

FACTORS AFFECTING INTERNET ADOPTION IN THE GARMENTS INDUSTRY IN BANGLADESH: A STRUCTURAL EQUATION MODELING (SEM) APPROACH

Al Nahian Riyadh¹
Arifur Rahman²
Moutushi Tanha³

Abstract: *The present study reviews the determinants of internet adoption in the RMG sector discussed in the internet adoption literature. It incorporates the determinants in a model and tests the model in the context of the developing nations. This study is a step forward in the continued evolution of the understanding of factors affecting internet adoption. By developing a structural equation model (SEM), the present study examines the existence of organizational readiness and external pressure constructs and determines the relationships between these two types of constructs with the intent to adopt internet. The results indicate that the readymade garments industry in developing countries should pay attention to the Perceived Benefits, Organizational Capabilities, and Competitive Intensity while making decisions regarding internet adoption. Based on the findings, the present study recommends that investment in infrastructure development by governments and other agencies should go hand-in-hand with schemes for business development and managerial improvement for the RMG sector of Bangladesh.*

Keywords: *Developing Countries; Garments Industry; Internet Adoption; Structural Equation Modeling*

INTRODUCTION

Opportunities for electronic commerce and global marketing have suggested that the internet could be very important for the business organizations, especially in developing nations (Mehrtens et al., 2001). Internet technology has a direct impact on companies, customers, suppliers, distributors, and potential new entrants into an industry (Porter, 2001). In some cases, Internet technology adoption and use contributes to the creation of competitive advantages (Odedra-Straub, 2003). Adoption of the internet can be viewed as an *innovation* for a firm, based on Damanpour's (1991) argument that an *innovation* is something that is "new to the adopting organization".

¹ Product Analyst, HomeStart Finance, Australia.

² Assistant Professor, Department of Marketing, University of Dhaka, Bangladesh.

³ Assistant Professor, Department of Marketing, University of Dhaka, Bangladesh.

With the continuous spread of global Internet connectivity, the lowering of unit costs and the internationalization of the markets for goods, labor, and information means that information technology; especially the internet can offer businesses in developing countries a chance to access global markets easily, operate efficiently, and compete fairly (Molla and Licker, 2005; Davis, 1999). Some observers question the optimism surrounding the potential of the internet for developing countries (Humphrey et. al., 2003; Pare, 2003), but different studies by Dutta and Roy (2004-05), Odedra (2003), Tarafdar and Vaidya (2004), Tigre (2003) reveal that there is a consensus that businesses in developing countries have been slow to adopt the internet. In light of this, studying the factors that affect internet adoption in developing countries is an important consideration for an understanding of the global diffusion of internet.

The export-oriented RMG sector has made a crucial contribution to the transformation of the Bangladesh economy (Majumder and Binayak, 2006). The export-oriented readymade garments (RMG) sector in Bangladesh started its journey in the late 1970s as a small non-traditional export sector. Bangladesh exported RMG worth only US\$ 69 thousand when Reaz Garments exported its first consignment to the USA in 1978 (Azam, 2005). By FY2002, within a span of about two decades, exports have increased to US\$4.5 billion. A crucial study by Moody (2010) regarding the RMG of Bangladesh explored that how a competitive niche in ready-made-garments has underpinned a relatively strong export performance of +10% annual growth, throughout the global crisis. Bangladesh has benefited from the reduction in global demand for high-end garments, a trend which negatively affected its main export competitors (a Giffen goods phenomenon) in 2009. And, it remains a low-cost and reliable garment-manufacturing source for a growing number of global retailers.

The related literature regarding this study in the developed countries has mostly focused on internet issues (Bunker and MacGregor, 2000; Kartiwi and MacGregor, 2007; Eriksson et al., 2008) because unlike developing countries, financing seems not to be a critical issue (Guglani, 2001). Khalifa and Davison (2006) mention that existing literature on the adoption of information technologies can be grouped into two approaches. One focuses on the rationalistic goal oriented behavior of firms and the other focuses on the external forces of institutions. These theories, however, are not mutually exclusive as both firms' related and institutional forces together determine adoption. Hence, there is a clear demand for an internet adoption model for the RMG sector in developing countries like Bangladesh. A model that incorporates both the goal oriented behavior of firms, as well as, institutional pressure on technology adoption.

Previous studies of Cloete et al., (2002), Hadidi (2003), Mann (2000) and Travica (2002) on internet adoption in developing countries identified technological, social, cultural, legal, and institutional constraints as major inhibitors. That is, they considered conditions in the external environment (often the nation-state) to

be major determinants of internet adoption at the firm level. As a result, the explanatory power of these studies to interpret variations in internet uptake among organizations operating in the same developing country context tends to be limited. Studies of Kuan and Chau (2001), Grandon and Pearson (2004), Wang and Cheung (2004) from developed countries indicate that innovation and organizational readiness factors are relevant to decisions about internet adoption. Although the obvious differences between developing and developed countries may exclude superficial generalization from studies of developed countries, one might expect these factors to affect internet adoption in developing countries as well (Molla and Licker, 2005). Nevertheless, little is known about the firm-level determinants of internet adoption in developing countries. Noticeably missing from the literature are a robust model and instrument to study the factors that affect internet adoption in developing countries.

LITERATURE REVIEW

The study of factors affecting in internet adoption has drawn much attention in the previous research. Numerous studies have been initiated to look at the adoption of the internet in the developed, as well as, in developing countries (Agarwal and Prashad, 1997, 1998, 1999; Davis, 1986, 1989, 1993; Kendall et al., 2001; Moore and Benbasat, 1991; Premkumar and Potter, 1995; Rogers, 1983; Sathye and Diana, 2001; Tan and Teo, 2000; Taylor and Todd, 1995). Much research is still being initiated to study the adoption of newly innovated technologies both in from an individual and an organizational perspective (Azam, 2007, 2005, 2006; Ramayah et al., 2003; Ramayah et al., 2003; Ramayah et al., 2004; Ramaya et al., 2006). Several models and theories have been employed to investigate the factors that affect the adoption of innovations in general and, especially, in information technology (IT). These include diffusion of innovations (DOI), institutional theory, the theory of planned behavior (TPB), and the Technology Acceptance Model (TAM) (Ajzen, 1985; Davis, 1989; Fichmann, 1992; King et al., 1994; Montealegre, 1999; Rogers, 1995). A review of innovation-adoption studies based on these theories identified some key themes. Although, Rogers's theory is the oldest theory among these four and TAM is the youngest, each of the theories is useful and is being used, sometimes replicated, in different adoption research.

A number of studies focus on the adoption of innovations by individuals in the developed countries (Gefen and Straub, 2000; Tan and Teo, 1998; Taylor and Todd, 1995). Because an organization's adoption of innovations in the developed, as well as, the developing countries is more complex than an individual's, such work can, at best, provide only a partial explanation when the adopting entity is an organization (Rogers, 1995). Some studies give more emphasis to the attributes of the innovation (e.g., relative advantage, complexity and compatibility) as major determinants of adoption and thus demonstrate an

innovation imperative perspective (Rogers, 1995; Tigre, 2003). Others, stress the characteristics of top management, such as their innovativeness and commitment to innovation, and thus demonstrate a managerial imperative perspective (Lakhanpal, 1994; Mirchandani and Motwani, 2001). Still others accentuate organizational characteristics (e.g., specialization, functional differentiation, formalization, readiness and centralization), and thus demonstrate an organizational imperative perspective (Damanpour, 1991; Goode and Stevens 2000). Several studies focus more on environmental factors related to competitive pressure and suppliers' push, and institutional regulatory and influence actions thus demonstrating an environmental imperative perspective (Dos-Santos and Peffers, 1998; King et al. 1994; Montealegre, 1999).

Models based on the factors affecting internet adoption perspective, cover the four main domains of adoption (innovation, management, organization, and environment) and have better explanatory power than models that mainly depend on only one of the other views (Montealegre, 1999; Orlikowski, 1993; Wang and Cheung, 2004). The review shows that it is difficult to develop a unifying, one-size-fits-all theory of innovation adoption. Theories and frameworks probably need to be tailored to the type of innovation and its adoption context (Fowler, 1993). Earlier adoption studies pertain either to a time period before widespread Internet took off or to the specific context of businesses in developed countries. It is argued here that the notion of internet adoption in the developing countries context offers new perspectives for understanding the global adoption and assimilation of internet adoption.

The published works of Teo et al. (1997), Vadapalli and Ramamurthy (1997), and O'Keefe et al. (1998), each target different organizational sectors and provide evidence to suggest that there are a number of different factors affecting Internet adoption. However, there appears to be relatively little agreement between these three pieces of work as to the identity of such critical factors. Chwelos et al. (2001) and Iacovou et al. (1995) hypothesized a model that includes three factors as determinants of EDI adoption and impact in SMEs: perceived benefits (technological), organizational readiness (organizational), and external pressure (inter organizational). This model has not been empirically tested outside the small sample of firms that led to its genesis. Premkumar et al. (1997) examined EDI adoption in the European trucking industry, finding that firm size and top-management support (organizational factors), as well as, competitive pressure and customer support (inter organizational), were significant in predicting adoption of EDI.

Internet adoption frameworks, however defined, are important tools for assessing the preparation of a nation-state or an organization to exploit the potentials of the internet (Dutta et. al. 2004; Hartman et al., 2000; Oxley and Yeung, 2001). Internet adoption in developing countries has attracted a lot of academic and

practitioner interest (bridges.org, 2006; Choucri, 2003; Travica, 2002). To date, studies on factors affecting internet adoption in developing countries have almost all focused on macro-level constraints and thus demonstrate an environmental imperative perspective. Businesses in developed and developing countries differ in respect to information technology and internet adoption context. By and large, businesses in developing countries, because of managerial, organizational, and environmental constraints, face substantially greater risks in implementing an internet facility than businesses in developed countries (Molla and Licker, 2005). However, there has been very little systematic investigation of why some firms in developing countries implement the internet; whereas, others do not. And there has been little study of the factors that account for the differences in the sophistication (i.e., the extent of institutionalization) of internet use among businesses in these markets.

The study of Teo et al. (1997) considered the organizational, technological and environmental factors. Another study of Vadapalli and Ramamurthy (1997) explored the motivating factors, that is to say, the perceived benefits which will lead an organization to adopt internet. Other research includes factors like: management support, information sharing, and competition. But none of the above studies was undertaken with the complete set of factors that might affect the adoption of the internet. Consequently, given the global nature of the Internet phenomenon, it is increasingly important that further sector and country-specific studies are undertaken so that experiences can be shared and objective comparisons can be made. To this end, an extensive research study was initiated that sought to explore the factors affecting the adoption of the Internet in the garment manufacturing sector of Bangladesh.

OBJECTIVES

The study, thus, looks at the status and mode of Internet use in the garments sector of Bangladesh and explores the effects of different factors influencing adoption of the Internet as an innovation in the arena of this new and modern technologically assisted environment. So, for this study the main objective is to explore the factors that are affecting internet adoption in the garments sector of Bangladesh. The specific objectives of this research are as follows:

1. To derive a number of distinct factors that are likely to affect the adoption of the Internet.
2. To explore the nature of the relationship between each of the derived factors and the resulting levels of Internet adoption.
3. To explore the current status of internet adoption in the garments sector of Bangladesh.
4. To formulate a strategy to increase the rate of internet adoption in the garments sector of Bangladesh.

The aim of this paper is to extend the existing adoption models and to propose an integrated and eclectic conceptual framework of factors which influence internet adoption behavior by the RMG sector of Bangladesh. To accomplish the above mentioned objectives, this study starts with a critical understanding of the RMG sector's internet adoption behavior, and factors that could drive or inhibit wider adoption and use of the internet. It then examines the roles of institutions in the internet adoption process of the readymade garment industry and how effectively they can play a role in expediting the adoption of the internet. Finally, to develop a theoretical model by integrating the theories of rationalistic goal oriented behaviors of firms and institutional theories in order to better explain technology adoption in developing countries like Bangladesh.

CONCEPTUAL MODEL AND HYPOTHESIS DEVELOPMENT

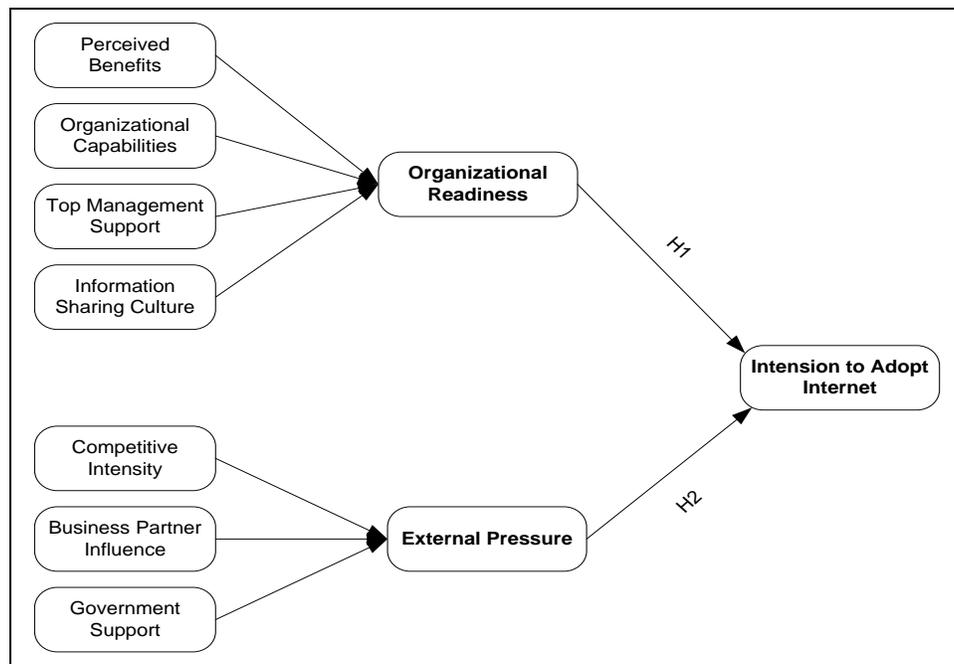
An examination of prior research on internet adoption reveals that the contingency model, that is, Roger's model, Chwelos's model and Iacovou's model, incorporates many of the factors previously demonstrated to be significant predictors of adoption of the internet. According to Rogers, the decision process begins with the knowledge of the existence of the innovation and matures by observing persuasion and the decision and implementation stage. During the knowledge stage the consumer is exposed to the innovation's existence and gains some understanding of how it functions, the persuasion stage refers to that period when a consumer forms favorable or unfavorable attitudes towards the innovation. Often, early adopters who are typically innovators themselves, or in some cases, change agents, attempt to convince the general user population of the benefits of the innovation.

Using Rogers's theory of factors affecting internet adoption as the theoretical foundation, this study considers willingness to adopt, or, in other words, adoption rate of the Internet by the professionals as an exogenous variable and perceived benefits, compatibility, complexity, trialability, and observability of innovation as perceived by the adopter as indigenous variables. The recently published works of Teo et al. (1997), Vadapalli and Ramamurthy (1997), and O'Keefe et al. (1998), each of which targets a different organizational sector, provide evidence to suggest that there are a number of different factors affecting Internet adoption. However, there appears to be relatively little agreement between these three pieces of work as to the identity of such critical factors.

Chwelos et al. (2001) and Iacovou et al. (1995) established a model that includes three factors as determinants of EDI adoption and impact in SMEs: *perceived benefits* (technological), *organizational readiness* (organizational), and *external pressure* (inter organizational). Through this study, authors have tried to develop a combined model of factors affecting internet adoption in the RMG sector of Bangladesh by taking into consideration the contingency model, Roger's model,

Chwelos's model and Iacovou's model. This model draws on the two foci of internet adoption influences as identified above and incorporates factors found to be influential in the previous literature. The resulting research model used in this paper is depicted in Figure: 01.

Figure 01: Proposed Model of Factors Affecting Internet Adoption in the Garments Sector of Bangladesh



To illustrate the commonalities of this model with others proposed before, Table 01 compares its constructs and sub-constructs to those found to be statistically significant in earlier empirical work.

In this model, *intention to adopt the internet for the garments sector of Bangladesh* is determined by focusing on two constructs: *Organizational Readiness* and *External Pressure*. The constructs *Organizational Readiness* and *External Pressure* are both composed of sub-constructs, as described in Table 03. The *Organizational Readiness* construct is the combination of *perceived benefits*, *organizational capabilities*, *top management support*, and *information sharing culture* sub-constructs. The other construct *External Pressure* is the combination of *competitive intensity*, *business partner influence*, and *government support* sub-constructs.

Table 01: Comparison of the Research Model to other Studies

Research Model	Rogers, 1983					Teo et al., 1997; Vadapalli and Ramamurthy, 1997; and O'Keefe et al., 1998								Grover, 1993				
	Perceived Benefits	Observability	Trialability	Complacency	Compatibility	Technological Policy	Top Management Support	Management Risk Position	Compatibility	Relative Advantage	Competitive Intensity	Information Intensity	Government Support	Proactive Tec. Org.	Internal Push	Market Assessment	Competitive Need	Impediments
Perceived Benefits	✓									✓								
Organizational Capabilities					✓	✓			✓					✓	✓	✓		✓
Top Management Support							✓	✓										
Information Sharing Culture		✓										✓						
Competitive Intensity				✓							✓						✓	
Business Partner Influence				✓							✓							
Government Support													✓					

Different studies of Kendall et al. (2001); Limthongchai and Speece, (2002) and Rogers, (1983) identified that 'perceived benefits' has been found to be one of the best predictors and is positively related to the factors affecting the rate of adoption of the internet. Generally, a positive relationship exists between perceived benefits and the adoption of internet behaviors (Chwelos, 2001). There are potential opportunities and benefits of using the Internet by professionals. The growing awareness and understanding of the advantages of the Internet and its different tools among the readymade garments sector in Bangladesh can positively influence in the desire for and the in adopting the Internet.

The internet attracts the RMG sector to gain perceived benefits in (a) making work easier, (b) increasing employees' productivity, (c) increasing the performance of employees, and (d) providing information. Limthongchai and Speece, (2002) argued that organizational capabilities is an important criteria for increasing internet adoption. This study also revealed that to increase the organizational capabilities to adopt the internet should be on following key aspects, that is to say, how IT can be used to support operations. There should be a good understanding, of the need for the necessary technological and other skills needed to implement internet Values and norms should not prevent them from adopting the internet. The need for top management support and commitment during the assessment of innovation and the adoption and implementation of any IT project_ has consistently been found to be important (Lederer et al., 1997; Chwelos, 2001). Information technology has been changing the way companies sell their products. Today most products come with information on the nature, characteristics, and proper usage of the product. Indeed, the greater the complexity of the product, the more information is required to describe the product (Yap, 1990). Firms in more information-intensive sectors are more likely to adopt it than those in less information-intensive sectors (Malone et al., 1987).

Organizational Readiness, as used in prior research (Chwelos et al. 2001; Iacovou et al. 1995; Swatman and Swatman 1991 and 1992), measures whether a firm has sufficient ability, willingness and situation information technology (IT) sophistication and financial resources to undertake the adoption of the internet. Thus, based on the previous literature, the readiness construct used in this paper is composed of four sub-constructs: *Perceived Benefits*, *Organizational Capabilities*, *Top Management Support*, and *Information Sharing Culture*).

Hypothesis 1 (H1): *Higher Organizational Readiness will lead to greater intention to adopt the internet in the Garments sector of Bangladesh.*

It is generally held by economists that competition increases effectively and positively the likelihood of adoption of the internet (Utterback, 1994). They suggested that, by adopting IT, businesses will be able to change their competitive environment in three ways: namely, by changing the industry structure, altering rules of competition, and giving businesses new ways to outperform their rivals. Less likely is that the adoption of the internet in the RMG

sector will help this sector to stand out, not only, in the internal competition but also in external competition. IT and the Internet are creating many new inter-relationships among businesses, and expanding the scope of industries in which a firm must compete to achieve competitive advantage (Porter and Millar, 1996; Porter, 2001). To maintain a successful alliance, communications between partners play a significant role where information sharing and delivering on promises become an important part of managing the relationship. Internet adoption in a firm can enhance its alliance advantage by providing an effective and cheaper communication channel among alliance partners. The Internet provides ubiquitous access to information and offers a platform-independent means for alliance partners to exchange information (Tarafdar and Vaidya, 2004).

Government in both developed and developing countries together with donor agencies are playing a crucial role to foster the adoption of the internet (OECD, 1999), as Government intervention is critical in sustainable technological development in the readymade garments sector (Rothwell, 1994). South Asian Development Facility (SEDF), a concern of the World Bank, is also working for technology and internet adoption in some Asian countries. The role of institutions has been studied by many researchers like the role of Government (Scupola, 2003), the role of professional association (Damsgaard and Lyytinen, 2001). Kapurubandara and Lawson (2008) emphasized the need for training programs, workshops and seminars in local languages for awareness and skill development in the adoption of the internet in the readymade garments sector. Obviously, the developed countries internet adoption model cannot fully explain the internet adoption behaviors of developing countries, especially in the countries like Bangladesh.

In the Research study of Chwelos et al. (2001), it is argued that External Pressure encapsulates the influences arising from several sources within the competitive environment surrounding the organization: *competitive intensity*, relating to the ability of the internet to maintain or increase competitiveness within the industry; *Business Partners' Influence*, relating to the efforts of industry associations or business partners to spread internet standards and encourage adoption; and *Government Support*, relating to the efforts to remove the industry related barriers and to expand access to the internet (Provan, 1980).

Hypothesis 2 (H2): *Higher external pressure will lead to greater intension to adopt the Internet in the Garments sector of Bangladesh.*

Intension to adopt the internet can be defined as the degree to which an organization has the intention to try a new innovation on a limited basis (Ang et al., 2003). The greater the opportunity to try an innovation, the easier it is easy for consumers to evaluate it and ultimately adopt it. New ideas that can be tried will generally be adopted more rapidly than innovations that cannot be given a

small-scale trial. Kendall et al. (2001) found that a testable innovation is less risky for the adopters. In this research model, Organizational Readiness captures the organizational factors, as well as, the technological and the inter-organizational factor. Finally, the external pressure construct is composed of inter-organizational factors as well as the macro level factors.

Operationalization of Research Model

In order to explore the factors affecting levels of Internet adoption, respondents were questioned on their perceptions of the facilitators, inhibitors, advantages, and disadvantages of Internet adoption. While the set of 27 distinct adoption factors was derived primarily from the exploratory qualitative research, many of the issues have also been mentioned in the literature. Each factor was explored using a seven-point Likert scale to ascertain the extent to which the factor was perceived to have influenced the adoption decision. For this study the authors have used Organizational readiness and external pressure constructs to find out the factors affecting internet adoption in the garments sector of Bangladesh. The construct organizational readiness is composed of 4 sub-constructs; the construct external pressure is the combination of 3 sub-constructs. Table 02 provides a full list of the constructs relating to the factors affecting Internet adoption. All the related variables with every constructs are given in the Appendix-A.

Table 02: Measurement Items and Their Sources

	Type of the Construct	Name of the Sub-constructs	Type of the Sub-Constructs	Related Sources	No. of Items
Intent to Adopt	Reflective	Nil	Nil	Lee, 2009	3
Organizational Readiness	Formative	Perceived Benefits	Reflective	Chowelos et al., 2001	4
		Organizational Capabilities	Reflective	Ifinedo 2008	3
		Top Management Support	Reflective	Lin et al., 2002	4
		Information Sharing Culture	Reflective	Teo et al., 2009	3
External Pressure	Formative	Competitive Intensity	Reflective	Zhu et al., 2004	4
		Business Partner Influence	Reflective	Chau and Hui, 2001	4
		Government Support	Reflective	Zhu and Kraemer, 2005	2

METHODOLOGY

The data for the study were collected from Bangladesh, which falls within the developing-countries classification. Bangladesh is situated in Asia, a region often considered least prepared for internet, e-commerce and electronic data interchange (EDI) facilities (Dutta et al., 2004; World Bank, 2001). Bangladesh's experience with and approach to internet adoption in the readymade garments sector is expected to influence other countries in the continent and beyond. Many in the development community look to Bangladesh for leadership in information and communication (ICT) development because it is a key player on the Asian continent and a promoter of the new partnership for Asian development (Davison et al., 2000). Studies of Bangladesh's readymade garments industry therefore, can offer important lessons about internet diffusion in other developing countries. Further, because Bangladesh is one of the most advanced readymade garments market among the developing countries in the globally competitive market, the benefits of the adoption of the internet will be seen as sufficiently relevant to motivate consideration even at the earliest stages of readiness. The Government of Bangladesh is aiming to utilize this potentiality properly and to build "Digital Bangladesh". The foregoing observations make Bangladesh a salient choice for a study of the internet adoption phenomenon in developing countries.

The aim of this research is to build upon the findings of previous exploratory, qualitative research that identified a number of critical factors affecting Internet adoption in the RMG sector, based upon a sample of 150 garments. The chosen survey instrument was a questionnaire as it offers the maximum potential to produce results that are generalizable in terms of the population (McGrath, 1982). While the rigorous process by which the questionnaire was designed, pre-tested, and ultimately distributed is summarized in table 03, the aim of this section is to focus in particular on the content of the questionnaire and the mechanisms by which it was ultimately targeted and distributed.

Table 03: Summary of Research Method

Steps	Purpose and Outcome
Literature Review	Literature reviewed to gain insights into the factors that might affect Internet adoption. The work of Rogers (1983), Iacovou et al. (1995), Teo et al. (1997), Vadapalli and Ramamurthy (1997), O'Keefe et al. (1998), and Chwelos et al. (2001) was particularly helpful in this respect.
Qualitative Research	In-depth interviews were conducted to determine the factors that were perceived as being influential in determining the level of Internet adoption. Interviews were conducted with the manager responsible for Internet development in 10 garment manufacturers, which were specifically chosen so that they formed a representative cross-section of the RMG sector.

Instrument Development	Integration of the interview findings and the literature provided the necessary material for the development of a draft questionnaire.
Pretesting	<p>Pretesting (Reynolds et al., 1993) was conducted as a mechanism for both refining and validating the research instrument. The pretesting was conducted in the following three phases:</p> <ol style="list-style-type: none"> 1. A group of 15 appropriate individuals, including academic experts and decision makers each completed the questionnaire and then participated in debriefing interviews. 2. A further eight academic experts and decision makers who have not participated in the first phase of pretesting critically evaluated the questionnaire. 3. Representatives of 30 garment manufacturers completed the questionnaire and provided critical feedback with respect to its validity, wording, and clarity. <p>After each of the three phases, the draft questionnaire was modified to take account of the participants' concerns and observations. The pretesting resulted in many significant changes to the questionnaire's design, which greatly increased its quality.</p>
Full Survey	The survey, once thoroughly validated, was mailed to the leading garment manufacturers (150 garments). The respondents were all managers or senior managers, IT managers, Merchandisers typically from the Information Technology function.

In order to address the four research objectives highlighted in the previous Section, it was necessary to develop a series of measures that would adequately describe a garment's maker's level of Internet adoption and the factors that have been influential in its adoption. The research questionnaire was developed through an iterative process of review and refinement, and it was ultimately divided into two major sections. The first section records company details and information specific to the respondent's position and role. This section also sought to classify the company's product activity sector, the size of the organization in terms of the total number of employees, the total number of IT staff, average annual sales, and percentage of sales in overseas, organizations' ownership pattern, respondents' job experience, and their level of internet (website) involvement. The other section records respondents' response regarding two constructs, which are composed of seven sub-constructs.

The primary objectives of the targeting exercise were to determine which types of individuals, in which class of organizations to target (Doherty et al., 2003). In this study Readymade Garments were an obvious starting point, for this and readymade garments were taken as the sampling units. To make the sample a generalizable one, the list of the members of the Bangladesh Garment Manufacturers and Exporters Association (BGMEA) was taken as the sampling

frame. BGMEA is the apex trade body that represents the export oriented woven, knit, and sweater garment manufacturers and exporters of the country. This study exercised the probability sampling technique. A total number of 150 garments makers were selected by using a simple random sampling technique. According to the literature review and the official data of the BGMEA, there are around 2913 member garment manufacturers in Bangladesh. With respect to the choice of individuals and organizations to target, the qualitative research indicated that the employee with responsibility for internet development was most likely to be a manager working in the information technology department, merchandising department or in a smaller number of cases, the CEO, Chairman or the Owner of the organization. These individuals were invited to either complete the questionnaire, if they were responsible for their organization's internet activities, or forward it to the manager with the most direct responsibility. Consequently, it can be concluded that if there is any bias, it is minimal, and will not unduly affect the generalisability of the results, within the confines of the sampling frame.

Given the prediction-oriented nature of this research and the relatively small sample size compared with the number of variables, the Partial Least Squares (PLS) Graph (version 3, build 1126) was used to validate the measures and test our research model. PLS has special abilities that make it more appropriate than other techniques, such as multiple regression and LISREL, to handle relatively small sample sizes. Furthermore, PLS has the ability to account for measurement errors for unobserved constructs and to examine the significance of structural paths simultaneously (Chin et al., 2003). PLS is better suited when the focus is on theory development, whereas LISREL is preferable for confirmatory testing of the fit of a theoretical model to observed data, thus requiring stronger theory than PLS (Barclay et al., 1995).

Recently, Structural Equation Modeling (SEM) has become more popular in Information Systems research. One benefit of SEM is that you can simultaneously assess the measurement model (relationship between constructs and measures) and the path model (relationship between the constructs) to test theoretical relationships. This advantage of SEM, therefore, is useful in theoretical research which includes: **(a)** the relationships between constructs and **(b)** describes the relationships between the construct and measures (Edwards et al., 2000). The direction of the relationship between measures and constructs can flow in two directions: directly from the measure to the construct or directly from the construct to the measure. It is important for researchers to pay attention to the direction of causality between measures and constructs as attention to directional causality leads to serious consequences. The two types of latent construct measurement models are reflective and formative. Reflective measures are caused by the latent construct, whereas, formative measures cause the latent construct. Reflective indicators are used when a construct is deemed to exist before it is measured, and each item "reflects" this unmeasured latent variable. Because each item reflects the same latent variable, the construct is

unidimensional, and therefore the items should be correlated, making measures of internal consistency appropriate (Chwelos et al., 2001). The second type of measurement model is called formative. In contrast to reflective ones, formative constructs are the indicators that influence the construct. These are often called 'causal' indicators and the construct is often termed a combination variable (Maccallum et al., 1993) or composite variable (MacKenzie et al., 2005). This means that the measures cause the construct and that the construct is fully derived by its measurement. In the case of a formative construct, the measurement error is at the construct level, meaning that part of the construct is not explained by the measures.

ANALYSIS

All the items related with the sub-constructs were measured on a ratio scale using Likert 7-point measurement. The content validity of the measures was examined by pre-tests with 30 garment makers to validate the instruments; we examined internal consistent reliability, convergent validity, and discriminant validity. For this study separate factor analyses were performed as the organizational readiness, external pressure and intention to adopt internet constructs to ensure that the ratio of variable items to the sample size was maintained at 1:5. This statistical rule of thumb was suggested by Kelinger (1986), has been used in numerous studies (Grover, 1993; King and Sabherwal, 1992; Premkumar and Ramamurthy, 1995).

Table 04: Measurement Model

Construct	Items	Composite Reliability	AVE	Loadings	t-statistics
Intent to Adopt	IA1	0.876	0.708	0.892	47.17*
	IA2			0.955	86.35*
	IA3			0.644	9.75*
Perceived Benefits	PB1	0.820	0.541	0.784	7.25*
	PB2			0.806	6.30*
	PB3			0.807	7.93*
	PB4			0.500	4.05*
Organizational Capabilities	OC1	0.659	0.401	0.600	2.96*
	OC2			0.784	6.89*
	OC3			0.489	1.95**

Top Management Support	TMS1	0.849	0.587	0.733	10.17*
	TMS2			0.853	13.27*
	TMS3			0.631	5.78*
	PMS4			0.826	10.25*
Information Sharing Culture	ISC1	0.874	0.700	0.858	18.16*
	ISC2			0.853	9.96*
	ISC3			0.793	6.59*
Competitive Intensity	CI1	0.827	0.549	0.758	13.21*
	CI2			0.881	36.05*
	CI3			0.682	9.88*
	CI4			0.617	10.40*
Business Partner Influence	BPI1	0.842	0.577	0.836	26.73*
	BPI2			0.849	17.60*
	BPI3			0.555	4.30*
	BPI4			0.762	9.28*
Government Support	GS1	0.749	0.623	0.9986	9.59*
	GS2			0.500	2.79*

Note: *significant at 1% level; **significant at 5% level

Internal consistent reliability was examined using composite reliability. In PLS, composite reliability relies on actual loadings to compute the factor scores and is a better indicator of internal consistent reliability than Cronbach's alpha (Ranganathan et al., 2004). As shown in Table 4, the composite reliability values for the sub-constructs in the model were all above the suggested threshold of 0.7 (Chin, 1998; Straub, 1989) except Organizational Capabilities and thus support the reliability of the measures. Two tests were used for convergent validity. The first examined item reliability by their factor loadings on the construct. As table 04 shows, all items had a loadings above the suggested 0.55 (Falk and Miller, 1992) except the Perceived Benefits, Organizational Capabilities and Government Support sub-constructs. The second test examined average variance extracted (AVE) of constructs. The AVE values for all the sub-constructs were above the limit of 0.50 (Fornell and Larcker, 1981) except for the Organizational Capabilities sub-construct. The AVE value of the sub-construct Organizational capabilities is 0.401 which is marginal to the standard AVE value. Furthermore, all estimated standard loadings were significant at the 0.01 level ($p < 0.01$), suggesting good convergent validity.

Discriminant validity was examined at both item and construct level. For this study the authors have examined the discriminant validity at the construct level. At the construct level, the square root of the AVEs in the diagonal cells for each construct is larger than any correlation between this construct and any other construct (Fornell and Larcker, 1981), as the table 05 presents. Thus, the discriminant validity was supported.

Table 05: Correlation Among Constructs

	IA	OC	PB	TMS	CI	BPI	GS	ISC
Intent to Adopt	0.84							
Organizational Capabilities	0.71	0.63						
Perceived Benefits	0.43	0.41	0.73					
Top Management Support	0.38	0.53	0.59	0.77				
Competitive Intensity	0.64	0.54	0.36	0.30	0.74			
Business Partner Influence	0.37	0.30	0.33	0.47	0.49	0.76		
Government Support	0.37	0.34	0.65	0.28	0.37	0.23	0.79	
Information Sharing Culture	0.37	0.39	0.04	0.20	0.69	0.57	0.16	0.84

Note: Bold diagonal elements are the square root of AVE, by rules of thumb should be larger than off-diagonal elements, demonstrate Discriminant validity.

The structural model in PLS is assessed by examining the standardized path coefficients (direct effect). The path coefficients indicate the strength of relationships between constructs. The significance of the path coefficients is assessed by the bootstrap t-values which should be higher than 2 (Chin, 1998). The PLS path coefficients are shown in Figure 2. For this analysis, the sample is composed of the 150 responses from garments industry with the dependent variable "Intention to adopt the Internet". Statistical significance was assessed using a bootstrap procedure, with a 500 resample. Because the study of (Chin, 1998) found that PLS does not generate an overall goodness-of-fit index, one primarily assesses validity by examining R^2 and the structural paths, as one would with a regression model. The findings support the primary hypotheses (Hypothesis 1 and 2) of the model (see Figure 2). Organizational Readiness and External Pressure are all positively related to the intention to adopt Internet, with significance at the $p < 0.001$ and $p < 0.005$ level. Approximately 79% of the variance in intention to adopt the Internet is accounted for by these two

independent constructs in the model ($R^2 = 0.785$). The standardized path coefficients range from 0.281 to 0.638, exceeding the suggested minimum standard of significance at 0.20 (Chin, 1998). Thus, the fit of the overall model is good.

Figure 02: Internet Adoption Model

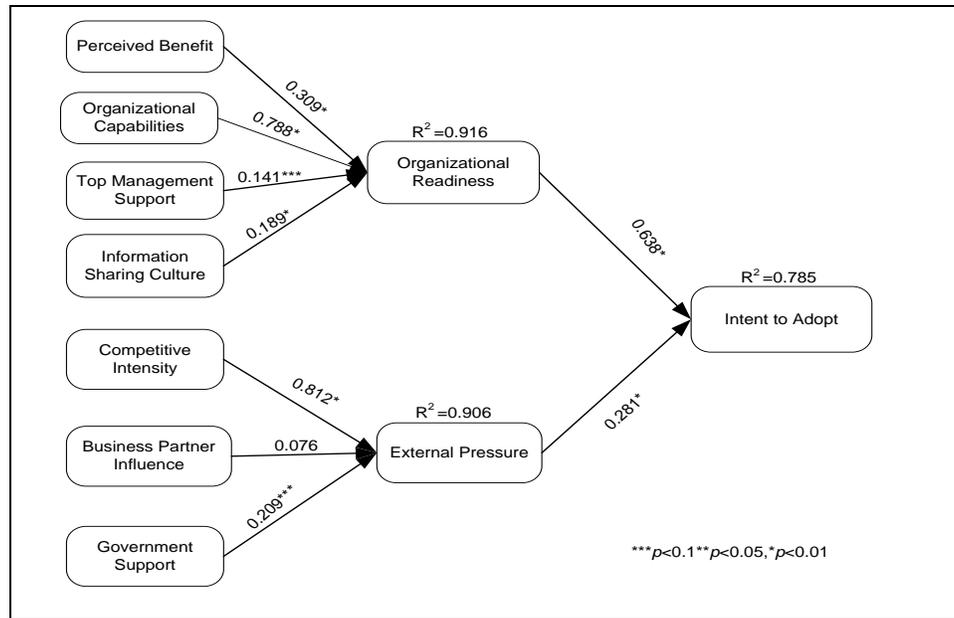


Table 06: Measurement Items and their Co-Efficient Value

Construct	Sub-constructs	Type	Path Co-efficient Value	R ²
Intent to Adopt	Nil	Reflective	Nil	0.785
Organizational Readiness	Perceived Benefits	Reflective	0.309	0.916
	Organizational Capabilities	Reflective	0.788	
	Top Management Support	Reflective	0.141	
	Information Sharing Culture	Reflective	0.189	
External Pressure	Competitive Intensity	Reflective	0.812	0.906
	Business Partner Influence	Reflective	0.076	
	Government Support	Reflective	0.209	

Effect size (f^2) was also computed to judge the strength of the effect of a particular independent variable on the dependent variable (Chin, 1998). It was obtained by: $f^2 = \frac{R^2_{included} - R^2_{excluded}}{1 - R^2_{included}}$. The threshold cut-off value of $f^2 = 0.02$ for small effect, $f^2 = 0.15$ for medium effect and $f^2 = 0.35$ for large effect sizes (Cohen et al. 1988). Multiplying the value of effect size (f^2) by $(n-k-1)$, where n is sample size, k is number of independent construct, provides a pseudo F statistic. These F statistics can be used for measuring the significance of effect size (f^2) with 1 and $n-k$ degrees of freedom (Mathieson et al., 2001). The results of f^2 and corresponding F statistics are presented in table 07, which shows that both two indicators have certain effects on Internet adoption, varying from small effect to larger effect. Organizational Readiness has the largest effect on the adoption of the internet on the other hand, External pressure has only a small effect on the dependent variable that is the intension to adopt the internet. The significant test of effect size shows that effect size of organizational readiness is significant at 1% level.

Table 07: Effect Size in the Operational Model

Construct Excluded	$R^2_{excluded}$	f^2	Degree of Effect	F value
Organizational Readiness	0.666	0.553	Larger effect	49.82*
External Pressure	0.761	0.117	Small effect	10.51*

* Significant at 1% level

All three sub-constructs of the construct Organizational Readiness are positive and significantly contribute to the intension to adopt the Internet. The weights on the sub-constructs reveal their relative importance in determining organizational readiness. Two of the four sub-constructs were found to be relatively more important for the intension to adopt the internet. These are: Organizational capabilities (0.788), and Perceived Benefits (0.309). The rest two sub-constructs which are Top Management support (0.141) and Information sharing Culture (0.189), have also a positive influence on the intention to adopt the internet. But the loadings for these sub-constructs are poorer than the other two. Because PLS estimates the measurement model and the relationships between constructs simultaneously, the item weights of formative constructs display the importance of their impact on intention to adopt the Internet (Chwelos et al., 2001). These

weights can be interpreted similarly to estimated beta coefficients from a multiple regression analysis. The sub-construct weights for the formative constructs are presented in Table 6. Two of the three sub-constructs of the construct external pressure, competitive intensity (0.812) and Government Support (0.21), are positive and significantly contribute to the intention to adopt the internet. For this study, the authors have already developed two hypotheses to find out the impact of Organizational Readiness and External Pressure on the Dependent variable that is Intention to Adopt the Internet. From Table 8 we will get clear findings about the above hypotheses. The hypotheses can be tested by using the significance of the standardized path coefficients which can be assessed by the bootstrap t-values which should be higher than 2 (Chin, 1998). From the following table (see table 08) we can see the t-value for the path of H1 is 8.035 and H2 3.500 which are far above the standard value. So this study supports both of our hypotheses which focus on the fact that both organizational readiness and external pressure will lead to greater intent to adopt the internet.

SUMMARY OF THE RESEARCH

From this study the authors have found that all the constructs and sub-constructs support the reliability of the measures. All the constructs and sub-constructs are satisfying all the reliability and validity tests except one or two sub-constructs, but they are also very marginal to the standard measures. In this study, the authors have used two independent constructs. Between the two independent constructs, Organizational Readiness has the largest effect on the adoption of the internet and, External pressure has the smaller effect on the dependent variable that is the intention to adopt the internet. Because these two independent constructs have extensive impact on the adoption of the internet and the t-value is well above the moderate value, the authors can conclude that both of their hypotheses are supporting the measures which indicate that both organizational readiness and external pressure will lead to greater intent to adopt the internet.

Table 08: Summary of Results

Hypotheses	Standardized path coefficient	t-value for path	Results
Hypothesis 1 (H1): Higher organizational readiness (OR) will lead to greater Intent to adopt Internet (ITAI)	0.638	8.035	Supported
Hypothesis 2 (H2): Higher external pressure (EP) will lead to greater intent to adopt Internet(ITAI)	0.281	3.500	Supported

Approximately 79% of the variance in intention to adopt the Internet is accounted for by these two independent constructs in the model ($R^2 = 0.785$). Thus, the fit of the overall model is good. The construct Organizational readiness highly depends on the two sub-constructs, organizational capabilities and perceived benefits. The other construct External pressure directly linked with the competitive intensity. So the intention to adopt internet largely depends upon the accumulative structure of the above sub-constructs. In the similar study of Chwelos et al. (2001) on the developed countries (U.S.), it was found that competition is the only one strong external factor that highly affects the adoption of the internet. However, in this study, government support and trading partner influence were also found significant. This is may be because the study has been conducted in a developing country, Bangladesh, where government rules and regulations still play a significant role in technology adoption.

CONCLUSION

This empirical study has applied rigorous statistical methods in the development of taxonomy of distinct and meaningful factors that have the potential to influence the uptake of the Internet within the garment sector. The economy of a country like Bangladesh greatly depends on the flow of export oriented products and services and the readymade garments industry of Bangladesh is one of the biggest bread earners and also earned foreign exchange for the country. As the internet has become the most efficient and effective media of communication, it does not require mentioning that without the usage of this medium, many business and non-business dealings will lag behind. With the growing development of the RMG sector, it has become evident that there has to be efficient openings for the usage of modern communication technology. Taking advantage of the Internet as the vehicle of communication has enabled numerous garment manufacturing companies to communicate faster and achieve an easier and clearer level of communication with their counterparts across borders.

More specifically, it has been shown that operating in an appropriate market sector and having a positive view of the viability of the Internet, when coupled with an appropriate strategy, level of commitment of the management, competitive intensity, government support, information sharing culture of the management, and organizational capability, have the greatest influence on Internet adoption. Such insights are of particular importance at this period of time when many organizations are making the transition from a relatively limited to a more extensive web presence in this extensively competitive world. While the findings will be of most significance to those organizations operating within the garments sector of Bangladesh, it is likely that they will also be of interest to the garments industry in other countries that have still to establish a significant web presence. Finally, given that the Internet is an increasingly important, highly dynamic, and global phenomenon, it is important that a variety of follow-up studies are conducted. In particular, it is important that similar studies are

conducted in a range of sectors, in a variety of countries to identify areas of commonality and variation, in terms of the factors influencing Internet adoption.

REFERENCES

- Ajzen, I. (1985). "From intentions to actions: A theory of planned behavior". In J. Kuhl and J. Beckmann (eds.), *Action Control: From Cognition to Behavior*. New York: Springer Verlag, pp.11-39.
- Ang, C., Tahar, R. M. and Murat, R. (2003). "An empirical study on electronic commerce diffusion in the Malaysian shipping industry", *Electronic Journal of Information Systems in Developing Countries*, Vol. 14, No. 1, pp.1-9.
- Azam, M. S. (2007). "Implementation of B2C E-commerce in Bangladesh: The effects of buying culture and E-infrastructure", *Advances in Global Business Research*, Vol. 3, No.1, pp.55-81.
- Azam, M. S. (2006). "Implementation of B2C e-commerce in Bangladesh: The effects of buying culture and e-infrastructure" In Dianne H.B. Welsh, Mohd. Shukri Ab Yajid, Valentin H. Pasthenko and Zafar U. Ahmed (Eds.), *Advances in Global Business Research*, Vol. 3, pp.55-66.
- Azam, M. S. (2005). "Adoption of personal computer in Bangladesh: The effects of perceived innovation characteristics" In Noorhayati Mansor, Lim Thien Sang, Mohd Safri Saiman and Kalsom Abd Wahab (Eds.), *Proceedings of the 2nd International Conference of the Asian Academy of Applied Business (AAAB)*, 28 - 30 July, Padang, Indonesia, pp.647-655.
- Barclay, D., Higgins, C. and Thompson, R. (1995). "The partial least squares approach to causal modeling: Personal computer adoption and use as an illustration", *Technological Study*, Vol. 2, No. 2, pp.285-309.
- Bridges.org. (2006). "E-readiness assessment: Who is doing what and where", Available at <www.bridges.org>
- Bunker, D. J. and MacGregor, R. C. (2000). "Successful generation of information technology (IT) requirements for small/medium enterprises (SME's): Cases from regional Australia." *Proceedings of the SMEs in a Global Economy*, 2000, Wollongong, Australia, pp.72-84.
- Chin, W. W., Marcolin, B. L. and Newsted, P. R. (2003). "A partial least squares latent variable modeling approach for measuring interaction effects: Results from A Monte Carlo Simulation study and an electronic mail adoption study", *Information Systems Research*, Vol. 14, No. 2, pp.189-217.
- Chin, W. W. (1998). "Issues and Opinion on Structure Equation Modeling", *MIS Quarterly*, Vol. 22, pp.vii-xvi.
- Choucri, N. et al. (2003). Global e-readiness: For what? <<http://ebusiness.mit.edu>>
- Chwelos, P., B. Izak and D. Albert S. (2001) "Research report: Empirical test on an EDI adoption model", *Journal of Information Systems Research*, Vol. 12, No. 3, September 2001, pp.304-321.
- Cloete, E., Courtney, S. and Fintz, J. (2002). "Small business acceptance and adoption of e-commerce in the Western-Cape Province of South-Africa", *Electronic Journal of Information Systems in Developing Countries*, Vol. 10, No. 4, pp.1-13.

- Damsgaard, J. and Lyytinen, K. (2001). "The Role of Intermediating Institutions in Diffusion of Electronic Data Interchange (EDI): How industry associations in the grocery sector intervened in Hong Kong, Finland, and Denmark", *The Information Society*, Vol. 17, No. 3, pp.195-210.
- Damanpour, F. (1991) "Organizational innovation: A meta-analysis of effects of determinants and moderators" *Academy of Management Journal*, Vol. 34, No. 3, pp.555-591.
- Davis, C. H. (1999). "The rapid emergence of electronic commerce in a developing region: The case of Spanish-speaking Latin America", *Journal of Global Information Technology Management*, Vol. 2, No. 3, pp.25-40.
- Davis, F. D. (1993). "User acceptance of information technology: Systems characteristics, user perception and behavioral impacts", *International Journal of Man-Machine Studies*, Vol. 38, pp.475-487.
- Davis, F. D. (1989). "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 1, pp.319-340.
- Davis, F. D. (1986). "A technology acceptance model for empirically testing new end-user information systems: Theory and results", An unpublished doctoral dissertation, Massachusetts Institute of Technology.
- Davison, R. et al. (2000) "Technology leapfrogging in developing countries: An inevitable luxury" *Electronic Journal of Information Systems in Developing Countries*, Vol. 1, No. 5, pp.1-6.
- Doherty, N. F., Chadwick, F. and Hart, C. A. (2003). "An analysis of the factors affecting the adoption of internet in the UK Retail Sector", *Journal of Business Research*, Vol. 56, pp.887-897.
- Dos-Santos, B. L. and Peffers, K. (1998). "Competitor and vendor influence on the adoption of innovative applications in electronic commerce", *Information and Management*, Vol. 34, pp.175-184.
- Dutta, A. and Roy, R. (2004). "The mechanics of Internet growth: A developing country perspective", *International Journal of Electronic Commerce*, Vol. 9, No. 2, pp.143-166.
- Dutta, S., Lanvin, B. and Paua, F. (2004). "*The Global Information Technology Report, 2003-2004: Towards an Equitable Information Society*", Oxford: Oxford University Press.
- Eriksson, L. T. et al. (2008). "Small business e-commerce development in Sweden - an empirical survey", *Journal of Small Business and Enterprise Development*, Vol. 15, No. 3, pp.555-570.
- Falk, R. F. and Miller, N. B. (1992). "*A Primer for Soft Modeling*", Akron, University of Akron Press.
- Fichmann, R. G. (1992) "Information technology diffusion: A review of empirical research" In DeGross, J. I., Becker, J. D. and Elam, J. J. (eds.), *The Proceedings of the Thirteenth International Conference on Information Systems*. Atlanta: Association for Information Systems, pp.196-206.

- Fornell, C. and Larcker, D. F. (1981). Evaluating Structural Models with Unobserved Variables and Measurement Errors. *Journal of Marketing Research*, Vol. 18, pp.39-50.
- Fowler, F. J. (1993). *Survey Research Methods*, 2nd edition, London: Sage.
- Gefen, D. and Straub, D. (2000). "The relative importance of perceived ease of use in IS adoption: A study of e-commerce adoption", *Journal of the Association for Information Systems*, Vol. 1, No. 8, pp.1-30.
- Goode, S., and Stevens, K. (2000). "An analysis of the business characteristics of adopters and non-adopters of WWW technology", *Information & Management*, Vol. 1, No. 1, pp.129-154.
- Grandon, E. E., and Pearson, J. M. (2004). "Electronic commerce adoption: An empirical study of small and medium US businesses", *Information & Management*, Vol. 42, No. 1, pp.197-216.
- Grover V. (1995). "An empirically derived model for the adoption of customer based inter-organizational systems", *Decis Sci*, Vol. 24, No. 3, pp.603- 40.
- Guglani, S. (2001). "Future of E-Finance for SMEs ", *A Paper Presented in Expert Group Meeting on Improving Competitiveness of SMEs in Developing Countries: Role of Finance, including E-Finance to Enhance Enterprise Development*", Geneva, 22-24, pp.1-16.
- Hadidi, R. (2003). "The status of e-finance in developing countries", *Electronic Journal of Information Systems in Developing Countries*, Vol. 11, No. 5, pp.1-5.
- Hartman, A., Sifonis, J. and Kador, J. (2000). *Net Ready: Strategies for Success in the Economy*. New York: McGraw-Hill.
- Humphrey, J. et al. (2003). *The Reality of E-Commerce with Developing Countries*. London: London School of Economics.
- Iacovou, C. L., Benbasat, I. and Dexter, A. S. (1995). "Electronic data interchange and small organizations: Adoption and impact of technology", *MIS Quarterly*, Vol. 19, No. 4, pp.465-485.
- Kapurubandara, M. and Lawson, R. (2007). "SMEs in Developing Countries Need Support to Address the Challenges of Adoption e-commerce Technologies", 20th Bled eConference eMergence.
- Kartiwi, M. and MacGregor, R. C. (2007). "Electronic Commerce Adoption Barriers in Small to Medium-Sized Enterprises (SMEs) in Developed and Developing Countries: A Cross-country Comparison", *Journal of Electronic Commerce in Organizations* Vol. 5, No. 3, pp.35-51.
- Kendall, J. T. (2001). "Electronic commerce adoption by SMEs in Singapore", *Proceedings of the 34th Hawaii International Conference*, <<http://www.computer.org/Proceedings/hicss/0981>>, Visited on 12 February 2004.
- Kerlinger, F. N. (1986). *Foundations of Behavioral Research*, New York: Holt, Rinehart & Winston.
- Khalifa, M. and Davison, R. M. (2006). "SME Adoption of IT: The Case of Electronic Trading Systems", *IEEE Transactions on Engineering Management*, Vol. 53, No. 2, pp. 275-284.

- King, J. L. et al. (1994). "The institutional factors in information technology innovation", *Information Systems Research*, Vol. 5, No. 2, pp.139-169.
- King, W. and Sabherwal, R. (1992). "The factors affecting strategic information systems applications: An empirical assessment", *Information and Management*, Vol. 23, pp. 217-235.
- Kuan, K. K. Y., and Chau, P. Y. K. (2001). "A perception-based model for EDI adoption in small businesses using a technology-organization-environment framework", *Information & Management*, Vol. 38, pp.507-521.
- Lakhanpal, B. (1994). "Assessing the factors related to microcomputer usage by middle managers", *International Journal of Information Management*, Vol. 14, pp.39-50.
- Lederer, A. L., Mirchandni, D. A. and Sims, K. (1997). The link between information strategy and electronic commerce. *Journal of Organizational Computing and Electronic Commerce* Vol. 7, No. 1, pp.17-34.
- Limthongchai, P. and Speece, M. W. (2002). "The effects of perceived characteristics of innovation on e-commerce adoption by SMEs in Thailand", <<http://www.blake.monclair.edu/cibconf/conference/DATA/Theme7/Thailand2.pdf>>, (8 March 2004).
- Maccallum, R. C., and Browne, M. W. (1993). "The Use of Causal Indicators in Covariance Structure Models - Some Practical Issues", *Psychological Bulletin*, Vol. 114, No. 3, pp.533-541.
- MacKenzie, S. B., Podsakoff, P. M. and Jarvis, C. B. (2005). "The problem of measurement model misspecification in behavioral and organizational research and some recommended solutions", *Journal of Applied Psychology*, Vol. 90, No. 4, pp.710-730.
- Malone, T. W., Yates, J. and Benjamin, R. I. (1987). "Electronic markets and electronic hierarchies", *Communications of the ACM*, Vol. 30, No. 6, pp.484-497.
- Mann, C. L. (2000). "Electronic commerce in developing countries: Issues for domestic policy and WTO negotiations", In S. Robert (ed.), *Services in the International Economy: Measurement, Modeling, Sectoral and Country Studies, and Issues in the World Services Negotiations*. Ann Arbor: University of Michigan Press, pp. 34-58.
- Mathieson, K., Peacock, E. and Chin, W. (2001). "Extending the Technology Acceptance Model: The influence of Perceived Resources", *The Data Base for Advances in Information Systems*, Vol. 32, No. 3, pp.86-112.
- McGrath, J. D. (1982). *The study of research, choices and dilemmas*. pp.69-102.
- Mehrtens, J., Cragg, P. B. and Mills, A. M. (2001). "A model of Internet adoption by SMEs", *Information & Management*, Vol. 38, pp.165-76.
- Mirchandani, D. A., and Motwani, J. (2001). Understanding small business electronic commerce adoption: An empirical analysis. *Journal of Computer Information Systems*, Vol. 41, No. 3, pp.70-74.
- Molla, A., and Licker, P. (2005). "E-commerce adoption in developing countries: A model and instrument", *Information & Management*, Vol. 44, No. 6, pp.877-899.

- Molla, A. and Licker, P. S. (2005). "Perceived E-Readiness Factors in E-Commerce Adoption: An Empirical Investigation in a Developing Country", *International Journal of Electronic Commerce*, Fall 2005, Vol. 10, No. 1, pp.83-110.
- Montealegre, R. (1999). "A case for more case study research in the implementation of information technology in less-developed countries", *Information Technology for Development*, Vol. 8, pp.199-207.
- Montealegre, R. (1999). "A temporal model of institutional interventions for information technology adoption in less developed countries", *Journal of Management Information Systems*, Vol. 16, No. 1, pp.207-232.
- Moody (2010). "Credit Analysis: Bangladesh" *Moody's Investors Service*, pp.1-14.
- O'Keefe R, O'Connor, G. and Kung, H. J. (1998). "Early adopters of the Web as a retail medium: small company winners and losers", *European Journal of Marketing*, Vol. 32, No. 7/8, pp.629-643.
- Odedra-Straub, M. (2003). "E-commerce and development: Whose development?" *Electronic Journal of Information Systems in Developing Countries*, Vol. 11, No. 2, pp.1-5.
- OECD (1999). "Business-to-Business E-commerce: Status, Economic Impact and Policy Implications", *OECD Working Paper*, No. 77.
- Orlikowski, W. (1993). "CASE as organizational change", *Management Information Systems Quarterly*, Vol. 17, No. 3, pp.309-340.
- Oxley, J., and Yeung, B. (2001). "E-commerce readiness: Institutional environment and international competitiveness", *Journal of International Business*, Vol. 32, No. 4 (4th quarter, 2001). pp.705-724.
- Pare, D. J. (2003). "Does this site deliver? B2B e-commerce services for developing countries", *Information Society*, Vol. 19, No. 2, pp.123-135.
- Porter, M. E. (2001). "Strategy and the Internet", *Harvard Business Review*, March, Vol. 79, No. 3, pp.63-78.
- Porter, M. E., and Millar V. E. (1996). "How information gives you competitive advantage", In *Managing Information for the Competitive Edge* (Auster, E., and Choo, C.W. eds), Neal-Schuman Publishers Inc., New York , pp.71-92.
- Premkumar, G. and Crum, M. R. (1997). "Determinants of EDI adoption in the transportation industry", *European Journal of Information Systems*, Vol. 6, No. 2, pp.107-121.
- Premkumar, G. and Potter, M. (1995). "Adoption of computer aided software engineering (CASE) technology: An innovation adoption perspective", *Data Base for Advances in Information Systems*, Vol. 26, pp.105-123.
- Premkumar, G. and Ramamurthy K. (1995). "The role of inter organizational and organizational factors on the decision mode for adoption of inter organizational systems", *Decision Sci*, Vol. 26, No. 3, pp.303-336.
- Provan, K. G. (1980). "Recognizing, measuring, and interpreting the potential/enacted power distinction in organizational research", *Acad. Management Rev*, Vol. 5, No. 4, pp.549-559.

- Ramayah, T, D. et al. (2006). "Perceived characteristics of innovating (PCI): The case of the human resource information systems (HRIS)", In Dianne H.B. Welsh, Mohd. Shukri Ab Yajid, Valentin H. Pasthenko and Zafar U. Ahmed (eds.), *Advances in Global Business Research*, Vol. 3, pp.152-158.
- Ramayah, T., Joshua, I. and Bushra, A. (2004). "PC Usage among students: The case of a private institution of higher learning", *Proceedings of the International Conference on Management Education*, 28-29 June, Kuala Lumpur, Malaysia.
- Ramayah, T, Muhamad, J. and Bushra, A. (2003). "Internet usage among students of institutions of higher learning: The role of motivational variables", *Proceedings of the 1st International Conference on Asian Academy of Applied Business Conference*, 10-12 July, Sabah, Malaysia.
- Ramayah, T. et al. (2003) "Receptiveness of internet banking by Malaysian consumers", *Asian Academy of Management Journal*, Vol. 8, pp.1-29.
- Ranganathan, C., Dhaliwaland, J. S. and Teo, T. S. H. (2004). "Assimilation and Diffusion of Web Technologies in Supply-Chain Management: An Examination of Key Drivers and Performance Impacts", *International Journal of Electronic Commerce*, Vol. 9, pp.127-161.
- Reynolds. N., Diamantopoulos, A. and Schlegelmilch, B. (1993). "Pre-testing in questionnaire design; a review of the literature and suggestions for further research", *Journal of European Business Management School, University of Wales*. Vol. 35, No. 2, pp.171-182.
- Rogers, E. M. (1995). *Diffusions of Innovations*, 4th edition, New York: Free Press.
- Rogers. E. M. (1983). *Diffusion of Innovations*, 3rd edition, New York: Free Press.
- Rothwell, R. (1994). "Issues in User-Producer Relations in the Innovation Process: The Role of Government", *International Journal of Technology Management*, Vol. I9, No. 5, 6, and 7, pp.629-649.
- Santos, B. L. D. and Peffers, K. (1998). "Competitor and vendor influence on the adoption of innovative applications in electronic commerce", *Information and Management*, Vol. 34, pp.175-184.
- Sathye, M. and Diana, B. (2001). "Adoption of electronic commerce by SMEs: Australian evidence", *Journal of E-Business*, Vol. 1, pp.1-11.
- Scupola, A. (2003). "The adoption of Internet commerce by SMEs in the south of Italy: an environmental, technological and organizational perspective", *Journal of Global Information Technology Management*, Vol. 6, No. 1, pp.52-71.
- Straub, D. (1989). "Validating instruments in MIS research", *MIS Quarterly*, Vol. 13, pp.147-169.
- Swatman, P. M. C. and Swatman, P. A. (1992). "EDI system integration: A definition and literature survey", *Inform. Soc.* Vol. 8, No. 3, pp.169-205.
- Swatman, P.M. C. and Swatman, P. A. (1991). "Electronic data interchange: Organizational opportunity, not technical problem", *Proc. 2nd Australian Conf. Databases and Inform. Systems*. Sydney, Australia.
- Tan, M. and Teo, T. S. H. (2000). "Factors influencing the adoption of internet banking", *Journal of the Association for Information Systems*, 1, <[http://www.jais.isworld.org /articles](http://www.jais.isworld.org/articles)>, Visited on 25 February 2004.

- Tan, M., and Teo, T. S. H. (1998). "Factors influencing the adoption of the Internet", *International Journal of Electronic Commerce*, Vol. 2, No. 3, (spring 1998), pp.5-18.
- Tarafdar, M., and Vaidya, S. D. (2004). "Adoption of electronic commerce by organizations in India: Strategic and environmental imperatives", *Electronic Journal of Information Systems in Developing Countries*, Vol. 17, No. 2, pp.1-25.
- Taylor, S. and Todd, P. A. (1995). "Understanding information technology usage: A test of competing models", *Information Systems Research*, Vol. 6, pp.145-177.
- Teo T., Tan, M. and Buk, K. (1997). "A contingency model of Internet adoption in Singapore", *International Journal of Electronic Commerce*, Vol. 2, No. 2, pp.57-69.
- Tigre, P. B. (2003). Brazil in the age of electronic commerce. *Information Society*, Vol. 19, No. 1, pp.33-43.
- Travica, B. (2002). "Diffusion of electronic commerce in developing countries: The case of Costa Rica", *Journal of Global Information Technology Management*, Vol. 5, No. 1, pp.4-24.
- Utterback, J. M. (1994). "Innovation in industry and the diffusion of technology", *Journal of Scientific Research*, Vol. 183, pp.639-675.
- Vreede, G. D., Jones, N. and Mgaya, R. J. (1999). "Exploring the application and acceptance of group support systems in Africa", *Journal of Management Information Systems*, Vol. 15, No. 3, pp.197-234.
- Vadapalli A, and Ramamurthy, K. (1998). "Business use of the Internet: an analytical framework and exploratory case study", *International Journal of Electronic Commerce*, Vol. 2, No. 2, pp.71-94.
- Vadapalli A, and Ramamurthy, K. (1997). "Business use of the Internet: an analytical framework and exploratory case study", *International Journal of Electronic Commerce*, Vol. 2, No. 2, pp.57-69.
- Wang, S. and Cheung, W. (2004). "E-business adoption by travel agencies: Prime candidates for mobile e-business", *International Journal of Electronic Commerce*, Vol. 8, No. 3, pp.43-63.
- World Bank. (2001). *Global Economic Prospects and the Developing Countries*, New York.
- Yap, C. S. (1990). "Distinguishing Characteristics of Organizations of Using Computers", *Information and Management*, Vol. 18, pp.97-107.