu system*, or long-term oriented relationships among Japanese firms was developed with the shortage of resources faced after World War II. By establishing closed business networks among related firms, businesses achieved the efficient coordination of production and distribution of goods based on technical and institutional stock specific to these rigid and related entities. Often times this technology and knowledge was not transferable across corporation or industry boundaries as it was unique to each 'family'. In turn, manufacturing technology enhanced these coordination, distribution and production processes within this closed system.

Under this system, Japanese manufacturers intensively developed products with their own in-house technology since customers were most interested in the quality of products and their accessories. In order to assure quality, firms preferred in-house procurement of manufacturing parts, or relied on their *keiretsu* companies. In other words, Japanese firms used an "*individual language*" that consequently excluded entities outside the family. This mutually dependent system worked effectively to distribute risks among related firms by flexibly distributing losses and profits independent of each deal.

These traditional business systems of Japan together with the main bank system, which enabled banks to obtain inside information on related firms for monitoring their financial conditions, also developed closed networks that were established individually. Within the network, each system functioned complementarily and dependently, achieving high productivity in this protected environment where excellent line-workers and a stable supply of products were available. Furthermore, within these closed networks, implicit transaction rules among related entities

and specific communication “languages” were developed that excluded new comers outside these tight-knit “families.”

Section 3: Use and Penetration of IT in the Institutional Systems of the US and Japan

Figures 1-9¹ demonstrate the penetration and use of Information Systems in Corporate Japan and Corporate America revealing the way limitations in network flexibility. Figure 1 shows that IT networks are significant business components in both countries. Figure 2 shows that the B2B market in Japan is small but growing. Furthermore, Figure 3 shows that there is growth in sales for those who are making this investment. In addition, business practitioners in Japan are leveraging IT tools to enhance the communication between companies and automate existing processes (Figure 4). In this regard mobile communications are beginning to play a greater role (Figure 5). In the US, Business-to-Business Networks are extremely well developed as seen in Figures 6-8. This data indicates that the US has well developed and fluid business-to-business interactions. Figure 6 shows that more than 70% of US companies use e-commerce in business interactions. Figure 7 supports this observation by showing that a large and growing number of firms in the US are using fully integrated Enterprise Resource Planning Software to streamline not only business processes, but importantly the interactions between key stakeholders (such as suppliers and customers). Figure 8, showing the high-level of use of information systems in logistics similarly demonstrates this phenomenon. Finally, Figure 9 shows that the US has an extremely active and growing electronic marketplace linking buyers and sellers (not just consumers) in corporate America.

Conclusion

These institutional differences are attributable to the fact that the US shifted from trade/production to finance and monetary activity early and also shifted from social protection to the release of market forces very early. In addition, during the 1980s and 1990s, US firms invested in business sectors focusing on core competence and return on investment in terms of shareholder value. This meant

that firms increased outsourcing inducing the expansion of the labor market and network flexibility as observed in the data analysis above. IT not only enhance these processes but extended them. In Japan, the shifts to finance and monetary activity and to the release of market forces happened much later. During the 1980s Japanese firms invested in operational efficiencies in a closed network focused on lean production such as in the keiretsu arrangement. They aimed at improving processes such as TQC, JIT and Kaizen. This coupled with the institutional realities of life-time employment and inappropriate corporate governance structures limited flexibility.

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¹ Data Sources: US Census Bureau, Annual Survey of Manufacturers, March 2002; and the Japanese Ministry of Posts and Telecommunications, 2002.

Figure 1. Use of E-commerce Networks in the US and Japan

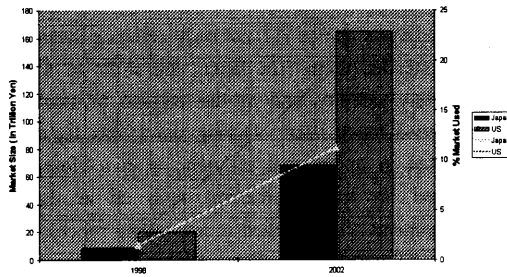


Figure 2. Use of E-commerce in Japan

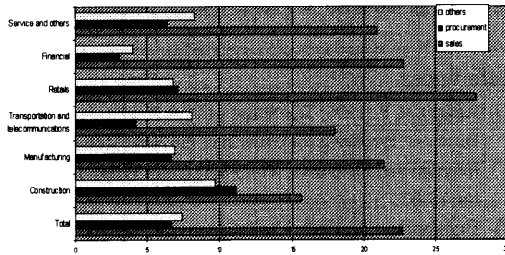


Figure 3. Use of B2B Networks and Average Annual Percent Growth in Sales

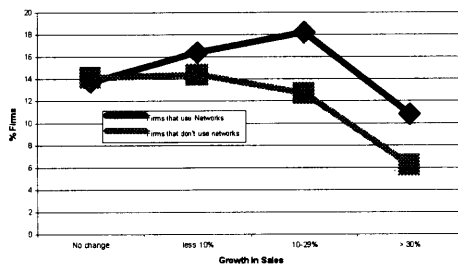


Figure 4. Use of Email in Corporate Japan

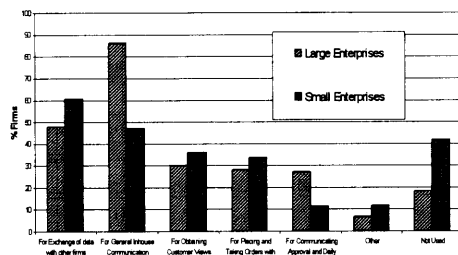


Figure 5. Use of Mobile Devices in Corporate Japan

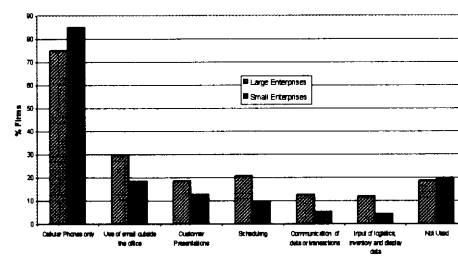


Figure 6. Orders Placed Using B2B Networks in US during 2000

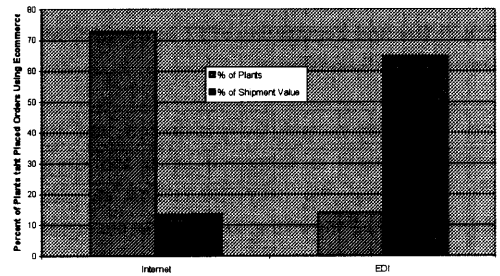


Figure 7. Fully Integrated ERP Software Use in 2000

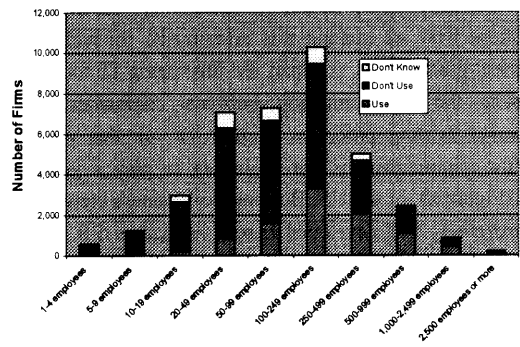


Figure 8. Firms that Provide Logistics via E-Commerce

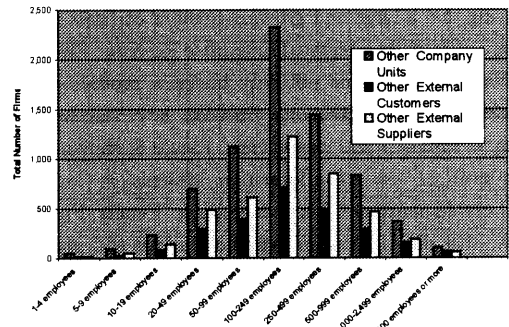


Figure 9. Use of Electronic Marketplaces in the US to Link Specialized Business Buyers and Sellers in 2000

