

ICT Adoption in Small and Medium Enterprises: An Empirical Evidence of Service Sectors in Bangladesh

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Abstract—The purpose of this study is to improvement a deep understanding of the issues which effect the adoption and practice of ICT by SMEs in Bangladesh. This Study observes the association between ICT adoption and its five factors which are perceived benefits, perceived cost, ICT knowledge, external pressure and government support. The consequences of this Study show that three factors inspected are significantly vital to the adoption of ICT whereas perceived cost and outer pressure are found to be unimportant in determining its adoption. This Study provides a better understanding of SME's awareness about ICT adoption in their provision corporate field. Those SMEs who are interested in endorsing their business on online may find these findings as helpful in guiding their efforts.

Index Terms—Bangladesh, chittagong, Dhaka, ICT, SMEs.

I. INTRODUCTION

Today's business world has been deeply influenced by Information and Communication Technologies (ICT) and the application of ICT amongst commercial is widespread. ICT are quickly changing worldwide production, work and business methods and trade and consumption patterns in and between enterprises and customers. Each commercial must bring ICT into their business process and take benefit of the profits they offer [1]. In the developed countries including Australia and United Kingdom Small and Medium enterprises (SMEs) account for more than half of all business and over half of all service [2]. Nowadays small businesses are gradually using and adopting info and communication technology due to the beginning of Personal Computer, cost-effectiveness and cheaper ICT products. The use of ICT can progress commercial competitiveness with internet as long as numerous opportunities for SMEs to compete similarly with big companies [3]. As the world economy endures to move toward better accumulation as a result of advances in information communications technology, and the growing reduction in trade barriers, some of the greatest opportunities for small businesses will derive from their ability to participate in the regional and international markets [4]. Adoption of the ICT is considered to be a means to enable these businesses to compete on a worldwide scale, with better competence, and closer client and supplier relationships [5]. In this respect, SMEs should consider information and communication technology (ICT) as an important approach in their business to take

competitive advantage from the global markets [6]. Furthermore, ICT is a resource of SME which may benefit them to access and contribute to in order to improve its competitiveness [7].

II. LITERATURE REVIEW

Small and medium enterprises (SMEs) play a vital role in the Bangladesh economy are considered to be the backbone of industrial growth in the country [8]; [9]. Small and medium sized enterprises play a significant role in the country's economic development, particularly in the manufacturing sectors [9]; [10]. A research shows that the services sector grew by 6.8% in 2013, driven by higher consumer. Growth emanated from strong expansion in all sub- sectors with transport and communication in the lead at 8.4% followed by wholesale and retail trade, hotels and restaurants (7.1%) and finance, insurance, real estate and business services (6.5%). Together with new growth areas in information and communications technology (ICT), the services sector was able to maintain its premier position.

III. THE CONCEPTUAL FRAMEWORK FOR THE STUDY

The theoretical model verified in this paper contains constructs that have demonstrated theoretical support, based on a number of studies done in this area in dissimilar advanced and developing countries, particularly on ICT and other invention perspective. The model examines the factors that would possibly affect the ICT adoption.

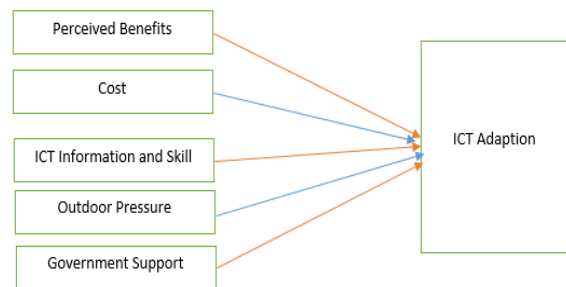


Fig. 1. Conceptual framework.

A. Perceived Benefits

The current study has demonstrated that the better the benefits perceived by the SMEs the higher the possibility of ICT adoption. Perceived benefits should be careful as one of the factors that could affect ICT adoption in the firms. In one experiential study found that ICT is able to offer enterprise a wide range of possibilities for improving their competitiveness such as provide mechanisms for getting

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access to new market opportunities and specialized information services [11]. According to OECD (2004) it was found that ICT is able to improve information and knowledge management inside the firm and increase the speed and reliability of transactions for both business-to-business (B2B) and business-to-consumer (B2C) transactions. Besides that, they also clarified the opportunities accessible by ICT, which an organization can exchange real-time information and build closer relationship with suppliers or business partners and customers. This Study also found the possibility of immediate customer feedback according to the client demand in the new markets.

B. Cost

The price of adoption is a significant issue in the adoption and use of the Web. Generally, the higher the costs adoption of the innovation, the slower the pace of invention expansion is likely to be [12]; [13]. The cost factor was studied by various Information System (IS) studies [14]; [15] & [11] and found direct and significant relationship between cost and adoption of technology. The lower the cost of adoption the higher the new innovation such as the ICT will be adopted by the company and vice versa.

C. ICT Knowledge and Skill

Current study on ICT adoption is emphasized on SMEs and examined the factors influencing SMEs adopting ICT. Small business tends to avoid ICT into their business, if it is seen as complex to use [16]. This is not shocking because SMEs always deficiency of skills between workforce to use ICT [17]. Study reveals that the ICT adoption in SME depends on the CEO/owner being the ICT decision-maker. Their findings clearly specified that ICT adoption is positively connected to firm scope.

D. External Pressure

Outside pressure like pressure from business trading associates is one of the significant predictor that has robust influence on adoption of ICT. Lacking of pressure from their trading partners, the business owner may perceived the technology as a waste of resources [18]; [19]. It means that SMEs trading partners are not fully utilizing IT in doing business. The dependency on client/dealer is carefully connected to 'external pressure to adopt. When a main dealer or customer adopts IT, the small commercial owner is more likely to adopt [20]. The confirmed industry sector has been shown to be interested to adopt technology if competitors and trading partners or a whole industry are adopting IT, the individual small business is likely to adopt as well [21]. A studies, found that small businesses are often forced to use IT by large companies. So this could be a factor driving the use of web-commerce if their trading partners force them to usage it [22]; [23].

E. Governments Support

Both industry and government bodies have a role to play in promoting and supporting small business networking and ICT. A research shows that Australian governments are committed to accessible e-commerce for SMEs, and have decided that some intervention was necessary to make participation affordable, particularly for small and remote businesses [24]. A national framework was established to

ensure all Internet based e-commerce systems used by governments in Australia and New Zealand became fully interoperable, which helped SMEs and their entree to the marketplace [25]. This has strong manufacturing support with most of the major e-commerce facility providers now established in Australia.

IV. HYPOTHESES

A theory is a declaration or scheme that can be verified by referring to a gathering of experiential studies. Hypotheses are typically stated in a form that predicts either the differences or association between two variables under Study [26]. Growth of a theory involving causal collation where possible and quantifiable would be valuable in managerial the analysis policy. Frequently such hypotheses can be made if the meaning of an item is prudently analyzed within a consecutive context.

V. METHODS

A. Samples and Procedures

A survey instrument was expressed to obtain feedback from SMEs in Bangladesh, measuring their awareness, receptivity and adoption of ICT in their corporate industry. In order to focus on SMEs, lists were sought from the Small and Medium Industries Development Corporation (SMIDEC) in Bangladesh web site. As such, the surveys sent out were personally addressed to the owner and or manager of each of SMEs. Due to the exploratory nature of this study, a cross sectional approach was undertaken to measure firms' responses regarding adoption of ICT. The population of this Study comprises all SMEs from service sectors in Dhaka and Chittagong states in Bangladesh that are registered under Small and Medium Industries Development Corporation (SMIDEC). The target groups were SMEs considered based on the number of employees in the industry is most commonly used in management study [27]. The SMIs industries are classified as those industries with total workforce of less than 130 employees [28], Data were gathered based on mail and personal administered questionnaire. A packet of 300 survey instruments, enclosing a return envelope were sent to randomly selected from insurance, banking and finance, health and medical, education, tourism, logistics, professional management, IT related service and advertising sector. The respondents for this Study were targeted to be the owner or manager of the organizations because they always had the chance to deal with ICT in their working position.

To maximize the return rate, three subsequent reminders were sent over telephone and the mail lists maintained by SMIDEC after the initial surveys were mailed. Telephone inquiries were conducted only three weeks later as a last resort for those SMEs that had not responded. The response rate for the survey was 48.25 per cent (183 responses). Due to missing values for at least two sections of the responses 13 samples were discarded from this study and finally 160 samples were then processed and analyzed.

B. Statistical Tools

Bivariate incidence delivery of the respondents, according to types of businesses, ownership of the company, respondent's location, computer possession, Internet contact, length of Internet access, and working system was accessible. Data were collected on demographic variables are processed and stated in percentage through the descriptive analysis. Descriptive analysis refers to the alteration to describe a set of issues that will make them easy to understand and interpret [29]; [30].

C. Test of Reliability, Validity and Identification of Factors

1) Dependability

The measurement of reliability provides consistency in the measurement of variables. Internal consistency reliability is the most commonly used psychometric measured assessing survey instrument and scales [31]. Cronbach is the basic formula for determining the dependability based on internal consistency [32]. The reliability coefficient for government support (0.792) indicates high internal consistency among its statements [33]. Since the Cronbach's alpha values are in between 0.792 to 0.878 and all above cut off limit, that is 0.7, the constructs are therefore deemed to have adequate reliability.

2) Test for construct validity: Factor analysis

A factor analysis was conducted in order to develop factors that help in explaining the role of experience and reference group in online brand trust. There are six factors were identified for the factor analysis using the Eigen value criteria that suggest extracting factors with an eigenvalue of greater than 1.0. In conducting the factor analysis we followed [34]; [35].

VI. RESULT AND ANALYSIS

In this section, the results and analysis of the empirical Study are presented and discussed. The main aim of this analysis is to identify the major factors that influence ICT adoption by SMEs in Bangladesh. First the socio-economic characteristics of the respondents are analyzed. Then, the factors those related with ICT adoption are discussed. Finally, the some recommendations are given to the decision-making and management context.

A. Discussion

In this section, we will present and discuss the conclusions derived from our results and we will make steadily a series of recommendations for government and SMEs management. According to the results, an apparent benefit has a strong, significant relation to ICT adoption. It is expected since past literature has consistently shown that perceived benefit has a significant and positive influence on the ICT [36]. The subscale mean value (not shown here), indicate Internet will allow company to cross international boundary. However, defendants are not found computer simplify their daily business operation. ICT adoption by SMEs. Usage of ICT applications in business purposes brings many advantages for its user to business area [36]. At present, most of the businessmen are curious to find out the

benefit that they can gain through appropriate ICT implementation. Implementing ICT in the organization will be able to offer businesses a wide range of possibilities for improving their competitiveness such as provide mechanisms for getting access to new market opportunities and specialized information services [11]. Moreover, businesses are able to receive immediate customer feedback which allows companies to react fast to changing client demands and recognizing new market niches. Some respondents would also like to agree with the use of Internet on business will be important for future company's progression. Most of the respondents believe that doing business over the Internet will generate desired returns in terms of profit (mean value).

B. Limitations and Future Directions

Similar other experiential studies, this Study is not without its limitations. Our sample consisted of SMEs in Dhaka and Chittagong states in Bangladesh may limit the generalizability of the results. Although several technology adoption studies focused on the zone basis state based respondents, such as experience using technology, differ from state to state from overall population of SMEs [37]; [38]. The sample size itself is comparatively small. The Study can be strengthened by increasing the sample size and including participants.

C. Implications

1) Implications for study

This Study presents an introductory study that explains 52 per cent of the variance in SMEs adoption of EC. This study can serve as a starting point for other ICT adoption study, while encouraging further exploration and integration addition adoption constructs. Future study needs to focus on a larger cross section and more diversified random samples to confirm the findings of the current study. Moreover, to further clarity of the factor influence on ICT adoption in the businesses, Technology Acceptance Model (TAM) and or other model could be used. Future studies could also examine the causal relations between factors and SMEs' observe overall ICT adoption by employing a structural equation modeling technique. In addition, future study needs to examine ICT adoption in the context of cross-national variances.

2) Implications for practice

The Study reveals five significant indicators of SMEs' intention to adopt ICT in their business. It can be done by having seminars or induction sessions to allow SMEs to evaluate their new creations. In order to obtain better answers towards ICT adoption, it is recommended that authority should give certificates as a token and financial support to attend the seminar. They could establish a close link with all SMEs and get continuous feedback from them in order to classify the problem areas and take essential movements to rectify them. Another way to enhance the use of ICT in the SMEs sectors, that the government should enforce standardized, consistent and uniform policies in all SMEs sectors, agencies or subsidiaries in implementing ICT system. As it is found in this study, respondents mentioned ICT is a complex system, the system should be made as user-friendly as possible as not all users are familiar with

computers and the Internet, especially the old SMEs.

VII. CONCLUSION

The tenacity of this Study is to investigate factors affecting purpose to adopt ICT in the SMEs of two states in Bangladesh. This Study also contributes to and spreads our understanding of the Internet as a medium for commercial usage in the provision arena, classifying the motivations for adopting or rejecting the ICT by the SMEs. From a decision-making viewpoint, the findings provide support for investment decisions, and for decisions relating to the development of Internet services that address and take the concerns and needs of companies into consideration.

REFERENCES

- [1] G. A. Charchill and T. J. Brown, *Basic Marketing Research, Thomson Corporation*, USA, 2000.
- [2] M. Terziovski, D. Samson, and D. Dow, "The business value of quality management systems certification," *Journal of Operations Management*, vol. 15, no. 1, pp. 1-18, 1997.
- [3] S. Poon and P. M. C. Swatman, "Electronic networking among small business in Australia — An exploratory study," *International Conference*, pp. 446-460, 1996.
- [4] C. E. Courtney and S. J. Fintz, "Small business acceptance and adoption of e-commerce in the western-cape province of South Africa," *EJISDC*, vol. 10, no. 4, pp. 1-13, 2002.
- [5] Z. Zhang, A. B. Waszink, and J. Wijngaard, "An instrument for measuring TQM implementation for Chinese manufacturing companies," *International Journal of Quality and Reliability Management*, vol. 17, no. 7, pp. 730-755, 2000.
- [6] W. G. Zikmund, *Exploring Marketing Research*, 2000.
- [7] M. K. Hashim, "SME's in Malaysia: Past, present and future," *Malaysia Management Review*, vol. 35, no. 1, pp. 22-32, 2000.
- [8] B. M. Alberto and L. L. Fernando, "A firm level analysis of determinants of ICT adoption in Spain," *Technovation*, vol. 27, pp. 352-366, 2007.
- [9] C. M. Parker, "Educating small and medium enterprises about electronic data Interchange: Exploring the effectiveness of a business stimulation approach," *Department of Information Systems*, 1997.
- [10] C. Iacovou, I. Benbasat, and A. Dexter, "Electronic data interchange and small organizations: Adoption and impact of technology," *MIS Quarterly*, vol. 19, no. 4, pp. 465-485, 1995.
- [11] F. Giovanni and A. Mario, "Small company attitude towards ICT based solutions: Some key-elements to improve it," *Educational Technology and Society*, vol. 6, no. 1, 2003.
- [12] G. Swash, "UK business information on the Internet," *New Library World*, vol. 99, pp. 238-242, 1998.
- [13] D. H. Drury and A. Farhoomad, "Innovation Adoption of EDI," *Information Resource Management Journal*, vol. 9, no. 3, pp. 5-13, 1996.
- [14] MacGreor, "Attitudes of Small Business to the Implementation and use of IT: Are we basing EDI Design initiatives for Small Business on Myths?" *9th International EDI-IOS Conference*, 1996.
- [15] L. Alfansi and A. Sargeant, "Marketing segmentation in the Indonesian banking sector: the relationship between demographics and desired customer benefits," *International Journal of Bank Marketing*, vol. 18, no. 2, pp. 64-74, 2000.
- [16] E. Mansfield, *Industrial Research and Technological Innovation: An Econometric Analysis*, Norton, New York, 1968.
- [17] SMIDEC, *SMI Development Plan (2001-2005)*, *Percetakan Nasional Malaysia Berhad*, Kuala Lumpur, 2002.
- [18] A. U. Kazi, "Small and medium business enterprises and the use and adoption of information and communication technology: A study of legal issues and legal perspectives," *International Journal of Organisational Behaviour*, vol. 12, no. 1, pp. 144-160, 2007.
- [19] J. F. Hair, R. E. Anderson, R. L. Tatham, and W. C. Black, "Multivariate data analysis," *Upper Saddle River*, NJ, 1998.
- [20] B. Cox and S. Ghonein, "Drivers and barriers to adopting EDI: A sector analysis of UK industry," *European Journal of Information Systems*, vol. 5, pp. 24-33, 1996.
- [21] S. Chong, G. Pervan, and C. Bauer, *Implementation Success of Internet-based Electronic Commerce*, 2001.
- [22] Spectrum, *Moving into the Information Society*, HMSO, London, 1997.
- [23] S. M. Mutula and P. V. Brakel, "E-readiness of SMEs in the ICT sector in botswana with respect to information access," *The Electronic Library*, vol. 24, no. 3, pp. 402-417, 2006.
- [24] J. C. Nunnally, *Psychometric Theory*, McGraw Hill, New York, NY, 1978.
- [25] J. V. Beveren and H. Thomson, *Global Perspective: The Use of Electronic Commerce by SMEs*, 2002.
- [26] L. Doig, "Making e-commerce affordable," *Australian CPA*, vol. 70, no. 6, 2000.
- [27] A. R. Denni, "Information exchange and use in group decisions making: You can lead a group to information, but you can't make it think," *MIS Quarterly*, vol. 4, no. 2, pp. 433-457, 1996.
- [28] SMIDEC, *SMI Development Plan (2001-2006)*, *Percetakan Nasional Malaysia Berhad*, Kuala Lumpur, 2002.
- [29] E.-J. Mutsaers, H. V. D. Zee, and H. Giertz, "The evolution of information technology," *Information Management and Computer Security*, vol. 6, no. 3, pp. 115-26, 1998.
- [30] T. Ramayah and P. L. Koay, "An exploratory study of internet banking in Malaysia," in *Proc. The 3rd International Conference on Management of Innovation and Technology*, Hangzhou City, P. R. China, 2002.
- [31] D. Kirby and M. Turner, "IT and the small retail business," *International Journal of Retail and Distribution Management*, vol. 21, no. 7, pp. 20-27, 1993.
- [32] S. Davis, *The Diffusion of Process Innovations*, Cambridge: Cambridge University Press, 1979.
- [33] Premkumar, G. K. Ramamurthy, and M. Crum, "Determinants of EDI adoption in the transportation industry," *European Journal of Information Systems*, vol. 6, pp. 107-121, 1997.
- [34] W. G. Kim and Y. Cha, "Antecedents and consequences of relationship quality in hotel industry," *Hospitality Management*, vol. 21, pp. 321-338, 2002.
- [35] J. C. Wang and K. H. Tsai, *Factors in Taiwanese Firms' Decisions to Adopt Electronic Commerce: An Empirical Study*, Blackwell Publishers Ltd, UK, 2002.
- [36] J. Thong and C. Yap, "Information technology adoption by small business: An empirical study," *Diffusion and Adoption of Information Technology*, pp. 160-175, 1996.
- [37] A. H. Seyal and M. M. Rahim, "A preliminary investigation of electronic data interchange adoption in Bruneian small business organisations," *The Electronic Journal of Information Systems in Developing Countries*, vol. 24, no. 4, pp. 1-21, 2006.
- [38] U. Sekaran, *Research Methods for Business*, Wiley Publications, New York, NY, 2000.



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