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The Role of Information Systems in Small and Medium-Sized Enterprises in Japan

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ABSTRACT

This research examines the adoption of information technology in small and medium sized enterprises in Japan. SMEs comprise more than 99 percent of the total Japanese enterprises. These one million-plus businesses employ 72.7 percent of workers and account for more than 50 percent of the total value and almost 60 percent of the value added. SMEs are not only a crucial source of employment, but through extensive subcontracting networks forming the basis of the Japanese production system, they are also essential participants in global business practices. Furthermore, they constitute a critical segment of the Japanese innovation and economic systems. This investigation explores institutional changes in Japanese SMEs and identifies the current uses of information technology, factors driving these uses, and implications for the continuing evolution of SMEs. This research shows that Japanese SMEs are beginning to use information resources to enhance their operations and strategic relationships.

Keywords

Small and Medium sized enterprises, SMEs, IT utilization, Japan, Small Businesses

INTRODUCTION

This research examines the adoption of information technology (IT), specifically web applications and mobile technologies in business practice in small and medium sized enterprises in Japan. While mobile technologies and the Internet are ubiquitous in Japan, previous work has indicated that they are still largely untapped by businesses for purposes of achieving operational efficiencies or strategic advantage, especially among Small and Medium Enterprises (SMEs) in Japan (Griffy-Brown, et al. 1999).

In the current global economy, strategic thinking and planning are essential for firms of all sizes. The business world is facing considerable challenges such as deregulation, new technologies, economic pressures, political pressures, and increasing globalization and competition. These challenges require distinct strategic approaches. Some scholars such as Dess and Covin and Slevin (1989) consider an entrepreneurial approach essential. Entrepreneurial orientation reflects a firm's propensity to engage in innovation along with a pro-active, risk-seeking, competitive inclination to achieve its strategic objective (Kyobe, 2004). Stata (1989), Mintzberg (1990), Senge (1990) and Dodgeson (1993) also consider strategy to be less about the selection of markets and market positions and more about the building of key internal capabilities that can be sustained. These scholars see competitive advantage to be rooted in a company's ability to innovate, learn, leverage relationships and implant vision. Furthermore, the success of strategy is often linked to the development of core and distinctive capabilities which enable a firm not merely to enhance operational efficiencies but also to create sustainable strategic advantage. Information Technology (IT) and Information Systems (IS) play significant roles in supporting this goal. Henderson and Venkatraman, (1999) and Sabherwal and King (1991) argue that the effective use of IT shapes the strategies of many organizations. While Sabherwal and King (1991) developed a theory of strategic use of information resources, their work mainly focused on large enterprises. Some studies have looked at SMEs, but in a very limited context. DeLone (1988) examined the determinants for success of computer usage in small business in the U.S., while Kyobe (2004) has examined SMEs and their use of IT in South Africa. Others researchers have similarly looked at operational use in different national contexts (Blili and Raymond, 1993; Neidلمان, 1979; Delone 1988; Bridge and Peel, 1999). The current study extends previous research by investigating the strategic use of IT in an understudied sector of Japan, the world's technology dominated second largest economy.

RESEARCH QUESTIONS

This study seeks the answer to the following research questions:

1. What institutional changes have impacted SMEs in Japan that might engender new operational and strategic priorities?
2. To what extent do SMEs in Japan use information technology?
3. Are these technologies merely used operationally, or are they also used strategically?

A theoretical framework for this research is presented followed by the data collection and methodology section. The first part of the analysis examines the history of institutional changes in Japan's SMEs. The second section focuses on the use of information technology in Japanese small and medium firms. The concluding section addresses the extent to which these uses are strategic and identifies opportunities for introducing strategic initiatives.

THEORETICAL FRAMEWORK

In this investigation, the theoretical basis for exploring the competitive use of information resources in small firms resides in the resource-based approach (Johnson and Scholes, 1993). The essence of this approach is in understanding how the individual firm rather than the industry uses resources (Johnson and Scholes, 1993; Lynch, 2000). Other similar concepts have been used to measure the impact of IT on competitive advantage (Strassman, 1990; Wiseman and Macmillan, 1984). For example, Strassman (1990) measures management productivity, or the impact of IT on return-on-management. This approach is problematic given possible cultural impacts on management and expected returns.

Wiseman and Macmillan (1984) offer a useful focus on strategic thrusts such as the impact of IT on differentiation, cost, innovation, growth and alliance. Sethi and King (1994) categorize these two approaches as the "outcome approach" and the "attribute approach." The "outcome approach" assesses competitive advantage using outcomes such as revenue growth rate, return on investment, and profits as the dominant criteria. The difficulty in applying this approach, particularly in SMEs, is that the relationship between IT investment and these variables can be very hard to trace with confidence, given the typical level of asset analysis and record keeping in small firms. This approach also does not account for the use of IT in strategic decision-making (Ang, Davies, and Finlay, 2001).

The attribute approach identifies key attributes such as: 1) efficiency (the ability to reduce cost in functional areas), 2) better customer services, 3) enhanced links to suppliers, 4) the ability to market products and services, and 5) the ability to differentiate products and services (Kyobe, 2004). The attribute approach has the advantage of offering greater insight into how and why information resources offer competitive advantage (Sethi and King, 1994; Johnson and Scholes, 1993; Lynch, 2000). This latter investigation primarily uses the attribute approach and therefore attempts to capture how SMEs in Japan are leveraging information resources to strategically connect with customers, link to suppliers in B2B networks, and better market their products. However, this investigation also uses some measures from the outcome approach, in particular, the exploration of the use of information resources to enhance sales.

DATA COLLECTION METHODOLOGY

In this investigation, small and medium sized businesses are defined as business establishments having fewer than 300 employees, under 100 employees in the wholesale sector, and fewer than 50 employees in the retail and service sectors. Small-scale business establishments are defined as business establishments having one to 19 employees (one to four employees in wholesale, retail, food service and service sectors).

Three major components comprise the data collection methodology. First, this research collected primary data regarding SMEs. Included in this data collection were the surveys from Japan's Management and Coordination Agency, the Establishment and Enterprise Census of Japan, the Japan Small Business Research Institute, and both the Small and Medium Enterprise Agency and the National Small Business Information Center in Japan. These surveys collected data from over 800,000 small and medium Japanese enterprises. Secondly, interviews were held with Japan's Small Business Research Institute and with company executives in the Japanese mobile phone industry as well as executives in the Japanese IT industry. Finally, qualitative data were collected from approximately 16 different Japanese SMEs across industries. The strategy used for collecting these data is known as triangulation, which involves multiple methods for collecting historical data (Yin, 1994). Multiple sources of data such as participant observation, open/structured interviews, and public and private documents were used to facilitate the mapping of events that comprise the strategic use of information resources in SMEs.

SMEs IN THE CONTEXT OF JAPAN

Based on the results of the Management and Coordination Agencies Establishment and Enterprise Census of Japan (JSBRI, 2004), small and medium sized enterprises comprise 99.7 percent of the total number of enterprises across manufacturing, wholesale, retail and services. Service providers account for the largest increase in the number of SMEs (JSBRI, 2004). These one million-plus businesses employed 72.7 percent of workers and account for more than 50 percent of the businesses' total value and almost 60 percent of the value added (JSBRI, 2004). SMEs are a critical segment of Japan's economy. Small and medium businesses are not only a crucial source of employment, but through the extensive subcontracting networks that form the basis of the Japanese production system, they are also essential participants in global business practice, given that Japan is the world's second largest economy after the United States. SMEs' growth in service provision also elevates the importance of these enterprises in the Japanese economy.

HISTORICAL DEVELOPMENT OF JAPANESE SMEs

To understand the current technological status of small and medium sized enterprises in Japan, it is useful to examine the historical development of these institutions and the way in which they came to occupy their current place in Japan's production system. This examination provides insight into key relevant institutional innovation and change in Japan over the past 50 to 60 years. Prior to World War II, bureaucrats at the Ministry of Commerce and Industry (MCI) viewed small and medium sized businesses as a remnant of the more traditional and inefficient system of production networks referred to as the "old" *tonya* system. In fact, some cite government intervention to encourage small firm mergers as one of the first examples of Japan's so called "industrial policy" (Altbach, 1997). The "old" *tonya* system was one in which "mercantile capitalists outsourced processing to less skilled labor in the poorer districts of big cities or to part-time farmers" (Altbach, 1997). After World War I, the "new" *tonya* system emerged in which a manufacturer often owned factories that would handle more sophisticated production processes and then assemble the final product (Altbach, 1997). However, the smaller firms that were part of this production system were very unstable, and therefore the government sought to decrease their numbers. This policy was extremely unsuccessful and actually provided the necessary environment for the creation of the complex networks of production typical of Japan's current manufacturing sector (Friedman, 1988; Altbach, 1997).

Following World War II, Japan's political and fiscal environment offered both good and bad news to small and medium sized businesses. SMEs had a greater political voice, especially through organizations such as *Chuseiren* (Small and Medium Enterprise League), which had at least five million members. However, steep interest rates severely restricted SMEs' finances. The People's Finance Corporation was established in 1949 to lend money to very small business (Altbach, 1997), and the government also set up other similar organizations to assist.

In the 1950s, a series of laws was passed to help small businesses. These laws included the creation of special financing institutions, the protection of small firms from competition, as well as provision of permission to reduce taxes and to form commercial and industrial unions to prevent excessive competition. One of the most interesting laws was the 1957 Law of the Prevention of Delay in the Payment of Subcontracting Charges and Related Matters (Altbach, 1997), which kept large firms from shifting costs to smaller partners by consistently paying them late. Both David Friedman and Toshihiro Nishiguchi argue that the complex of regulations, government affiliated financial institutions, as well as the complex web of SME support organizations enabled SMEs to expand (Friedman, 1988; Nishiguchi, 1994).

The subcontracting systems that emerged developed into what Nishiguchi refers to as the "clustered control" model (Nishiguchi, 1994)). This network is structured in descending tiers of subcontractors commonly understood to be a pyramid featuring increasing numbers of firms at each tier relating longitudinally and horizontally in clusters. In Japan, these clusters are partly interrelated and partly independent, and they overlap in intricate ways (Nishiguchi, 1994). Nishiguchi documents the increasing development of this system through the increasing percentage use of outsourcing (Nishiguchi, 1994; Altbach, 1997). In this regard, Japan's economic vitality remains highly dependent both globally and domestically on small and medium sized enterprises.

Under combined currency pressure and the prolonged economic recession, a great deal of production shifted overseas beginning in the early 1990s. Japanese foreign direct investment (FDI) in Asia accounted for 12.4 percent of production in 1990, doubled in the mid 1990s, and has again subsequently risen significantly (Altbach, 1997). This change indicates major transitions in Japanese industry, particularly in the small and medium sized business sector. In fact, SMEs also turned to direct investment in Asia in order to reduce costs. SMEs account for approximately 30 percent of all cases of FDI. While an increasing number of these organizations are building plants overseas, studies of the Small and Medium Enterprise Agency show that most of these companies are seeking alternatives to overseas investment amidst the difficult domestic environment (JSBRI, 2000; Altbach, 1997). This search for

alternatives is not surprising, largely because of the obstacles for SMEs in moving overseas, such as: 1) lack of managerial expertise, 2) limited financial resources, 3) limited information about overseas markets, 4) shortage of firm-specific assets (marketing experience, proprietary product/production technologies, valuable brand name, etc.) (Altbach, 1997; JSBRI, 2000).

The public and private sector response to this transition is multifaceted. One approach is to encourage better use of information resources. That is, in order to address many of the challenges companies face, the public and private sectors are looking to enhance operational efficiencies, reduce costs, and enhance relationships by leveraging information technologies. Depending on the relationships between the firms and often on the management structure as well (traditional Japanese versus “western”), the burden of cost may be borne by the large companies. While large firms are using these technologies in highly sophisticated ways, their smaller counterparts are just now beginning to use information resources (Griffy-Brown, Watanabe, and Fujisue, 1999). Given the institutional changes described above, it is possible to explore with greater understanding how and why SMEs are using information resources.

UTILIZATION OF IT IN JAPAN'S SMEs

In order to understand the dynamics of IT more clearly in the context of Japanese SMEs, we must look closely at the types of operations/processes in which SMEs are currently employing information technology. Of particular interest is their involvement in the business-to-business (B2B) market, since SMEs in Japan play a critical role in many complicated business clusters. The size of the B2B market in Japan is surprisingly small, given the importance of these clusters. While the B2B market grew seven-fold between 1998 and 2003, it is still less than 15 percent of the total market (JSBRI, 2000).

Furthermore, while there have been significant advances in IT throughout Japan, particularly in mobile communications, SMEs are on the whole investing less in information systems than are large enterprises. In fact, approximately one in 10 firms in the small business sector has not undertaken any information system (IS) investment at all (JSBRI, 2000).

Successful investments are strategic investments based on particular goals, such as restructuring services or planning to enter new business areas. An examination of the data collected indicates that over 70 percent of Japanese SMEs that have invested in IS are in some way dissatisfied with the systems they are using (Figure 1).

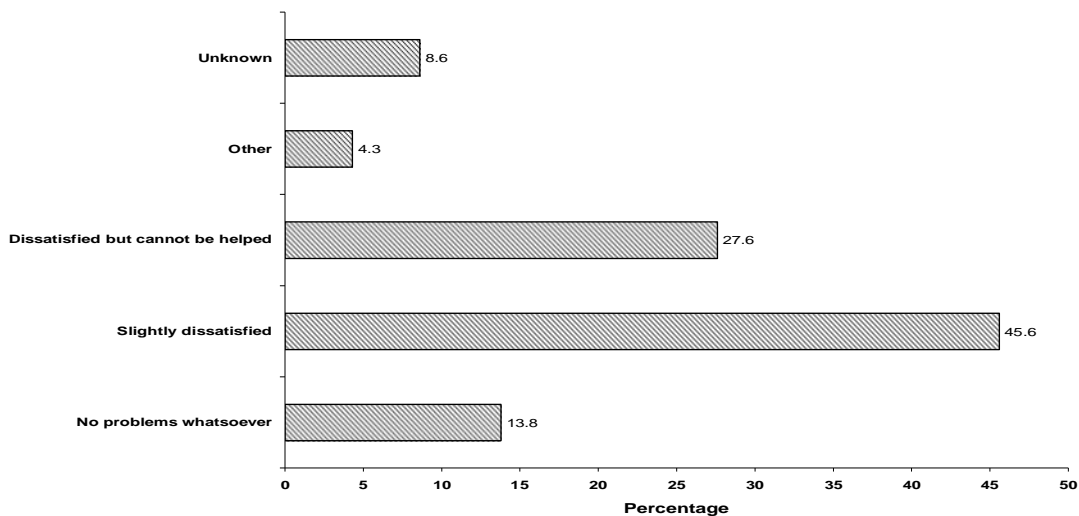


Figure 1. SME Satisfaction with Systems Currently in Use

What are the problems these businesses are facing in terms of IT investment, and why are the results of these investments so unfavorable? When this issue is probed further, it appears that the challenges in making decisions regarding IT investment are multifaceted for Japanese SMEs. Many of the problems identified involve human resources (finding people who can use the technology or specialists to help maintain it once it is installed). In addition, other problems include security concerns, measuring returns on investment, and a lack of clarity regarding what to invest in to begin with (Figure 2). Based on these data, it would appear

that 15 percent of the SMEs polled invested in Information Systems (IS) without formulating any strategic goals. (They were unsure of what to invest in, but invested anyway.) Thirteen percent had no clarity regarding the Return on Investment (ROI), or effects of this investment. Both of these facts combined suggest a lack of strategic IS investment for approximately 30 percent of the firms surveyed. However, it also appears that many firms are attempting to make strategic investments, but are simply experiencing problems in deploying and using the systems.

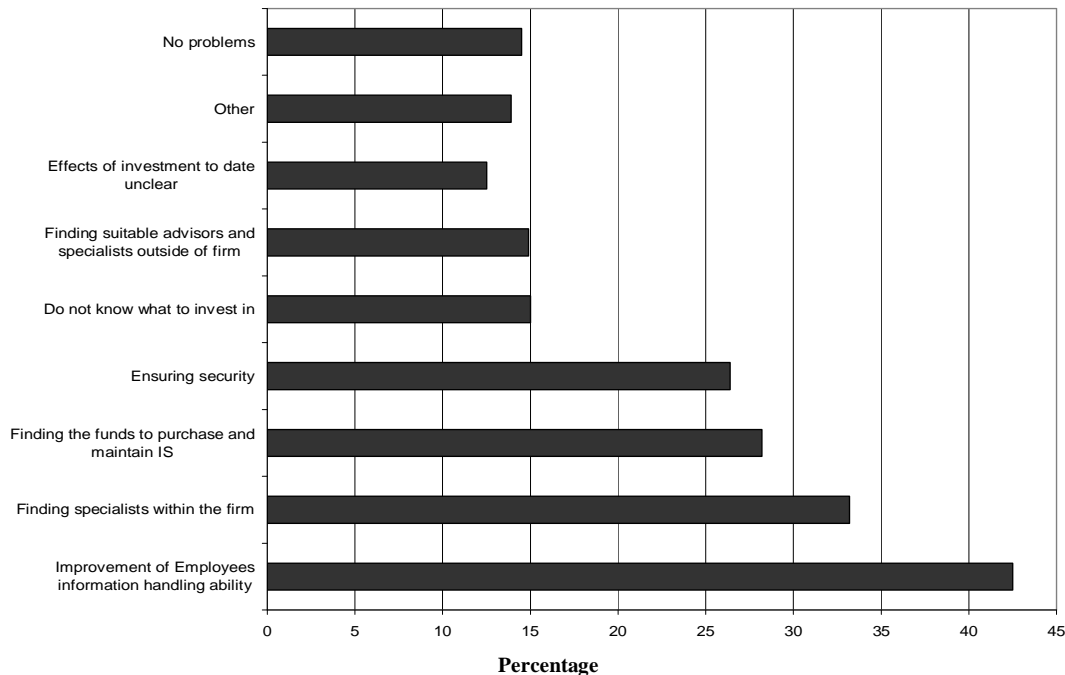


Figure 2. SME IT-Related Challenges for IS Investors

One way to explore further these strategic uses of IS is to look at how these firms are using IS to leverage relationships. In this regard, SMEs and even small home offices in Japan are increasingly using the Internet to enhance their customer bases and/or relationships within clusters. In fact, while the use of web sites varies depending on sector and size, over half of all small and medium manufacturers and service companies now have homepages (JSBRI, 2004).

However, approximately 20 to 30 percent of Japanese SMEs of all sizes have adopted the use of B2B networks using the Internet (Figure 3).

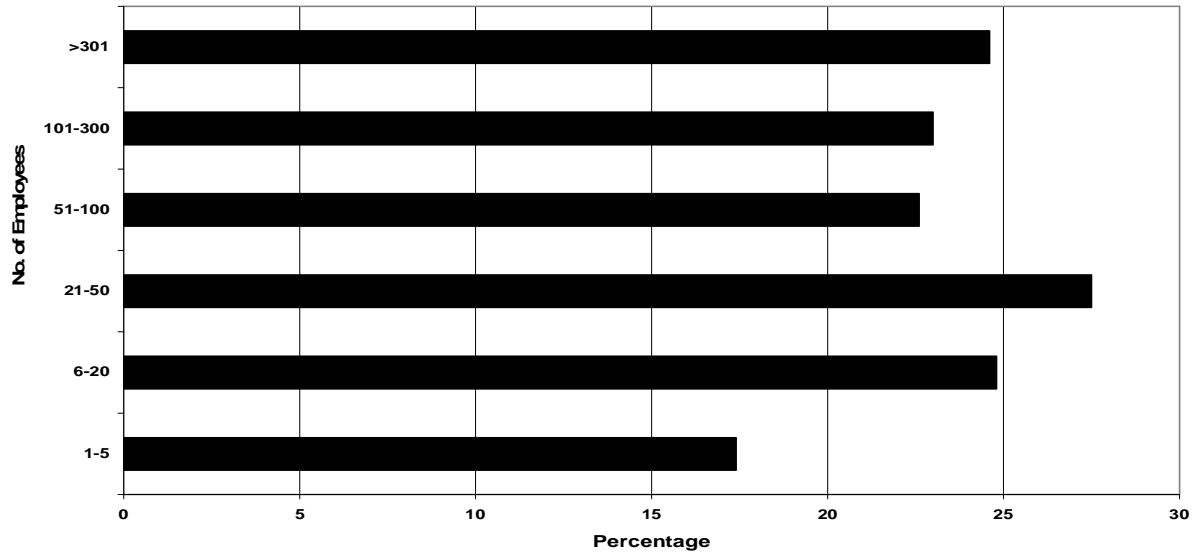


Figure 3. Percentage of Japanese Firms with Internet B2B Networks

Furthermore, growth in sales tends to be larger among the firms that are using B2B networks (Figure 4). The growth in B2B sales is not surprising given deregulation in the 1990s and the new competitive offerings of Internet Service Providers (ISPs). The growth in B2B networks and the fact that their use does appear to impact sales indicates that Japanese SMEs are gaining some strategic benefits in terms of their ability to leverage relationships. Interesting to note is that the new ISP landscape, featuring affordable and easy-to-use service, appears to be playing a valuable role in enabling SMEs to use information resources strategically.

In addition, in terms of relationship building, almost 60 percent of Japanese SMEs use email (Figure 5). SMEs also appear to be making more use of email than do Large Enterprises for particular practices such as exchanging data and information with other firms, getting customer feedback, and placing and taking orders (Figure 5). These data certainly indicate that email is playing an important role in the formation of everyday networks among Japanese SMEs and between SMEs and large Japanese enterprises.

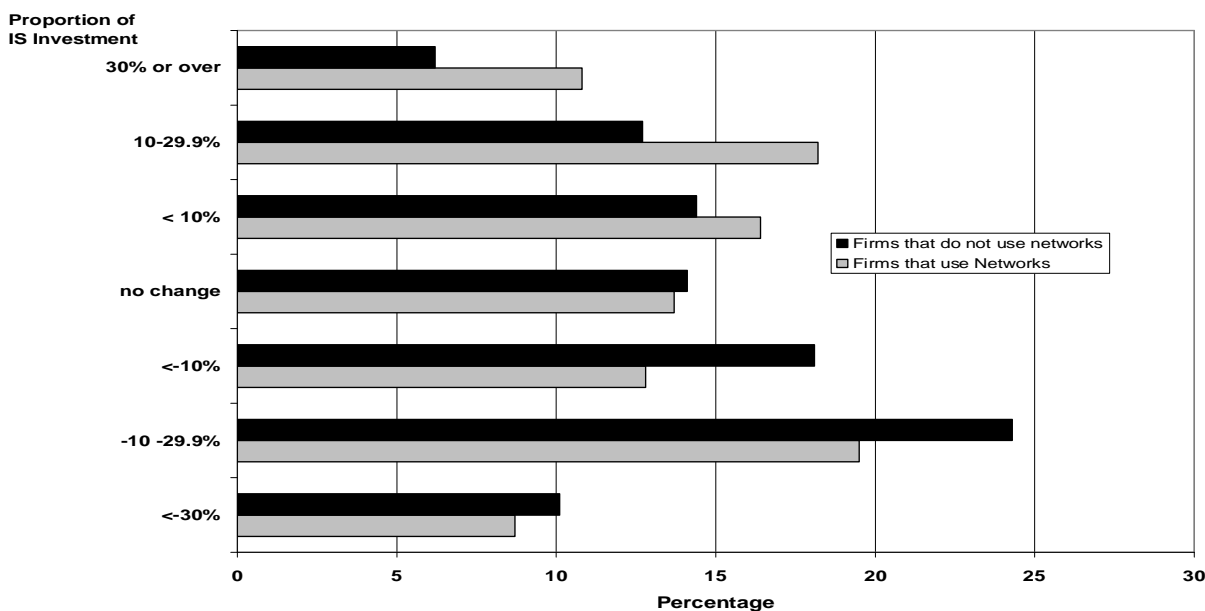


Figure 4. Use of Internet-based B2B networks and average annual percentage growth in sales

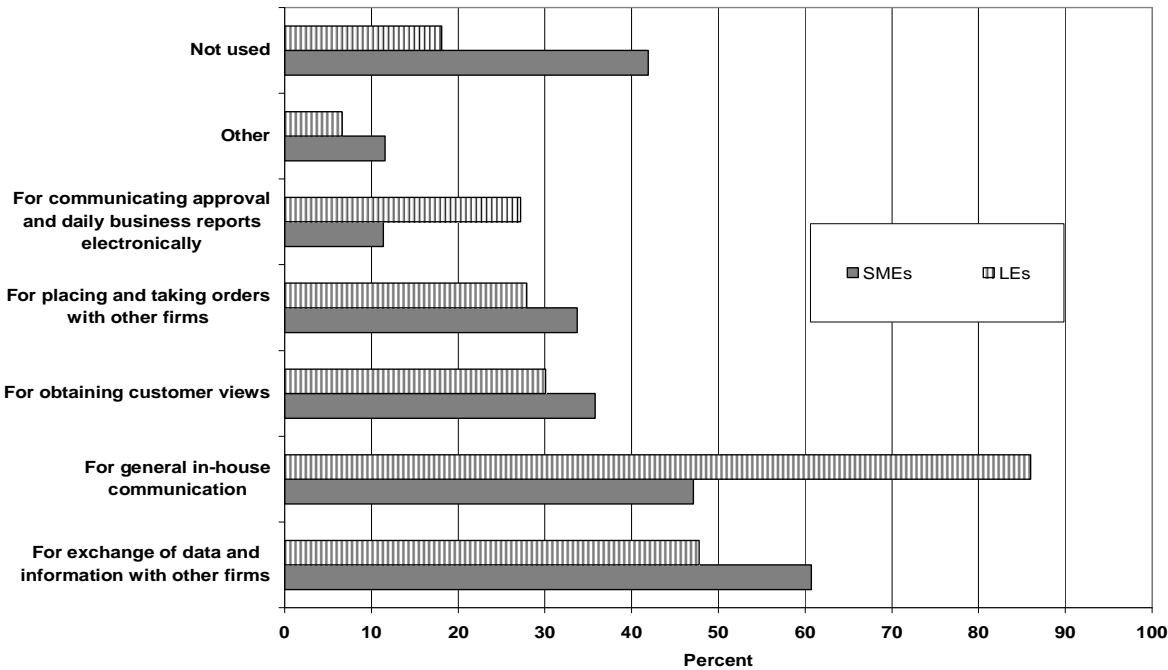


Figure 5. Uses of Email

For SMEs, the Internet serves as a means of taking orders and of ascertaining customer needs. However, Japanese SMEs’ use of the Internet to reach customers is cautious at best. In 2001, 20 to 30 percent of firms having 100 or fewer employees was accessed no more than once a day (or 30 times per month on average), while 30 to 40 percent of such firms had over 500 page views per month (JSBRI, 2004). These meager figures would indicate that Internet use in this way had little if any impact on the Japanese SMEs’ bottom lines. In fact, 70 percent of firms with no more than 100 employees had one inquiry a day over the Internet, and 20 percent of such firms did not take any Internet orders at all in a month (JSBRI, 2004).

However, some Japanese SMEs are succeeding in leveraging information systems to impact sales. Figure 6 shows that some firms are succeeding in strengthening their relations with existing customers and are winning new customers by leveraging the Internet to enhance their client bases. The most prevalent Internet mechanisms for doing so in the SME sector appear to be: 1) sending out regular emails, 2) creating a customer database, 3) updating the firm’s homepage once a week, 4) analyzing inquiries and sales, and 5) establishing online membership systems.

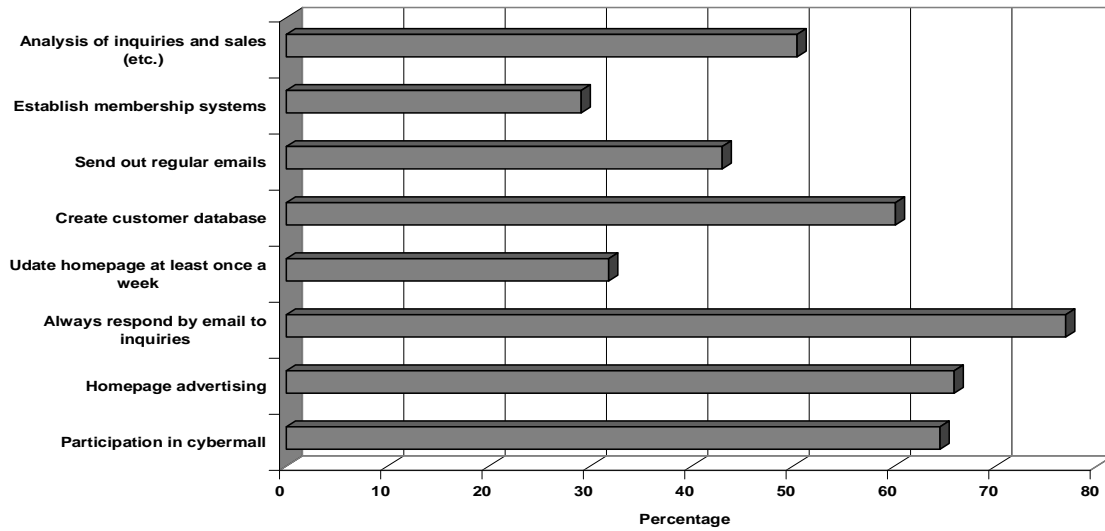


Figure 6. Total Sales and Actions by Online Stores

While some Japanese SMEs are reaching out in this way to customers, the use of internal networking is very small. Less than 20 percent of SMEs have established internal computer networks. Interesting to note is that SMEs are using mobile information devices to achieve some of their communication needs. Cell phone use is currently the main means of communication (Figure 7). Email use follows at a distant second. Also of interest is that SMEs are engaged in reforming their business and logistics operations and are achieving results by putting internal information online so that it can be accessed from outside the office using mobile devices (Figure 7).

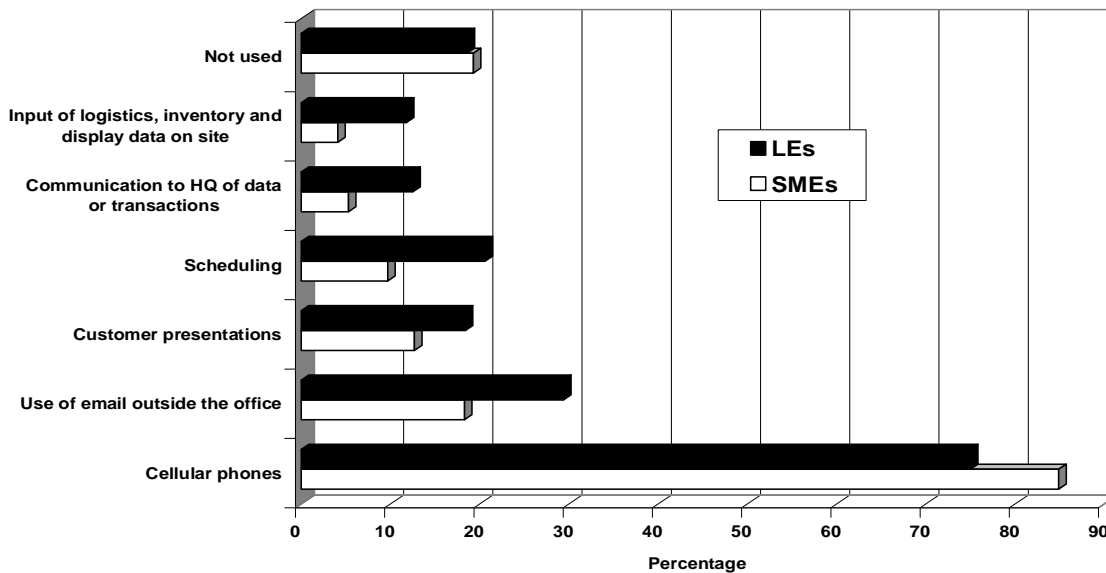


Figure 7. LE and SME Use of Mobile Devices**RESULTS**

According to recent literature, business strategy involves the use of key internal capabilities to innovate, learn, and leverage relationships. Furthermore, these capabilities are distinctive in that they enhance operational efficiencies and create competitive advantage. The attribute approach argues that the strategic use of information systems involves information systems used to accomplish strategic thrust (Wiseman and Macmillan, 1984; Sethi and King, 1994; Kyobe, 2004).

This investigation sought to examine these strategic thrusts in the context of specific attributes such as how SMEs in Japan leverage information resources to strategically connect with their customers, link to suppliers in B2B networks, and market their products more effectively. In line with this theoretical framework (Kyobe, 2004; Wiseman and Macmillan, 1984; and Sethi and King, 1994), it is clear that SMEs in Japan are endeavoring to use information resources to enhance relationships. Contrary to previous research which showed that SMEs in Japan were barely using IT at all compared to their large counterparts (Griffy-Brown, et al., 1999), data from the surveys revealed that many SMEs in Japan are now using information systems to connect with customers, link to suppliers, and market their products more effectively. Furthermore, it would appear that against the historical context of the development of SMEs, which in Japan have been traditionally tied in clusters to large enterprises, these smaller firms are showing increased independence and are adapting to environmental and economic circumstances in ways not previously seen.

The first strategic use of IS by SMEs demonstrated in this investigation was in B2B and to some extent B2C networks. In this regard, Japanese SMEs are using homepages, email and other Internet technologies. Sales tend to be higher in firms that are using B2B networks. It is interesting that Japanese SMEs appear to be using email more than are large enterprises to exchange data and information with other firms. It is unclear if this means that total data exchanged over the Internet is higher, or if large enterprises are merely using other electronic means in day-to-day networking. However, it is clear that Japanese SMEs are leveraging IS strategically in terms of relationship building rather than mere in-house use.

In terms of reaching new customers over the Internet, Japanese SMEs are not faring well in online sales. Nonetheless, it does appear that these SMEs are using information resources to strengthen existing customers and are also enhancing their customer bases in other ways. For example, firms are creating customer databases, sending out regular emails to existing customers, analyzing inquiries and sales, and establishing online memberships. All of these IS activities here examined are strategically enabling the SMEs to learn about and leverage relationships in order to create advantage over their competitors. Mobile devices also hold some promise in terms of improving SMEs' operational and strategic capabilities.

Based on qualitative data collected from 16 different SMEs in Japan, finances and financial applications may be a key information resource to be employed strategically by the SMEs over the next three to five years. This change is driven by new legislation in Japan, the requirement of meeting global accounting standards, and the need for SMEs to be compatible with larger partner companies and their software. This need for standardization and even integration will probably drive Japanese SMEs toward greater use of web applications in this area for the short term.

Human Resources (HR) and Customer Relationship Management (CRM) applications also seem poised for the Japanese SME market. However, both types of applications are accompanied by cultural and organizational complexities that make the process needs significantly different from those in the West. For example, Japanese seniority structure and group promotional HR schemes create entirely different work incentives and HR structures than do those typical in the United States. In Japan, the expectation of long-term employment as the primary employee incentive rather than performance targets continues to prevail, although this expectation is eroding. In addition, Japanese employees tend to be committed to groups as opposed to individuals. Therefore, Japanese businesses track group incentives rather than individual incentives. Such a tendency would greatly affect any sales force automation design or HR system design that might be used in a Japanese ERP/web application or mobile technology environment. The key areas to explore are the services and systems related to existing business processes that SMEs currently use. Oftentimes these organizations use software from Hitachi or other traditional Japanese corporations that has features compatible with local services, but that lack compatibility with large enterprises or global standards.

CONCLUSIONS

This research shows that Japanese SMEs are beginning to use information resources to enhance their operations and to some extent to enhance their strategic relationships. Some SMEs are even beginning to use customer databases, commercial software, and other information resources to achieve strategic objectives. Others are using B2B networks and email to leverage relationships for strategic advantage.

This investigation's historical analysis indicates that social forces, government policy, and network externalities have played critical roles in the institutional development of Japanese SMEs and their strategic positioning in the Japanese and global economies. This analysis sets the stage for understanding with greater clarity the use of information systems in the context of small firms in Japan. The analysis of statistics related to the current use of information systems in Japanese SMEs indicates that contrary to previous research, SMEs in Japan are beginning to use information systems more broadly, and that many SMEs are leveraging such systems for strategic purposes. Based on interviews with 16 different Japanese SME firms across several industries, the results of this qualitative research indicate that SMEs in Japan are using information systems strategically, but that SMEs still tend to do so in an ad hoc manner even though there are opportunities in the financial and HR areas for wider IS adoption. The primary reasons underlying this practice among Japanese SMEs are quite simply that Japanese SME employees are concerned with day-to-day operations and usability. The SMEs consequently do not yet have the time or resources to devote to strategic initiatives. Indeed, this is a challenge for SMEs world-wide.

Given the importance of the SME sector in Japan and Japan's economic importance in the world, it is essential to gain more insight into the use of information systems in the IS context. Further research is required to establish more concretely the critical success factors involved in the deployment of information systems in Japanese SMEs. In addition, it would be helpful to understand more transparently the decision-making processes involved in such deployment among Japanese SMEs.

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