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EXECUTIVE DECISIONS ABOUT WEBSITE ADOPTION IN SMALL AND MEDIUM-SIZED ENTERPRISES

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ABSTRACT

A model of website adoption by small and medium-sized enterprises (SMEs) is developed by considering literature supporting electronic commerce adoption and electronic data interchange adoption. A survey of 89 small and medium-sized enterprises (SMEs) without websites was used to test a model hypothesizing relationships among: perceived benefits, perceived pressure, organizational readiness and intent to adopt a website. Survey findings indicate perceived benefits (strategic and informational), organizational readiness (IT resources) and internal pressure directly affect intent to adopt a website ($R^2=.36$). An analysis of interviews conducted with late adopters and non-adopters 18 months after the survey support the findings. Interestingly, financial resources and external pressure were not found to be significantly influential. The findings provide guidance for practitioners working with SMEs and policy makers interested in increasing SME website adoption.

Keywords: SMEs; website adoption; Internet adoption

INTRODUCTION

A growing number of small and medium-sized enterprises (SMEs) have embraced electronic commerce (EC) [10]; however, differences in website adoption rates between large firms and SMEs remain [6]. For example, 74% of large firms in Canada had websites in 2002 compared with only 57% of firms with 20 to 99 employees [16,28]. Similar differences exist for on-line payments, on-line ordering, and integration with order

fulfillment. The relatively low level of EC adoption is symptomatic of the challenges many SMEs face in adopting information technology (IT)-related innovations [8].

The differences between SMEs and large firms are important. Attewell and Rule [1] suggest IT adoption research focuses heavily on large firms, and argue that firm size can affect several organizational processes. Thong [31] concluded that large firm IT adoption studies are difficult to generalize to SMEs because of fundamental differences between large firms and SMEs

including the central role of the CEO and the focus on generalist rather than specialist skills among employees in SMEs. Gallaugher and Auger [11] suggest SMEs are more constrained in financial, human, and information resources than large firms, but remain more flexible with a higher capacity to adapt than large firms.

The objective of this study is to test a model of the determinants of website adoption in SMEs. Website adoption is defined as “*the establishment of a company website to share business information, maintain business relationships, and conduct business transactions through telecommunications networks*” [25,35]. Previous research has identified many factors affecting the intention to adopt EC in SMEs. Mirchandani and Motwani [23] suggested seven determinants in the EC adoption for SMEs when summarizing literature from Cragg and King [5], Igbaria et. al. [15], Moore and Benbasat [24], and Thong [31]. Previous research on the adoption of electronic data interchange (EDI) provides a model with three constructs [4,14]. Mehrtens et. al. [22] subsequently extended the EDI adoption model to EC adoption. Mirchandani and Motwani [23] and Mehrtens et. al. [22] present alternative models of EC adoption in SME’s.

REVIEW OF LITERATURE ON SME ADOPTION OF IT AND EC

EDI and Website Adoption

Website technologies and EDI both utilize inter-organizational technologies, providing an electronic link with stakeholders and enabling business-to-business transactions. The adoption of both technologies almost always requires organizational-level decisions [4,19]. The important differences in these technologies are in their focus. EDI has a narrow focus: firms adopt proprietary systems to communicate with suppliers through the exchange of structured data involving business-to-business processes. In contrast, website adoption has a broad focus: firms adopt Internet technologies with business-to-business and/or business-to-consumer processes. Website adoption can involve SMEs creating a website to serve suppliers; however, the dominant effect is on customers and employees [9]. Customers with access to the Internet are able to gather information interactively, regardless of time and location. Customers

These different perspectives provided us with an opportunity to consider important factors highlighted in both approaches and develop further understanding of website adoption in SMEs.

The contributions of this study are threefold: 1) research from both EC and EDI adoption in SMEs are considered in a theoretical model, 2) the model is tested with a survey instrument and regression analysis, and 3) results from the survey are triangulated through follow-up interviews with 18 firms. This paper provides a theory-based perspective on SME executive decisions when considering website adoption.

The paper is organized as follows. The next section presents a review of the literature on SME adoption of IT and EC. This is followed by a description of a small firm website adoption model based on Iacovou et. al. [14]) and a set of hypotheses. We then discuss methods and measures used in the study, followed by sample results and construct tests. In the discussion of findings we include results from follow-up telephone interviews with late adopters and non-adopters. Finally, in presenting our conclusions we look at limitations, extensions and implications.

may also order products and services, change orders dynamically, check order status, or seek on-line advice [3]. More importantly, companies are able to extend website functionality and offer new products and services without being constrained by physical customer interfaces and/or structured data requirements [11].

The Iacovou et al. [14] small firm EDI adoption model (Figure 1) suggests that perceived benefits, perceived pressure, and organizational readiness impact adoption of EDI. The model was developed using case studies [14] and empirically tested with survey research [4]. Kuan and Chau [17] utilized and extended this model, defining three constructs: 1) technology (perceived direct and indirect benefits), 2) environment (industry and government pressure), and 3) organization (financial assets and IT competence). Mehrtens et al. [22] adapted the Iacovou small firm EDI adoption model to EC in SMEs using seven case studies. Mehrtens et al. [22] concluded that the EDI adoption model [14] was generally transferable to Internet technologies. MacKay et al. [20] also used the EDI adoption model to describe website adoption in small voluntary organizations.

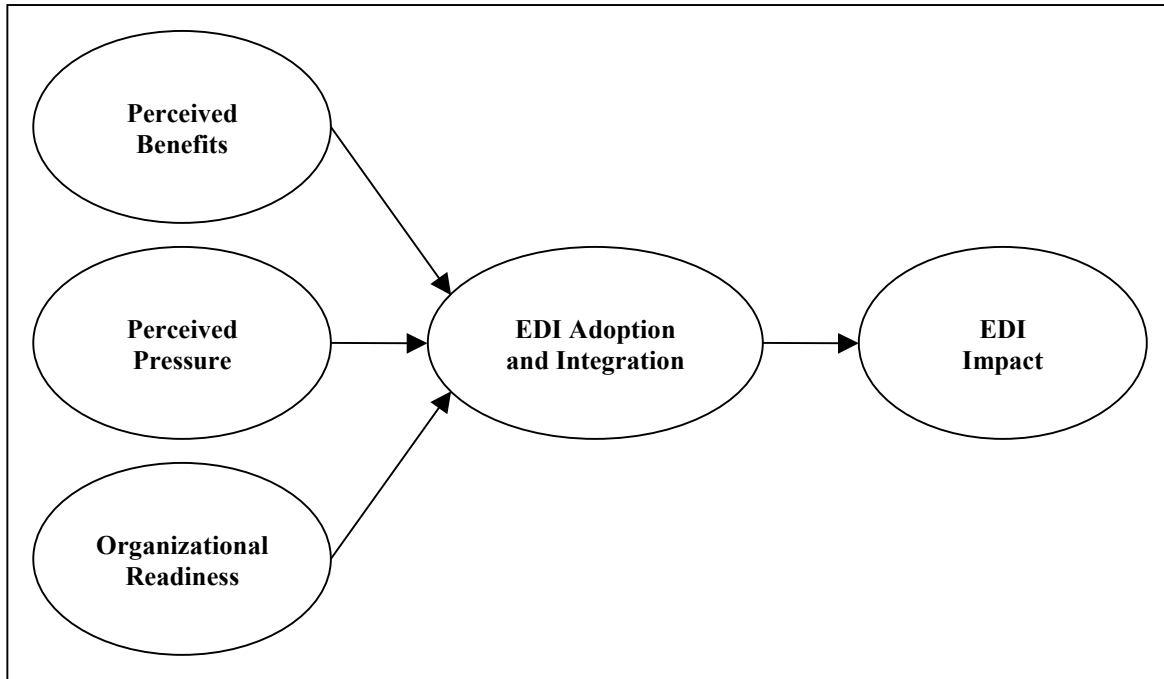


Figure 1: Iacovou et al. [14] Small Business EDI Adoption Model

Other Models of EC Adoption in SMEs

Previous studies have reported that both organizational and environmental factors influence the adoption of IT and EC in SMEs. Organizational factors external to the business include business environment, IT expertise, IT resources and financial resources [0, 0, 0, 0, 0, 0]. Environmental factors include customer pressure, supplier pressure, trading partner pressure, and industry pressure [0, 0, 0]. Harrison et al. [13] and Mehrtens et al. [22] concluded the internal environment (i.e., employee and IT group pressure) also played a significant role in the adoption of IT and EC in SMEs. A review by Mirchandani and Motwani [23] suggested seven determinants (six organizational and one environmental) of EC adoption in SMEs including:

1. The CEO's perception of relative advantage (*organizational*)
2. Compatibility with the SME's operations (*organizational*)
3. Managerial time required to implement (*organizational*)
4. The dependence of the SME on information (*organizational*)
5. Employee IT knowledge (*organizational*)

6. The financial costs (i.e., cost/benefits analysis) (*organizational*)
7. The nature of the SME's competition (*environmental*)

We suggest that these seven factors can be included in the more parsimonious EDI Adoption Model for SMEs [14]. The CEO's perception of relative advantage, also highlighted in Thong [31], is addressed in the EDI Adoption Model through perceived benefits. Perceived benefits (as measured by Lederer [18]) include strategic, operational and informational benefits which relate directly to the above items (2), (3) and (4) on Mirchandani's list. The environmental factor, the nature of an SME's competition, is partially addressed under the perceived pressure to adopt that arises from customers, suppliers and employees. The competitive environment is also addressed under perceived strategic benefits of adoption. The IT knowledge and financial costs elements can be captured in the organizational readiness construct in the EDI Adoption Model.

A point to consider in website adoption research is the level of website development intended [0, 0]. A different set of factors might be needed to explain intention to adopt a basic, static website versus intention to adopt an interactive, transaction-enabled website. Since

our research focused on adoption of simple websites, these differences are not reflected in the model used.

SMALL FIRM WEBSITE ADOPTION MODEL AND HYPOTHESES

The Iacovou et al. [0] model, augmented by items identified in Mehrrens et al. [0] and Harrison et al. [0], was adopted as the model of website adoption to be tested in this study. The adapted model of small firm EC adoption is shown in Figure 2. Intent to adopt a website is the dependent variable. The model suggests *intent to adopt a website* is determined by three primary factors: *perceived benefits*, *perceived pressure*, and *organizational readiness*. These constructs are composed of specific sub-constructs as discussed below.

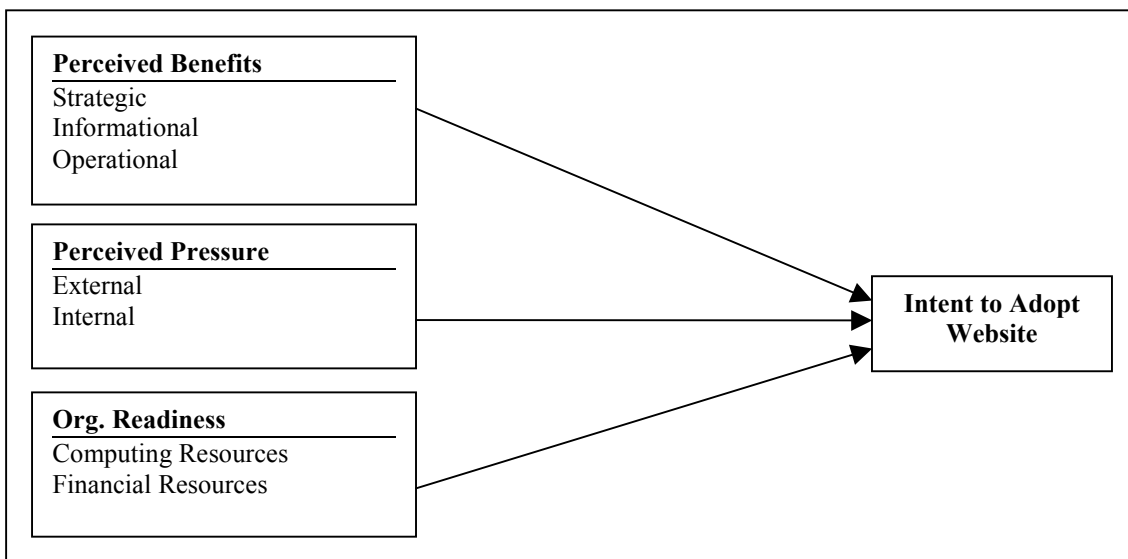


Figure 2: Factors Affecting Intent to Adopt a Website in SMEs

The importance of perceived benefits to the adoption of EC in SMEs has also been highlighted [0, 0, 0, 0, 0, 0]. Lederer et al. [18] found that strategic and informational benefits are the most important determinants of EC adoption. The authors also reported that SMEs did not anticipate cost savings as a benefit of their EC efforts. Similar findings have been reported by Teo and Tan [30] and Walczuch et al. [34]. These studies conclude that strategic and informational benefits, specifically related to customers, have a positive influence on EC adoption. Thus, the perceived benefits construct used in this paper is composed of three sub-constructs: strategic benefits, informational benefits and operational

Perceived Benefits

Cragg and King [5] found relative advantage was a primary reason for encouraging further IT growth. Iacovou et al. [14] argued that relative advantage was expressed by perceived benefits and found a positive relationship between perceived benefits and EDI adoption. Previous studies have identified perceived benefits as one of the key factors affecting the adoption of general-purpose IT in SMEs [0, 0, 0, 0, 0, 0, 0]. Chwelos et al. [4] found a positive correlation between perceived benefits and intent to adopt EDI, and Mehrrens et al. [22] reported that relative advantage was a predictor of Internet adoption in SMEs. Harrison et al. [13] concluded that attitude toward adoption (i.e., positive or negative anticipated consequences of adoption) strongly influenced a small business executive's decision to adopt an IT to help his/her firm compete.

benefits. We anticipate that each of these perceived benefits will lead to a higher intent to adopt a website, but their relative importance is unknown.

- **Hypothesis H1a:** Higher perceived strategic benefits will lead to greater intent to adopt a website.
- **Hypothesis H1b:** Higher perceived informational benefits will lead to greater intent to adopt a website.

- **Hypothesis H1c:** Higher perceived operational benefits will lead to greater intent to adopt a website.

Perceived Pressure

The importance of perceived pressure to the adoption of IT in SMEs has been highlighted in several studies [0, 0, 0, 0]. Studies on EDI adoption found external pressure was the single most important factor [0, 0]. Harrison et al. [13] found that external pressure from customers and suppliers also had a strong influence on IT adoption, as did internal pressure from the information systems group and other employees.

With respect to the Internet, Mehrtens et al. [22] reported that adoption was influenced by external pressure from customers and suppliers, but not competitors, as well as internal pressure from employees.. This result is consistent with Thong [31], who concluded that competitive environment does not have a significant direct effect on SME decisions to adopt IT. Thus, for website adoption, the perceived pressure construct is composed of two sub-constructs adapted from Harrison et. al. [13] and Chwelos et. al [4]: external pressure to adopt a website (expressed as perceived approval/disapproval of current use of internet by customers and suppliers) and internal pressure to adopt ((expressed as perceived approval/disapproval of current use of internet by employees and IS group). Note that this paper suggests the use of two measures of perceived pressure from previous studies. Establishing the content validity of these pressure measures remains an important consideration for future work in the area Both of these pressure measures are hypothesized to have direct effects on intent to adopt a website.

- **Hypothesis H2a:** Higher perceived external pressure will lead to greater intent to adopt a website.
- **Hypothesis H2b:** Higher perceived internal pressure will lead to greater intent to adopt a website.

Organizational Readiness

Organizational readiness, as used in prior research [0, 0, 0], refers to the firm's level of (1) hardware resources, (2) software resources, and (3) financial resources available for EC adoption. This factor is considered important in website adoption, because SMEs typically lack the technical and financial resources necessary for EC and other IT investments. Mehrtens et al. [22] found that SMEs with high levels of IT are more

likely to adopt the Internet. Chwelos et al. [4] found that IT sophistication affected the firm's ability to adopt EDI. Harrison et al. [13] found that a small business executive's decision to adopt an IT was affected by the firm's availability of required hardware and software resources.

Previous studies have concluded the availability of financial resources for IT is also an important factor affecting IT adoption [31]. Cragg and King [5] found that a number of economic factors inhibited IT growth in SMEs. For example, with little internal computer expertise, small firms are highly reliant on costly advice and support obtained from external resources [5]. Chwelos et al. [4] found that financial resources affected the firm's ability to adopt EDI. Harrison et al. [13] found that a small business executive's decision to adopt an IT to help his/her firm compete is affected by the firm's availability of required financial resources. Thus, for website adoption, the organizational readiness construct is composed of two sub-constructs adapted from Harrison [13] and Chwelos [4]: computing resources and financial resources, both of which are hypothesized to directly affect intent to adopt a website.

- **Hypothesis H3a:** Higher levels of computing resources will lead to greater intent to adopt a website.
- **Hypothesis H3b:** Higher levels of financial resources will lead to greater intent to adopt a website.

METHODS AND MEASURES

A survey instrument was created to test the model of website adoption. SMEs in British Columbia, Canada, participated in a survey assessing their perceived benefits, perceived pressure, and organizational readiness for website adoption. Four industry groups were targeted: 1) Agriculture, Forestry, Fishing and Mining; (2) Construction and Manufacturing; (3) Transportation, Communication, and Utility; and (4) Wholesale and Retail Trade. These industries were targeted because they were likely to include both adopters and non-adopters of websites. SMEs were defined as having between 20 and 200 employees [13], and only independent SMEs were considered in the population. Subsidiaries, government agencies, and franchises were not included in the sample. Contact information was obtained from a commercial directory service.

The sample targeted a single owner, executive, or senior manager responsible for deciding to adopt a website within each SME. A total of 904 companies received a request to participate. All requests and

responses were completed by mail. A total of 351 responses were collected. Of these responses, 32 were returned mail and 24 were returned due to no interest. An additional 72 companies were eliminated from the list for reasons including incorrect industry, companies with more than 200 or fewer than 20 employees, or an assistant filled in the survey. This left a total of 223 completed

surveys with a response rate of 24.7%. Of the participating firms, 89 (40%) were identified as companies that had not yet developed a company website. These firms are labeled “non-adopters” and are the focus of this research. Characteristics of the sample of non-adopters are provided in Table 1.

Table 1: Characteristics of Non-Adopters Respondents and their Companies

Participant Characteristic	Values
Rank in the Company	President/CEO = 41% Vice President/Senior Executive = 16% Senior Manager = 25% Other Manager = 18%
Sex	Male = 79% Female = 21%
Tenure with Company	Average = 22 years 75% with firm > 10 years
Responsibility	Average of 25 direct reports
Age	Average = 43
Number of Employees	> 20 and < 100 = 82% Average no. of employees = 39
Revenue	Average = \$3.5 Million No Firm > \$25 Million

Measures

In developing measures for the constructs proposed in the model, we made use of previous validated measures wherever possible. In some cases, such as for perceived benefits, a large number of previously validated items were available. For other constructs, such as perceived pressure and perceived organizational readiness, considerably fewer items were available. The discussion below outlines the development of measures for this study.

Intent to adopt Internet website. The intent to adopt an Internet website was measured using a combination of three items as outlined by Tan and Teo [29]. Participants who had not adopted a website were asked to indicate on a five-point Likert-type scale: “*How likely is it that your company intends to have an Internet website: 1) within the next 6 months, 2) within the next 12 months, and 3) within the next 18 months.*” The responses for the time periods 6, 12, and 18 months were then weighted by 3/6, 2/6, 1/6 respectively. The summation of

the weighted responses produced a number between 1 = *not at all* and 5 = *very much*, that represented the intent to adopt a website [29].

Independent Measures: Factor Analysis

Our research model proposed that three variables influenced the intent to adopt a website: perceived benefits, perceived pressure, and organizational readiness. Forty-one questions were used to measure these variables. We first tested whether these questions represented the items in our model, by doing a factor analysis.

Table 2 presents summary results of the factor analysis run with 41 variables. The sample size (n=89) is relatively low for this analysis, however prior instruments are being used so factor so the factor analysis confirmation of inter-item correlations. A ratio of four sample points for each variable is preferred; however, this ratio is conservative and a ratio 2:1 can provide useful results [0]. As can be seen in Table 2, seven factors were identified, explaining 75% of the variance in the data. This showed initial support for our model, which contained seven sub-constructs.

Table 2: Factor Analysis for Survey Items

Factor	Sums of Square Loadings			Rotated Loadings		
	Total Eigen Value	% Variance	Cumulative	Total Eigen Value	% Variance	Cumulative
1. Strategic Benefits	17.21	40.97	40.97	9.25	22.03	22.03
2. Informational Benefits	4.06	9.67	50.64	6.57	15.65	37.68
3. Operational Benefits	3.38	8.05	58.69	6.54	15.57	53.25
4. External Pressure	2.43	5.79	64.48	2.41	5.75	59.00
5. Internal Pressure	1.66	3.94	68.42	2.19	5.22	64.21
6. Computing Resources	1.47	3.49	71.91	2.06	4.91	69.12
7. Financial Resources	1.28	3.05	74.96	1.85	4.41	73.53

The seven factors, grouped under the three variables provided in Figure 2, are discussed below.

Perceived Benefits. Perceived benefits were measured using items adapted from Lederer et al. [18]. Thirty-three items were included. Participants were asked to indicate on a five-point Likert scale (1 = not important, 5 = very important): “How important are the following benefits to your company regarding the potential use of the Internet website?” A factor analysis suggested three factors relating to perceived benefits: strategic, informational, and operational.

Strategic benefits. Ten items were used to construct a scale of strategic benefits associated with adopting a website. Example benefits include: “*Enhance competitiveness or create strategic advantage*”, “*provide new products or services to customers*”, and “*enable the organization to catch up with competitors.*”

Informational benefits. Some companies adopt a website to provide easier and faster access to company information for customers, suppliers, and investors. Ten items were used to construct this scale. Example benefits include: “*Enable easier access to information*”, “*improve information for management control*”, and “*increase flexibility of information requests.*”

Operational benefits. A website may provide savings in distributing information and other operational efficiencies. Thirteen items were used to construct a scale of operational efficiencies. Example benefits include: “*Enhance employee productivity or business efficiency*”, “*save money by reducing travel costs*”, and “*save money by reducing communication costs.*”

Perceived Pressure. Perceived pressure refers to the normative beliefs an individual has regarding another group’s beliefs whether an Internet website

should, or should not, be adopted. The results from the factor analysis in

Table 2 indicate two pressure groups can be identified: external (including customers and suppliers) and internal (including employees within the firm).

External pressure is the perceived pressure from customers and suppliers. Following Harrison et al. [13] and Chwelos et al. [4], the measure of perceived external pressure was collected by asking respondents to indicate their beliefs regarding “*the level of customer approval of the company’s current use of the Internet*” (no companies had a website). A similar question was asked about suppliers.

Internal pressure is the perceived pressure related to employees within the firm. Again following Harrison et al. [13] and Chwelos et al. [14], two questions related to internal pressure were collected. These questions were directed towards the level of approval of the company’s current use of the Internet with regards to employees and the internal IT group.

Organizational Readiness. Items for the organizational readiness scales were adapted for Internet websites from Chwelos et al. [4] and Harrison et al. [13]. In this study, participants were asked to indicate: “*To what extent does your company have the following resources for enabling website adoption?*” Participants’ responses were measured using a five-point Likert scale (1 = not at all, 5 = very much). Four questions relating to two resources: 1) computer hardware/software and 2) financial resources were collected and results from the factor analysis shown in Table 2 suggest that these two can be identified. These factors align with hardware and software resources identified in Harrison et. al [13] and financial resources in Chwelos [4].

Summary of Independent Constructs

Seven variables were created for the regression model: three perceived benefits (strategic, informational, and operational); two perceived pressure (internal and

external); and two organizational readiness (computing and financial resources). Table 3 provides correlations between factor scores for each of the seven variables. Since all variables are factor scores (with a mean of zero), the means and standardizations

Table was created using averages of raw scores across all sample items.

Table 3: Descriptive Statistics and Correlations among Independent Measures

Measures <i>n</i> = 89	Mean (1 low – 5 high)	Std. Dev	Perceived Benefits			Perceived Pressure		Organiz. Readiness	
			1	2	3	4	5	6	7
1. Strategic Benefits	3.08	1.09	1.00						
2. Informational Benefits	3.35	0.95	.59**	1.00					
3. Operational Benefits	2.93	0.96	.57**	.60*	1.00				
4. External Pressure	3.28	0.84	.31**	.14	.11	1.00			
5. Internal Pressure	3.34	0.82	.34**	.10	.12	.00	1.00		
6. Computing Resources	3.34	0.87	.09	.10	.09	.04	.05	1.00	
7. Financial Resources	3.28	1.02	.02	.08	.09	-.05	.22*	0.10	1.00

* indicates significance at the 0.05 level, ** indicates significance at the 0.01 level

The correlation matrix in Table 3 shows high correlation in particular for the three benefit items. The divergence between the three benefit measures was demonstrated in a factor analysis using all items in the survey. A high correlation between strategic benefits and both internal and external pressure was also observed.

Table 4 provides results of the internal consistency of questions associated with each of the factors. Reliability estimates (using Cronbach’s alpha) range between 0.70 and 0.95. Thus, overall results appear robust enough to proceed with the regression analysis.

Table 4: Cronbach’s Alpha Reliability Analysis—Independent Variables

Factor	Questions (see appendix)	Alpha
Strategic Benefits	Q. (1-10) – 10 items	0.93
Informational Benefits	Q. (11-20) – 10 items	0.95
Operational Benefits	Q. (32-33) – 13 items	0.93
External Pressure	Q. (34-35) – 2 items	0.70
Internal Pressure	Q. (36-37) – 2 items	0.75
Computing Resources	Q. (38-39) – 2 items	0.94
Financial Resources	Q. (40-41) – 2 items	0.81

SAMPLE RESULTS AND CONSTRUCT TESTS

Regression Analysis

A linear model was estimated using the ordinary least squares method. The regression was estimated so that inferences could be made regarding the linear

relationships existing between an SME’s intent to adopt a website and the three proposed factors— perceived benefits, perceived pressure and organizational readiness—that influence this intent. The factor analysis indicated that seven independent variables related to the three proposed factors were available as independent

constructs. The model to be estimated was operationalized using the following linear form:

$$Y = A_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7$$

Where,

- Y = Intent to Adopt Website
- X1 = Perceived strategic benefits
- X2 = Perceived informational benefits
- X3 = Perceived operational benefits

- X4 = Perceived external pressure
- X5 = Perceived internal pressure
- X6 = Computing resources
- X7 = Financial resources.

Results of the estimation are provided in Table 5. The results indicate the set of independent variables linearly influence the intent to adopt a website (F= 6.32, p= .000, n=89) with a R² = 0.359 and an adjusted R² = 0.302.

Table 5: Regression Results

Independent Variable	Coefficient b _i	Std. Error	Beta	t-value	Sig p-value
(Constant)	2.71	0.13		20.14	0.00
Strategic Benefits	0.84	0.19	0.56	4.32	0.00
Informational Benefits	0.41	0.20	0.27	2.04	0.05
Operational Benefits	-0.01	0.19	-0.01	-0.05	0.96
Internal Pressure	0.30	0.15	0.20	2.02	0.05
External Pressure	-0.21	0.14	-0.14	-1.43	0.16
Computing Resources	0.30	0.14	0.20	2.13	0.04
Financial Resources	-0.09	0.14	-0.06	-0.68	0.50
ANOVA (F-test)					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	68.653	7	9.808	6.325	0.000
Residual	122.494	79	1.551		
Total	191.147	86			

Tests suggest the coefficients for strategic benefits, informational benefits, perceived internal pressure, and computing resources had a significant positive effect on the intent to adopt a website. The

coefficients for operational benefits, external pressure, and financial resources did not significantly influence the intent to adopt a website. A summary of the hypotheses tested is shown in Table 6.

Table 6: Summary of Hypotheses testing

Factor	Independent Variable	Hypothesis	Direction	Beta	Sig.	Confirmed?
Perceived Benefits	Strategic Benefits	H1a	+	0.56	0.00	Yes
	Informational Benefits	H1b	+	0.27	0.05	Yes
	Operational Benefits	H1c	No effect	-0.01	0.96	No
Perceived Pressure	Internal Pressure	H2a	+	0.20	0.05	Yes
	External Pressure	H2b	+	-0.14	0.16	No

Organizational Readiness	Computing Resources	H3a	+	0.20	0.04	Yes
	Financial Resources	H3b	+	-0.06	0.50	No

Qualitative Support for Survey Results

To further understand the results provided by the survey, a set of interviews were undertaken with firms participating in the study. Interviews were collected 18 months after the survey was completed. Firms chosen for interviews included only those that had indicated the highest level (a rating of 5 on a 5-point scale) of intention to adopt a website within 18 months from the survey date. A total of 18 firms were interviewed. Nine of the firms had adopted a website within the 18 month period; these are labeled as Late Adopters (LA). The remaining nine had not yet adopted; these are labeled non-adopters (NA). Four of these NA companies were actively developing websites and expecting to launch within the next few months.

To collect the data, telephone interviews, typically of less than 10 minutes duration, were undertaken. The interviewer began by asking whether the company had adopted, and, if so, when had the adoption occurred and what was the web address. The interviewer then asked a series of scripted questions relating to the research model, including questions about perceived benefits, perceived pressure and organizational readiness. Participants were also asked if they had comments outside of the factors in the model. Some of these issues are raised later in the discussion.

DISCUSSION OF SURVEY AND INTERVIEW RESULTS

Perceived strategic and informational benefits were shown in this study to have a direct positive effect on intent to adopt a website. These results are consistent with previous studies in SMEs [0, 0, 0, 0] and support Lederer et al. [18] that strategic and informational benefits are the most important benefits of EC. As an example of perceived benefits affecting adoption, an adopting interviewee noted: *"It's kind of a selling feature when we go to a new site, we can say, hey, do you have a computer? We can show what we can do right there and then, so it's worked a couple of times to get new contracts and whatnot, so we're quite pleased with that."* Other non-adopting interviewees were still searching for strategic benefits and an opportunity to enter the e-commerce world: *"I've been looking at ways to try and repackage our service; we never have customers say no to*

what we do, it's just the price, and the changing market out there."

Perceived operational benefits were not found to be significant in the decision to adopt a website in the survey. Similar findings have been reported by Teo and Tan [30] and Walczuch et al. [34]. This was supported in the interviews. One non-adopting participant noted: *"I wasn't very impressed with what I saw and what was actually happening. I mean, I couldn't see value, what I could see was people shoving stuff up in the air hoping somebody would salute."* Another non-adopting firm commented: *"Nobody has been able to show me the value, you know, like, the return on the investment to date."*

One non-adopting interviewee reported that many antecedent factors (technical readiness, financial support and pressure) were in place. However, skepticism about the general value of the Internet, coupled with a lack of vision about the benefits that would accrue to the firm, resulted in non-adoption: *"I wasn't very impressed with what I saw in e-commerce. We think ultimately there might be some potential; it depends on what type of business you're in. Benefits will probably be really difficult to measure; financial benefits are kind of undefined at the moment. I'd rather put the money in my pocket."*

Consistent with prior research [0, 0], perceived internal pressure was a significant influence on website adoption. As an example of the importance of internal pressure, one late adopting firm noted: *"It was internal. We wanted to give our customers more than they expected to get. So what we do... is provide a lot of detailed reports to say exactly what it is that we test....we've made it available online for the customers... which is a lot faster than our competition."* On the other hand, a non-adopting interviewee indicated a lack of internal or external pressure, stating: *"We haven't seen any indication as to if we put an electronic catalogue together, that people would go there and order from there, to make it worthwhile."*

Contrary to Hypothesis H2b and to prior research [0, 0, 0], no significant relationship was found between perceived external pressure and intent to adopt a website. This can be partly explained by the fact that previous research on EDI adoption has largely focused on the buyer side [4] and external pressure from partners. External pressure from partners is likely more significant in the intent to adopt EDI than intent to adopt a website.

These results suggest that SMEs adopt a website more because of internal pressure from employees than external pressure from customers. One adopting interviewee noted the mix of internal and external pressures affecting adoption: *"We actually did customer surveys and focus groups, and then we also have staff, we have an internal internet, so we always have staff who are contributing ideas, so basically, there was a lot of feedback that yes, we needed one."* This suggests it may be difficult to completely separate internal and external reasons for adopting. For example, Elsammani et al. [7] has identified "need pull" versus "technology push" SMEs. The presence of these two groups of SMEs suggests differences in an executive's perception of external/and internal pressure may be based on the type of change being considered by the executive.

Consistent with our Hypothesis H3a, adequate computing resources had a direct positive effect on the intent to adopt a website. These results are consistent with previous studies of IT and EC adoption in SMEs [0, 0, 0, 0] and suggest the level of organizational readiness, in terms of computing resources, is an important factor influencing website adoption in SMEs. Since SMEs are characterized by severe constraints on resources, this result suggests only those SMEs with adequate computing resources would consider the adoption of a website as a viable undertaking. The lack of computing resources was often noted in non-adopting firms. For example, one firm noted: *"The only problem is we don't have any ADSL or cable type for an Internet provider. Yeah, it's everywhere beside us but not exactly where we're at, so, we're just waiting and I believe next fall..."*, while another non-adopting firm commented, *"I've got a really rotten computer, and I keep getting cut off (laughing) and it's all in the computer, not in the company."*

Contrary to Hypothesis H3b, no relationship was found between the level of financial resources and intent to adopt a website. This result is not consistent with previous research, which found the level of financial resources to be a significant factor on adoption [0, 0, 0]. This result may be the outcome of measurement error. Several participants interviewed mention the lack of financial resources holding them back from further website development. One interviewee noted, *"But, you know, I don't have a quarter million dollars to pour into something to create an interactive site that might have some value to the customer."* Another late adopting interviewee, not happy with the company's current site, also noted a lack of financial resources for initiating an update: *"What we've done is basically just put a bit of information about ourselves up there. It's not interactive, so there's absolutely no reason for anyone to go and do*

anything on it, and we don't have the budget to do it properly."

CONCLUSIONS

This study considered two streams of research focused on SMEs: 1) the adoption of EC and 2) the adoption of EDI. The paper presented a model of small firm website adoption based on Iacovou et al. [0]. Factors in the model include perceived benefits, perceived pressure and organizational readiness. The results indicate support for the proposed linkages between model variables and demonstrate the relative contribution of the factors in website adoption in SMEs. The results of both the survey and follow-up interviews indicate that intent to adopt a website was directly influenced by perceived strategic benefits, perceived informational benefits, perceived internal pressure, and the level of computing resources (hardware and software). There was no support found for the impact of financial resources and external pressure.

While prior research has provided a large number of factors affecting EC and EDI adoption, the Iacovou et. al [14] model offers a simple and powerful mechanism for explaining website adoptions in SMEs by summarizing these influences into one of three categories: 1) perceived benefits, 2) perceived pressure or 3) organizational readiness. Policy makers and consultants can influence perceived benefits or perceived pressure by appealing to the SME executive most responsible for the decision. Clearly outlining the cost/benefits of the decision and increasing the awareness of internal and external pressures will enable SME executives to make improved decisions about adoption. In addition, the influence of organizational readiness is significant. These issues can be addressed not only by practitioners working with SMEs, but also by policy makers who can influence the price of computer software and services through tax incentives.

Limitations and Extensions

Some caution is warranted in interpreting the results, because all measures were obtained from executives in SMEs using a single questionnaire. The use of self-report scales to measure the study variables suggests the possibility that common method variance may account for some of the results obtained. In particular, the perceived pressure construct requires more attention in regards to measurement. This study used two measures but the content validity of these measures needs to be more carefully addressed. Longitudinal research will be important and is essential to confirm the causal

linkages among the study variables. Further research should also examine the impact of website adoption on the business performance of SMEs, as proposed by MacKay et al. [21].

Several factors which are part of the literature in EC adoption emerged during our interviews. Three are of interest: peer pressure, IT competency in the CEO, and risk. As one adopting interviewee said, *"Everybody else seems to be on there, so we'd better get there, too"* and a non-adopting interviewee noted, *"Yeah, I think increasingly, year after year, it'll be pretty soon. We'll be wondering how we did without it."* Economically, there may be perceived network effects [0, 0] in play in the decision to adopt. Like the Yellow Pages or directory services, the pressure to *"just be there"* may be an important factor [26]. Adding a variable to capture this effect may increase the measured effect of external pressure on the intent to adopt a website.

Another potentially important factor in SMEs may be the experience with and general attitude towards Internet technology of the decision-maker as investigated by Elsamanni and Scown [8] and Thong [32]. Several non-adopter interviewees showed a general lack of experience or confidence regarding the web. For instance, *"Oh, if I had more time, I would probably spend more time browsing... I've never really learned how to use it, how to access stuff. I'm not very quick on it. Where other people find the name of the capitol of Timbuktu in ten seconds, me, it would take probably a year. I'm more of a physical, you know, dictionary, encyclopedia, atlas kind of person."* Another non-adopter noted *"I wouldn't press the buttons! (laughing) It's just the age, I guess. We never grew up with that technology."*

Risk is an additional factor that emerged in interviews. MacKay et al. [20] explore risk in the context of small voluntary organizations and suggest there are several elements to consider. Our interviews suggest technical risk as the primary concern for some decision-makers. For example, one non-adopting firm remarked: *"My concerns are that it's not secure. It's a pain in the neck in that if you're running any Windows applications, you're always susceptible to picking up viruses, no matter what length you go to. You think you have it secure, and somebody downloads something from their lousy little Palm Pilot."*

Implications

This study suggests an executive decision about website adoption is positively affected by the strategic and informational benefits they perceive from adopting a website. Managers of SMEs should strongly pursue opportunities to understand how other SME are using

websites effectively, in order maintain an up to date idea of the perceived benefits from adopting. Since perceived benefits change along with new technology, SME managers should aggressively pursue an understanding of how website can help their business.

These results suggest that to accelerate website adoption levels by SMEs, external service providers, government agencies, and educational institutions should focus on promoting strategic and informational benefits related to website adoption. These benefits can include direct access to wider customer base, reduced geographic market barriers, the ability to provide additional informational services to customers (such as service updates and customer services FAQ's, and increased opportunities for customers to purchase goods and services through the Internet). Without a belief in the tangible benefits of website adoption, executives in SMEs will remain hesitant about adopting. A proactive approach demonstrating potential benefits is therefore needed to help overcome challenges faced by many SMEs.

The results also suggest the level of IT investment in an SME is positively related to website adoption. To spur website adoption, therefore, governments might consider tax policies that favor faster accumulated depreciation of IT assets could accelerate the investment in IT. Acceleration of website adoption would seem to be possible if services of website design and implementation were provided for SMEs. Programs that link SME's with students possessing affordable IT skills, or programs that provide support for SME's in contacting appropriate IT resources would increase web site adoption. In addition, SME executives may be unaware of the real costs of adopting a website at the rudimentary website level. Governments interested in supporting SME's might also consider writing up case studies, and developing promotional material, including clear cost figures, to educate SMEs about the costs and benefits of building a website.

The study results also suggest that effective pressure to adopt a website comes from internally, within the company, rather than from pressure externally. This suggest that SME executives listen closely to what their employees are saying about website adoption. The significance of internal pressure on the intent to adopt a website provides a further guideline that communication of the benefits of website adoption should be directed not only to top management but also employees. Demonstrating the usefulness of a website to both SME executive and employees is an important factor in adoption.

Further research can proceed in several directions. As mentioned above, there are several variables emerging from this research which may prove

influential on the intent to adopt. The focus of this study was on companies without websites (i.e., non-adopters). Using the basic integrated model of website adoption in SMEs, researchers can expand the search for explanatory power by including variables from different contexts, including environmental and organizational characteristics. Also, further research is needed to understand the relationship between perceived external pressure and intent to adopt a website. With respect to companies with websites (i.e., adopters), the impact portion of the Iacovou et al. [14] model may be adapted and tested using website adopters to test whether the factors influencing adoption also influence the outcome of adoption, i.e., the organizational impact of website adoption [0, 0].

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APPENDIX

INTENT TO ADOPT EC

If your company does NOT have a website, please answer Question 1 below.

How likely is it that your company intends to have a website:

Within the next 6 months	1	2	3	4	5
Within the next 12 months					
Within the next 18 months					

PERCEIVED BENEFITS

Strategic Benefits

(1) Provide new products or services to customers	1	2	3	4	5
(2) Provide improved products or services to customers					
(3) Enhance competitiveness or create strategic advantage					
(4) Align well with stated organizational goals					
(5) Change the way the organization conducts business					
(6) Enable the organization to catch up with competitors					
(7) Help establish useful linkages with other organizations					
(8) Improve customer relations					
(9) Enhance the credibility and prestige of the organization					
(10) Enable the organization to respond more quickly to change					

Informational Benefits

(1) Enable easier access to information	1	2	3	4	5
(2) Improve management information for strategic planning					
(3) Improve information for management control					
(4) Improve the accuracy or reliability of information					
(5) Present information in a more concise manner or better format					
(6) Enable faster retrieval or delivery of information or reports					
(7) Increase volume of information output					
(8) Increase flexibility of information requests					
(9) Facilitate organizational adherence to government regulations					
(10) Improve information for operational control					

Operational Benefits

(1) Allow other applications to be developed faster	1	2	3	4	5
(2) Provide the ability to perform maintenance faster					
(3) Save money by avoiding the need to increase the workforce					
(4) Save money by reducing travel costs					
(5) Save money by reducing the workforce					
(6) Save money by reducing system modification or enhancement cost					

- (7) Save money by reducing hardware use
- (8) Allow previously infeasible applications to be implemented
- (9) Increase return on financial assets
- (10) Enhance employee productivity or business efficiency
- (11) Speed up transactions or shorten product cycles
- (12) Save money by reducing communication costs
- (13) Provide greater data or software security

PERCEIVED PRESSURE (1 & 2 – External, 3 & 4 – Internal)

- | | | | | | |
|--|---|---|---|---|---|
| (1) How much do your customers disapprove of current use? | 1 | 2 | 3 | 4 | 5 |
| (2) How much do your suppliers disapprove of current use? | | | | | |
| (3) How much do your Information Systems People/Group disapprove of current use? | | | | | |
| (4) How much do your employees disapprove of current use? | | | | | |

ORGANIZATIONAL READINESS

To what extent does your company have the following resources for enabling:

- | | | | | | |
|--------------------------------------|---|---|---|---|---|
| Financial resources | 1 | 2 | 3 | 4 | 5 |
| Ability to obtain external resources | | | | | |
| Computer hardware | | | | | |
| Computer software | | | | | |