

## NONBUSINESS E-COMMERCE IN MALAYSIA: AN INVESTIGATION OF KEY ADOPTION

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### ABSTRACT

Non-business EC is a relatively new research niche in the general e-commerce stream. It denotes the use of e-commerce by non-business institutions such as academic institutions (as in the present study), not-for profit organizations, religious organizations, and government agencies to reduce their expenses or to improve their operations and customer service. A field survey was conducted to determine key factors that facilitate the adoption of non-business EC in Malaysian Universities. Since e-commerce adoption decision is a strategic one, a comprehensive list of potential facilitators and non-facilitators for the strategic use of information technology was derived from past research and used as the basis for collecting data from 65 schools, centres and units from 5 public universities in Kota Kinabalu and Kuala Lumpur. These data were factor-analysed to determine the key underlying dimensions of facilitators. On the basis of the resulting five dimensions namely, relative advantage, network orientation, information efficiency, innovativeness, and competitiveness, regression analysis was done to determine the impact of the five dimensions on adoption. Non-business EC was parted into two: (1) partial EC (or e-brochure) where adoption is solely for promotion and dissemination of product or service information, (2) full EC, which includes the use of the application for ordering or reserving service, payment, and off-line or online delivery. The results suggest that relative advantage, network orientation, and information efficiency are the most important facilitators. Inhibitors were not estimated eventually, as there were no non-users among the respondents. In other words all the respondents are at least adopters of partial EC. Full implications of the findings are discussed.

**Key Words:** *E-Commerce, Non-Business, Adoption, Facilitators*

### INTRODUCTION

As we enter the second millennium, we experience one of the most important changes in our lives – the move to an Internet-based society. One of the most significant changes is in the manner business is conducted especially in how the marketplace and commerce is managed. Electronic commerce (henceforth e-commerce) describes the manner in which transactions take place

over networks, mostly the Internet. It is the process of electronically buying and selling goods, services, and information.

E-commerce could be classified based on the nature of transaction. Turban et al. (2000) distinguished the following types:

- Business-to-Business. This is the most common type of e-commerce today. It includes electronic market transactions between organizations.
- Business-to-Consumer. These are retailing transactions with individual shoppers.
- Consumer-to-Consumer. In this category, consumers sell directly to consumers.
- Consumer-to-Business. This category includes individuals who sell products or services to organizations, as well as individuals who seek sellers, interact with them, and conclude a transaction.
- Nonbusiness E-commerce. This includes nonbusiness institutions such as academic institutions, not-for profit organizations, religious organizations, and government agencies using various types of e-commerce to reduce their expenses or to improve their operations and customer service.
- Intra-business (organizational) e-commerce. In this category fall all internal organizational activities, usually performed on Intranets that involve exchange of goods, services, or information.

The e-commerce revolution has brought a myriad of opportunities and risks each resulting in either facilitating or inhibiting its adoption. The global nature of the technology, low cost, opportunity to reach hundreds of millions of people, interactive nature, variety of possibilities, and resourcefulness and rapid growth of the supporting infrastructures (especially the web) result in many potential benefits to organizations, individuals, and society. Potential benefits of e-commerce to organizations include: (1) expansion of the marketplace to national and international markets, (2) decreases the cost of creating, processing, distributing, storing, and retrieving paper-based

information, (3) ability for creating highly specialized businesses, (4) allows reduced inventories and overhead by facilitating "pull"-type supply chain management, (5) the pull-type processing enables expensive customisation of products and services which provides competitive advantage to its implementers, (6) reduces the time between the outlay of capital and the receipt of products and services, (7) initiates business processes reengineering projects, (8) lowers telecommunication cost—the Internet is much cheaper than Value Added Networks (VANS),

(8) other benefits include improved image, improved customer service, new found business partners, simplified processes, compressed cycle and delivery time, increased productivity, eliminating paper, expediting access to information, reduced transportation costs, and increased flexibility (Turban et al., 2000).

Turban et al., (2000) grouped the limitations of e-commerce into technical and non-technical. Technical limitations include: (1) lack of system security, reliability, standards, and some communication protocols, (2) insufficient telecommunication bandwidth, (3) the software development tools are still evolving and changing rapidly, (4) difficult to integrate the Internet and e-commerce software with some existing applications and databases, (5) vendors need special Web servers and other infrastructures, in addition to the network servers, (6) some e-commerce software might not fit with some hardware, or may be incompatible with some operating systems or other components. Non technical limitations are: (1) cost and justification—the cost of developing e-commerce in-house can be very high, and mistakes due to lack of experience may result in delays, (2) security and privacy issues, (3) lack of trust and user resistance, (4) other limiting factors are lack of touch and feel online, government regulations and standards are not refined enough for many circumstances, there are not enough support services, in most applications there are not enough sellers and buyers for profitable e-commerce operations, could result in breakdown of human relationships, and accessibility to the Internet is still expensive and/or inconvenient for many potential customers.

### Research Problem

Despite these limitations, e-commerce adoption and use continues to grow rapidly around the world. The Internet B2B space is gaining much attention, with valuation for publicly traded B2B companies escalating rapidly. Estimates for the size of this burgeoning space vary widely from Gartner Group's prediction of \$7.29 trillion by 2004 to Goldman Sachs' estimation of \$1.5 trillion (Kearney, 2000), shows that the future hold great promise for adopters. Similarly, Arthur Anderson (2000) indicated that B2B represents 84% of total e-business revenue and the growth prospects are substantial with the revenues predicted to be anywhere from \$2.7 trillion to over \$7 trillion in the next three years. In Malaysia, one of the fastest growing economies of East Asia, the need to study e-commerce adoption and adoption facilitators and inhibitors in non-business organizations is critical as it will help to create a more favourable environment for greater use of e-commerce as a tool for competitiveness, resilience, and success in the global business environment.

The current research focuses on the non-business e-commerce. Being the most un-common type of e-commerce (Turban et al., 2000), an understanding of its major drivers will help to create a favourable attitude and environment for adoption in Malaysian not-for-profit making organizations. Although there has been significant research on e-commerce drivers, existing empirical research focusing on not-for-profit making organizations like institutions of higher learning is lacking. Most studies concentrate on the marketing and bottom line benefit of e-commerce without much attention to a host of other factors that could be influential. In this research therefore, a broad spectrum of factors were investigated from IT drivers, to business needs, innovative needs, competitive position, environmental factors, economies of scale, to top management guidance, etc. Understanding the determinant structure of these variables will greatly push back the frontier of knowledge in the area of e-commerce application in not-for-profit making organizations, as well as help in technology management in these institutions, not to mention the immense benefits to systems designers and marketer, and policy makers, etc.

### Objectives of the Study

One main focus of IT implementation research has been to determine why people accept or reject new technology. The current research will explore why non-business institutions will accept or reject e-commerce. The objectives of this study are therefore many fold: (1) to identify a comprehensive list of potential facilitators and inhibitors from prior research and practitioner literature, (2) to identify those facilitators and inhibitors that significantly determine e-commerce acceptance or rejection in non-business organizations in Malaysia, (3) to provide guidance to researchers and practitioners concerning the contingent factors and organizational processes that may facilitate or inhibit e-commerce development and diffusion in Malaysia, (4) to compare the drivers of e-commerce adoption in business organizations with non-business organizations, and (5) to understand the determinant structure of these key factors and e-commerce adoption in Malaysia .

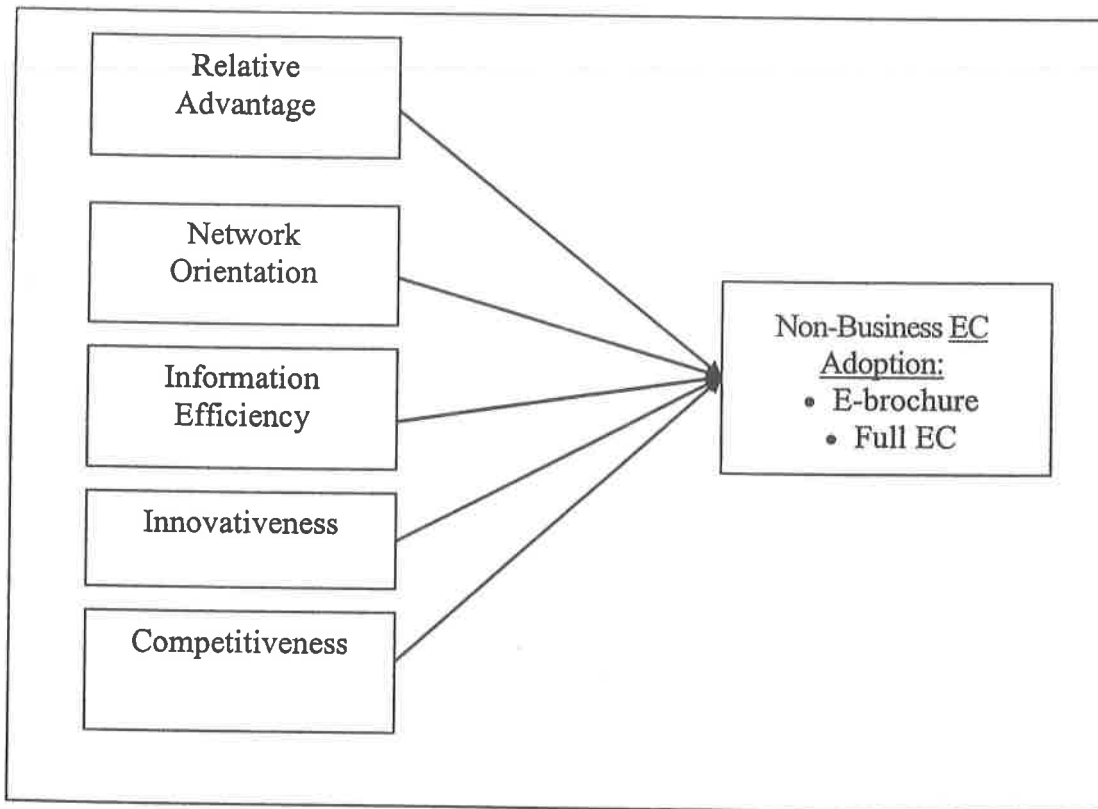
### Organization of the Study

The research is organized into nine sections. Section one introduces the whole idea about e-commerce for not-for-profit making organizations, followed by section two defines the research problems, section three, the objectives of the research, section four the theoretical framework and section five the hypothesis. In the section six concentrates on explaining the methodology adopted in the research, while section seven reviews existing literature on generic e-commerce since there is hardly any known work focusing on e-commerce in the context of not-for profit making organizations. List of IT usage drivers were also reviewed. The section eight holds the results of the analysis, and the remaining sections discuss the findings, implications of the findings, and concluding remarks.

### Theoretical Framework

Based on the resulting dimensions from factor analysing the list of items adapted from previous works, the following factors were examined to understand their influence on non-business EC adoption in selected Malaysian public universities. They include; relative advantage, information-efficiency, network, innovativeness, and competitiveness. These factors are schematised as Figure 1 below.

Figure 1: The Schema of the Research Model



**Hypotheses**

The following hypotheses are proposed for the research.

- Hypothesis 1a: There is a positive relationship between the relative advantage of e-brochure and its adoption.
- Hypothesis 1b: There is a positive relationship between the relative advantage of full e-commerce and its adoption.
- Hypothesis 2a: The greater the network of an organisation, the greater will be its adoption of e-brochure.
- Hypothesis 2b: The greater the network of an organisation, the greater will be its adoption of full e-commerce.
- 3a: Information efficiency is positively associated with e-brochure adoption.
- Hypothesis 3b: Information efficiency is positively associated with full e-commerce

adoption.

- Hypothesis 4a: The greater the innovativeness of an organisation, the greater the likelihood of e-brochure adoption.
- Hypothesis 4b: The greater the innovativeness of an organisation, the greater the likelihood of full e-commerce adoption.
- Hypothesis 5a: The greater the need for competitiveness, the greater will be e-brochure adoption.
- Hypothesis 5b: The greater the need for competitiveness, the greater will be full e-commerce adoption.

**Methodology**

**Population of Study**

Unit heads, directors of centres, deans of schools, and other senior administrators in public universities in Kuala Lumpur and Kota Kinabalu in Malaysia were

surveyed to gain information on the extent of use of e-commerce in their various departments as well as the usage drivers. The earlier intention of this research was to investigate all the public and private universities in Malaysia, but the sponsor of the research reduced the scope. Nevertheless, the objectives of research were met. In all, 65 usable responses were received out of a total of 165 qualified respondents from five Universities in Kota Kinabalu and Kuala Lumpur.

### Data Collection

In order to achieve the two main objectives of the research that is, to identify a comprehensive list of potential facilitators and inhibitors from prior research and practitioner literature, and to examine their impacts on non-business EC adoption, a list of facilitators for the use of IT was compiled from an extensive review of past literature. In compiling the list, we included all facilitators from previous work (see Table 1). A corresponding list of inhibitors can be identified as the absence of factors that make up the facilitators, for example, if strong market position is a facilitator for adopters, then the lack of strong market position may be considered an inhibitor for non-adopters (King & Teo 1996).

Clearly, the development of a list of inhibitors as the absence of facilitators may limit the range of applicability of the results. This approach is used because past research and existing literature do not treat inhibitors nearly as extensively as they do facilitators. This makes the list of inhibitors relatively short. In addition, it is felt that in deriving the list of inhibitors from the list of facilitators, one can directly examine whether the absence of a facilitator would necessarily function as an inhibitor. This would provide useful insight about the relative importance of each facilitator and inhibitor.

The initial list of facilitators and inhibitors was jointly reviewed by two of the authors in order to eliminate or combine repetitive items. From this list, a questionnaire was prepared using a five-point Likert-type scale ranging from "greatly inhibitive" to "greatly facilitative". The scale also had a column marked "not applicable" to allow for items that are not relevant to a particular company. In line with ICOLC (1998), adoption was measured based on the number of job tasks

undertaken with the e-commerce application. System usage for the sole purpose of promoting services is regarded as e-brochure (or partial adoption), and usage for promotion, reserving or ordering services, payment, and order fulfilment online or offline denote full adoption. The questionnaire was pre-tested with five deans of schools and directors of centres and modified appropriately.

### Literatures

#### E-commerce and Marketing Levers

#### E-commerce as a Business Model

E-commerce has proven to be a very vital business model in the recent times, and the concept of the business model has gained momentum in recent years, partly through the growth and interest in e-business. Definitions of what constitutes a business model vary in the literature. A good business model remains essential to every successful organization, whether it's a new venture or an established player, a profit-oriented or a not-for-profit making organization.

Timmers (1999) defines a business model as: ... the organization (or "architecture") of product, service and information flows, and the sources of revenues and benefits for suppliers and customers. Weill and Vitale (2001, p. 34) define an e-business model as: ... a description of the roles and relationships among a firm's consumers, customers, allies, and suppliers that identify the major flows of product, information, and money, and the major benefits to participants. Such a broad definition poses problems in researching the e-business model. Recognizing this, Weill and Vitale (2001) re-constructed the e-business model into eight "atomic e-business models" namely: full service provider, intermediary, shared infrastructure, value net integrator, virtual community, and whole-of-enterprise/government. Firms may develop one or a combination of these atomic e-business models to pursue their business strategies. Other writers suggest that the businesses model is a useful construct for understanding value creation from e-business. Amit and Zott (2000, p.1) assert that: A business model depicts the design of transaction content, structure and governance so as to create value through the exploitation of business opportunities. We propose that a firm's

business model is an important locus of innovation and a crucial source of value creation for the firm and its suppliers, partners and customers. Similarly, Ross et al. (2001, p.3) claims that a business model demonstrates "changes in how the firm generates revenues or manages costs".

In parallel with the expansion in e-commerce, firms developed new business models to create value for their customers or to replace existing business processes and operations (Magretta, 2001). The Internet has spawned various business models or, to be more precise, different architectures for buyers and sellers to interact, exchange goods and services, and for sellers to extract revenues. For not-for-profit making business, the Internet has helped and is still helping to reduce expenses (e.g. through improved purchasing) or to improve their operations and customer service (e.g. use of e-brochures to 'promote offerings, online application, online registration, online payment, online teaching, online assessment, online service fulfilment, online procurement of materials including teaching staff and non-academic staff, etc). Thus non-business e-commerce can actually spell surplus for the adopting institution by reducing cost service delivery.

### **E-commerce and Transaction Costs**

Transaction costs are costs incurred by a buyer or seller of a good or service while completing the transaction. Transaction costs incurred by buyers include the costs of searching for goods, comparison of different competing products, examining goods & services, bargaining for lower prices, making order and payments, receiving deliveries and so on. Transaction costs for sellers relate to distribution, pricing, servicing etc. for individual buyers purchasing few items, or large institutional buyers who often buy in bulk. In either case, buyers and sellers always try to minimize their transaction costs.

Research shows that making purchase over the Internet reduces transaction costs for individual buyers (Liang & Huang, 1998; Dominique, 1998) for some products. These products are ones that have low asset specificity and uncertainty associated with them. For instance, books can be easily purchased over the Internet, while shoes, are a problem (Liang & Huang, 1998). Consumers prefer to personally examine shoes,

and thus their transaction costs are higher, whereas they are content with examining the image and contents of a book available on the Internet. Individuals can also seek for information on a number of academic institutions, and after making a choice based on an objective assessment of what each has on offer can apply and register online for a program of study. Most people have become familiar with e-commerce and the Internet by acting as shoppers in a retail store. They look at what is available, place an order, and wait for the merchandise to arrive. What they do not appreciate is the chain of events they have triggered. The order goes to the fulfilment operation, the service providers, the agent or representative, or a combination of the above: If the order is for educational services, the order can be delivered electronically or by a face-to-face service supplier – customer interaction, but for physical goods, it is then picked, packed, handled to a shipper, and delivered to the customer. Most of this process is accomplished seemingly and expeditiously.

Although the average consumer today still prefers to place order over the phone or use traditional shopping methods rather than placing orders online, He or she may be a regular Internet user and may have found the product on a site (Sullivan, 2001; Jorgensen, 1999), eventually, the Internet become the primary channel of order placement despite the initial struggle for survival by e marketers. The brighter future of non-business and business e-commerce is evident in the number of institutions and organizations that are embracing this electronic mode of transaction. Furthermore, forecasting, planning replenishment have been the key to the success of most good companies in the past (Fosnaught, 1999; Jain, 2001; Cooke, 2000; Helms et al., 2000; Reeder and (Rowell, 2001), and they will remain instrumental to the success of non-business EC. In fact, without an effective planning system, an organisation can go out of business quicker than it got into business in the world of e-commerce. The reputation of non-business EC and e-commerce for profit organisation in both the -business-to-business and business-to-business worlds are made (or marred) based on their ability (or inability) to get it right for the customer that first time (Morrell, 2000). Thus, e-fulfilment has been experimented by a number of organizations in the quest to fulfil customers' orders for goods and services more efficiently.

### **Electronic Fulfilment (E-fulfilment)**

There are quite a few reasons why fulfilling orders placed over the Internet (e-fulfilment) differs from fulfilling orders placed any other way. First of all, since anyone sitting with a computer connected to the Internet is a potential customer, the customer base is huge and so does the unpredictability in demand. Second, fulfilling individual customers demand (B2C) for example a thousand items sent a single business (B2B distribution). A single error in information processing or in the e-fulfilment process is enough to jeopardize a timely delivery.

E-fulfilment process is a series of coordinated steps required to bridge the gap between a customer browsing an e-commerce site and actually purchasing and wing an order product. The site needs to be user friendly and be able to communicate with the customer which services (in the present case) are available for sale. Customers must be able to shop, select from the offered services and place an order in a secure Web environment. This order is then transmitted to the fulfiller or fulfillers, who assume responsibility for delivering the order to the customer. Finally, the site and fulfiller jointly handle any post-purchase activity and/or service that might be required.

### **Facilitating and Inhibiting Factors**

Information systems researchers have suggested a number of factors that influence technology adoption and usage behaviours of individuals and organisations. The theoretical models employed which have been developed to investigate and understand the factors affecting the acceptance of computer technology in organisations include the Theory of Reasoned Action - TRA (e.g. Fishbein & Ajzen 1975; Ajzen and Fishbein 1980), the Technology Acceptance Model - TAM (e.g. Davis 1989; Davis et al. 1989), the Theory of Planned Behaviour - TPB (e.g. Ajzen 1991; Mathieson 1991), the Model of PC Utilisation (Thompson, Higgins, and Howell 1991), the Decomposed Theory of Planned Behaviour (Taylor and Todd 1995), the Innovation Diffusion Theory (e.g. Agarwal and Prasad 1997; 1998; Rogers 1995), and the Entrepreneurs' Technology Acceptance Model - ETAM (Ndubisi & Richardson 2002), and the Moguls Model of Computing - MMC (Ndubisi et al. 2004). Unfortunately, none of these models and their replications and adaptations has

addressed the issue of e-commerce usage for non-business purposes or usage by not-for-profit-making organisations. E-commerce adoption decision in organisations is clearly a strategic one. Since strategic IT applications can have a significant impact on the firm's strategy, and since there is evidence that some firms are much more successful than others in developing them (King et al. 1989), studies of the factors that facilitate or inhibit the development of such applications are of great importance.

Organizational facilitators can be defined as factors that positively influence the ability of an organization to exploit information resources, information resources include both information technology and information (King et al. 1989). Similarly, organizational inhibitors can be defined as factors that negatively influence this ability or those decisions (King et al. 1989). There have been few empirical studies of facilitators and inhibitors. Most studies concentrate on a fairly small set of potential facilitators. Many focus on only one variety of system. Inhibitors are studied even less frequently. Moreover, few studies have attempted to determine empirically and rigorously the underlying structure of the important facilitators and inhibitors that can aid in our understanding of the situational and process elements related to the development of strategic IT applications (King et al. 1989) and non-business EC in particular.

Some of the few intuitive or prescriptive works on facilitators and inhibitors include Neo (1988), Reich and Benbasat (1990), King and Sabherwal (1992), King and Teo (1994). Neo (1988), in his content analysis of firms that use strategic IT applications found that there are ten key dimensions that facilitate the use of strategic IT 'applications: alignment with business planning, communication between IS and management, consideration of IS role, competitive pressure, internal needs customer needs, strength in IT, extensive computer facilities, management vision and support, and consultants' recommendation.

Reich and Benbasat's (1990), study of factors influencing the success of customer-oriented strategic systems (COSS) proposed different dimensions for factors influencing COSS development, adoption, and competitive advantage. Development was proposed to be influenced by the sponsoring company (including corporate level and IS function characteristics), the

industry, and the COSS project itself. COSS adoption, they showed, was influenced by the COSS itself (including its development, functions, and support), the industry, and its customers. Competitive advantage from COSS was influenced by the sponsoring company, the COSS itself (including functions and support), the underlying product supported by COSS, the industry, and its customers.

In a study of factors affecting strategic information systems applications, King and Sabherwal (1992), considered three dimensions: the environmental context, the organizational context, and the information systems functional context. Similarly, in a study of facilitators and inhibitors for the strategic use of IT, King and Teo (1994), utilized three different dimensions: internal factors, perceived needs, and external factors. The list of factors identified in the above studies and more were examined in the light of non-business EC adoption.

## RESULTS

### Demographic Profile of Respondents

The following is the profile of the demography of the respondents to the survey. The results in Table 1 show that various fields of academics are represented; deans of schools, directors of centres, unit heads, and other senior administrators participated in the survey; majority of the respondents have been on the job for more than five years; majority of the respondents have general computer experience of between five to thirty years; respondents are below sixty years old; two-third of the respondents are male; there is a large variation in the number of students/clients being served; and majority of the respondents employ between five to fifty staff.

Table 1: Demographic Profile of Respondents

Field of Specialisation	Percent	Age of Respondents	Percent
Management Science	35.4	Below 30 years	26.2
Information Science	15.4	31-40 years	30.8
Social Science	12.3	41- 50 years	29.2
Physical Science	12.3	51-60 years	13.8
Engineering	4.6	Above 60	0.0
Others	20.0		
Job Title	Percents	Gender	Percent
Dean of School	29.2	Male	66.2
Centre Director	6.2	Female	33.8
Unit Head	61.5		
Others	3.0		
Job Experience	Percent	Number of Students/clients	Percent
Below 5 years	21.5	Below 300	23.1
5-10 years	26.2	300-500	16.9
11-20 years	21.5	501-1000	3.1
21-30	27.7	1001-2000	15.4
Above 30 years	3.1	2001-3000	15.4
		Above 3000	26.2
Years of Computer Experience	Percent	Number of Employees	Percent
Below 5 years	3.0	Below 5	12.3
5-9 years	37.0	5-50	53.8
10-14 years	37.0	51-100	15.4
15-20 years	21.6	101-300	9.2
Above 20 years	1.5	301-500	7.7
		Above 500	1.5



**Test of Relationships**

Employing the multiple regression analysis, the study examines the presence of a statistical relationship among the construct's dimensions. As observable from Table 2, relative advantage, network orientation,

information efficiency, innovativeness, and competitiveness contribute significantly ( $F = 11.83$ ;  $p < .001$ ) and predict 51 % of the variations in e-brochure adoption or web presence.

**Table 2: Influences on E-brochure Adoption or Web Presence**

Dimensions	Beta Coefficients
Relative advantage	.188
Network orientation	.399*
Information efficiency	.340*
Innovativeness	-.034
Competitiveness	-.011
$R^2 = .509$ $F = 11.83$ Sig. $F = 0.000$ $p < 0.01$	

Details of the results show that there is significant relationship between an organisation's orientation to its network of stakeholders ( $t$ -value = 3.48;  $p$ -value < 0.01) and information efficiency ( $t$ -value = 3.34,  $p$ -value < 0.01) and web presence or e-brochure adoption. There is no significant relationship between relative advantage, innovativeness, and competitiveness and e-brochure adoption at 5% significance level. This result goes to show that the three variables are not significant drivers of e-brochure or the use of website solely for presentation of services information.

The second regression analysis was done using the five independent dimensions above and full e-commerce adoption as the dependent variable. Full non-business e-commerce adoption in this study refers to the use of the application for all of the following tasks: (1) providing business and service related information (mere web presence or e-brochure); (2) on-line service ordering/reservation; (3) online payment; and (4) online/offline delivery. The results of the second regression show that relative advantage, network orientation, information efficiency, innovativeness, and competitiveness contribute significantly ( $F = 8.61$ ;  $p < .001$ ) and predict 43% of the variations in full e-commerce adoption. Table 3 below shows the summary of the results.

**Table 3: Influences on Full Non-business E-commerce Adoption**

Dimensions	Beta Coefficients
Relative advantage	.249 <sup>m</sup>
Network orientation	.227 <sup>m</sup>
Information efficiency	.234*
Innovativeness	-.027
Competitiveness	.153
R <sup>2</sup> = .426      F = 8.61 Sig. F = 0.000 <sup>m</sup> p < 0.07      *p < 0.01	

Details of the results show that there is marginal relationship between relative advantage (t-value = 1.85; p-value < 0.07), network orientation (t-value = 1.84; p-value < 0.07) and full e-commerce adoption. Information efficiency is significantly associated with full e-commerce adoption (t-value = 2.15; p-value < 0.05). Nonsignificant relationship is observed between innovativeness, competitiveness and adoption at 5% significance level.

The subsequent chapter discusses the details of these results, implications of the findings, future research directions, and concluding remarks.

## DISCUSSION

### Preamble

Two distinctions of non-business EC adoption are made in this study, first E-brochure – a partial adoption or adoption forerunner, which refers to web presence solely for providing information on products and services. This can also be referred to as e-catalogue, or e-promotion. This category is often a harbinger to the second category. Second, full e-commerce, which deals with the use of the application for all of the following tasks: (1) providing business and service related information (mere web presence or e-brochure); (2) on-line service ordering/reservation; (3) online payment; and (4) online and/or offline fulfilment. Isolating the two levels helps to better understand the key factors that drive each.

### Inhibiting Factors

At the onset, the research purposed to understand the adoption facilitators (i.e. influences on adoption) and adoption inhibitors (factors that hinder adoption). While the facilitators concern current users, inhibitors concern non-adopters. However, from the data collected from respondents, it is clearly shown that there are no non-adopters. In other words, all the respondents are adopters, at least of the partial model. Moreover, the means of the items (see Table 2) show that on a scale of 1 to 5, none of the items is un-facilitative. Thus, since there are no cases of non-users (of at least partial e-commerce) and no item is un-facilitative, the study of inhibitors becomes irrelevant and non-applicable. To this effect, only facilitators were measured. The following sections discuss the roles of these facilitators.

### Key Dimensions of Facilitating Factors of Non-business EC

From the result of Factor analysis, five factors were identified in this study as facilitators of non-business e-commerce adoption. These factors are denoted as (1) relative advantage, (2) network orientation, (3) information efficiency, (4) innovativeness, and (5) competitiveness. By identifying these factors, the first and most important objective of this research is accomplished. It is clear from literature that there is no known empirically identified key dimensions of facilitators for non-business e-commerce. Thus, the outcome of the current research is highly value-additive. It represents a springboard

from which future research in the area of Non-business e-commerce can take a leap.

The first underlying dimension (F1) of the *facilitators* in Table 4, called "relative advantage" comprises items that are related to beneficial outcomes such as perceived importance of e-commerce, tangible benefits of e-commerce application, favourable organisation's image/reputation, ability to identify and/or benefit from e-commerce opportunities, assistance with high information intensity of services, perceived need to differentiate products and/or services, favourable economic growth, and strong e-commerce leadership. The relative advantage of non-business e-commerce over the use of traditional method as an adoption factor is intuitively appealing and is consistent with the results of a number of prior IS research on women (Ndubisi 2003), men (Venkatesh & Moris 2000), and both (Ndubisi et al. 2003; Jantan, Ndubisi & Ong 2003; Richardson & Ndubisi 2003). The visibility of e-commerce in terms of perceived importance, tangible benefits, and other relative advantages often tend to be higher with increased system usage. Conversely, inadequate use of systems create lower visibility. Such low usage of applications has been identified as one of the plausible explanations for the productivity paradox (Sichel 1997; Landauer 1995).

The second dimension (F2) consists of items that relate to the organisation's "network". These include: strong technical support staff, extensive information distribution network, communication between IS and management, integration of e-commerce with business planning. Generically, information technology has often been used to link up with network members (e.g. customers, suppliers, etc), also usage of information technology has been reported to be enhanced by access to experiential knowledge of network members (Ndubisi et al. 2003; Laudon & Laudon 1997; Cragg and King 1993).

The third dimension (F3) consists of items that relate to "information efficiency" and includes: perceived need to facilitate paper work and perceived need to store/ and process information. One key salience of information technology is its ability to speed up information collection, storage and dissemination cycle. E-commerce can be of immense benefit to both suppliers and consumers of products and services

based on its ability to provide detail information about an offering, allow the buyer to order or reserve product or service, allow for payment electronically, orders fulfilment, and even post-transaction services in some instances. E-commerce can be used to facilitate paper work within the organisation as well as with clients, students, customers, suppliers, etc by eliminating or reducing the use of traditional methods of ordering, payment, and delivery, which is slower. Also e-commerce application can help to collect, store and process information about orders more accurately and speedily than when manually executed. The salience of speed and accuracy of order handling has been recognised in a number of studies. Stock and Lambert (2001) for example, argue that the speed and accuracy of a firm's order-processing activities have a great deal to do with the level of customer service the company provides.

A.T. Kearney reports that the components of order processing may be broken down into three groups: (1) operational elements, such as order entry/editing, scheduling, order shipping set preparation, and invoicing; (2) communication elements, such as order modification, order status inquiries, tracing and expediting, error correction, and product information requests, and (3) credit and collection elements, including checking and accounts receivable processing/collecting (A.T. Kearney, 1978). The Internet allows firms to transfer information inexpensively and effectively throughout the world, making e-commerce a key contributor to supply chain integration (Stock & Lambert 2001).

The fourth dimension (F4) is made up of items that relate to the firm's innovative needs and capability - "innovativeness." Dos Santos et al. (1993) found that innovative IT investments increase a firm's value while noninnovative IT investments do not. Ndubisi and Richardson (2002) and Ndubisi et al. (2004) found that more innovative users make greater usage of information technologies. This implies that the need to innovate and the organisation's capability to innovate will drive the institution or unit to adopt e-commerce.

The fifth and last dimension (F5) is made up of items that relate to the firm's "competitiveness", which includes strong market position and perceived need to lower costs. Many firms have used low cost production

as a competitive strategy and to strengthen market position. Moreover, in order for a firm to survive in its competitive environment it is often necessary to improve or maintain its market position, lower cost, and improve service. E-commerce can provide the organisation (not-for-profit making and profit-making ones alike) with the ability to fulfil these needs. Jantan, Ndubisi and Ong (2003) in a study of the impact of e-commerce on the distribution of four different products namely, differentiated products, architectural products, technological products, and complex products, found that irrespective of the category of the offering under consideration, that e-commerce's importance is on the increase.

### **Estimating The Impact of the Resulting Dimensions on Adoption**

#### **E-brochure Adoption**

The first regression analysis estimates the relationship between the resulting dimensions and e-brochure adoption. The results show that network orientation (F2) and information efficiency (F3) have significant relationship with e-brochure adoption. The use of website for providing product information to an organisation's stakeholders is the basic step in the electronic commerce process, albeit, many organisations graduate from this level to full e-commerce. Nevertheless, the unprecedented power of the Internet in helping to reach millions of surfers around the world with information that is individualised at the same time cannot be denied. The Internet can be used to leverage customer information in a customer-centric environment in few ways including learning more about customers and devising strategies to acquire target customers. Organisations can use the Internet technology to collate, analyse, and exploit relevant information about customers to reduce uncertainty. The Internet technology also allows interactivity. Interactivity is defined as the extent to which a two-way communication flow occurs between the organisation and customers (Mohammed et al. 2003) or other channel stakeholders. The Internet enables an unprecedented level of customer dialogue. With regards to the academic institutions under study, suppliers, students and other clients could have conversations with the organisation administrators or university reps,

in a scale that no other medium can provide. Universities that are deploying E-learning will even more readily attest to this capability of interactivity. The need for an extensive distribution of information internally and externally commonly characteristic of educational institutions, as well as the quest for efficient information collation, processing, and dissemination, clearly drives e-brochure usage.

The volume of data generated and processed by academic institutions may push for increased IT usage. According to Thong and Yap (1995); and Kimberly and Evanisko, (1981), large amount of data and voluminous transactions are likely to act as a push factor for the organisation to adopt or use the technology that can help to streamline the operations and offer process efficiencies within the organisation. Current research unveils that the more intensive the data handled by the organisation/unit, the more it will adopt the Internet technology. This is because all things being equal, voluminous data are generally more cumbersome to handle (especially without a technology) than lesser amount of data.

Another facilitator for e-brochure adoption is the internal interaction existing or needed among members of the organisation and organizational arms. The study shows that strong (internal) network manifested in the availability and accessibility of internal technical expertise, communication between information technology unit and other units, as well as the incorporation of information system with planning bring about usage of e-brochure. This finding corroborates the outcome of earlier studies. Igbaria (1992), Thong and Yap. (1994), Igbaria et al. (1997), and Ndubisi et al (2001) are some of the works that have studied the influence of internal support on technology usage in organizations. Staff support refers to the support of the organization's or unit's IT programmes by both managers and non-managers, which may come in the form of accepting the system, being receptive to training, willingness to experiment with the system, cooperation with other system users, extending help to less experienced users, assistance with system difficulties, etc. In big organizations like the academic institutions, where the number of employees and clients/students are often large, support of technical staff may be more crucial to the success of systems than in smaller

organizations where the clientele base is smaller.

E-brochure adoption is not statistically associated with relative advantage, innovativeness, and competitiveness. It is important to highlight that there is little or no treat of rivalry among Malaysian Universities. In fact there is even need for more universities, which is to say that demand for university education is higher than supply, hence there is little or no competition among the existing institutions. This "seller market" situation could be a plausible explanation why e-brochure is not driven by competitiveness. The need to be competitive may have been a determinant factor if there is keen competition among the existing universities for students and other clients. The current situation is such that whether a university promotes its services on the net or not, it will still get student allocation every session, such ease of attracting students can be even an economic reason for the little emphasis on investing in technologies for the reason of outwitting rivals.

Innovativeness is not a significant factor possibly because of the high rate of e-brochure diffusion among Malaysian institutions of higher learning. Hardly any university in Malaysia is not on the Internet. They promote their academic and non-academic programs, research, consultancy services, etc. irrespective of the level of innovativeness of the administrators or teaching staff. In fact, the use of website is so common that even the most rigid, inflexible and change phobic administrators are adopting it. Such scenario explains the non-influence of innovativeness on adoption. However, the result that poses a little surprise is the non-influence of relative advantage. Such could be the case, especially when no deliberate effort is made to record, analyse, and recognise the gains from the use of the website for promotional activities.

#### Full EC Adoption

The study also reveals 'significant relationship between information efficiency and full e-commerce adoption, as well as marginal relationship between relative advantage, network interaction and adoption. As stated earlier, full e-commerce usage is assumed when the organisation not only uses the Internet for product/service promotion, but when it also allows customers to order/reserve service, pay online, and

receive delivery offline or online (as in E-learning, E-fulfillment, and E-procurement).

Relative advantage determines the usage of non-business e-commerce. Kotler (2003) describes relative advantage as the degree to which an innovation appears superior to existing product. This is the degree to which an innovation is perceived by a potential adopter as being better than the idea it supersedes (Rogers 1995). The degree of relative advantage may be measured in economic terms as well as in social prestige, and satisfaction. Gregor and Jones (1999) found that perceived relative advantage of an innovation is positively associated with its rate of adoption. Similarly, non-business e-commerce adoption is positively associated with its relative advantage to the institutions.

Interaction with network of stakeholders is another important adoption factor. Both the internal customers (e.g. subordinates and superiors) and external customers (students, clients, suppliers, etc) can benefit from e-commerce adoption in the organisation. Customers expect to have a personal experience with the organisation, but broadcast approaches send the same messages to all members of the large audience. The Internet enables the organisation to engage in customer-specific actions—a broadcast to an audience of one, and also allows the customer to control the degree of customisation by taking action to set the level of customisation desired. Such capability added to the availability of skills within the organisation to create an ease of use environment form important facilitators of adoption.

Information efficiency not only determines e-brochure usage, but also full EC adoption. Buying and selling online requires the transmission of impersonal and personal information from buyer to seller, and some of these information are highly confidential and may lead to loss of wealth and/or property when intercepted by unauthorised person/s. Additionally, speed and accuracy in picking orders, processing them, billing, fulfilling orders, and collecting bill can result in satisfied customer. Since full EC allows these organisations to carry out these activities more efficiently, a possible explanation as to the association between information efficiency and non-business EC adoption is furnished.

As with e-brochure, innovativeness and

competitiveness have no significant association with non-business EC adoption. This is often the case when adoption neither reflects the leaders innovativeness nor is undertaken to out-compete rivals. The lack of rivalry among the universities in Malaysia as stated earlier explains why adoption may not be for the purpose of overcoming competition.

### Conclusions and Implications

This study has a number of implications. With regards to theory, the research identifies the facilitators of non-business e-commerce adoption by Malaysian universities. This is a big contribution to theory since there is no known study on the key dimensions of facilitators for e-commerce usage in not-for-profit-making organisations. The results of the exploratory factor analysis show five key dimensions (relative advantage, network orientation, information efficiency, innovativeness, and competitiveness) as the parsimonious set. These results should be of interest to both researchers and practitioners in identifying potentially important dimensions that may facilitate the use of e-commerce (partial or full) in educational institutions and other non-business settings.

The results suggest that non-business establishments that wish to enhance the usage of e-commerce should focus on its relative advantage, networking capability, information efficiency. Other factors that were identified from factor analysis, which, though they do not show significant relationship with adoption but might be of interest to consider by other non-business establishments not included in the present study are innovativeness and competitiveness. The fact that relative advantage is not a significant determinant of e-brochure adoption but is a full EC adoption determinant shows where real value lies in the use of the Internet technology. As presented earlier, full EC is an advance over e-brochure in that it additionally allows e-order, e-payment, and e-fulfilment. Since the universities are more or less sure of their yearly quota of students with or without online promotion, the relative advantage of e-brochure may be blur because of such indulgence. This is not the case with full EC, which enables service ordering, payment, and fulfilment electronically. For example, the school or unit that allows students/clients to register, pay, and receive services online, will increase value and earnings faster than those

which merely promote services online while the rest of the process is done offline.

Moreover, in this era of globalisation when universities around the world seek for students across the globe, real value may not lie in merely promoting services online (after all almost everyone does it), but real value creation lies in the ease and speed of actualising a transaction. Again those divisions or units which are capable of allowing customers/clients to order, pay and receive services online are more likely to enjoy the patronage of foreign students and/or clients. The salience of information efficiency in determining e-brochure and full EC adoption is evident. As mentioned earlier, the main product in online transaction is information-product information, order information, payment information, and delivery information, therefore the speed and accuracy of transmitting these pieces of information to and fro will determine the perceived efficiency of the system and its adoption. This is an important finding for designers and marketers of non-business EC applications.

Systems designers and vendors may also capitalise on the influence of organisation network to promote products and training. Since usage is driven by the size of the network of internal and external customers as well as the level of assistance provided by technical experts within the organisation, system vendors may design their marketing strategy with a focus on schools or units with larger clientele. They may also provide training in order to assist in increasing the skills of technical experts. It is also useful to vendors to know that adoption does not depend on the innovativeness of the adoption decision maker (see Ndubisi et al 2004). Both innovative and less innovative heads are equally likely to buy the application, therefore market targeting efforts need not be discriminatory.

### Limitations and Future Research

It has been mentioned earlier that this research is limited to the universities in Kota Kinabalu and Kuala Lumpur by the instruction of the sponsor. This is a big limitation considering that a bigger, complete, and more representative result could have been unveiled if all the universities in Malaysia were represented. However, this limitation creates a need for further research. Future research in the area of non-business EC in Malaysia should cover all public universities in

Malaysia.

It is also necessary to examine other non-business establishments other than academic institutions. This future research will surely add value to the current scanty literature and poor understanding of the facilitators of non-business EC adoption.

Apart from testing the resulting dimensions from

this study, future research should also attempt to generate more dimensions of facilitators since in our thinking, the list of key dimensions of facilitators presented in this work is not exhaustive. The resulting new dimensions from future research and the dimensions from this research should be replicated or adapted in future studies of non-business EC in other nations for a more general conclusion to be drawn.

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