



Electronic Commerce Adoption Barriers in Small to Medium-Sized Enterprises (SMEs) in Developed and Developing Countries: A Cross-Country Comparison

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ABSTRACT

Today, electronic commerce (e-commerce) has been utilised as a rapid vehicle to transform the world into an information society. In the business environment, e-commerce has made considerable inroads not only into large organisations but also the small and medium-sized enterprises (SMEs). However, SMEs are not adopting e-commerce with same speed as their larger counterparts. This slow growth has been attributed to various adoption barriers, which have been well documented in numerous research studies. While several recent studies have begun examining the relationship between the perceptions of adoption barriers in developed economies, the relationship between the perceptions of these barriers has not been fully examined in developing economies. This paper examines the correlation and underlying factors of barriers to e-commerce (as perceived by SME owner/managers) in a developing economy (Indonesia). It then compares these with SME owner/manager perceptions from a developed economy (Sweden). The study showed that there are differences in the groupings and priorities of barriers to e-commerce between the two locations. Most importantly, however, was the finding that while Swedish respondents were more concerned with technical issues, the Indonesian respondents were more concerned with organisational barriers.

Keywords: barriers; developed countries; developing countries; e-commerce; SMEs

INTRODUCTION

The importance of the SME sector as the cornerstone of most economies is widely recognised (Abdullah & Bakar, 2000; Hall, 2002; National Office of Information Economy, 2002). This is not only borne out by the number of SMEs (almost 90% of the total number of businesses

across the world), but also by their significant role in creating employment opportunities (Hall, 2002). The role of SMEs is further highlighted in studies by Abdullah and Bakar (2000) and Urata (2000) that suggest that SMEs are vital to the emergence of healthy private sectors, especially in poorer countries. However, research

has indicated that the SME contribution to the gross domestic product (GDP) of many nations has fallen over the past few years (Abernethy, 2002). While the reasons for this decrease are diverse, SMEs are attempting to reverse the trend by turning to global markets. This development has been enabled by the advent of e-commerce technology. E-commerce, defined as “the buying and selling of information, products, and services via computer networks” (Kalakota & Whinston, 1997, p. 22) is radically changing the dynamics of the business environment and the way in which people and organizations are conducting business with one another. For SMEs, e-commerce has the potential to become a source of competitive advantage. E-commerce is a cost effective way of accessing customers globally and competing on par with large businesses. Indeed, Lee (2001) suggests that e-commerce has altered the outlook of businesses from one focused on lean manufacturing (termed as economics of scarcity) to a focus on information which he terms as economics of abundance. SMEs have started to capitalise on these benefits initially by connecting to the Internet. Indeed, according to the American City Business Journals (Internet Economy Indicators, 2003), SMEs using the Internet have grown 46% faster than their counterparts who do not use the Internet (Bajaj & Nag, 1999; Khiang & Chye, 2002; Scupola, 2003).

Despite the exponential growth of e-commerce (the U.S. Census Bureau reports that e-commerce retail sales reached \$11.9 billion in the U.S. during the first quarter of 2003), it is the larger businesses that have reaped the benefits (Riquelme, 2002). In contrast, the rate of e-commerce adoption in the regional SME sector has remained relatively low (Magnusson, 2001; Poon & Swatman, 1998; Van Akkeren & Cavaye, 1999). According to the National Research Council (2000), only 25% of SMEs had a Web site in mid-1999. Of those that did have a Web site, the revenue they generated via business-to-customer (B2C) e-commerce was negligible (*Wall Street Journal*, August 17, 1999 cited in National Research Council, 2000;

Ruth, 2000). This slow growth of e-commerce adoption in SMEs has been attributed to various adoption barriers that are faced by small business owners/managers. These barriers have been well documented in numerous research studies. However, the relationship between these barriers has not been fully examined, particularly in developing countries. A number of studies (Kaynak, Tatoglu, & Kula, 2005; Stockdale & Standing, 2004; Taylor & Murphy, 2004) have suggested that much of the literature concerned with e-commerce use (or lack of use) in SMEs has been undertaken in developed countries (particularly, but not exclusively the U.S., Europe, and Scandinavia). They argue that the wholesale application of these findings to developing economies is not justifiable because the driving forces for SMEs to adopt e-commerce, as well as the barriers preventing adoption differ widely from location to location. The aim of this paper is threefold: (1) to analyse the correlation between various e-commerce adoption barriers in order to identify any underlying factors; (2) to examine whether there are any significant differences in the rating of importance of barriers to e-commerce between SMEs that are located in a developing country (Indonesia) and those located in a developed country (Sweden); and (3) to determine whether the underlying factors themselves differ between SMEs in a developed and a developing economy. The paper begins by examining the nature of SMEs and identifying features that are unique to SMEs. A discussion of barriers to e-commerce adoption based on previous research is then presented and the barriers are mapped to the unique SME features. This is followed by a correlation and factor analysis of the combined Swedish and Indonesian data. A series of two-tailed t-tests is then applied to determine whether there are any significant differences between the ratings of importance of the barriers to e-commerce adoption (Indonesia—Sweden). Finally, a factor analysis of the data is undertaken for each location. A discussion of similarities and differences is then presented. Finally, the limitations of the study are presented and conclusions drawn.

THE NATURE OF SMALL TO MEDIUM ENTERPRISES

There have been numerous studies carried out in order to isolate the features unique to SMEs. Most of these studies have focussed on the differences between SMEs and their larger counterparts. Based on an extensive review of the literature, a summary of the features unique to SMEs is shown in Table 1. An analysis of the features revealed as being internal or external to the business is presented. Internal features include management; decision making and planning processes; and the acquisition of resources, while external features are related to the market (products/services and customers) and the external environment (risk taking and uncertainty).

It is proposed that the features unique to SMEs detailed in Table 1 are a source numerous inhibitors of technology adoption and use in SMEs. These inhibitors or barriers will be discussed next.

SMEs in Sweden

The European Union views SMEs as a catalyst for regional development (European Commission, 2003). SMEs have been earmarked as playing an important role in promoting growth because they are seen as a key source of jobs and employment prospects (Keniry, Blums, Notter, Radford, & Thomson, 2003; Larsson, Hedelin, & Gärling, 2003). For the purposes of its various support programs and measures, the European Commission has constructed a single set of definitions of SMEs (European Industrial Relations Observatory, 2006).

Two major interconnected policies exist in Sweden. These are termed the SME policy and the Entrepreneurship policy. Both policies pursue several major objectives: (1) to stimulate employment creation, (2) to stimulate regional development, (3) to stimulate innovation, and (4) to expand economic growth. Lundström and Stevenson (2002) suggest, among other things, the two policies support the creation of new firms, the delivery of education and support to newly established firms, the promotion

of women as owner/manager, the spread of technology to SMEs, and the streamlining of financial, organisational, and exporting support for SMEs.

At a practical level, Boter and Lundström (2005) point to two national agencies (Almi Business Partner and Swedish Trade Council) and two regional agencies (the National Labour Market Board and the County Administration Board) whose tasks include the development of entrepreneurship curricula; the development of business—education partnerships; the development of community support; the administration of funding for new initiatives; and the involvement of the students in technical and organisational analysis of SME firms and ventures.

SMEs in Indonesia

During the last 20 years, there has been considerable growth in terms of the number of SMEs throughout Asian economies, and Indonesia in particular. Indonesian SMEs have proven to be the most dynamic and vibrant sector, especially during the time of financial crisis in 1997 (Urata, 2000).

There is no consensus on the definition of SMEs in the Asia Pacific region. The definitions differ from country to country depending on the phase of economic development as well as their existing social conditions. As the focus of this study is on the Indonesian economic setting, the official definitions from two Indonesian government bodies: The Central Bureau of Statistics (CBS, 2004) and the Ministry of Cooperatives and Small and Medium-Sized Enterprises (DEPKOP, 2005a) will be adopted.

There are currently more than 40 million SME establishments in Indonesia. They account for 99.99% of the total number of business enterprises. Based on the latest data (DEPKOP, 2005b), the largest percentage is in the agriculture sector (58.9%), followed by trade (22%), and manufacturing (6.3%) sectors with transportation and services also significant. The significance of SMEs to the Indonesia economy is further highlighted by their contribution to national development and by the fact that, as a

Table 1. Features unique to small and medium-sized enterprises (SMEs) (Adapted from Macgregor & Vrazalic 2004)

| ID | FEATURES UNIQUE TO SMEs | REPORTED BY |
|---|---|--|
| <i>Features related to management, decision making and planning processes</i> | | |
| INT 1 | SMEs have small and centralised management with a short range perspective | Bunker & MacGregor (2000) Welsh & White (1981) |
| INT 2 | SMEs have poor management skills | Blili & Raymond (1993) |
| INT 3 | SMEs exhibit a strong desire for independence and avoid business ventures which impinge on their independence | Dennis (2000) Reynolds, Savage, & Williams (1994) |
| INT 4 | SME owners often withhold information from colleagues | Dennis (2000) |
| INT 5 | The decision-making process in SMEs is intuitive, rather than based on detailed planning and exhaustive study | Reynolds et al. (1994) Bunker & MacGregor (2000) |
| INT 6 | The SME owner(s) has/have a strong influence in the decision-making process | Reynolds et al. (1994) Bunker & MacGregor (2000) |
| INT 7 | Intrusion of family values and concerns in decision-making processes | Dennis (2000) Bunker & MacGregor (2000) Reynolds et al. (1994) |
| INT 8 | SMEs have informal and inadequate planning and record keeping processes | Reynolds et al. (1994) Tetteh & Burn (2001) Miller & Besser (2000) Markland (1974) Rotch (1967) |
| <i>Features related to resource acquisition</i> | | |
| INT 9 | SMEs face difficulties obtaining finance and other resources, and as a result have fewer resources | Cragg & King (1993) Welsh & White (1981) Gaskill & Gibbs (1994) Reynolds et al. (1994) Blili & Raymond (1993) |
| INT 10 | SMEs are more reluctant to spend on information technology and therefore have limited use of technology | Walczuch, Van Braven, & Lundgren (2000) Dennis (2000) MacGregor & Bunker (1996) Poon & Swatman (1997) Abell & Limm (1996) |
| INT 11 | SMEs have a lack of technical knowledge and specialist staff and provide little IT training for staff | Martin & Matlay (2001) Cragg & King (1993) Bunker & MacGregor (2000) Reynolds et al. (1994) Welsh & White (1981) Blili & Raymond (1993) |

INTERNAL FEATURES

Table 1. continued

| <i>Features related to products/services and markets</i> | | EXTERNAL FEATURES | |
|---|---|-------------------|--|
| EXT 1 | SMEs have a narrow product/service range | | Bunker & MacGregor (2000) Reynolds et al. (1994) |
| EXT 2 | SMEs have a limited share of the market (often confined towards a niche market) and therefore rely heavily on few customers | | Hadjimonolis (1999) Lawrence (1997) Quayle (2002) Reynolds et al. (1994) |
| EXT 3 | SMEs are product oriented, while large businesses are more customer oriented | | Reynolds et al. (1994) Bunker & MacGregor (2000) MacGregor, Bunker, & Waugh (1998) |
| EXT 4 | SMEs are not interested in large shares of the market | | Reynolds et al. (1994) MacGregor et al. (1998) |
| EXT 5 | SMEs are unable to compete with their larger counterparts | | Lawrence (1997) |
| <i>Features related to risk taking and dealing with uncertainty</i> | | | |
| EXT 6 | SMEs have lower control over their external environment than larger businesses, and therefore face more uncertainty | | Westhead & Storey (1996) Hill & Stewart (2000) |
| EXT 7 | SMEs face more risks than large businesses because the failure rates of SMEs are higher | | Brigham & Smith (1967) DeLone (1988) Cochran (1981) |
| EXT 8 | SMEs are more reluctant to take risks | | Walczuch et al. (2000) Dennis (2000) |

sector, they provide and create jobs especially during times of recession (Asian Development Bank, 2003; DEPKOP, 2005a). Table 2 provides a comparison of SMEs in Sweden and Indonesia.

E-Commerce in Developed and Developing Countries

As already noted, despite the apparent benefits derivable from e-commerce adoption and use, SMEs are slower to adopt the technology compared to their large business counterparts. This is particularly the case in developing economies such as Indonesia where factors such as the lack of telecommunication infrastructure (Sheth & Sharma, 2005; Wood, 2004), low average income of the population, the lack of

credit card penetration (Hawk, 2004), as well as cultural barriers (Hawk, 2004; Paul, 2002) further restrict the viability of using e-commerce technologies. Interestingly, however, is the fact that the Internet is growing faster in developing countries (Lim, 2002; United Nations Conference on Trade & Development, 2002). While far from ideal, this does indicate willingness for business and government to acknowledge the potential e-commerce has on business, particularly small business.

Barriers to E-Commerce Adoption in SMEs

It has been demonstrated previously that the rate of e-commerce adoption in SMEs has been low. This slow paced uptake of e-com-

Table 2. A comparison of SMEs in Sweden and Indonesia

| Country | Small Business | Medium Business |
|-----------|---|--|
| Sweden | Employees: Fewer than 50 people <i>and</i> Annual turnover: EUR 7 million <i>or</i> Annual balance-sheet total: Not exceeding EUR 5 million | Employees: 50-250 people <i>and</i> Annual turnover: EUR 40 million <i>or</i> Annual balance-sheet total: Not exceeding EUR 27 million |
| Indonesia | Employees: 5-19 people <i>and/or</i> Annual turnover < Rp 1 billion (EUR 8.5 million) <i>and</i> Assets < Rp 200 million (excluding land and buildings) | Employees: 20-99 people <i>and/or</i> Annual turnover >Rp 1 billion (EUR 8.5 million) <i>and</i> Assets < Rp 10 billion (excluding land and buildings) |

merce technologies has been documented and researched widely, with results indicating that SMEs face inhibitors or barriers that prevent them from implementing and fully reaping the benefits of e-commerce. In their study of 27 SME manufacturing firms, Cragg and King (1993) identified the lack of financial and managerial resources, and inadequate levels of technical expertise as the major inhibitors of IT growth in small businesses. These three factors were also identified by Welsh and White (1981) as being symptomatic to SMEs. However, other barriers have also been identified.

Like the unique features of SMEs, the barriers to e-commerce adoption can be classified as external or internal to the business. Hadjimanolis (1999), in a study of e-commerce adoption by SMEs in Cyprus, found that external barriers could be further categorised into supply barriers (difficulties obtaining finance and technical information), demand barriers (e-commerce not fitting with the products/services or not fitting with the way clients did business), and environmental barriers (security concerns). Internal barriers were further divided into resource barriers (lack of management and technical expertise) and system barriers (e-commerce not fitting with the current business practices). A summary of e-commerce adoption barriers in SMEs is presented in Table 3. An analysis was undertaken to examine the relationship

between these barriers and unique features of SMEs listed in Table 1. Table 3 shows this relationship by indicating which unique features can be mapped to which barriers. For example, one of the most commonly cited barriers to e-commerce adoption is that it is too expensive to implement, a barrier that arises from the fact that SMEs face difficulties obtaining finance, unlike their larger counterparts. If the finance was readily available to SMEs, high cost may not be a barrier to e-commerce adoption. Table 3 is an initial, exploratory attempt at determining the relationship between unique features and barriers. Further research is required to establish the nature of this relationship.

METHODOLOGY

An empirical study was designed to collect data from two countries representing developed and developing economies. Sweden was selected as an example of a developed country, and Indonesia as an example of a developing country (World Bank Group, 2006).

Ten barriers to e-commerce adoption were gathered from the literature. For the Swedish study, six in-depth interviews were undertaken with SME owner/managers to determine whether the barriers were applicable and complete. In order to validate the barriers to the Indonesian setting, a series of eight in-depth interviews with SMEs owner/managers and consultants

Table 3. Summary of e-commerce adoption barriers and their relationship to the features unique to SMEs

| BARRIERS TO E-COMMERCE ADOPTION | REPORTED BY | UNIQUE FEATURE ID |
|---|---|--|
| High cost of e-commerce implementation; Internet technologies too expensive to implement | Iacovou et al. (1995); Quayle (2002); Purao & Campbell (1998); Lawrence (1997); Riquelme (2002); Van Akkeren & Cavaye (1999); Fielding (1996) | INT 9 |
| E-commerce too complex to implement | Fielding (1996); Quayle (2002) | INT 11 |
| Low level of existing hardware technology incorporated into the business | Lawrence (1997) | INT 10 |
| SMEs need to see immediate ROI and e-commerce is a long-term investment | Lawrence (1997); McGowan & Madey (1998) | INT 1 |
| Organisational resistance to change because of the fear of new technology among employees | Lawrence (1997); Van Akkeren & Cavaye (1999) | INT 2; INT 11 |
| Preference for and satisfaction with traditional manual methods, such as phone, fax, and face-to-face | Lawrence (1997); Venkatesan & Fink (2002); Poon & Swatman (1999) | INT 10; EXT 3 |
| Lack of technical skills and IT knowledge among employees; Lack of computer literate/specialised staff | Quayle (2002); Lawrence (1997); Riquelme (2002); Van Akkeren & Cavaye (1999); Iacovou (1995); Damsgaard & Lyytinen (1998); Chau & Turner (2002) | INT 11 |
| Lack of time to implement e-commerce | Walczuch et al. (2000); Lawrence (1997); Van Akkeren & Cavaye (1999) | INT 5; INT 2; INT 1 |
| E-commerce is not deemed to be suited to the way the SME does business | Abell & Limm (1996); Hadjimanolis (1999); Iacovou et al. (1995); Poon & Swatman (1997) | INT 5; INT 8; EXT 3; |
| E-commerce is not deemed to be suited to the products/services offered by the SME | Walczuch et al. (2000); Kendall & Kendall (2001); Hadjimanolis (1999) | EXT 1; EXT 5 |
| E-commerce is perceived as a technology lacking direction | Lawrence (1997) | INT 1; INT 10; EXT 8 |
| Lack of awareness about business opportunities/ benefits that e-commerce can provide | Iacovou et al. (1995); Quayle (2002) | INT 1; INT 2; INT 5; INT 8; EXT 3; EXT 4 |
| Lack of available information about e-commerce | Lawrence (1997) | EXT 8 |
| Concern about security of e-commerce | Quayle (2002); Purao & Campbell (1998); Abell and Limm (1996); Riquelme (2002); Van Akkeren & Cavaye (1999); Poon & Swatman (1999); Hadjimanolis (1999) | EXT 6; EXT 7; EXT 8 |
| Lack of critical mass among customers, suppliers, and business partners to implement e-commerce | Abell and Limm (1996); Hadjimanolis (1999) | EXT 2 |
| Heavy reliance on external consultants (who are considered by SMEs to be inadequate) to provide necessary expertise | Lawrence (1997); Van Akkeren & Cavaye (1999); Chau & Turner (2002) | INT 11 |
| Lack of e-commerce standards | Tuunainen (1998); Robertson & Gatignon (1986) | INT 11 |

was undertaken to determine whether the barriers were applicable and complete. The interviews in both Sweden and Indonesia showed that all of the barriers were applicable and no extra barriers were forthcoming. Based on the interviews a survey instrument was developed for SME managers. The survey was used to collect data about the barriers to e-commerce adoption in SMEs. The respondents, who had not adopted e-commerce, were asked to rate the importance of each barrier to their decision not to adopt e-commerce. A standard 5-point Likert scale was used to rate the importance with 1 meaning very unimportant and 5 mean-

ing very important. Figure 1 shows the English equivalent of the question.

Karlstad was the chosen location in Sweden. Karlstad is described as a regional “developed” city, both by the Organisation for Economic Cooperation and Development (OECD) and the World Bank, and it contained personnel who could assist with the distribution and re-gathering of the survey materials.

A total of 1,170 surveys were distributed by post in four regional areas of Sweden: Karlstad, Filipstad, Saffle, and Arvika.

The same procedure with data collection in Sweden was undertaken in Indonesia. The

Figure 1. Question about barriers to e-commerce adoption used in survey

23. This question relates to the reasons why your organisation is not using e-commerce. Below is a list of statements indicating possible reasons. Based on your opinion, please rank each statement on a scale of 1 to 5 to indicate how important it was to your decision NOT to use e-commerce, as follows:

1 = the reason was very unimportant to your decision not to use e-commerce
 2 = the reason was unimportant to your decision not to use e-commerce
 3 = the reason was neither unimportant nor important to your decision not to use e-commerce
 4 = the reason was important to your decision not to use e-commerce
 5 = the reason was very important to your decision not to use e-commerce

| Our organisation does not use e-commerce because: | Rating | | | | |
|---|--------|---|---|---|---|
| E-commerce is not suited to our products/services. | 1 | 2 | 3 | 4 | 5 |
| E-commerce is not suited to our way of doing business. | 1 | 2 | 3 | 4 | 5 |
| E-commerce is not suited to the ways our clients (customers and/or suppliers) do business. | 1 | 2 | 3 | 4 | 5 |
| E-commerce does not offer any advantages to our organisation. | 1 | 2 | 3 | 4 | 5 |
| We do not have the technical knowledge in the organisation to implement e-commerce. | 1 | 2 | 3 | 4 | 5 |
| E-commerce is too complicated to implement. | 1 | 2 | 3 | 4 | 5 |
| E-commerce is not secure. | 1 | 2 | 3 | 4 | 5 |
| The financial investment required to implement e-commerce is too high for us. | 1 | 2 | 3 | 4 | 5 |
| We do not have time to implement e-commerce. | 1 | 2 | 3 | 4 | 5 |
| It is difficult to choose the most suitable e-commerce standard with so many different options available. | 1 | 2 | 3 | 4 | 5 |

respondents who had not adopted e-commerce were asked to rate the importance of each of the barriers to their decision not to adopt e-commerce. A standard 5-point Likert scale was used to rate the importance with 1 meaning very important and 5 meaning very unimportant.

Seven locations were chosen across the three provinces in Indonesia, as they were deemed to have sufficient numbers of adopters as well as non-adopters. These were:

- West Java: Bandung, Sukabumi, and Tasikmalaya
- Bali: Denpasar, Kuta, and Gianyar
- DKI Jakarta

These locations were also chosen as they were determined to represent a “developing” economy, and again, they contained personnel who could assist with the distribution and re-gathering of the survey materials. A total 330 surveys were distributed by post.

RESULTS

Responses were obtained from 313 SME organisations in Sweden giving a response rate of 26.8%. One hundred twenty-nine of these responses were from non-adopter SMEs; 179 responses were obtained from Indonesia, giving a response rate of 54.2%; 96 of these responses were from non-adopter SMEs. A test for reliability was applied to both sets of data. The Cronbach’s Alpha for the Swedish responses was .910, while for the Indonesian data it was .780.

The first aim of the study was to determine whether there were any underlying factors for the barriers to e-commerce adoption in SMEs. The rating of the barriers was combined. The results of the Kaiser-Meyer-Olkin MSA (.887) and Bartlett’s Test for Sphericity ($\chi^2 = 1347$, $p=.000$) indicated that the data set satisfied the assumptions for factorability. *Principle components analysis* was chosen as the method of extraction in order to account for maximum

Table 4. Five highest rated barriers for both Sweden and Indonesia.

| Sweden | Indonesia |
|--|--|
| E-commerce is not suited to our products/services. | E-commerce is not suited to our products/services. |
| E-commerce is not suited to our way of doing business. | E-commerce does not offer any advantages to our organisation. |
| We do not have the technical knowledge in the organisation to implement e-commerce. | E-commerce is not suited to our way of doing business. |
| E-commerce is not suited to the ways our clients (customers and/or suppliers) do business. | E-commerce is not suited to the ways our clients (customers and/or suppliers) do business. |
| We do not have time to implement e-commerce. | E-commerce is not secure. |

Table 5. Total variance explained

| Component | Rotation Sums of Squared Loadings | | |
|-------------------|-----------------------------------|---------------|--------------|
| | Eigenvalue | % of Variance | Cumulative % |
| 1 (Too Difficult) | 5.145 | 51.451 | 51.451 |
| 2 (Unsuitable) | 1.856 | 18.561 | 70.012 |

Table 6. Rotated component matrix

| | Component 1 (Too Difficult) | Component 2 (Unsuitable) |
|---|--------------------------------|-----------------------------|
| E-commerce is not suited to our products/services. | | .882 |
| E-commerce is not suited to our way of doing business. | | .894 |
| E-commerce is not suited to the ways our clients (customers and/or suppliers) do business. | | .786 |
| E-commerce does not offer any advantages to our organisation. | | .817 |
| We do not have the technical knowledge in the organisation to implement e-commerce. | .721 | |
| E-commerce is too complicated to implement. | .844 | |
| E-commerce is not secure. | .662 | |
| The financial investment required to implement e-commerce is too high for us. | .810 | |
| We do not have time to implement e-commerce. | .785 | |
| It is difficult to choose the most suitable e-commerce standard with so many different options available. | .804 | |

variance in the data using a minimum number of factors. A two-factor solution was extracted with Eigenvalues of 5.145 and 1.856 and was supported by an inspection of the Scree Plot. The two factors accounted for 70.012% of the total variance as shown in Table 5.

The two resulting components were rotated using the Varimax procedure and a simple structure was achieved as shown in the Rotated Component Matrix in Table 6. Six barriers loaded highly on the first component. These barriers are related to the complexity of implementation techniques, range of e-commerce options, high investments, the lack of technical knowledge, and time. This component has been termed the "Too Difficult" factor. Four barriers highly loaded on the second component are termed the "Unsuitable" factor and are related to the suitability of e-commerce to the respondent's business, including the extent that e-commerce matched the SME's products/services, the organisation's way of doing business, their client's way of doing business, and the lack of advantages offered by e-commerce implementation. These two factors are

independent and uncorrelated, as an orthogonal rotation procedure was used.

The second aim of the study was to determine whether there were any significant differences in the rating of importance of any of the barriers (Sweden vs. Indonesia). A series of two-tailed t-tests was applied to the data (see Table 7).

Six of the ten barriers showed a statistically significant difference (Sweden—Indonesia). With the exception of the barrier "We do not have the technical knowledge in the organisation to implement e-commerce," all the significant barriers were rated higher by the Indonesian respondents. Four barriers showed a significant difference at the .001 level. These were e-commerce is not suited to our products/ services, e-commerce is not suited to our way of doing business, e-commerce is not suited to the ways our clients (customers and/or suppliers) do business, and e-commerce does not offer any advantages to our organisation.

The final aim of the study was to determine whether the factors underlying the barriers to e-commerce differed between developing and

Table 7. Two-tailed *t*-tests

| Barriers | N Sweden | Mean Sweden | N Indonesia | Mean Indonesia | t-value | Signif. |
|---|----------|-------------|-------------|----------------|---------|---------|
| E-commerce is not suited to our products/services. | 129 | 2.72 | 96 | 3.70 | 5.117 | .000 |
| E-commerce is not suited to our way of doing business. | 129 | 2.61 | 96 | 3.49 | 4.649 | .000 |
| E-commerce is not suited to the ways our clients (customers and/or suppliers) do business. | 129 | 2.55 | 96 | 3.38 | 4.317 | .000 |
| E-commerce does not offer any advantages to our organisation. | 129 | 2.34 | 96 | 3.66 | 7.250 | .000 |
| We do not have the technical knowledge in the organisation to implement e-commerce. | 129 | 2.57 | 96 | 2.16 | -2.268 | .024 |
| E-commerce is too complicated to implement. | 129 | 1.97 | 96 | 2.26 | 1.655 | .099 |
| E-commerce is not secure. | 129 | 2.08 | 96 | 2.58 | 2.937 | .004 |
| The financial investment required to implement e-commerce is too high for us. | 129 | 2.23 | 96 | 2.05 | -1.022 | .308 |
| We do not have time to implement e-commerce. | 129 | 2.46 | 96 | 2.33 | -.654 | .514 |
| It is difficult to choose the most suitable e-commerce standard with so many different options available. | 129 | 2.28 | 96 | 2.07 | -1.158 | .248 |

developed economies. A factor analysis was used to examine the barriers to e-commerce for both Indonesia and Sweden. The Kaiser-Meyer-Olkin MSA (.895 Sweden, .720 Indonesia) and Bartlett's Test for Sphericity ($\chi^2 = 845$ $p = .000$ Sweden, $\chi^2 = 448$ $p = .000$ Indonesia) indicated that the data set satisfied the assumptions for factorability. Principle components analysis was chosen as the method of extraction in order to account for maximum variance in the data using a minimum number of factors. A two-factor solution was extracted with Eigenvalues of 5.615 and 1.556 for Sweden. This was supported by an inspection of the Scree Plot. These two factors accounted for 71.717% of the variance. A three-factor solution was extracted with Eigenvalues of 3.439, 2.586, and 1.014 for Indonesia. Again, this was supported by an

inspection of the Scree Plot. These three factors accounted for 70.400% of the variance. Table 8 provides the details.

In both cases the resulting components were rotated using a Varimax procedure and a simple structure was achieved as shown in Table 9.

DISCUSSION

The first aim of the study was to analyse the correlation between various e-commerce adoption barriers in order to identify any underlying factors. An examination of Tables 5 and 6 shows that, as a composite group, adoption barriers can be grouped according to two factors termed unsuitable and too difficult. The "Too Difficult" factor is related to the barriers that make e-commerce complicated to implement, including barriers such as the complexity of e-commerce

Table 8. Total variance explained

| Component | Sweden | | | Indonesia | | |
|---------------|------------|------------|--------|------------|------------|--------|
| | Eigenvalue | % variance | Cum. % | Eigenvalue | % variance | Cum. % |
| Too Difficult | 5.615 | 56.154 | 56.154 | 2.586 | 25.864 | 60.255 |
| Unsuitable | 1.556 | 15.562 | 71.717 | 3.439 | 34.391 | 34.391 |
| Time/Choice | | | | 1.014 | 10.145 | 70.400 |

Table 9. Rotated component matrix

| Barrier | Indonesia | | | Sweden | |
|---|---------------|------------|-------------|---------------|------------|
| | Too Difficult | Unsuitable | Time/Choice | Too Difficult | Unsuitable |
| E-commerce is not suited to our products/services. | | .876 | | | .864 |
| E-commerce is not suited to our way of doing business. | | .926 | | | .882 |
| E-commerce is not suited to the ways our clients (customers and/or suppliers) do business. | | .863 | | | .729 |
| E-commerce does not offer any advantages to our organisation. | | .671 | | | .803 |
| We do not have the technical knowledge in the organisation to implement e-commerce. | .874 | | | .714 | |
| E-commerce is too complicated to implement. | .722 | | | .864 | |
| E-commerce is not secure. | .596 | | | .699 | |
| The financial investment required to implement e-commerce is too high for us. | .648 | | | .798 | |
| We do not have time to implement e-commerce. | | | .782 | .829 | |
| It is difficult to choose the most suitable e-commerce standard with so many different options available. | | | .850 | .809 | |

implementation techniques, the difficulty in deciding which standard to implement because of the large range of e-commerce options, the difficulty obtaining funds to implement e-commerce, the lack of technical knowledge, and the difficulty in finding time to implement e-commerce.

The “Unsuitable” factor, on the other hand, is related to the perceived unsuitability of e-commerce to SMEs. These barriers include the unsuitability of e-commerce to the SME’s products/services, way of doing business, and client’s way of doing business, as well as the

lack of perceived advantages of e-commerce implementation.

The second aim of the study was to examine whether there are any significant differences in the rating of importance of barriers to e-commerce between SMEs that are located in a developing country (Indonesia) and those located in a developed country (Sweden). An examination of Table 7 shows that 6 of the 10 barriers showed a statistically significant difference between the two locations. However, the results of Table 6 are different to expectation. Where conventional wisdom would suggest that the greater difference would be seen in the technical barriers (with the developing economy respondents placing a greater level of importance on these than the developed economy respondents), it is the organisational barriers that show the greatest difference, with the developing economy placing a greater level of importance on these barriers. A number of authors (Hawk, 2004; Lim, 2002; Paul, 2002; Sheth & Sharma, 2005; Wood, 2004) have indicated that there are "organisational difficulties" in many developing countries, including low income, low credit card penetration, and cultural differences. The data from Table 7 seem to support these as being more important to developing economies. Indeed, it is interesting to note that the only barrier that showed any significant difference between the two sets of respondents, "we do not have the technical knowledge to implement e-commerce," was actually rated more important by the Swedish respondents.

The final aim of the study was to determine whether the underlying factors themselves differ between SMEs in a developed and a developing economy. An examination of Tables 8 and 9 show a number of interesting, and again, unexpected results. Firstly, and most obviously, is that while the Swedish respondents loaded the barriers onto two factors, the Indonesian respondents loaded theirs onto three. Perhaps even more interesting, however, is the fact that again the Swedish respondents were more concerned with technical barriers, while the Indonesian respondents were concerned with

organisational barriers. An examination of Table 9 shows that two barriers, "we do not have time to implement e-commerce" and "it is difficult to choose the most suitable e-commerce standard with so many different options available" were loaded onto a separate and uncorrelated factor by the Indonesians, while the Swedish respondents considered them to be part of the organisational factor.

The results of this study are significant in several ways. The analysis has shown that 10 of the most common barriers to e-commerce adoption can be grouped in relation to two or three main factors. This gives researchers a powerful explanatory tool because it reduces the "noise" in the data. Instead of accounting for 10 different barriers, the inhibitors to e-commerce adoption can be explained as a result of one of three factors: (1) e-commerce is either too difficult, (2) unsuitable to the business, or (3) we have a problem with time and choice. The rotated component matrix also enables the prediction of the scores of each individual barrier based on the score of the two or three factors and vice versa, for an SME. This has implications for research into e-commerce barriers. Whereas, before researchers have identified various barriers (such as the ones listed in Table 3), this is the first time a study has shown that certain barriers are correlated and can be logically grouped according to two or three factors. This makes it simpler not only to explain but also to predict barriers to e-commerce adoption in SMEs.

LIMITATIONS OF THE STUDY

It should be noted that this study has several limitations. The data used for this study were drawn from four areas in Sweden and three provinces in Indonesia. As is apparent, while conclusions can be drawn, they are not generalisable to SMEs in other locations. Also, the data for the study were collected from various industry sectors, and it is not possible to make sector specific conclusions. Finally, this is a quantitative study and further qualitative research is required to gain a better understanding of the key issues.

CONCLUSION

The aim of this study was threefold: (1) to analyse the correlation between various e-commerce adoption barriers in order to identify any underlying factors; (2) to examine whether there are any significant differences in the rating of importance of barriers to e-commerce between SMEs that are located in a developing country (Indonesia) and those located in a developed country (Sweden); and (3) to determine whether the underlying factors themselves differ between SMEs in a developed and a developing economy. To this end, the unique features of SMEs were presented and mapped to e-commerce adoption barriers indicating a potential relationship between the two. Further investigation is required to identify the exact nature of this relationship. A factor analysis was performed on the composite data to determine whether there were underlying factors for the barriers to e-commerce adoption and use. A two-tailed t-test was applied to the data to determine whether there were differences in the perception of barriers to e-commerce between the two locations. The results showed that it was the organisational barriers that provided the most significant differences, with the Indonesian respondents rating these higher than the Swedish respondents. Finally, the data were separated and a series of factor analyses was applied. The data showed that while the Swedish respondents were more concerned with technical issues, the Indonesian respondents were more concerned with organisational barriers.

The results of this study are important both for researchers as well as small business practitioners (including government agencies and owner/managers). While many studies have suggested (or at least predicted) that e-commerce "levels the playing field," this study has shown that this may only be applicable at a technical level. Indeed, the study raises a number of interesting questions as to why it is the organisational barriers, rather than the technical barriers that are of paramount importance in the emerging SME economy of Indonesia. An examination of many governmental Web sites and brochures concerned with e-commerce

adoption by SMEs suggest that they are more focussed on the technical problems that may beset a small business than organisational concerns. Indeed, Taylor and Murphy (2004) suggest that governments are "besotted with technology," often to the detriment of organisational concerns. The data clearly shows that, particularly for developing economies, organisational impacts of e-commerce appear far stronger than technical concerns. For the owner/manager, the data clearly show that it is essential to consider the organisational impacts of e-commerce adoption, including customers, suppliers, products/services, and the methods employed within the small business.

The study presented in this paper is only one part of a larger long-term project investigating the drivers and barriers to e-commerce adoption in SMEs. Further research is currently being undertaken in order to overcome some of the limitations outlined previously.

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