

# Analysis and Research on Presenting the Current State of, Challenges Facing, and Factors Promoting Electronic Commerce at Small and Medium-Sized Japanese Enterprises that Use Information Systems

Junichi Sakata  
Tokyo Institute of Technology

## Abstract

*Electronic commerce (EC) has expanded and proliferated throughout the world together with the advance of information technology (IT) to become a permanent fixture of doing business. However, the main players are still overwhelmingly large-scale enterprises, whereas the number of small and medium-sized enterprises (SMEs) conducting EC is decidedly small. What are the factors that obstruct the implementation of EC, whose start-up costs are low and which is highly user friendly, at SMEs? The main purpose of this paper is to provide an answer to this question. 4,500 enterprises were surveyed for this paper, and the results show that few small and medium-sized enterprises (SMEs) in Japan that conduct electronic commerce (EC) in their businesses experience direct management effects, such as increases in sales, customers, or market share. Rather, the effects are limited to improvements in their current lines of business, such as by making the execution of business go more smoothly, or improving customer service. This is because EC has not helped to reform collaborative undertakings with other enterprises or business mechanisms.*

## 1. Background

(Porter 1985 [1]) argued from early on that it is essential for an enterprise to include information technology in its competitive strategies. In Japan, information technology has been regularly used in business activities since the commercialization of the Internet in 1992, and it is increasingly true that discrepancies in information technology-related activities are a major factor in deciding the quality of business results, attesting to Porter's assertion. Meanwhile, EC is a new business method and new business field brought about by information technology. A survey conducted by Japan's Ministry

of Economy, Trade and Industry in 2005 revealed that the market scale of business-to-business transactions (B-to-B) via EC is approximately \$240 billion and that the market scale for business-to-commerce transactions (B-to-C) via EC is approximately \$37.6 billion<sup>1</sup>. Meanwhile, the results of a survey conducted by the US Department of Commerce at the same time showed that the market scale of B-to-B via EC is approximately \$2 trillion and the market scale of B-to-C via EC is approximately \$17 million<sup>2</sup>, indicating that the market for B-to-C via EC in Japan and the market for B-to-B via EC in America, respectively, are more robust. The results of a survey conducted by Japan's Ministry of Internal Affairs and Communications in 2007 shows that approximately 222,000 enterprises, or 14.7% of the total 1,510,000 enterprises in Japan, implement EC. On a capital basis, approximately 12% of enterprises with capital under approximately \$322,407 use EC, approximately 22% of enterprises with capital between \$322,407 and \$1,074,691 use EC, approximately 30% of enterprises with capital between \$1,074,691 and \$3,224,073 use EC, and approximately 40% or more of large-scale enterprises with capital above \$3,224,073 use EC in some form. It is clear from these results that it is mainly the large-scale enterprises that implement EC in Japan, whereas only 10% of SMEs, which comprise approximately 90% of all enterprises in Japan, do the same. This should be alarming given the importance and potentialities of EC to SMEs.

In light of the foregoing, the purpose of this research is to identify, in concrete terms, the state of EC implementation at Japanese SMEs and,

<sup>1</sup> The specific Ministry of Economy, Trade and Industry figures are \$240,730,793,574 and \$37,614,186,496, respectively.

<sup>2</sup> The specific US Department of Commerce figures are \$2,031,166,029,824 and \$17,087,588, respectively.

simultaneously, to explore the factors promoting the proliferation of EC based on the research results. (Approximate calculations have been made based on the exchange rate of \$1 = ¥93 as of January 1, 2001.)

## 2. Prior Research

The definition and concept of EC is broad. (Kalakota & Whinston 1997 [2]) define it as the purchase and sale of information, products, and services via a computer network connected to the Internet, and Japan's Ministry of Economy, Trade and Industry defines it as the conduct of commercial transactions through a computer network system. It would appear that the definition itself is generally uniform around the world. However, (Porter 2001 [3]) points out that EC offers some unique features to enterprises in terms of value-creation. With respect to this point, (Shapiro & Varian et. al. 1999 [4]) claim that the biggest factors in the explosive proliferation of EC over a short period are its low cost and user-friendliness. It seems that SMEs that have insufficient management resources but nevertheless have flexible organizational operations can genuinely enjoy these features and effectively implement EC. (Poon & Jevons 1997 [5]) assert that SMEs that utilize EC provides them with opportunities to reach markets and customers that were previously inaccessible. (Dutta & Evrard 1999 [6]) claim that by leveraging EC, SMEs improve their customer and internal communications and facilitate the collection of information, which leads to smoother business activities with customers and suppliers. Accordingly, the prior research shows that the implementation of EC brings about broad effects for SMEs, and that the number of SMEs that actually use EC is comparatively low compared with large-scale enterprises. In fact, (Keeling at al.2000 [7])have a very interesting perspective on this point. They claim that the SMEs that implement EC can provide greater choice to their customers, increase the number of opportunities for their businesses to be selected over the competitors, and improve their competitive abilities. Even so, the advantage that SMEs have over large-scale companies is their proximity to the customer. Therefore, the SMEs that do not strongly prioritize building competitive advantages over competitors are not very motivated to start using EC to the point of discarding the close relationships with their customers through a single channel. Aside from this, (Romualdo et.al. 1998 [8]) state that the reason why SMEs do not actively implement EC is the lack of IT personnel and

strategy managers. They point out that when a SME implements EC, they have to request an outside party to formulate the core areas of the EC implementation, which consists of having such party come up with a strategy, build a technological base, devise a cost reduction and revenue improvement plan associated with the project, and the like. This amounts to an increase in investment cost despite the expectation that EC start-up costs are low.

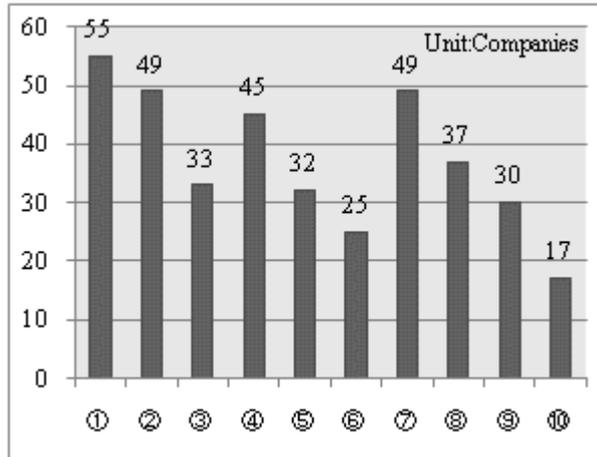
## 3. Research Methodology and Hypotheses

A questionnaire regarding EC was sent by mail to 1,000 Japanese SMEs for this paper, and Tokyo Shoko Research Ltd., a private-sector credit database, was used for sampling companies. Note that SMEs that recorded three consecutive years of declining profits in their most recent closing of accounts were excluded. 168 enterprises responded, for a collection rate of approximately 16.8%. The breakdown of respondent industry types is shown in Table 1. As mentioned above, the hypotheses used for this paper are premised on the current state of EC at Japanese SME's. (1) Many enterprises, including SMEs, understand the importance of, and are in fact conducting, EC in light of the spread and penetration of the information infrastructure in Japan and improved user literacy. (2) Meanwhile, the biggest reason why some enterprises are not conducting EC, even though they recognize its importance, is because of a "shortage in human resources who specialize in IT." (3) Lastly, when concrete results are obtained with EC, it is most often due to "improvements of customer service," and only rarely is it due to "increases in sales," "increases in customers," or "expanded market share." In this paper, we will test these hypotheses, reevaluate the research results, and examine EC methodologies that directly lead to the three effects mentioned above for Japanese SMEs who use it.

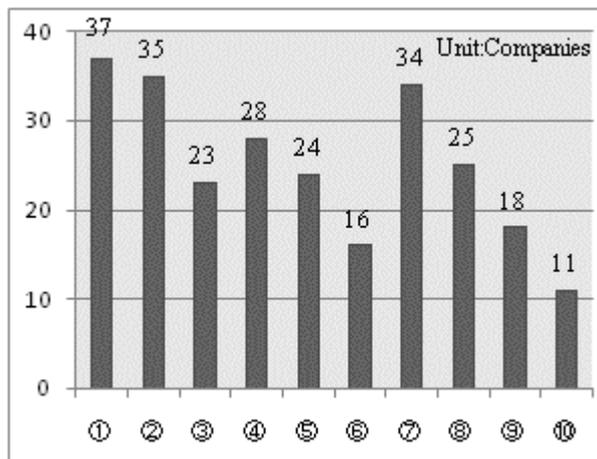
## 4. Survey Results

Firstly, Figure 1 shows the responses (multiple responses allowed) provided by managers at 168 respondent SMEs to the reasons why they consider EC important. For this question, there are five degrees of importance, and managers who chose 4 or 5 believe that EC is "quite" or "extremely" important. (Managers who responded with a 1, 2, or 3 "do not consider the choices as important reasons to conduct EC.") Of the ten choices, the number of managers at SMEs who cited "increases sales,

expands market share, or increases customers,” “improves customer service,” “builds our company’s brand,” “helps to keep pace with the changing global environment,” and the like, as important reasons to conduct EC has increased. On the other hand, the number of managers who rated “cuts business operating and human resource costs” or “bridges the management resource gap with large-scale enterprises” as important for managerial reasons has decreased. This shows that managers at SMEs do believe that EC is a strategic tool for aggressive management purposes.



**Figure 1. Important reasons for implementing EC**

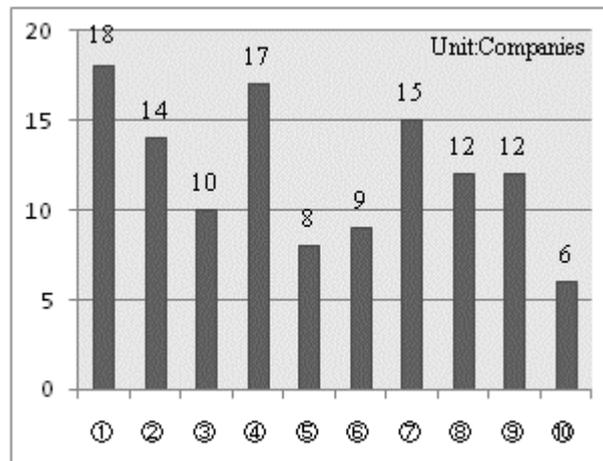


**Figure 2. State of EC by important reason**

Next, Figure 2 shows, by the ten categories of important reasons, the number of enterprises actually conducting EC that rated it a 4 or 5. It appears that the number of SMEs who cite the top important reasons in Figure 1 above, such as “increases sales, expands market share, or increases customers,” “improves customer service,” and

“builds the company brand,” has increased. It also appears that the number of managers who believe EC is important because it is a “tool for bridging the management gap with large-scale enterprises” is low, and additionally that there are comparatively few enterprises actually conducting EC.

Figure 3 shows, by the ten categories of important reasons, the number of enterprises that have indicated important reasons for conducting EC, but that do not actually conduct it themselves. Figure 3 shows that the number of responses is less than 20 across all categories, and that the percentage of enterprises that indicated important reasons for EC but that do not actually conduct it themselves has risen. This is at odds with our initial projections, which shows that among SMEs, those conducting EC are doing so with specific intentions.



**Figure 3. Number of enterprises that recognize important reasons for conducting EC, but that do not conduct it themselves**

**Table 1. Ten important reasons**

No.	Important Reasons
1	Increases sales, expands market share, or increases the number of customers
2	Improves existing customer service
3	Cuts business operating and human resource costs
4	Helps to keep pace with the changing global environment
5	Globalizes the business (gains overseas customers)
6	Bridges the management resource gap with large-scale enterprises
7	Builds the company (reputation) brand
8	Helps develop business for SMEs without a strong financial base
9	Keeps, at least to a small degree, talented human resources
10	Significantly cuts marginal costs required for IT

Table 2 shows the reasons why SMEs, which believe EC is important, do not conduct it themselves (multiple responses allowed). The responses were surprisingly balanced across all 10 choices, and this sheds some light on the reasons why some enterprises do not conduct EC. The top three reasons have to do with human resources and communications, and represent challenges that are unique to SMEs.

Table 3 shows the results of the effects achieved by SMEs that rated the important reasons for conducting EC a 4 or 5. Roughly 50% of the enterprises cited “made business (including clerical affairs) run more smoothly” as a specific effect, followed by “improved employee productivity and business efficiency” and “improved customer service.” One surprising result was that nearly half the SMEs that believe EC is important and that are actually conducting EC have achieved their initial objectives. On the other hand, few enterprises achieved the effects of “increased number of international customers” or “increased international sales,” and the number of enterprises that cite an increase in international trade, the most typical effect said to be brought about by EC, has grown smaller.

**Table 2. Reasons against conducting EC**

Order	Reasons against conducting EC, even if specific important reasons for conducting EC exist	Number of enterprises
1	Customers want direct communication with the enterprise	17
2	Lack of time/money at present to conduct business and EC simultaneously	16
3	Lack of human resources inside the enterprise who understand EC (IT) (must hire new staff)	15
4	No expectation of making sufficient profits from EC	14
5	No expectation of cutting current overhead (expenses) with EC	13
6	Industry is not EC-ready	12
7	Lack funds to build (use) necessary IT system to support EC	10
8	Customers lack sufficient technical literacy	9
9	Customers are not open to sharing data	7
10	Relies on settling transactions by credit card, which delays receipt of cash	6

**Table 3. Effects achieved by conducting EC**

Order	Specific important reasons for conducting EC exist, and effects achieved from conducting it	Number of enterprises citing “effects”
1	Made business (including clerical affairs) run more smoothly	27
2	Improved employee productivity and business efficiency	24
3	Improved customer service	24
4	Sales rose	13
5	Number of customers rose	11
6	Inventory costs decreased	11
7	Expanded types of products	10
8	Expanded market share	8
9	Facilitated obtaining materials at lower cost	8
10	Increased number of materials suppliers	7
11	Increased number of international customers	7
12	Unit prices rose	6
13	Increased international sales	3

Table 4 shows the kinds of information (content) exchanged via EC between enterprises, which gain specific effects from conducting EC, and customers. It is noteworthy that 17 enterprises cited the third-highest effect, “sales and delivery (distribution) of materials and parts based on data exchanges through information systems (supply chain management).” As mentioned above, many Japanese SMEs enter and do business in the value chains of large-scale enterprises. However, it is intriguing that enterprises have succeeded in building their own supply chain and achieved effects through EC. On the other hand, a similar number of enterprises responded that they were achieving effects by “implementing information systems specified by trading partners and exchanging order information.” Furthermore, a similar number of enterprises cited “sales (to general customers and companies) of products and other goods via the company website,” showing that SMEs are in a transition period and testing various lines of business based on business-to-business (B-to-B) models via EC.

**Table 4. Data regarding EC-based trading between enterprises, which cite the effects of EC, and customers**

Order	Services offered	No. of Enterprises
1	Sales (to general customers and companies) of products and other goods via the company website	20
2	Implementing information systems specified by trading partners and exchanging order information	18
3	Sales and delivery (distribution) of materials and parts based on data exchanges through information systems (supply chain management)	17
4	Sales of products and other goods via the company website and management of related customer information (tastes, ordering history, etc. of customers)	14
5	Opening a store and displaying products using a pre-existing EC base, such as Rakuten, Amazon, or Yahoo!	8
6	Electronic settlement by credit card over the Internet	7
7	Implementation of point system connected to sales of products and other goods via the company website	5
8	Offering of recommendation function to customers regarding products and other goods	5

Table 5 is a list, by content, of the most-frequently achieved effects gained through EC. The number of enterprises that responded “made business (including clerical affairs) run more smoothly” and “improved employee productivity and business efficiency” through exchanges of “product and inventory data” and “settlement, accounts receivable, and accounts payable data” via EC has increased. Judging by these results, it is clear that even when the content of the data being exchanged concerns the enterprise’s products or services, it has yet to tie into direct effects with respect to management strategy, such as “improves sales,” “increases customers,” or “expands market share.”

**Table 5. The most-frequently achieved effects gained through EC by content**

Exchanged Content	Positive Effects Achieved Via EC	No. of Enterprises
Settlement, accounts receivable, and accounts payable data	Made business (including clerical affairs) run more smoothly	18
Product and inventory data	Made business (including clerical affairs) run more smoothly	17
	Improved employee productivity and business efficiency	17
Product and other goods-related information (color, size, shape, price, etc.) (with trading partners, customers)	Improved customer service	13
Distribution and shipping information	Improved employee productivity and business efficiency	11
Sales and sales projection data	Improved customer service	10
Information regarding services offered (content, price)	Improved customer service	10
Business documents, such as design drawings and plans (digital)	Made business (including clerical affairs) run more smoothly	9
Data on materials, parts, production volume, etc.	Made business (including clerical affairs) run more smoothly	9

#### 4. Discussion

The results of this survey make it possible, at least partially, to identify the state and effects of, as well as the challenges facing, Japanese SMEs conducting EC. One surprising result was that the number of enterprises that believed conducting EC to be important was extraordinarily high, and that many enterprises were already conducting EC to achieve specific goals. In particular, the results show that SMEs place heavy emphasis on EC to achieve goals, such as “increase sales, expand market share, or increase the number of customers” and “build the company brand.” Furthermore, the fact that nearly half of the enterprises responded that EC has brought about actual effects is particularly noteworthy. Regarding this point, many enterprises cite the achievement of effects in the form of satisfying management goals, such as “made business (including clerical affairs) run more smoothly” and “improved employee productivity

and business efficiency,” surpassing the number of SMEs who cited the achievement of strategic, direct effects with respect to management, such as “increases sale,” “increases the number of customers,” or “expands market share.” As far as service-oriented enterprises go that are achieving some effects via EC, roughly the same number of SMEs responded (multiple responses allowed) that they were executing “sales of products and other goods via the company website,” “implementing information systems specified by trading partners and exchanging order information,” and “executing supply chain management.” It is fair say that SMEs are currently trying to find their way using business mechanisms for achieving strategic effects via EC.

To examine one idea suggested by these results, let’s take a look at the services being offered and the exchange of information with customers at enterprises that responded that the effective use of EC has led to strategic and direct positive effects with respect to management (“increases sales,” “increases the number of customers,” and “expands market share”). Table 3 shows, by the industry types of “offering services” and “exchanging data,” the eight enterprises that responded that they were already achieving the aforementioned effects via EC.

It is striking that no enterprises fall under Number S2, “sales and delivery (distribution) of materials and parts based on data exchanges through information systems (supply chain management).” It is equally striking that only two enterprises in the distribution industry responded to Number S6, “implementing information systems specified by trading partners and exchanging order information.” This shows that SMEs that have achieved some success with EC did so by executing “sales (to general customers and companies) of products and other goods via the company website” or “sales of products and other goods via the company website and management of related customer information (tastes, ordering history, etc. of customers).” The reasons for their success, then, stemmed from offering information about company products to existing customers or potential customers by leveraging EC as a tool, as opposed to collaborating with another enterprise via EC. These enterprises frequently use EC to provide product data (product and inventory data), which tie into new sales, increases in the number of customers, and expanded market share. But, it appears that even the successful Japanese SMEs that have achieved effects are stuck at “EC 1.0.” In other words, Japanese SMEs are not leveraging EC to achieve results or effects stemming from ideas about new products, the cultivation of

new trading partners, or dynamic collaborations with customers.

**Table 6. The eight enterprises were already achieving the aforementioned effects via EC by the industry types of “offering services” and “exchanging data”**

Industry Type	I Manufacturing			II Distribution		III Services		
	Comp any A	Comp any B	Comp any C	Comp any D	Comp any E	Comp any F	Comp any G	Comp any H
Offering services	S1	✓	✓			✓	✓	✓
	S2							
	S3	✓	✓	✓	✓	✓		✓
	S4			✓	✓			✓
	S5			✓			✓	✓
	S6				✓	✓		
	S7			✓		✓		
	S8			✓		✓	✓	✓
Exchanging data	T1	✓	✓		✓	✓		✓
	T2		✓			✓		✓
	T3	✓			✓	✓		
	T4			✓	✓	✓	✓	✓
	T5							✓
	T6			✓				✓
	T7	✓		✓		✓	✓	✓
	T8		✓	✓		✓		✓

No.	EC Activities
S1	Sales (to general customers and companies) of products and other goods via the company website
S2	Sales and delivery (distribution) of materials and parts based on data exchanges through information systems (supply chain management)
S3	Sales of products and other goods via the company website and management of related customer information (tastes, ordering history, etc. of customers)
S4	Implementation of point system connected to sales of products and other goods via the company website
S5	Electronic settlement by credit card over the Internet
S6	Implementing information systems specified by trading partners and exchanging order information
S7	Offering of recommendation function to customers regarding products and other goods
S8	Opening a store and displaying products using a pre-existing EC base, such as Rakuten, Amazon, or Yahoo!
T1	Product and inventory data
T2	Distribution and shipping data
T3	Business documents, such as design drawings and plans (digital)
T4	Settlement, accounts receivable, and accounts payable data
T5	Data on materials, parts, production volume, etc.
T6	Sales and sales projection data
T7	Product and other goods-related information (color, size, shape, price, etc.) (with trading partners, customers)
T8	Information regarding services offered (content, price)

## 5. Conclusion

Let's start by testing our hypotheses. We conducted a random-sampling survey of 1,000 Japanese SMEs, and 168 responded. There were 87 respondent enterprises, less than half the total, that conduct EC in the form of B-to-B or business-to-customer (B-to-C), which is less than we expected given the advances that have been made in telecommunications infrastructure. The top reason why so many enterprises do not conduct EC was that "customers want direct communication with the enterprise." This may be due to inflexible thinking by SMEs that do not conduct EC, however the lack of specialized staff and human resources ("lack of time/money at present to conduct business and EC simultaneously," "lack of human resources inside the enterprise who understand EC (IT)," etc.) is likely the biggest reason. Moreover, the top two effects cited by SMEs were "made business (including clerical affairs) run more smoothly" and "improved employee productivity and business efficiency." In contrast, the number of enterprises that achieved direct effects with respect to management, in terms of "increases sales," "increases the number of customers," and "expands market share," did not show in the top responses. In fact, Table 5 shows that the top responses even in the effects gained by handling various data via EC were "made business (including clerical affairs) run more smoothly" and "improved employee productivity and business efficiency." These results affirm all of the hypotheses in Chapter 2. However, how should we account for the lack of direct positive effects that are pivotal in respect of management? One reason might be that many of the respondent enterprises limit their EC activities to the provision of information about company products in particular (product details, inventory, etc.). To be sure, this does provide a convenience to existing customers, however this has little impact on gaining new customers or luring customers away from competitors. For B-to-B, it is necessary to actively exchange business information among the companies placing orders, such as parts supply information, design drawings, manufactured product specifications, and so on. For B-to-C, if useful information (e.g., information for comparison purposes, such as competitor products) for attracting potential customers can be exchanged, it will lead to further direct effects with respect to management, even if such information is not directly related to the

products. There needs to be an increase in the number of success stories, where enterprises achieve direct effects by conducting EC, in order to increase the number of SMEs that conduct EC on the whole. Barring such a development, we do not see the number of enterprises conducting EC increasing, even if enterprises were to supplement their human resources.

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