Determinants of the Future Level of Use of Electronic Marketplaces among Canadian Firms

Pierre Hadaya
Department of Management Information Systems and Quantitative Methods
Université de Sherbrooke
phadaya@adm.usherbrooke.ca

Abstract

Based on the literature on the diffusion of innovation and on information systems (IS), and building on emerging concepts in electronic commerce (e-commerce), this paper measures the influence of various factors (i.e., those that relate to the technology itself, to the present use of e-commerce and to business relationships) on firms' future level of use of electronic marketplaces (e-marketplaces). This theoretical model is tested on data collected from 1,200 senior managers in Canadian firms. Findings indicate that a firm's past experience in e-commerce and factors that relate to its business relationships ultimately affect its future use of e-marketplaces. Results of TOBIT regressions also show that the complexity of sophisticated e-commerce implementations is negatively correlated with the future level of use of e-marketplaces and that consultants and other experts play an essential role in encouraging and facilitating the use of this new type of electronic platform. Finally, our survey data demonstrate that the relative influence of some determinants differs according to the firms' size.

1. Introduction

With the emergence of the digital economy, characterized by the widespread use of the Internet and electronic commerce (e-commerce), many professionals and members of academia predicted the elimination of intermediaries – such as distributors and resellers – from industrial value chains [24]. Indeed, this removal would allow firms to interact directly with their customers and/or suppliers and could generate important economies for the remaining members of the supply chain [4]. This belief is based on the premise that e-commerce and other information technologies reduce transaction costs [42] and can, consequently, bring about the disappearance of many intermediaries [54].

Some authors, however, refute the hypothesis that intermediaries will disappear in the new economy. For example, Sarkar et al. [54] don't believe the use of e-commerce will trigger a major restructuring of the industrial value chains to a point where intermediaries will not play, in the future, a significant role. Rather, using transaction cost theory, the authors demonstrate how e-commerce can increase the number of intermediaries within an industry. They believe intermediaries play numerous essential roles and conduct activities that could not easily be undertaken by producers. They also attest that the Internet will allow intermediaries to enjoy economies of scale and scope and to develop new competencies which will stimulate the appearance of different types of cyberintermediaries.

Schmitz [55] believes the use of e-commerce will not diminish firms' interest for various types of services offered by intermediaries. The author uses the agency theory to measure the influence of the proliferation of e-commerce on firms' interest for three services provided by intermediaries: (1) Holding inventory to provide the service of immediacy and insurance against systematic valuation risk; (2) Reducing asymmetric information by establishing a reputation, and (3) Gathering, organizing and evaluating information that is dispersed in society. His research results demonstrate that the adoption of e-commerce by firms' will not diminish the demand for these three services but, on the contrary, will increase it.

The results from [54] and [55], along with others from the field of e-commerce, seem to indicate that the effect of e-commerce on the structure of intermediation rests on numerous factors, such as industry characteristics, types of products/services exchanged and power structures within the value chain. Whilst e-commerce may, in fact, diminish the importance of intermediaries within a supply chain by allowing the direct interaction between a firm, its customers and other business partners, it can also bread a phenomenon of reintermediation where new electronic intermediaries appear and take on new roles within a supply chain. These new intermediaries – also called electronic marketplaces (e-marketplaces) – will act, among other things, as aggregators, price discovery agents, match makers and value added resellers [60].

The purpose of this paper is to examine the relative influence of various factors (i.e., those that relate to the technology itself, to the present use of e-commerce and to business relationships) on firms' future level of use of

0-7695-2056-1/04 $17.00 (C) 2004 IEEE

these new electronic intermediaries. The remainder of the paper is organized as follows: First, we propose a definition of e-marketplace and present the four leading characteristics that differentiate e-marketplaces from one another; Next, the research model and hypotheses are presented followed by an explanation of the research methodology undertaken; Finally, research results are presented and discussed.

2. E-marketplace: A definition and its four leading characteristic

Though several definitions of e-marketplace were proposed [1, 4, 9, 42, 54, 60], they differ from one another by the scope and type of functions an e-marketplace provides, as well as the type of telecommunication infrastructure on which it relies. For example, Choudury et al. [9] define an e-marketplace as an interorganizational system (IOS) through which multiple buyers and sellers can interact to electronically identify potential partners, select potential partners and execute transactions. According to Bakos [2], e-marketplaces can help match buyers and sellers on the Internet by customizing product offerings, reducing buyers' search costs and supporting various price discovery strategies (e.g., electronic catalogue and electronic reverse auctions). They can also facilitate transactions between buyers and sellers by offering various value added services to their members (e.g. logistics services, credit verification).

Building upon definitions provided in the literature we define e-marketplace as being:

"An intermediary that allows buyers and sellers to meet on an electronic platform that rests on the Internet infrastructure in order to exchange information about products/services (e.g. prices, specifications), conduct transactions online and adhere to other value-added services (e.g. settlement, distribution, integration, SCM) offered by the intermediary."

E-marketplaces can be differentiated according to four leading characteristics: the types of goods they trade, their ownership model, the price discovery strategy they support and their core service offerings.

Two types of e-marketplaces have emerged on the Internet, namely sectorial (vertical) and multisectorial (horizontal) e-marketplaces [14]. A sectorial e-marketplace is deployed mainly to support the exchange of direct products – such as raw materials and intermediate goods purchased for resale – between buyers and sellers working in the same industry. A multisectorial e-marketplace facilitates the exchange of products/services used in various industries and is mainly deployed to support the exchange of indirect products – such as MRO, office supplies and plane tickets.

The ownership model of an e-marketplace is defined according to the characteristics of the organization (or group of organizations) owning and operating it [20]. Three such models currently exist. A neutral e-marketplace is owned and operated by an Internet start-up that is neither a buyer nor a seller on the electronic platform (e.g. Fastparts in the electronics industry). A proprietary e-marketplace is owned and operated by a single large "brick-and-mortar" firm that is neither a buyer nor a seller on the electronic platform. This intermediary is usually a distributor or a reseller that favours the sellers on the electronic platform (e.g. (Grainger, a supplier of electronic motors). A consortia-led e-marketplace is owned and operated by industry leaders, usually in partnership with one or more technology providers. In this model, the industry leaders are either buyers or sellers on the electronic platform (e.g. Covisint in the automotive industry which is owned and operated by Ford, General Motors, Daimler Chrysler, Renault, Peugeot and the technology providers Commerce One and Oracle).

Five price discovery strategies – defined as the electronic processes used by the intermediary to establish the price of the products exchanged on the electronic platform [2] – are commonly used today by e-marketplaces: the electronic multi-vendor catalogue, the electronic auction, the electronic RFP (Request for Proposal), the electronic exchange and the dynamic pricing strategy. An electronic exchange is an electronic bulletin-board where buyers and sellers can negotiate in an unstructured manner for the same products [3]. Chemconnect uses an electronic exchange to match buyers and sellers on its electronic platform. A dynamic pricing strategy adjusts the price of products according to supply and demand, such as the operation of a financial stock exchange [3]. Arbinet, an e-marketplace in the telecommunication industry, uses dynamic pricing to help carriers exchange bandwidth on its electronic platform. The choice of the price discovery strategy by the e-marketplace will depend on how and what member organizations buy on the electronic platform [33]. It is important to note, however, that successful e-marketplaces offer their members more than a single price discovery strategy in order to gain a competitive advantage [33] by supporting the exchange of more than a single family of products.

Another important attribute that differentiates e-marketplaces from one another is their service offerings [11]. Among the many services an e-marketplace can offer his members we mention content management, transaction processing, credit verification, insurance, financing, logistics, systems integration and consulting services, as well as various supply chain management services and the provision of various e-commerce applications in ASP format.

3. Research model and hypotheses

Literature on the benefits of e-marketplaces is abundant [1, 9, 13, 35]. However, to this day, very few empirical studies have attempted to identify the factors that entice firms to adhere to e-marketplaces. As such, based on the literature on information systems (IS) and on the diffusion of innovation, and building on emerging concepts in e-commerce, this study proposes to answer the following general research question: What are the determinants of the future level of use of e-marketplaces among Canadian firms? And,

Since previous studies have identified a multitude of variables that are possible determinants of organizational adoption of information technology [21, 36, 50] and because some authors argue that a unifying theory might be inappropriate due to fundamental differences between the different types of innovations [19, 22], we have limited our study to the following five groups of variables (see figure 1).

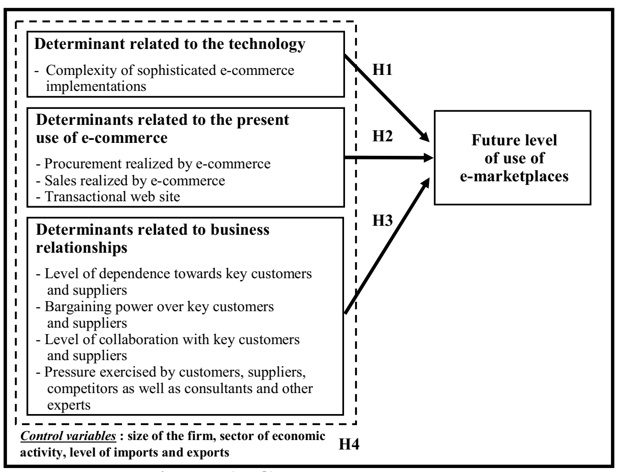

Figure 1: Conceptual model

3.1. Future level of use of e-marketplaces

Some surveys have attempted to measure the rate of adoption of e-commerce applications by firms [26, 45]. However, to this day, no research project has attempted, to our knowledge, to empirically measure the level of use of e-marketplaces by firms. This paper attempts to address this gap in the literature by capturing the extent to which firms will use e-marketplaces within 12 months.

Two reasons justify our decision to measure future rather than current level of use of e-marketplaces: (1) Various surveys have shown that the use of e-commerce by Canadian firms remains relatively low despite anticipated significant growth in the coming years [37]. Some authors have already used this approach when studying the adoption of radical technological innovations [39]; (2) The study of "trigger mechanisms" or stimuli to innovativeness represent a definite interest as regards to theory and practice, particularly in the development of public policies concerning SMEs [16, 56].

3.2. Determinant related to the technology: Complexity of sophisticated e-commerce implementations

Complexity is an important barrier to the adoption and implementation of technological innovations by firms [12, 21, 51, 53]. The influence of complexity is of greater importance for SMEs since their limited number of employees often breeds a lack of knowledge and expertise as far as information technologies are concerned [59]. From this, we hypothese:

H1: The complexity of sophisticated e-commerce implementations is negatively related to the future level of use of e-marketplaces.

Measures for the complexity of sophisticated e-commerce implementations are presented in section 4.2.1.

3.3. Determinants related to the present use of e-commerce

A firm's past experience with different technologies can ultimately affect its future decisions to adopt other similar technologies [6, 38]. Similarly, the present use of e-commerce by a firm can have a significance influence on its future e-commerce strategy. This reasoning is set forth based on the fact that a firm having acquired the necessary technical knowledge related to an innovation it already uses will be incited to increase its use of the aforementioned or similar innovations in the future. Three variables [57, 58] are included in our research model to measure the present use of e-commerce by firms: (1) The procurement realized by e-commerce; (2) The sales realized by e-commerce, and (3) The presence of a transactional web site. Hence, we hypothese:

H2: The present use of e-commerce by a firm is positively related to its future level of use of e-marketplaces.

3.4. Determinants related to business relationships

The determinants that relate to business relationships seem to be those that exercise the strongest influence on the adoption of innovations that have an impact simultaneously on a firm and its business partners [50], as is the case for e-marketplaces. Ten determinants corresponding to the characteristics of a firm's business relationships may influence a firm's future level of use of e-marketplaces: its level of dependence towards its key customers and suppliers, its bargaining power over its key customers and suppliers, its level of collaboration with its key customers and suppliers and the pressure it undergoes from four external groups.

Dependence can be defined as a firm's need to maintain a relationship with another firm in order to attain certain desired objectives [23]. There is a positive relationship between a firm's dependence towards another firm and its level of coordination with the latter [7, 41]. Some authors have also demonstrated that a firm's level of vertical coordination with its business partners positively influences its adoption of information technologies [51]. These arguments lead us to believe that a firm's level of dependence towards its key customers and suppliers will be positively related to its future level of use of e-marketplaces.

Bargaining power can be defined as the ability to influence actions, decisions or processes [44]. It is the control a firm possesses on its critical resources that allows it to influence the outcome of a negotiation to its own advantage. Within the context of information technology adoption, the deployment and use of an interorganizational electronic network comprised of different partners is often initiated by a player having an important bargaining power over its business partners [49]. By deploying e-commerce applications, this player will attempt to impose his own standards and control his partners' business processes [31].

Firms involved in interenterprise collaboration need to implement different coordination mechanisms in order to facilitate the communication and interaction between them. E-marketplaces allow firms to optimize their interenterprise business processes and make the coordination between the different actors involved easier [25, 30].

A firm that undergoes pressure from its different business partners – such as customers, investors, banks and suppliers – can be forced to initiate and implement certain practices. It has been demonstrated that customers can incite their suppliers to increase their investments in new technologies [10]. For example, Lefebvre et al. [39] showed that the influence of customers and technology suppliers are among the strongest determinants of future adoption of advanced manufacturing technologies. The influence of external partners and competitors is critical when the innovation is an interdependent technology, such as interenteprise information systems (IOS) [5, 28] and e-marketplaces. The pressure a firm undergoes from four external groups – the customers, the suppliers, the competitors, and the consultants and other experts – with regard to the implementation of e-commerce practices are included in the model. Thus, our third hypothesis is:

H3: The level of dependence of a firm toward its key customers and suppliers, its bargaining power over its key customers and suppliers, its level of collaboration with its key customers and suppliers as well as the pressure it undergoes from various external groups positively influence its future level of use of e-marketplaces.

The reader should note that H3 may have been decomposed in sub-hypotheses corresponding to the specific link between one independent variable and the dependant variable. The listing of these sub-hypotheses seems, however, not only redundant but also unnecessary since the main objective of this research is to show that firms' business relationships as a whole ultimately affect their use of e-marketplaces.

3.5. Control variables

Within the particular context of this study, four control variables were included: size of the firm, sector of economic activity, level of imports and level of exports. The size of a firm can influence its innovativeness [8, 40]. Larger firms are more capable of taking the risk of adopting new technologies [46] whereas smaller firms seem to be more flexible and receptive to new ideas [49]. As such, there has been mixed evidence on whether large or small firms are more innovative. However, based on the research results of recent studies on the adoption of e-commerce [37, 57], we are inclined to believe that a firm's size will be positively related to its future level of use of e-marketplaces.

E-commerce seems to be a sectorial phenomenon [37, 57]. Even though firms in every sector can use e-commerce to conduct business, the rate and the speed of the diffusion of e-commerce will vary considerably from one sector to another. Firms in certain sectors – such as computer and electronics, the automotive industry and the chemical industry – seem more capable of adopting and assimilating e-commerce applications and electronic platforms. The rate of adoption of interenterprise e-commerce is higher for manufacturing firms [57]. In this study we'll try to corroborate the latter research result by making a distinction between firms in the service sector and the others.

A firm's level of internationalization essentially refers to its capacity to buy from abroad the necessary inputs for its production and sell its final products in international markets. Two variables were chosen to measure a firm's level of internationalization: its level of imports and its level of exports. E-commerce allows firms to increase their level of internationalization [17, 52]. Also, firms having a high level of internationalization seem to be early adopters of e-commerce [37]. Finally, survey results from a study conducted among Canadian firms [32] demonstrate that the adoption rate of e-commerce amounts only to 16% for Canadian firms limiting their activities to their country whereas it climbs to 49% for Canadian firms working at the international level. Therefore,

H4: The size of the firm, the sector of economic activity in which it operates, and the level of its exports and imports need to be retained as control variables when examining the relation between the determinants and the future level of use of e-marketplaces.

4. Research methodology

4.1. Data collection and responding firms

All data were collected by means of an electronic questionnaire. Even though an electronic survey may limit our sample to firms that are used to work with e-mail and may have a relatively lower response rate than traditional mail questionnaire, it offers some considerable advantages compared to the latter as it eliminates data re-entry errors [43] while reducing the costs and the response cycle time [18].

The target population originates from a representative list of Canadian firms belonging to a firm specialized in direct marketing via the Internet. An e-mail was sent to members of the top management or to senior managers in Canadian firms presenting the research subject and a hyperlink to the electronic survey. Firms of any size and any sector could participate since we were interested in overall future use of e-marketplaces.

We received 1,612 questionnaires of which 412 did not provide any information about their present or future e-commerce strategy. Data analysis leads us to believe that this high number of incomplete questionnaires was mainly due to senior managers' time constraints. The data analyzed in this study therefore originates from a sample of 1,200 Canadian firms who are using or are planning to use e-commerce in the near future. Our sample size compares favourably to previous surveys conducted in the field of e-commerce [26, 45].

4.2. Research variables

Fifteen firms participated in a pilot of the survey instruments. Commentaries from the subjects resulted in minor changes to survey questions. Respondents were asked to complete the questionnaire that had the following three major sections: (1) Thirteen questions about the organization; (2) Twelve questions about their business relationships, and (3) Nine questions to measure their present and future use of e-commerce, the barriers to the use of this technology and their future level of use of e-marketplaces. Except for some factual measures (e.g., size of the firm, present use of e-commerce), a seven-point Likert scale (from completely disagree to completely agree or not at all to a large extent) was used to measure the complexity of sophisticated e-commerce implementations, the characteristics of business relationships as well as the firms' future level of use of e-commerce and e-marketplaces. Reliabilities (Cronbach's alphas) ranged from 0,63 to 0,83.

4.2.1. Complexity of sophisticated e-commerce implementations

Complexity of sophisticated e-commerce implementations was measured through three questions. The first captured the extent to which an upgrade of the IT and telecommunications infrastructure is required by firms looking to implement sophisticated e-commerce solutions since these require the deployment of some necessary infrastructure [48]. The second one measured the extent to which interoperability problems between e-commerce applications constitutes an implementation barrier. In fact, the proliferation of different standards and protocols can make it difficult for firms to adopt and use some communication technologies [49] – such as e-marketplaces. The last measure addressed the extent to which security issues act as an implementation barrier. The importance of confidentiality when transferring information electronically is a theme well documented in the field of e-commerce [34, 47].

5. Research findings and discussion

In order to assess the contribution and the relative influence of the various determinants of the future level of use of e-marketplaces, multivariate analyses were conducted. Since a significant number of firms – 449 firms to be exact– indicated that they do not plan on using e-marketplaces within 12 months, and as such gave a zero value to the dependant variable, Tobit models were more adequate than conventional regression models and were chosen because they take into account the truncated distribution of the dependant variable [15, 27].

5.1. Determinants of the future level of use of e-marketplaces

The data of the 1,200 companies collected from the survey were compiled and analysed with SPSS. Results of the Tobit regressions are presented in Table 1.

Table 1: Determinants of the future level of use of e-marketplaces (TOBIT)

Variables	Model 1 Control variables		Model 2 Control variables and determinants	
	$\hat{\beta} / SE_{\hat{\beta}}$	p(1)	$\hat{\beta} / SE_{\hat{\beta}}$	p(1)
Control variables				
Firm size (number of employees)(2)	4.0990	0.0000****	3.1847	0.0007****
Sector of economic activity (service sector versus other sectors)	0.3051	0.3801	-1.7130	0.0434**
Level of imports(2)	1.0611	0.1444	-0.2793	0.3901
Level of exports(2)	2.0016	0.0227**	1.4754	0.0701*
Determinant related to the technology				
Complexity of sophisticated e-commerce implementations			-2.9043	0.0019***
Determinants related to the present use of e-commerce				
Procurement realized by e-commerce(2)			3.0485	0.0012***
Sales realized by e-commerce(2)			1.3347	0.0910*
Transactional web site			1.5380	0.0621*
Determinants related to business relationships				
Level of dependence towards key customers			2.1034	0.0177**
Level of dependence towards key suppliers			1.6480	0.0497**
Bargaining power over key customers			-0.9707	0.1659
Bargaining power over key suppliers			-0.0332	0.4866
Level of collaboration with key customers			-2.1349	0.0164**
Level of collaboration with key suppliers			1.8347	0.0333**
Pressure from customers			1.0392	0.1494
Pressure from suppliers			-1.2147	0.1123
Pressure from competitors			-1.5477	0.0609*
Pressure from consultants and other experts			16.5142	0.0000****
Pseudo R^2 (3)	3.50 %		43.86 %	
Level of significance	0.0000****		0.0000****	
ΔR2			41.82 %	
pΔR2			0.0000****	

(1) p = level of significance based on a chi-square distribution
* $p < 0.10$, ** $p < 0.05$ *** $p < 0.01$, **** $p < 0.001$
(2) Expressed as the natural logarithm in order to normalize the variables
(3) Pseudo $R^2 = 1 + (L_\omega/L_\Omega)^{2/n}$ where L_ω is the maximum likelihood function with all of the parameters ($ß_0$, $ß_1$, …, $ß_p$), L_Ω is the maximum likelihood function with only the parameter $ß_0$, and n is the size of the sample

The interpretation of the results that follows is based on the p value[1].

A first observation can be drawn from the contribution of the four control variables (model 1). Table 1 shows that the control variables explain only 3.5% of the variance of the dependent variable. Of the four control variables, only two are significant: firm size and level of exports.

The complete analysis needs, however, to be drawn from the Tobit regression that takes into account the contribution of both control variables and the determinants. When we add the determinants (model 2), we notice that the coefficient of determination increases to 43.86 % while remaining very significant (p=0.0000). Findings can be summarized as follow:

(1) Pressure exercised by consultants and other experts is by far the most significant variable. This result shows that the future use of e-marketplaces by firms will rely, without a doubt, on the expertise of consultants and other experts on the subject. They seem to play the role of opinion leaders and change agents by providing information and advice about the innovation to firms, inciting them to adopt this new type of electronic platform, and also providing them technical support during the implementation process.

[1] The same conclusions can be reached by using the ratio $\hat{\beta} / SE_{\hat{\beta}}$

(2) Complexity of sophisticated e-commerce implementations is negatively and significantly related to the future level of use of e-marketplaces. This result corroborates numerous studies in the field of information technology that demonstrated that complexity is negatively related to innovation adoption [12, 51, 53].

(3) A firm's past experience in e-commerce ultimately affects its future strategy. This self-reinforcing phenomenon has also been observed in the case of various types of innovations unrelated to e-commerce [6, 38].

(4) Other than the pressure exercised by consultants and other experts, five factors that relate to business relationships exert an important influence on the future level of use of e-marketplaces. Two of them (the level of dependence towards key suppliers and the level of collaboration with key suppliers), combined with the fact that the variable procurement realized by e-commerce is significant, seem to indicate that firms will use e-marketplaces to transact, to optimize the coordination of their activities and to collaborate with their key suppliers in order to strengthen their ties with the latter. Two other variables (the level of dependence towards key customers and the level of collaboration with key customers (negative)), combined with the fact that the variable sales realized by e-commerce is significant, seem to indicate that firms will use e-marketplaces not only to transact with their existing key customers, towards which they are dependent but with whom they don't collaborate, but also to increase their pool of customers and hopefully develop with some of these new customers business relationships that value interenterprise collaboration. We also notice that the variable pressure exercised by competitors is negatively and significantly related to the future level of use of e-marketplaces. This result can be explained by the fact that more and more firms that are not threaten by the e-commerce strategy of their competitors are willing to join the same e-marketplace than the latter, or still develop one in partnership with them – named consortia-led e-marketplace (see section 2) – in order to decrease their respective costs associated to the development of their e-commerce strategy and share their respective pools of suppliers and/or customers.

(5) The size of the firm strongly influences the future level of use of e-marketplaces. We also notice that firms in the service sector will be less likely to use e-marketplaces whereas firms that export will be more inclined to use this new type of electronic platform.

Based on the discussion above, we can now draw the following conclusions in regards to the total acceptance, partial acceptance or rejection of the research hypothesis as formulated in section 3. H1 is accepted, H2 is completely accepted whereas H3 and H4 are only partly accepted.

5.2. Relative influence of the determinants according to the size of the firm

Now that we have validated our research hypothesis and as such answered our general research question, this section aims to complete the study of the determinants of the future level of use of e-marketplaces by verifying if the role of the determinants differs according to the size of the firm.

To verify if the size of the firm has an impact on the determinants of the level of use of e-marketplaces we thus have segmented our sample of 1,200 firms in two groups: SMEs (firms' having less than 500 employees) and large firms (firms with 500 or more employees) and measured, for both groups, the effect of the control variables and determinants on the future level of use of e-marketplaces (see Table 2).

The percentage of the variance explained for the future level of use of e-marketplaces is higher in the group of large firms than in the group of SMEs (R^2 = 61.35 % versus R^2 = 41.58 %), which seems to indicate that the identified determinants are more adequate for large firms. Only three variables have a similar and significant influence in both groups: the level of exports, the level of collaboration with key customers (negative) and the pressure from consultants and other experts. This finding reiterates the strong influence of consultants and other experts on the future level of use of e-marketplaces by firms and the strategic importance of this new type of electronic platform to allow firms to increase their pool of customers.

Seven variables are significant only in the group of SMEs while five others are significant only in the group of large firms. The complexity of sophisticated e-commerce implementations influences the future level of use of e-marketplaces for SMEs but not for large firms. This statement is understandable since large firms are less subject to knowledge barriers than SMEs. Because of their size, large firms posses more diversified technical knowledge and are better able to invest and prepare to facilitate knowledge acquisition during the assimilation process of an innovation. The present use of e-commerce seems also to influence the future level of use of e-marketplaces in the group of SMEs but not in the group of large firms. This result relates to the previous one, since in a SME environment, past experience plays a more important role because of

Table 2: Relative influence of the determinants according to the size of the firm (TOBIT)

Variables	SMEs (n_1 = 1045)		Large firms (n_2 = 143)	
	$\hat{\beta}/SE_{\hat{\beta}}$	$p^{(1)}$	$\hat{\beta}/SE_{\hat{\beta}}$	$p^{(1)}$
Control variables				
Sector of economic activity (service sector versus other sectors)	-1.2813	0.1001	-1.2335	0.1087
Level of imports(2)	0.5071	0.3061	-1.9873	0.0235**
Level of exports(2)	1.3713	0.0852*	1.4653	0.0714*
Determinant related to the technology				
Complexity of sophisticated e-commerce implementations	-3.0046	0.0014***	-0.4381	0.3307
Determinants related to the present use of e-commerce				
Procurement realized by e-commerce(2)	2.5134	0.0060***	1.2407	0.1074
Sales realized by e-commerce(2)	1.3119	0.0948*	0.3903	0.3482
Transactional web site	1.3698	0.0854*	1.0616	0.1442
Determinants related to business relationships				
Level of dependence towards key customers	1.9831	0.0237**	0.6391	0.2614
Level of dependence towards key suppliers	1.8115	0.0351**	-1.2998	0.0969*
Bargaining power over key customers	-1.2207	0.1111	0.8902	0.1867
Bargaining power over key suppliers	0.6541	0.2565	2.3057	0.0106**
Level of collaboration with key customers	-1.8940	0.0291**	-1.7575	0.0394**
Level of collaboration with key suppliers	1.2217	0.1109	2.8668	0.0021***
Pressure from customers	0.8093	0.2092	0.4993	0.3088
Pressure from suppliers	1.5739	0.0578*	0.2315	0.4085
Pressure from competitors	-0.5852	0.2792	-3.1245	0.0009****
Pressure from consultants and other experts	14.8671	0.0000****	8.6740	0.0000****
Pseudo $R^{2\ (3)}$	41.58 %		61.35 %	
Level of significance	0.0000****		0.0000****	

(1) p = level of significance based on a chi-square distribution
* $p < 0.10$, ** $p < 0.05$ *** $p < 0.01$, **** $p < 0.001$
(2) Expressed as the natural logarithm in order to normalize the variables
(3) Pseudo $R^2 = 1 + (L_\omega/L_\Omega)^{2/n}$ where L_ω is the maximum likelihood function with all of the parameters ($ß_0$, $ß_1$, …, $ß_p$), L_Ω is the maximum likelihood function with only the parameter $ß_0$, and n is the size of the sample

the scarcity of their technical and non-technical resources. Pressure from suppliers also influences the future level of use of e-marketplaces for SMEs but not for large firms. Finally, as logic would indicate, the level of dependence towards key customers and suppliers is significant only in the group of SMEs.

Four of the five variables that are significant only in the group of large firms (the level of imports (negative), the level of dependence towards key suppliers (negative), the bargaining power over key suppliers and the level of collaboration with key suppliers) indicate that large firms, with their bargaining power, will encourage their key suppliers, who seem to be located close by, to use e-marketplaces so they can collaborate with each other electronically. The last variable significant only in the group of large firms (the pressure exercised by competitors) shows that large firms will be less threatened than SMEs to cooperate with their competitors by using the same electronic platform and sharing their respective pool of suppliers and/or customers.

The results presented in this section demonstrate that the relative role of some determinants differs according to the size of the firm and that the determinants play a more important role to explain the future level of use of e-marketplaces for large firms than for SMEs.

6. Conclusion

Our aim here was to identify some of the determinants of the future use of e-marketplaces. The analysis of the sample data gathered from 1,200 senior managers in Canadian firms shows that: (1) The consultants and other experts play an essential role in the use of e-marketplaces while some other factors that relate to business relationships also exert an important influence on the future use of this new type of electronic platform; (2) The complexity of sophisticated e-commerce implementations is negatively related to the future use of e-marketplaces, and (3) The firm's past experience in e-commerce will affect its future level of use of e-marketplaces. Tobit regressions also show that the relative influence of some factors differs according to the firms' size.

In the future, we hope to identify the business processes firms will be more willing to optimize through e-marketplaces compared with the use of traditional "sell-side" or "buy-side" electronic platforms.

7. References

[1] Bailey, J.P., and J.Y. Bakos, "An Exploratory Study of the Emerging Role of Electronic Intermediaries", *International Journal of Electronic Commerce*, 1 (2), 1997, pp. 7-20.

[2] Bakos, J.Y., "A Strategic Analysis of Electronic Marketplaces", *MIS Quarterly,* 45 (3), 1991, pp. 295-310.

[3] Bear Stearns, *The Internet Business-to-Business Report*, 1999.

[4] Benjamin, R., and R.T. Wigand, "Electronic Markets and Virtual Value Chains on the Information Superhighway", *Sloan Management Review*, 36 (2), 1995, pp. 62-72.

[5] Bensaou, M., and N. Venkatraman, N., "Inter-organizational Relationship and Information Technology: A Conceptual Synthesis and a Research Framework", *European Journal of Information Systems*, 5 (2), 1996, pp. 84-91.

[6] Burgelman, R.A., and R.S. Rosenbloom, "Technology Strategy: An Evolutionary Process Perspective". In Rosenbloom, R.S., and Burgelman, R.A. (ed.), *Research on Technological Innovation, Management and Policy*, 4, JAI Press, Greenwich, 1989.

[7] Burvik, A., and K. Gronhaug, "Inter-Firm Dependence, Environmental Uncertainty and Vertical Co-ordination in Industrial Buyer-Seller Relationships", *Omega: The International Journal of Management Science*, 28 (4), 2000, pp. 445-454.

[8] Chen, X.D., and L.S. Fu, "IT Adoption in Manufacturing Industries: Differences by Company Size and Industrial Sectors – The Case of Chinese Mechanical Industries", *Technovation*, 21 (10), 2001, pp. 649-660.

[9] Choudhury, V., K.S. Hartzel, and B.R. Konsynski, "Used and Consequences of Electronic Markets: An Empirical Investigation in the Aircraft Parts Industry", *MIS Quarterly*, 22 (4), 1998, pp. 471-507.

[10] Christensen, C.M., and J.L. Bower, "Customer Power, Strategic Investment, and the Failure of Leading Firms", *Strategic Management Journal*, 17 (3), 1996, pp. 197-218.

[11] Christiaanse, E., and M.L. Markus, "Participating in Collaboration E-marketplaces", *IEEE, Proceedings of HICSS-36*, Computer Society Press, Hawaii, January 2003.

[12] Cooper, R.B., and W. Zmud, "Information Technology Implementation Research: A Technological Diffusion Approach", *Management Science*, 36 (2), 1990, pp. 543-559.

[13] Coperland, D.G., and J.L. McKenney, "Airline Reservations Systems: Lessons from History", *MIS Quarterly*, 12 (3), 1988, pp. 353-370.

[14] Corsten, D., and J. Hofstetter, "After the Hype: The Emerging Landscape of B2B Exchanges", *ECR Journal*, 1 (1), 2001, pp. 51-59.

[15] Cramer, J.S., *The Logit Model for Economists*, Edward and Arnold, London, 1991.

[16] Damsgaard, J., and K. Lyytinen, "Government Strategies to Promote the Diffusion of Electronic Data Interchange (EDI): What we Know and what we don't Know", *Information Infrastructure and Policy*, 1996, 5(3), 1996, pp. 169-190.

[17] De La Torre, J., "Introduction to the Symposium E-commerce and Global business: The Impact of the Information and Communication Technology Revolution on the Conduct of International Business", *Journal of International Business Studies*, 32 (4), 2001, pp. 617-640.

[18] Dillman, D.A., *Mail and Internet Surveys: The Tailored Design Method*, John Wiley, New York, 2000.

[19] Downs, G.W., and L.B. Mohr, "Conceptual Issues in the Study of Innovation", *Administrative Science Quarterly*, 21, 1976, pp. 700-714.

[20] Emarketer, *The Ecommerce B2B Report*, 2000.

[21] Fichman, R.G., "The Diffusion and Assimilation of Information Technology Innovations", In Zmud, R.W. (ed.), *Framing the domains of IT Management: Projecting the Futur … through the Past*, Pinnaflex Educational Resources Inc., Cincinnati, 2000.

[22] Fichman, R.G., and C.F. Kemerer, "Adoption of Software Engineering Process Innovations: The Case of Object Orientation", *Sloan Management Review*, 30 (10), 1993, pp. 47-59.

[23] Frazier, G.L., and R.C. Rody, "The Use of Influence Strategies in Interfirm Relationships in Industrial Product Channels", *Journal of Marketing*, 55, 1991, pp. 52-69.

[24] Gellman, R., "Disintermediation and the Internet", *Government Information Quarterly*, 13, 1996, pp. 1-8.

[25] Global Technology Management, *E-marketplaces: Strategies, Tools, and Opportunities,* Report prepared for Industry Canada, Information and Communications Technologies branch, 2000.

[26] Grandon, E.E., and J.M. Pearson, "Perceived Value and Adoption of Electronic Commerce: An Empirical Study of Small and Medium Sized Firms", *IEEE, Proceedings of HICSS-36*, Computer Society Press, Hawaii, January 2003.

[27] Greene, W.H., *Econometric Analysis*, 3rd edition, Prentice-Hall, New-Jersey, 1997.

[28] Grover, V., "An Empirical Derived Model for the Adoption of Customer-Based Interorganizational Systems", *Decision Sciences*, 24 (3), 1993, pp. 603-640.

[30] Holzmuller, H.H., "Delphi Study about the Future of B2B Marketplaces in Germany", *Electronic Commerce Research and Applications*, 1 (1), 2002, pp. 2-19.

[31] Imrie, R., and J. Morris, "A Review of Recent Changes in Buyer-Seller Relationships", *Omega: International Journal of Management Science*, 20 (5/6), 1992, pp. 641-652.

[32] Jopko, A., D. Morgan, and N. Archer, *An Evaluation of E-commerce Support for SMEs in Canada*, Working Paper, April 2001.

[33] Kambil, A., P.F. Nunes, and D. Wilson, "Transforming the Marketspace with all-in-one Markets, *International Journal of Electronic Commerce*, 3 (4), 1999, pp. 11-28.

[33] Kaplan, S., and M. Sawhney, "E-Hubs: The New B2B Marketplaces", *Harvard Business Review*, May-June, 2000, pp. 97-103.

[34] Kendall, J., L.L. Tung, K.H. Chua, C.H. NG, and S.M. Tan, "Electronic Commerce Adoption by SMEs in Singapore", *IEEE, Proceedings of HICSS-34*, Computer Society Press, Hawaii, January 2001.

[35] Lee, H.G., "Do Electronic Marketplaces Lower the Price of Goods?", *Communications of the ACM*, 41 (1), 1998, pp. 73-80.

[36] Lefebvre, É., and L.A. Lefebvre, *Information and Telecommunication Technologies: The Impact of their Adoption on Small and Medium-Sized Enterprises*, Report prepared for the International Development Research Center, 1996.

[37] Lefebvre, É., and L.A. Lefebvre, *L'Impact du Commerce Électronique sur les Processus d'Affaires et la Main-d'œuvre*, Research Report, 2001.

[38] Lefebvre, L.A., J. Harvey, and É. Lefebvre, "Technological Experience and the Technology Adoption Decisions in Small Manufacturing Firms", *R&D Management*, 21 (3), 1991, pp. 241-249.

[39] Lefebvre, L.A., É. Lefebvre, and J. Harvey, "Intangible Assets as Determinants of Advanced Manufacturing Technology Adoption in SMEs", *IEEE Transactions on Engineering management,* 43 (3), 1996, pp. 307-322.

[40] Lehman J.A., "Organizational Size and Information System Sophistication", *Journal of Management Information Systems*, 2 (3), 1985, pp. 78-86.

[41] Lonsdale, C., "Locked-in to Supplier Dominance: On the Danger of Asset specificity for the Outsourcing Decision", *Journal of Supply Chain Management*, 37 (2), 2001, pp. 22-27.

[42] Malone T., J. Yates, and R. Benjamin, "Electronic Markets and Electronic Hierarchies", *Communications of the ACM*, 30, 1987, pp. 484-497.

[43] Mann, C., and F. Stewart (2000), *Internet Communication and Qualitative Research: A Handbook for Researching Online*, Sage Publications, London, 2000.

[44] Mintzberg, G, H., *Power in and around Organizations*, Prentice Hall, New Jersey, 1983.

[45] Mirchandani, A.A., and J. Motwani, "Understanding Small Business Electronic Commerce Adoption: An Empirical Analysis", *Journal of Computer Information Systems*, Spring 2001, pp. 70-73.

[46] Palvia, S.C., and N.L. Chervany, "An Experimental Investigation of Factors Influencing Predicted Success in DSS Implementation", *Information and Management*, 29 (1), 1995, pp. 43-54.

[47] Phillips, M., *Successful Electronic Commerce*, Bookman Press, Melbourne, 1998.

[48] Premkumar, G., and M. Roberts, "Adoption of New technologies in Rural Small Business", *Omega: The International Journal of Management Science*, 27, 1999, pp. 467-484.

[49] Premkumar, G., K. Ramamurthy, and M. Crum, "Determinants of EDI Adoption in the Transportation Industry", *European Journal of Information Systems*, 6, 1997, pp. 107-121.

[50] Prescott, M.B., and S.A. Conger, "Information Technology Innovations: A Classification by IT Focus of Impact and Research Approach", *Data Base Advanced*, 36 (2/3), 1995, pp. 20-41.

[51] Robertson, T.S., and H. Gatignon, "Competitive Effects on Technology Diffusion", *Journal of Marketing*, 50 (12), 1986.

[52] Roccapriore, D., "Building IT for Export Exploration", *Business and Economic Review*, 46 (2), 2000, pp. 26-28.

[53] Rogers, E.M., *Diffusion of Innovations*, 4th edition, The Free Press, New York, 1995.

[54] Sarkar, M.B., B. Butler, and C. Steinfield, "Cybermediaries in Electronic Marketspace: Toward Theory Building", *Journal of Business Research*, 41 (3), 1995, pp. 215-221.

[55] Schmitz, S.W., "The Effect of Electronic Commerce on the Structure of Intermediation", *Journal of Computer-Mediated Communication,* 5 (3), 2000.

[56] Scupola, A., "The Adoption of Internet Commerce by SMEs in the South of Italy: An Environmental, Technological and Organizational Perspective", *Journal of Global Information Technology Management*, 6 (1), 2003, pp. 52-71.

[57] Statistics Canada, *Embracing E-business: does Size Matter?*, Connectedness Series, Ottawa, 2002.

[58] Statistics Canada, *Information and Communications Technologies and E-commerce in Canadian Industry*, Science, Innovation and Electronic Information Division Working Papers, Ottawa, 2000.

[59] Thong, J.Y.L., "Resource Constraints and Information System Implementation in Singaporean Small Business", *Omega: The International Journal of Management Science*, 29, 2001, pp. 143-156.

[60] ZWASS, V., "Structure and Macro-Level Impacts of Electronic Commerce: From Technological Infrastructure to Electronic Marketplaces", In K.E. Kendall. (ed.), *Emerging Information Technologies*, Sage Publications, California, 1998.