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2008

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ABSTRACT

The ubiquity of the Internet has allowed companies of any size to engage in e-business. However, e-business adoption among Small and Medium sized Enterprises (SMEs) is limited because of resource constraints and a failure to understand the strategic value of e-business. In an effort to better understand the value of e-business to SMEs, this paper examines the use of over 100 e-business applications by over 400 SMEs in five different industries. Cluster analysis suggests a three stage model for e-business evolution in which firms progress from making only nominal use of the Internet to convey company information, to supply chain and order management applications in a transitional stage, to more extensive and integrated use in subsequent stages. Evidence of differences in use is also presented for firms that are manufacturers versus service providers.

Keywords

SME, stage model, e-business, electronic commerce, adoption,

INTRODUCTION

Small and medium sized enterprises (SMEs) account for 80 to 95 percent of all incorporated businesses (Gersick, Davis, Hampton, and Lansberg, 1997; Poza, 2004; SBA, 2004), making SMEs the most common form of business organization in the U.S. (Daily and Dollinger, 1991). Not surprisingly, a newly released study conducted by the International Council for Small Business (ICSB) found concurrence among small business owners worldwide that information technology, including the use of e-business technologies, plays a major role in achieving business growth, serving customers, and competing in the marketplace (El Tarabishy, 2007). Indeed, ICSB's survey results found 91 percent agreement among small business owners that their "most sophisticated IT product was worth every penny they paid to buy and maintain it" (El Tarabishy, 2007, p.4).

Since IT expertise is typically rare within SMEs, they tend to look for "role models" among other small firms within and outside their own industry, and at larger businesses (El Tarabishy, 2007) for insights and inputs into their decision making,. This suggests that SMEs might follow an evolutionary path as they adopt, use, and gain experience with a new technology, and share information with others. Given the presence of an "organizational capabilities gap" with respect to e-business technologies (Levy and Powell, 2003), this cascading of information sharing and adoption is noteworthy.

Yet not all firms – or SMEs – are alike. One important way in which firms are distinguished is according to whether its primary business function is the provision of goods or services. Both sectors (i.e., manufacturing and services) are important to the U.S. economy, with the service sector growing at a faster pace than the manufacturing sector (Stevenson, 2007). While there are many similarities in manufacturing and service-providing firms (e.g., both must engage in forecasting,

capacity planning, and other business planning functions), there are significant differences, such as the type and extent of contact with customers, variability of inputs and outputs, workers' levels of skills, the structure of work, and so on.

Past research into the process of e-business adoption has been limited. We know of only one other quantitative study that specifically examined the topic (i.e., Daniel, Wilson, and Myers, 2002), finding evidence for a four-stage model based on the use of sixteen e-business technologies. Unfortunately, this is only a small subset of e-business applications that are currently available to support firms' e-business initiatives. Consequently, this paper focuses on developing an empirically tested stage model of e-business adoption by examining the use of over 100 e-business technologies within 412 SMEs. Our intent is to test the robustness of Daniel et al.'s (2002) model with an expanded set of e-business technologies, as well as examine the process of e-business adoption among manufacturing versus service-providing firms.

LITERATURE REVIEW

To date, there are few empirically validated models to help organizations manage their e-business transition. Non-empirical, prescriptive models are offered by Willcocks et al. (2000) and Rao et al. (2003). A basic premise of both models is that small business owners/managers are initially skeptical and leery about e-business' risks. However, after dabbling with developing a web presence and using the Internet to access information and transact business, SMEs develop proficiencies that furnish the knowledge, skills and confidence to overcome the "organizational capabilities gap" (Daniel et al., 2002). This enables them to extend – and further integrate – e-business technologies into operations.

There are few empirical studies focused on the sequential steps for e-business evolution among SMEs. Daniel et al. (2002) studied 678 SMEs in the UK, using cluster analysis to identify four different clusters, which lead them to deduce a four stage model for adoption of e-business technologies. According to their research, the first stage "Developers" were in the process of implementing their first e-business applications, which included the use of email, and providing information about the company, its products/services, and using the web for advertising and brand-building. Second stage "Communicator" firms, while continuing to use email extensively, also used the Internet to find information and most had begun to construct a website. In the third stage, "Web Presence" businesses deployed all of the applications of Developers, but now had fully functioning websites and were beginning to implement online order-taking and order-receiving capabilities. The "Transactors", fourth stage firms, not only accepted orders online, but also provided after-sales service and engaged in recruiting for new employees online. They were beginning to implement such capabilities as online payments and digital delivery of goods. Thus, Daniel et al.'s conclusion was that because each succeeding stage was predicated upon the use of all of the applications/technologies from the preceding stage – and at higher levels – it furnished support for a stage model of adoption.

Burgess and Cooper propose a three stage model of e-commerce adoption, contending that organizations "*typically start simply by establishing a 'presence' on the Web and build on functionality over time as the level of technical skill/expertise in the use of Internet technologies increases*" (2000, p. 194). In their model, the first stage involves promotion activities, the second focuses on provision and processing of information (e.g., value-added links, online inquiry), and the third, "maturity" stage includes more complex business processing functions, such as online ordering and payments, and order status tracking. Burgess and Cooper's study focused on an examination of the websites of 186 firms in the metal fabrication sector.

Finally, Levy and Powell (2003) conduct a case study of twelve SMEs to suggest that there may not be a sequential path to e-business adoption after all. Instead, they propose that various firms take up one of the four segmented strategies: Brochureware, Business support, Business opportunity, or Business development, based on business growth (planned versus unplanned, tempered by attitudes toward growth) and the business value of Internet technologies to achieve or enhance their growth strategy. For example, among firms whose customers require personal, face-to-face contact in making purchasing decisions, the Internet may offer very little direct business value, aside from email communication and, possibly, a website. These firms stay at the brochureware level, as a result of stable, i.e., unplanned, business growth and low business value of the Internet.

Moreover, Levy and Powell argue that because SMEs may choose to only implement selected Internet applications that coincide with their growth and business value goals, Internet adoption cannot be modeled as a sequential process (2003). Instead, they suggest the use of a "transportation" model with migration from one category to another "without the implicit idea of growth" (Levy and Powell, 2003, p. 175).

While the aforementioned studies have established some preliminary observations concerning SMEs and the processes they use in adopting Internet technologies, limitations include: (1) the inability to draw conclusions and generalize about populations of interest, (Levy and Powell, 2003; Yoon, Bock, and Jang, 2007) – a limitation inherent in case study research; and (2) Daniel et al.'s (2002) study measured the use of only sixteen areas of applications. Given the plethora of e-

business applications available at the present time, it would be beneficial to test the robustness of their model with many newer applications.

The type of applications and the intensity of their use are critical variables examined across all three studies. Application type is measured in terms of activities supported by e-business and is measured by whether or not applications exist in specific areas, e.g, Marketing, Customer Support (Daniel et al., 2002). Application intensity is the extent or amount of use of the application and is measured by the number of applications that support a specific area, e.g, six applications in Marketing (Burgess and Cooper, 2000, p. 194; Daniel et al., 2002). A third variable present in several of the studies, application complexity, was not included in our study.

Our work extends Daniel et al.'s (2002) research by including 102 e-business applications, across seven industry sectors in the U.S. We use these 102 applications from our earlier research (Magal and Kosalge, 2006) that discusses it in detail. Patterned after Daniel et al. (2002), we use cluster analysis to look for evidence of the sequential adoption of e-business applications (i.e., stage model) among SMEs, by using the two of the three variables previously identified: application type and application intensity. Our goal is to test the robustness of Daniel et al.'s (2002) four stage model with an expanded array of e-business technologies, with the intent of proposing a model for e-business adoption that is more all-encompassing and comprehensive.

RESEARCH METHODOLOGY

A self-administered questionnaire was developed as part of a larger study to understand e-business among SMEs. The survey instrument was carefully pilot-tested on a few SMEs, and vetted for clarity and applicability. The questionnaire was mailed to 9,365 CEOs (or owners) of U.S.-based family owned businesses, with fewer than 500 employees, a commonly used and recommended criterion to identify SMEs (Pflughoeft, Ramamurthy, Soofi, Yasai-Ardekani, and Zahedi, 2003; Grandon and Pearson, 2004; SBA, 2004). Within the U.S., family owned firms account for 80 to 95 percent of all incorporated businesses (Gersick et al., 1997; Poza, 2004; SBA, 2004), making family owned businesses the most common form of business organization in the U.S. (Daily and Dollinger, 1991). Four hundred and thirty nine responses were received for a response rate of 4.7 percent. The low response rate was of concern and a sampling (1,262) of the non-respondents was contacted to determine reasons for not participating. Of these, 191 (15.5%) were determined to be no longer in existence. Excluding the surveys sent to defunct businesses results in a response rate of 5.5%, which seems to be common in studies conducted among this population (e.g., Thong, 1999; Pflughoeft et al., 2003; Grandon and Pearson, 2004).

Of the respondents, 82 percent had revenues of greater than $1 million and 18% had revenues ranging from under $100,000 to $1 million. Arguably, extremely small businesses are less likely to engage in e-business activities, simply because their size may not justify the cost associated with even setting up for electronic mail or access to the Internet. These small family-owned businesses are likely to be one-person or "mom and pop" operations, firms that are unable to engage in e-business activities and are not likely to respond. Thus, there is a bias towards firms that do engage in e-business activities.

Researchers like Elia et al. (2004) identify 36 applications of e-business and Porter (2001) identify 33 applications. As part of this larger study, 102 different applications were identified and are reported elsewhere (Reference withheld for blind review). These applications are used in this study to identify stages of e-business evolution.

DATA ANALYSIS

Two types of analyses were conducted in sequence. First, a factor analysis was conducted on the 102 applications to identify higher level application categories. This was followed by a cluster analysis to identify groups of SMEs that had similar application characteristics.

Factor Analysis and Application Categories

An exploratory factor analysis was conducted on the 102 e-business applications using the principal components extraction method and Varimax rotation. The minimum eigenvalues was specified at 1.00. The scree plot in Figure 1 suggested around ten factors as optimal. Solutions with nine, ten, and eleven factors were considered. The criteria used to evaluate each solution was that each factor had to load uniquely on one factor only, and that factor loadings had to equal or exceed 0.40. Applications that did not meet these criteria were eliminated and the factor analysis was repeated with the smaller subset of applications. A ten factor solution was determined to be most interpretable. This solution included 66 of the original 102 applications.

The results of the factor analysis are displayed in Table 1. The ten factors were labeled Supply Chain Management, Order Management, Production Planning, Sales Promotion, Training, Company Information, Investor Relationship, Electronic Order Fulfillment, Family Information, and Legal. The questions were evaluated for reliability and validity; all

loadings were greater than 0.40 with 17 of 19 greater than 0.60, and the four factors explained 47.7 percent of the variance. The reliabilities (alpha) were 0.87, 0.80, 0.86, and 0.77, providing strong evidence of construct validity.

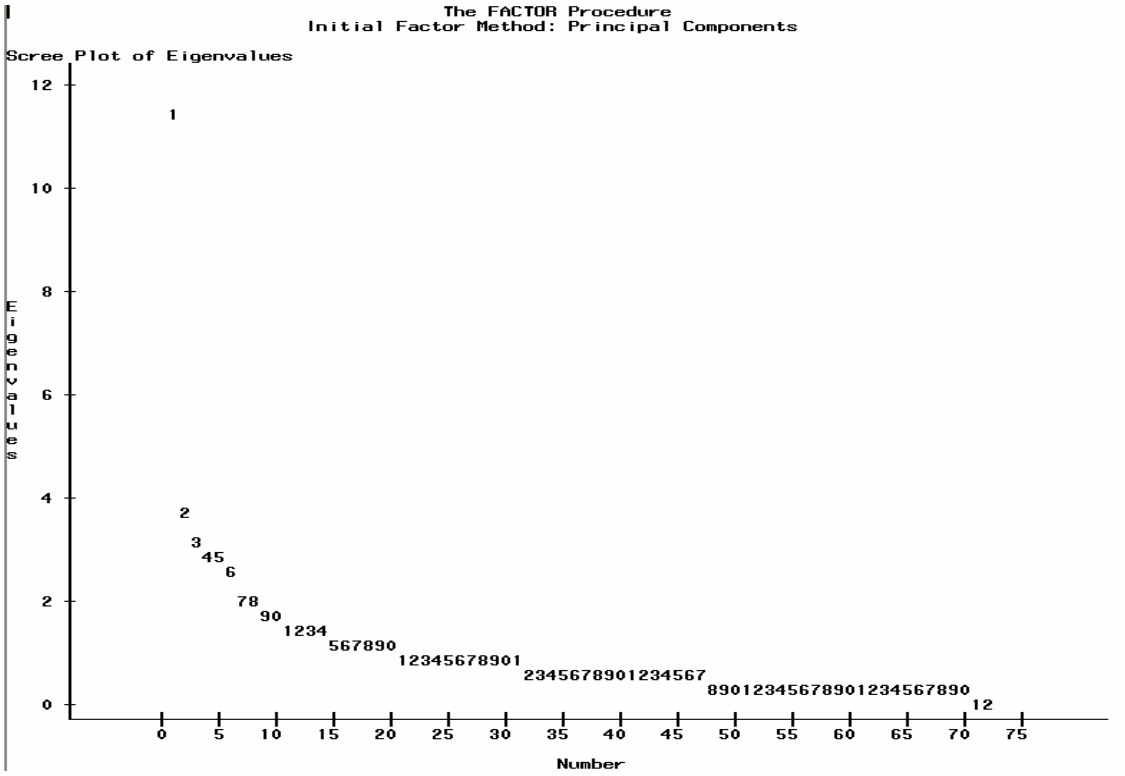

Figure 1: Scree plot for Factor analysis

	Factors
1	Supply Chain
2	Order Management
3	Production Planning
4	Sales Promotion
5	Training
6	Company Information
7	Investor Relationship
8	Electronic Order Fulfillment
9	Family Information
10	Legal

Table 1: Ten factors interpreted from the factor analysis in earlier table.

Grouping the SMEs with Cluster Analysis

The second step was to identify groups of SMEs with similar application characteristics. This was accomplished by a cluster analysis using the application categories identified above. This is similar to the method used by Daniels et al. (2002). The selection of number of clusters is a critical part of this analysis and this was achieved by applying criteria suggested by (Li, Wu, Han, and Yue, 2004). It is not necessary that all the conditions be fulfilled simultaneously. The criteria are: (1) Select NCL (Number of CLusters) where the R-square has the sharpest descent– select the NCL with the higher R-square; (2) PST2 should be higher in the NCL one less than the selected NCL; and (3) SPRSQ and PSF should be high or have local maxima for the selected NCL. Initial cluster analysis showed five clusters as in

Table **2**. The dendogram for clusters is seen in Figure 2.

NCL	Clusters Joined		Freq	SPRSQ	RSQ	PSF	PST2	RSQ descent
8	CL21	CL14	35	0.0217	0.33	28.4	7.8	0.082
7	CL20	CL12	94	0.0272	0.303	29.3	15.9	0.099
6	CL13	CL16	51	0.0293	0.273	30.5	10.8	0.121
5	CL8	CL11	49	0.033	0.24	32.2	8.8	0.142
4	CL30	CL7	238	0.0346	0.206	35.2	34.7	0.228
3	CL5	CL9	123	0.0464	0.159	38.7	15.5	0.346
2	CL4	CL6	289	0.0557	0.104	47.4	36.9	1
1	CL2	CL3	412	0.1035	0	.	47.4	

Table 2: Cluster selection table.

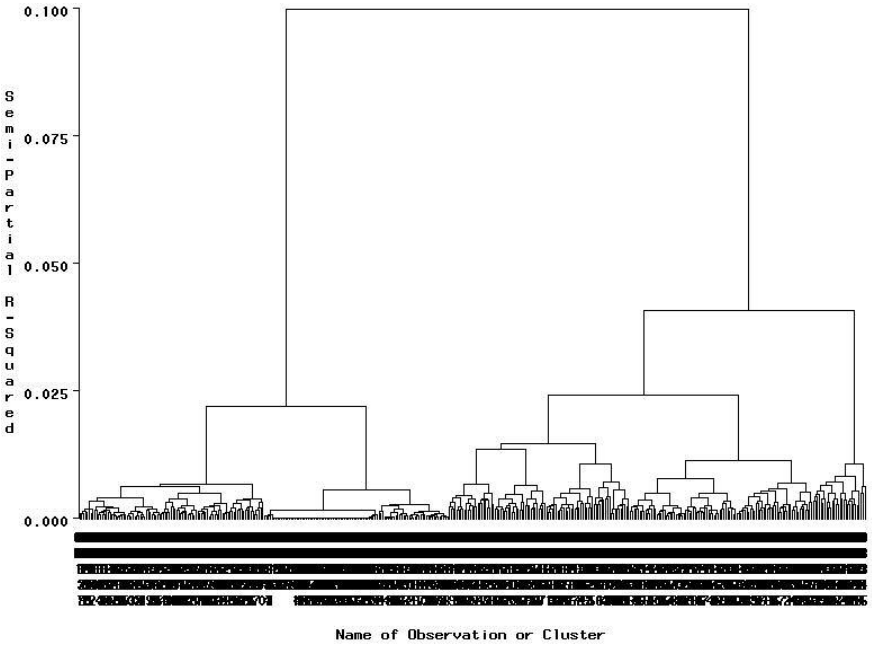

Figure 2: Dendogram for the cluster analysis.

The mean adoption levels for the various categories of applications are shown in Table 3. The higher the mean, the greater the extent of adoption of applications in the category (i.e., application intensity). Figure 3 plots these means across the five clusters. Similar to the results found by Daniel et al. (2002), the plot indicates an increasing level of e-business adoption, suggesting that the clusters are different stages of e-business adoption.

Clusters: Factors	1	2	3	4	5
SupplyChain	0.09	**0.29**	***0.46***	***0.43***	***0.48***
OrderMgt	0.05	**0.23**	**0.25**	***0.41***	***0.47***
ProdPlg	0.01	0.07	0.07	0.09	**0.27**
SalesPromo	0	0.02	0.02	*0.13*	*0.15*
Training	0	0.06	0.09	*0.11*	*0.15*
CompInfo	*0.15*	***0.35***	***0.32***	***0.48***	***0.30***
InvestRel	0.01	0.02	**0.23**	0.08	**0.22**
ElectOrdFul	0.01	*0.12*	0.09	*0.14*	**0.21**

FamilyInfo	0.02	*0.14*	0.03	0.09	*0.12*
Legal	0.01	0.01	0.02	**0.24**	*0.12*
All	0.04	*0.15*	*0.19*	**0.25**	**0.28**
N	**144**	**94**	**74**	**51**	**49**

Table 3: Means of factors in the five clusters. Highlighted range: *0.1--0.20*; 0.21—0.30; *0.3 +*

The results suggest following characteristics of the different stages:

- The types of applications adopted increase. A review of Table 3 indicates that companies do not engage in significant e-business activity until stage 2 and then the variety of applications increases as they progress from one stage to another. As expected, stage 1 has more firms than others. Succeeding stages have fewer SMEs, indicating an early stage of e-business adoption among SMEs.
- The intensity of applications, as measured by the mean level of adoption also increases as an SME moves from one stage to another. This increase is particularly noticeable between stage 1 and 2 and between 3 and 4. The extent of adoption is approximately the same between stages 2 and 3 and between 4 and 5.
- Stage 1 can be characterized as novice, reluctant users of e-business. We surmise that this is because they are interested in maintaining a "business card" on the web, either because it is fashionable or out of fear of being left behind.
- Stages 2 and 3 are transitional stages in which firms focus on five or six application categories. Applications in these categories are implemented to a moderate extent (.15 - .19) and the two stages are similar in the overall extent of adoption, with the following exceptions. In stage 3, there is a greater extent of adoption in supply chain and investor relations categories than in stage 2. While in stage 2, there are more applications related to providing family information.
- Stages 4 and 5 suggest more mature stages of e-business adoption with applications in seven to ten categories. The extent of adoption (intensity) is higher (.25 - .28). These stages are similar in overall extent of adoption with the following exceptions. Stage 4 has more applications related to company and legal information than stage 5. Stage 5 has more applications related to production planning, electronic order fulfillment and investor relations than stage 4.

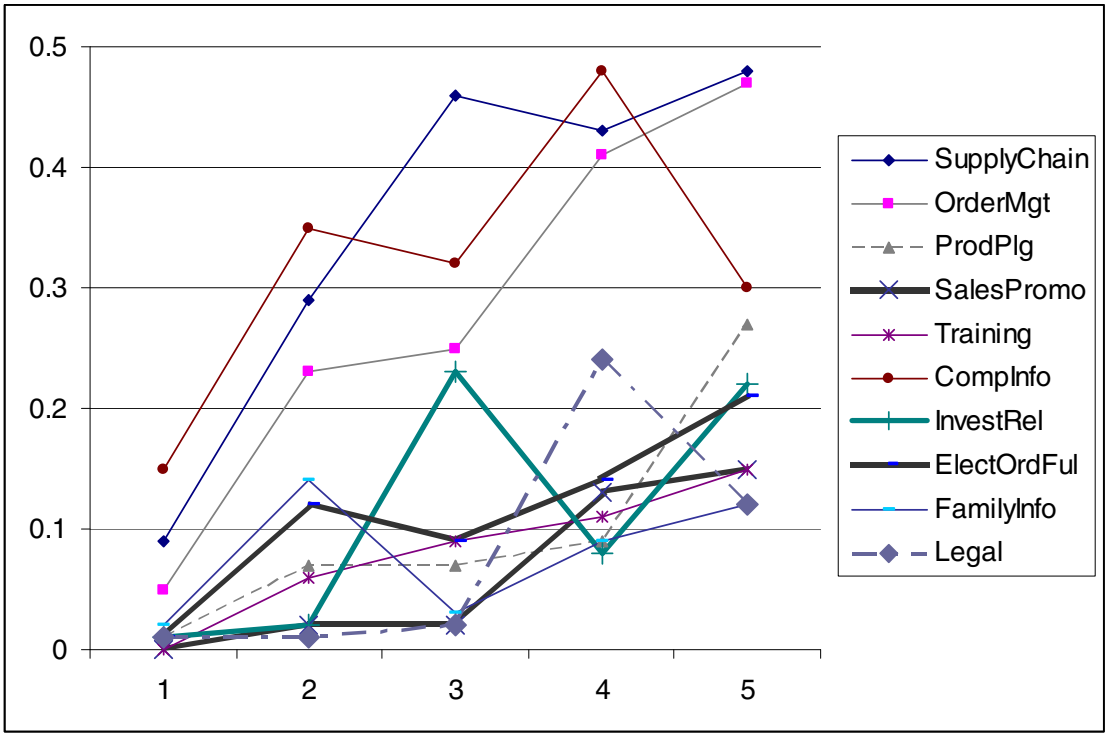

Figure 3: Plot of the above table of five clusters.

As shown in Table 4, a closer examination of stage 5 firms reveals that it has a greater population of service (as opposed to manufacturing) firms, confirming the importance of an analysis according to industry sector. Consequently, the data was resorted into two categories: (1) Manufacturing, which also included Agriculture/Forestry; and (2) Services, including Wholesale/Distribution, Construction, Retail, and Transportation.

Clusters: Industries	**CL 1**	**CL 2**	**CL 3**	**CL 4**	**CL 5**	**Total**	
Agriculture/ Forestry	2	2	0	0	0	**4**	
Manufacturing	46	36	19	16	9	**126**	
Services	23	15	11	6	12	**67**	
Wholesale/ distribution	15	13	9	9	11	**57**	
Construction	18	9	13	6	3	**49**	**229**
Retail	16	14	9	7	10	**56**	
Transport	1	1	3	1	0	**6**	
Others	14	3	8	2	5	**32**	
Missing frequency	**9**	**1**	**2**	**4**	**0**	**17**	
Total	**144**	**94**	**74**	**51**	**49**	**412**	

Table 4: Clusters by industries

Cluster analysis was conducted a second time with the ten factors for manufacturing firms and service sector firms, with the statistical results from SAS shown in Tables 5 and 6. As before, the number of clusters (i.e., stages of e-business adoption) was achieved by applying the criteria suggested by Li et al. (2004). When applied to manufacturing and service firms, it indicated three clusters. The dendograms for both are seen in Figure 4 and Figure 5. The level of application/use and the characteristics of each of the three clusters are seen in Table 7. It also shows many other variables that are significantly different in each of these clusters. The plot of the factor means for each cluster is plotted to observe the trend in Figure 6 and in Figure 7.

NCL	Clusters Joined		Freq	SPRSQ	RSQ	PSF	PST2	RSQ descent
8	CL9	CL17	51	0.0289	0.434	14.6	6.3	0.081
7	CL11	CL25	23	0.0356	0.399	14.8	7.3	0.090
6	CL10	CL18	16	0.0358	0.363	15.4	4	0.105
5	CL8	CL32	95	0.038	0.325	16.4	12.2	0.132
4	CL15	CL22	7	0.0428	0.282	17.9	4.3	0.174
3	CL6	CL4	23	0.049	0.233	21	4.1	0.300
2	CL5	CL7	118	0.0696	0.163	27.1	17.4	1
1	CL2	CL3	141	0.1633	0	.	27.1	

Table 6: Cluster statistics for Manufacturing firms

NCL	Clusters Joined		Freq	SPRSQ	RSQ	PSF	PST2	RSQ descent
8	CL19	CL23	25	0.0199	0.358	22.2	5.9	0.064
7	CL43	CL15	15	0.023	0.335	23.4	4.1	0.096
6	CL32	CL10	142	0.0317	0.303	24.4	31	0.106
5	CL6	CL21	162	0.0324	0.271	26.1	24.4	0.129
4	CL8	CL7	40	0.0347	0.236	29.1	6.8	0.212
3	CL9	CL4	64	0.0507	0.186	32.3	8.8	0.387
2	CL3	CL11	124	0.0718	0.114	36.5	15.4	1
1	CL5	CL2	286	0.1139	0	.	36.5	

Table 6: Cluster statistics for Service firms.

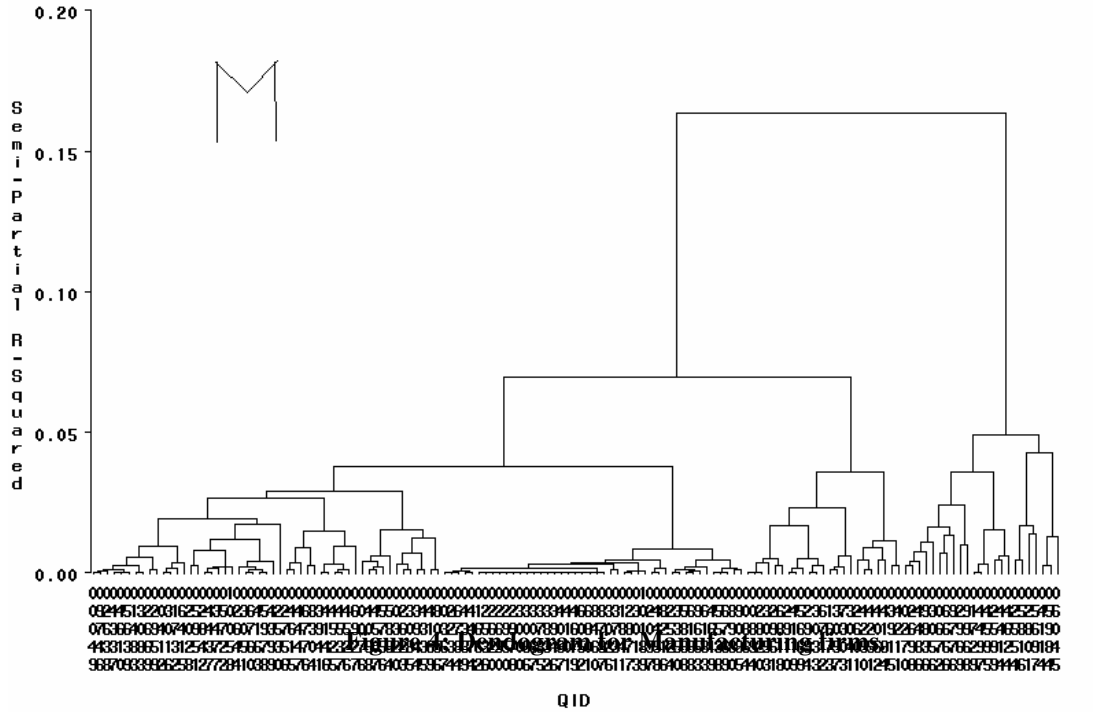

Figure 4: Dendogram for Manufacturing firms

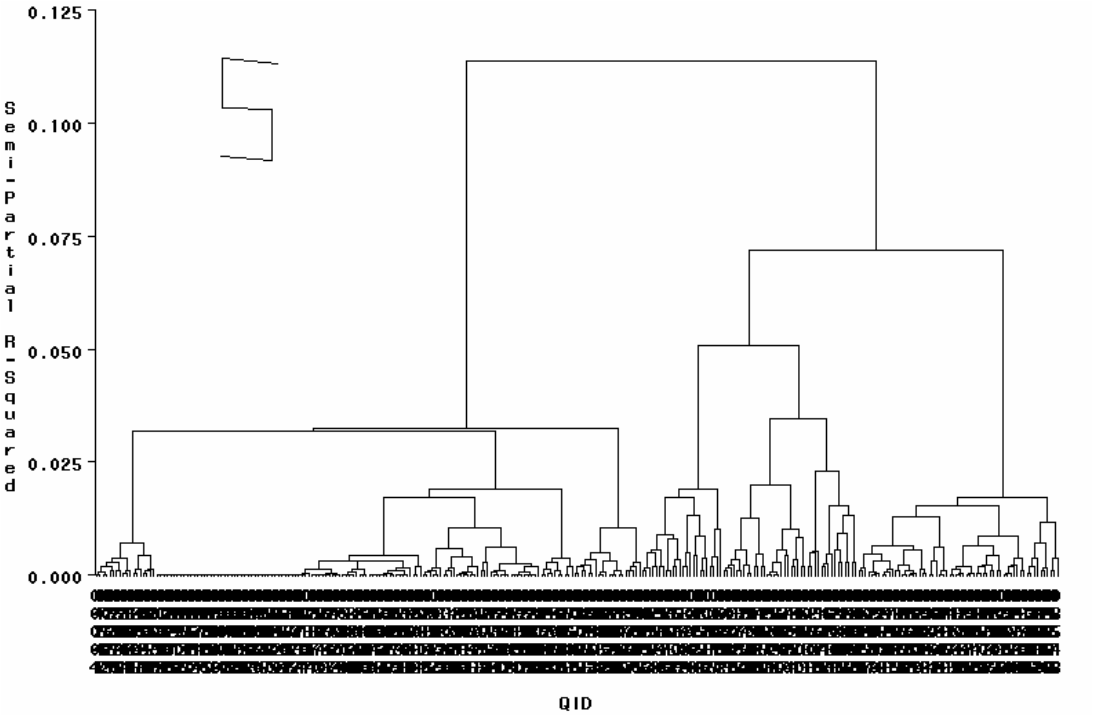

Figure 5: Dendogram for Service firms.

	MFG				SERVICE		
Clusters:	1	2	3		1	2	3
SupplyChain	**0.21**	**0.28**	***0.55***		*0.14*	***0.49***	***0.5***
OrderMgt	*0.16*	**0.23**	***0.52***		0.09	**0.22**	***0.53***
ProdPlg	0.03	0.03	***0.43***		0.01	0.02	**0.25**
SalesPromo	0.02	0.01	0.08		0.02	0.02	*0.14*
Training	0.02	0.04	*0.19*		0.02	0.08	*0.17*
CompInfo	**0.24**	***0.37***	***0.35***		**0.22**	**0.28**	***0.39***
InvestRel	0.03	*0.16*	**0.21**		0.01	**0.21**	*0.15*
ElectOrdFul	0.04	0.09	**0.25**		0.03	*0.12*	**0.21**
FamilyInfo	0.03	0.09	0.07		0.08	0.05	*0.13*
Legal	0.04	0.01	*0.1*		0.01	0.02	**0.23**
Overall	*0.1*	*0.16*	***0.31***		0.08	*0.18*	**0.3**

Table 7: Means of factors in the three clusters in Manufacturing and Service. Range: *0.1--0.20*; 0.21—0.30; *0.31* +

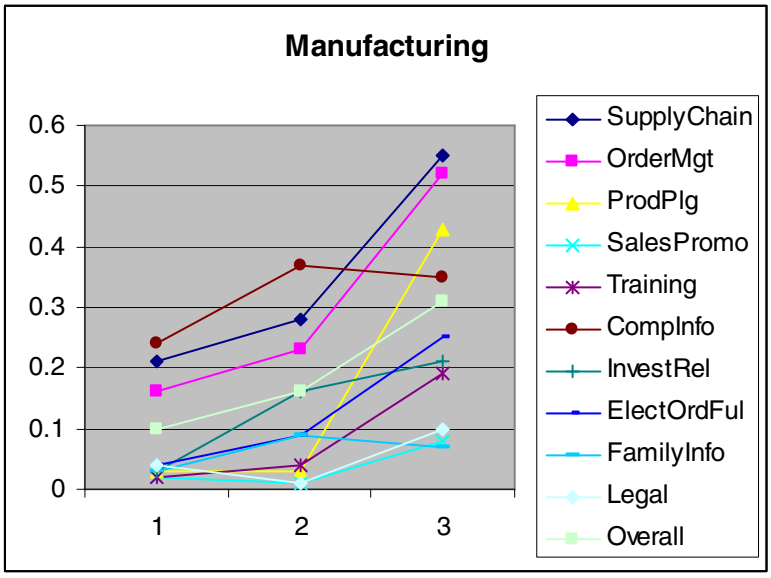

Figure 6: Plot of the Manufacturing firms factor means for the three clusters.

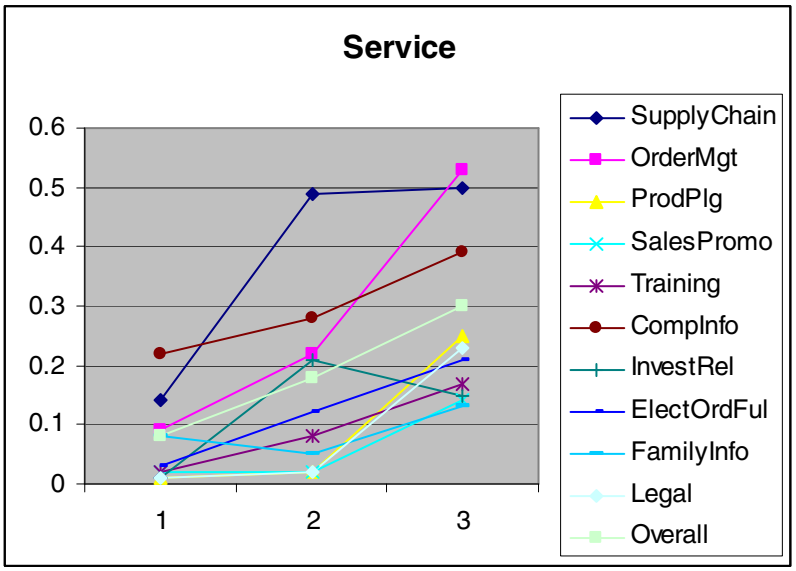

Figure 7: Plot of the Service firms factor means for the three clusters.

DISCUSSION

The objective of this paper was to test the robustness of Daniels et al.'s (2002) four-stage model with an expanded array of e-business applications, as well as to better understand e-business adoption among two important sectors of the U.S. economy – manufacturing and service-providing firms. Overall, we find evidence for the existence of a three-stage model for e-business adoption. As shown in Table 3 by the mean adoption levels for the ten categories of e-business applications, the higher the mean, the greater the extent of adoption of applications in the category (i.e., application intensity).

The results suggest following characteristics of the stages of adoption among manufacturing and service firms:

- The types of applications adopted increase across the stages. A review of Table 7 indicates that neither manufacturing nor service-providing firms engage in significant e-business activity in Cluster/Stage 1. Most notably, both types of firms only make use of applications that provide company-related information to their customers.
- For both manufacturing and service firms, noteworthy use of e-business technologies does not occur until Stage 2. For manufacturers, the leading category of applications remains providing Company Information, which in this stage would likely include having a website, a logical extension of an online business card. For service firms, however, the leading category of applications used (i.e., highest mean) is Supply Chain. This is probably not surprising given that early business adopters of the Internet used it primarily for information acquisition, particularly to look for products and information (Levenburg and Dandridge, 2000). Moreover, with the exception of Investor Relations, the differences between the two sectors are modest.
- Firms in Cluster/Stage 3, whether manufacturing or service-providing, make the greatest use of e-business applications, as measured by mean scores of factors. For both types of firms, the highest means are found in use of Supply Chain and Order Management applications, which is logical since as part of their operations, both would engage in activities like researching new suppliers, placing orders online, tracking shipments, receiving orders from customers, processing orders, order confirmation, and so on. Production Planning is more important to manufacturing firms, while Sales and Promotion activities are more important to service providers. Perhaps this is a result of the nature of their businesses. Arguably, since retailers were included in the services cluster, using the Internet for Sales and Promotion activities may be more relevant to their marketing plans.
- For both manufacturers and services firms, the number of applications increase between stages 1 and 2, and then again between 2 and 3. Companies largely do not engage in e-business activity until Stage 2, and then the variety of applications continues to increase as they progress to Stage 3.
- The intensity of applications, as measured by the mean level of adoption increases as an SME moves from one stage to another. This increase is particularly noticeable between Stages 1 and 2 for both types of firms, and for selected applications between Stages 2 and 3.
- Stage 1 firms devote minimal attention to e-business activities, which may be due to a more local orientation among some SMEs. Stage 2 firms may be in a transitional stage, as demonstrated by their use of the Internet for Supply Chain functions, moderate extent of use, and similarity in overall application intensity of use (as measured by means). Stage 3 suggests a more mature stage of e-business adoption, particularly for service-providing firms, with high(er) overall extent and intensity of use.

CONCLUSION

This research aimed to study the e-business adoption among SMEs and explore the possibility of a stage-adoption model. Other researchers have indicated such a possibility, but few studies were extensive enough across applications and industries.

This paper presents preliminary results indicating the presence of a three stage model for e-business evolution. The results support and extend the findings of previous studies on the stage hypothesis. However, the number, nature, and characteristics of the stages identified in this study are different from those identified in previous studies. This may be a result of sampling from a different geographic region of the world, i.e. the U.S. versus several prior studies conducted outside of U.S., a more mature e-business environment, or the inclusion of a much larger number of applications in the present study.

The study finds distinct differences between the stages of adoption, which were related to the extent and intensity of adoption of e-business applications. These results indicate that the SMEs begin with a focus on presenting the company information on the web, a focus that appears to remain strong regardless of their level of e-business adoption. The area of attraction for them is using the web for supply chain management and supplier coordination to better manage internal operations. This is closely followed by a focus on customer order processing and order management. Interestingly, online sales promotion was never a priority area for the SMEs. Similarly, they find the web least attractive for training and for sharing legal information. Perhaps this is due to the local orientation of many small firms.

In terms of future research, the stage model forms the basis for systematic analysis of the benefits, problems, and issues at each stage of adoption. This can help government agencies, as well as Internet application and service providers, to tailor their approaches according to these segments, as SMEs in each stage would likely have differing sets of needs. This would be especially important as SMEs sought to progress beyond their current stages and levels of e-business adoption, seeking wisdom from informed sources on which new applications they might adopt to expand and enhance existing ones.

Finally, as illustrated by this work, as the array of information technology available for SMEs' use evolves and expands, the need for testing the robustness of models, such as ours, suggests the increasing future need for research in this area. While early researchers (e.g., Poon and Swatman, 1999, Burgess and Cooper, 2000) identified three stages, subsequent researchers found four stages, and our research identified five stages. Will more, or more finely discriminated, stages of e-business evolution be identified by future researchers using larger sample sizes or with larger (greater than 102) numbers of applications? If, indeed, IT investments are a key to small business growth, acquiring a better understanding of how small businesses adopt – and use – e-business technologies is vital to their continued success and prosperity.

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