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Adoption of E-Technology in Small and Medium Enterprises (SMEs) -A Study in Khulna City of Bangladesh

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Abstract

Purpose: Small and medium enterprises (SMEs) are considered as the engine of economic growth throughout the world. To cope with the challenges of technological advancement and globalization, SMEs need to be conversant with internet based technology. This study aimed at identifying the level of e-technology adoption by the SMEs of Khulna city, attitudes of SME owners towards e-technology, and major impediments in such technology adoption.

Methodology: Opinion of 100 conveniently selected sample of SME owners were collected and analyzed using percentage, mean, factor analysis, regression analysis etc. to reach to study findings.

Findings: The level of e-technology adoption was found to be very low among the SMEs and the SME owners' attitudes toward such technology adoption were also negative in most cases. Among the major impediments, inadequate proficiency of SME owners, less supportive external agents, legal and security barriers, lack of knowledge, insufficient network structure, and financial constraints were found to influence the low rate of e-technology adoption by SMEs in Khulna city.

Key words: SME, E-technology, ICT, E-commerce, e-governance

Introduction

Small and Medium Enterprises (SME) are considered as the engine of economic growth and for promoting equitable development throughout the world. Like other countries around the world, SMEs play important role in employment generation and economic growth in Bangladesh (Hassan *et al*, 2010).In Bangladesh, SMEs including micro enterprises comprise over 99 percent of all industrial units, contributing over 85 percent of industrial employment. Micro, small and medium enterprises (MSMEs) together employ a total of 31 million people, equivalent to about 40 percent of the population of Bangladesh, aged 15+ (Zaman and Islam, 2011).In the context of liberalization of the economy and rapid globalization, SMEs in both developed and developing countries are faced with a number of challenges to overcome in the process of becoming competitive. Traditionally for its size limitation, SMEs are characterized by lack of technological expertise (Rubenstein, 1989), vulnerability to environmental uncertainty (Blake and Saleh.1995), lack of bargaining capacity and governance structure, absence of professional management, limited access to capital and market information etc., which typically constrain their effort to survive in the international market (Etemad *et al*, 2001). The adoption of e-technology or internet based technology can be critical factor in improving a firm's market reach and efficiency. Internet based technologies provide SMEs the opportunities to overcome the limitations of size and compete more effectively (Dholakia and Kshetri, 2004). Although SMEs have the potentials, at the rapidly increasing age of internet, to utilize the newly emerged technology dependent communication and transaction medium, e-commerce, in acquiring their competitiveness, the slow rate of adoption is evident in Bangladesh (Noor and Arif, 2011). Thus there are opportunities for conducting research on the level of e-technologies adoption by SMEs, reasons for the slow adoption rate and ways to overcome the challenges in the process of technology adoption for the development of SMEs. So, this paper aimed at presenting an overview of e-technology utilization in SMEs in Khulna, a Metropolitan City of Bangladesh.

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Literature Review

Ahmed and Chowdhury (2008) portrayed in a study that in most economies, Small and Medium Enterprises exist in significant number and supply vital driving force in innovation and competition. But finding a common definition of SMEs is a difficult task since there is no universal criterion to define SMEs. Common criteria to define SMEs include total number of employees, number of employees based on fields of activity, equity or total capital investment, annual volume of sales, total fixed assets or available resources owned by the enterprise, unique management, field of activity, innovations use, customer care and criteria of independence (Mirzac, 2013). Different countries set their own definitions, standards and laws to regulate SMEs. The government of Bangladesh also, provides an official definition of small and medium enterprise (SME) in terms of sector (service, business industrial), asset and manpower involvement. Small Enterprise refers to the firm/business which is not a public limited company and complies the following criteria: _Service sector-(Fixed Asset other than Land and Building) Tk 50,000-50,00,000, employed manpower (not above) 25 _Business sector – (Fixed Asset other than Land and Building) 50,000-50,00,000, employed manpower (not above) 25 _Industrial 50,000-1,50.00,000, employed manpower (not above) 50. Medium Enterprise refers to the establishment/firm which is not a public limited company and complies the following criteria: _Service Sector– (Fixed Asset other than Land and Building) Tk.50,00,000-10,00,00,000, employed manpower (not above) 50 _Business Sector (Fixed Asset other than Land and Building) Tk. 50,00,000-10,00,00,000 employed manpower (not above) 50 _Industrial Sector – (Fixed Asset other than Land and Building) Tk.1,50,00,000 - 20,00,00,000, employed Manpower not above 150 (Bangladesh Bank, 2011).

Zaman and Islam (2011) described in a study that in Bangladesh nearly about 6 million SMEs and microenterprises according to Asian Development Bank. Among these about 60-65% are situated and operated outside Dhaka and Chittagong. Though the business network of SMEs is small and scattered, its area of operations is vast indeed consisting of manufacturing, services, wholesaling, and retailing business. All those sectors are primarily responsible for the bulk of employment creation and development of SME business. SME business in Bangladesh primarily focuses on meeting up the local needs and demands and by far contributing to national income through all the respective fields that it covers.

In Bangladesh the empirical sub-sectors gearing up the economy substantially include jute, leather goods, ready-made garments, agribusiness, plastic products, information and communication technology, light engineering, handicrafts and silks, hotels and restaurants, printing, packaging and publishing etc. (Islam *et al*, 2008). As a whole this can set up the tunes that SME constitutes business starting from supplying raw materials and other goods to incubator business organization to selling goods to ultimate customers.

Kotelnikov (2007) mentioned that the proper development of ICT-enabled and networked SME sectors can enhance developing countries to gain rapid as well as sustainable economic and social growth through affordable but effective ICT solutions. And the most important issue is that e-technology adoption enables SMEs to upgrade the management of their internal and external business processes and communications with customers, suppliers, partners, employees and others.

Malo (2012) expressed electronic technology (e-technology) as a wide diversified and dynamic range of Information Technology (IT), Information System (IS), and Information & Communication Technology (ICT) which are used with the support of network architecture such as Internet, Intranet and Extranet for the assistance of personal, organizational and institutional activities. Similarly Stevens (2007) defined e-technology as any product, device or mechanism that is used to create and disseminate business related information or facilitate business transaction through World Wide Web, internet and intranet, e-mail, machine-readable and scanned information, desk-top

electronic devices or any other electronic means. Since e-technology is closely related to the business problems, it is also defined as the architecture, technologies and component that enable and support e-business" (Wei *etal*, 2001). Cloeteet al. (2002) claimed that e-technology adoption activities range from entry-level activities to sophisticated activities.

- Entry-level activities include - a minimum access to internet or having websites and e-mails.
- Advanced activities constitute - online payments, online purchasing, customer services, interactive websites, and online database management etc.

It is somewhat really unlikely that advanced e-technologies are adopted before adopting the entry-level technologies which implies that entry-level e-technology based activities are the enablers of advanced or sophisticated technology adoption for business activities.

However, e-business should be considered in details as it is a wide concept. In this way, components based definition of e-business requires dividing e-business into several e-activities as e-commerce, e-marketing, e-learning, e-banking, e-governance, e-cooperation, e-communication and e-invoicing etc. (Wenna, 2002; Malo, 2012).

In their research on adoption of e-commerce or e-technology Azam and Quaddus (2009) stated that the effects of perceived compatibility, complexity, observing ability and perceived risk appear significantly related to the willingness to adopt e-commerce. As most of the SMEs are risk-averse, so e-technology adoption is significantly influenced by the knowledge of benefits perceived (Yang, 2007). That means the higher the benefits of e-technology perceived, the higher the tendency or possibility of its adoption. Ratnasingham (2002) mentioned three types of e-technology adoption benefits and also subdivided these into several other categories. Those are as follows:

- **Technology benefits:** These types of benefit are derived from reducing errors and administrative costs, improving the speed of delivery and market reach by means of automation of manual process.

- **Operational benefits:** These benefits are derived from improved quality of information flow and customer services between employees and customers, reduced errors and costs by eliminating paper work, effective inventory management, improved cycle time to provide services and timely marketing of goods and services in a correct complete and accurate manner.

- **Relation-related benefits:** These benefits are derived from improved communication and relationships among employees, customers, suppliers and other trading partners. Adoption of e-technology improves the trust and image or reputation of the company among customers and the trading partners. Eventually all these benefits help to build long term sustaining relationship among the stakeholders of the business.

It is suggested in a number of researches that adoption of e-technology allows business organization to cope up with the turbulent and ever changing business environment. But the studies shown that there is a delay or failure in adopting ICT based e-technologies by the SMEs in developing countries (Kapurubandara and Lawson, 2008).This idea was also echoed in (Adeola and Olusein, 2014) that due to "digital divide" SMEs in developing nations like Nigeria could not take advantages of ICT effectively. Apulu and Latham (2009) also noted that there was a variation in adoption of ICT solutions between the developed nations and the developing nations. The developing nation like Nigeria and Mali are adopting such solutions at a slower rate of because the technology was not developed to directly meet the need of developing countries. Consistently, with this finding Uddin and Bose (2013) articulated the fact that technology has slightly positive correlation with SME success which is different from global research. However, it shows that the SME owners of Khulna City and also of Bangladesh have preferences for traditional and ancient business model. The study further added that the result is not unexpected as the country is far behind in

comparison to global standards of modern business operation still today. ICT adoption by SMEs in developing countries of Asia and Africa are found to be affected by a number of socio-economic factors. These factors include: lack of infrastructural facilities, lack of funds, lack of awareness, lack of appropriate government policies, lack of skills and training, cultural factors, electricity constraints, corruption, low levels of education, illiteracy, lack of access to information and so on (Adeola and Olusein, 2014). Lack of Skilled human resource (Woherem, 1993), lack of appropriate infrastructure (Kunda and Brooks, 2002; Ihua, 2009; Oshikoya and Hussain, 2007) and lack of funds (Arendt, 2008; Abor and Quartey, 2010) are the commonly cited barriers to ICT adoption. Ndayizigamiye (2012) summarized a number of issues affecting the adoption process of e-technology mainly by the SMEs in developing countries from various study reports published earlier. Those inhibiting factors are shown in the following table:

Table 1: Impediments affecting the adoption process of e-technology in developing countries

Factors
- Poor internet connectivity
- Landline constraints
- Underdeveloped state of internet service providers
- Inadequate diffusion of computers
- High cost of internet
- Lack of online payment process
- Limited availability of banking services
- Inadequate transportation & delivery networks
- Uncertain taxation rules
- Lack of skills among consumers
- Absence of legal and regulatory system
- Low Income
- Lack of qualified staff to develop and support e-technology
- Low bank account and credit card penetration
- Lack of access to computer, hardware/software
- Limited use by supply chain partners
- Concern with security and legal issues
- Low knowledge level of management and employees
- Unclear benefits from e-commerce/ technology
- Lack of knowledge and awareness about benefits of e-technology
- Awareness and education
- Market size
- E-commerce infrastructure
- Telecommunication infrastructure
- Government's role
- Social and Psychological factors

Source: Ndayizigamiye (2012)

Ghobakhloo *et al* (2011) reviewed literatures of two decades related to information technology adoption in SMEs and identified a number of factors influencing ICT adoption by SMEs. Instead of classifying those factors as facilitating or inhibiting, they classified those as internal and external to the enterprises. The internal factors include top management, resources, end users (staffs), IT solutions (computer application), organizational behavior and characteristics whereas competitive environment, Government, customers and suppliers, external IT consultant and vendors are the major external factors influencing IT adoption by SMEs.

The history of Bangladesh says that it had never been that much rich in technology from its emergence as an

independent nation. Rather it was technologically back warded in its early ages due to lack of financial resources, lack of infrastructure, low literacy rate and knowledge regarding the utilization and benefits of technology. Because of globalization the business industry of Bangladesh has been forced to attempt the challenges and track the benefits of technology. So, Bangladesh, although, started internet operation in 1993 and established high speed information infrastructure through submarine information super highway in 2005, and later introduced Third Generation (3G) Technology in 2012, still remain in its infancy level (Hossain et al., 2009).

Objectives of the Study

The main objective of the study is to find out the pattern of adoption of E-technologies in operating the business of SMEs in the context of Khulna City.

The specific objectives of the study are as follows:

- To identify the current spread of technologies in entrepreneurial activities of SMEs in Khulna City;
- To diagnose the tendency towards adopting technologies by SMEs of Khulna City;
- To pin-point the challenging factors that inhibit the technology adoption in SMEs; and finally
- To determine supports and set recommendations needed to overcome challenges in adopting technologies for SMEs in Khulna City.

Methodology

The study used descriptive research design since the aim of the study was to find out availability and uses of e-technology and the challenges and supports needed for such technology adoption in SME businesses in Khulna city. To achieve this aim following research questions were set.

Research Question: To what extents are the e-technology related facilities, knowledge and challenges exist and supports needed for SMEs in Khulna City?

- **Sub-question 1:** What is the current usage of technology in SME business operation of Khulna City?
- **Sub-question 2:** How is the tendency of SME operators in Khulna City towards adopting modern Technologies?
- **Sub-question 3:** What are the inhibiting challenges for adopting new technologies in SMEs?
- **Sub-question 4:** What more supports do the SMEs need to overcome the obstacles in adopting technologies?

Data from both secondary and primary sources were used for the study. Secondary data were used to formulate the study problem and instrument design basically. Among the major sources, websites, online journal articles, published journal articles, different books and other printed works related to SME businesses, e-technology uses were consulted. Primary data were collected through personal interview with 100 SME owners/ managers of Khulna city. The respondents were selected conveniently based on their availability from five (5) zones to cover most of the parts of Khulna city.

Table 2: Area wise distribution of respondents

Zone	Locations	No of Samples
Zone 1	Khalishpur, Daulatpur, Boyra& Adjacent	20
Zone 2	Sonadanga, Newmarket, KDA Avenue, Sir Iqbal Road & Adjacent	20
Zone 3	Gollamari, Nirala, Moilaputa, Railway & Adjacent	20
Zone 4	Dakbangla, Khan-e-sabur road, Tutpara& Adjacent	20
Zone 5	Rupsha, Khan Jahan Ali road, South Central road & Adjacent	20
	Total	100

20 SME respondents from each Zone for a total of 100 samples were selected for study purpose finally.

A standardize questionnaire was used to collect data from the respondents. The items included in the questionnaire were drawn from previous studies which were very much relevant to the objectives and research questions of this study. Some itemized questions had to be adapted to fix with the context of this study paper. Both close ended and open ended questions were used.The internal consistency reliability was tested statistically through the Cronbach's Alpha coefficient and found acceptable as the values ranged between 0.70 and 0.85 for different sections of the questionnaire. Two types of five point scales (one for measuring attitude toward e-technology adoption and the other for measuring perception about inhibiting challenges) were also used to get responses from the respondents.

Basically quantitative analysis techniques have been applied to analyse the gathered data and information. For analysis frequency, percentage, mean, factor analysis and regression analysis of responses were used. These tests have been done through the application of Statistical Package for Social Science (SPSS) software version 16.0. For open ended questions logical presentation and interpretation methods have been performed on the feedbacks received from the survey questionnaire.

Result and Discussion

This chapter presents the findings from the survey in this study paper. It further analyzes and interprets the survey responses in relation to the research questions.

Current usage of E-technology in SMEs: In this section the current usage of e-technology in the sample SMEs are analyzed to explore the answer to research Sub-question 1.Based on the literature review, the usage of e-technology had been divided into two categories – entry level activities and advance level activities.

Entry-level Activities: The Entry-level e-technology activities include 'minimum access to internet', 'E-mail', and 'website' adoption. Analysis of the respondents' response showed that majority of the SMEs not yet adopted even the entry level e-technology activities in their operation. As shown in figure 1, 36% and 42% of SMEs had minimum access to internet and use email respectively and only a few (11%) had their own websites.

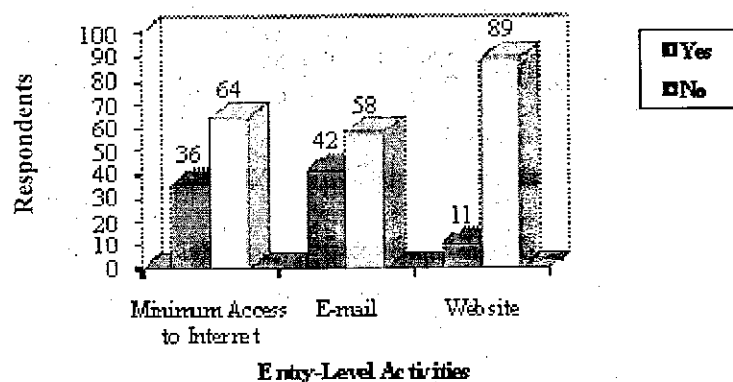Figure 1: Entry-level e-technology activities adoption in SMEs of Khulna City

Advance-level e-technology Activities adoption in SMEs of Khulna City: Advance-level e-technology activities include 'e-banking', 'e-marketing', 'e-learning', 'e-invoices', 'e-governance', 'e-procurement', 'e-selling', 'e-cooperation', 'e-payment', 'e-communication' and 'e-business platform' adoption by the SMEs. Analysis of the

respondents revealed that SMEs of Khulna city were yet to adopt most of the advance-level e-technology capabilities. This finding was actually predictable from our previous discussion since they were not conversant with the entry level capabilities. As shown in figure 2, among 100 SME respondents 54% already adopted internet banking or mobile banking (E-banking) and 60% also adopted payment through credit card or mobile phone (E-payment) as advance-level e-technology capabilities. This high level of adoption can be attributed to the prevailing banking system in the country. Since more and more banks are making online/ e-banking facilities available to the account holders, the SME owners are also taking such opportunities. While most of the respondents did not adopt other advance level capabilities such as e-marketing (87%), e-governance (94% & 99%), e-procurement (80%), e-selling (95%), e-learning (90%), e-cooperation (86%), e-invoice (83%), e-communication (83%) and e-business platform (97% & 90%) for the purpose of their business operation.
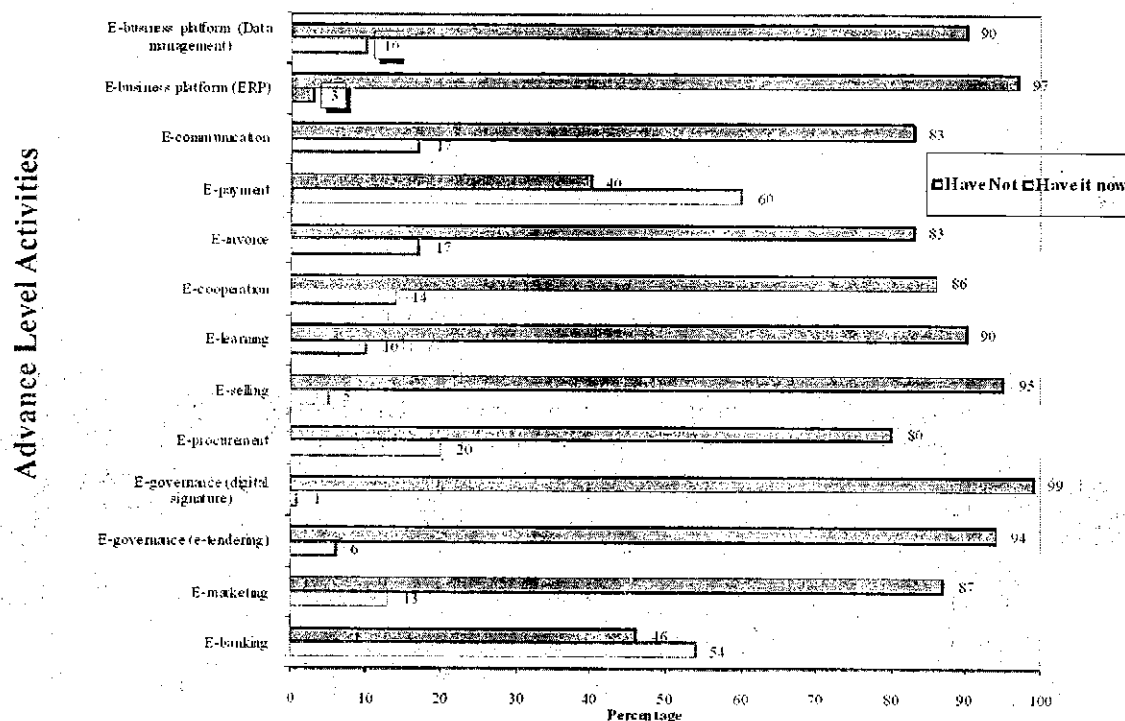
Figure 2: Advance-level e-technology activities adoption in SMEs of Khulna City

Tendency of SME Operators towards E-technology adoption: This section of the report analyzed the tendency of SME operators of Khulna City towards adopting e-technology in their operations and thus answered to the research sub question number 2.

Table 3: Tendency towards e-technology capabilities adoption

Advance level e-technology capabilities		Percentage (%)
Using internet or mobile banking (E-banking)	Have it within 1 Year	5%
	Have it within 3 Years	14%
	More than 3 Years	6%
	Never	21%
Engaging in Social Media/E-mail promotion (E-marketing)	Within 1 Year	8%

	Within 3 Years	3%
	More than 3 Years	10%
	Never	**66%**
Processing electronic tendering (E-governance)	Within 1 Year	1%
	Within 3 Years	4%
	More than 3 Years	2%
	Never	87%
Processing digital signature (E-governance)	Within 1 Year	1%
	Within 3 Years	5%
	More than 3 Years	3%
	Never	**90%**
Placing orders online to suppliers (E-procurement)	Within 1 Year	6%
	Within 3 Years	9%
	More than 3 Years	11%
	Never	**54%**
Selling goods or services online (E-selling)	Within 1 Year	7%
	Within 3 Years	8%
	More than 3 Years	12%
	Never	**68%**
Using internet base courses or tests (E-learning)	Within 1 Year	7%
	Within 3 Years	15%
	More than 3 Years	11%
	Never	**57%**
Integrating intranet or extranet system for mutual cooperation (E-cooperation)	Within 1 Year	2%
	Within 3 Years	11%
	More than 3 Years	8%
	Never	**65%**
Placing/accepting electronic invoices (E-invoice)	Within 1 Year	11%
	Within 3 Years	9%
	More than 3 Years	4%
	Never	**59%**
Payment through credit card/mobile phone (E-payment)	Within 1 Year	9%
	Within 3 Years	6%
	More than 3 Years	5%
	Never	20%
Using internet or intranet for communication (E-communication)	Within 1 Year	1%
	Within 3 Years	8%
	More than 3 Years	11%
	Never	**63%**
Electronic Enterprise Resource Planning system (E-business platform)	Within 1 Year	2%
	Within 3 Years	5%
	More than 3 Years	11%
	Never	**79%**
Electronic/computer base Data Management system (E-business platform)	Within 1 Year	12%
	Within 3 Years	10%
	More than 3 Years	9%
	Never	**59%**

Source: Field Study

Table 3 above indicates that majority of the surveyed SME respondents never expect to adopt the mentioned E-technology activities. Among them Processing Digital Signature (E-governance) has got the highest percentage (90.0%) in favor of Never adopting this technology, which depicts that it is the most unfavorable e-technology activities that SMEs expect to adopt or use for the purpose of their business operations.

On the other hand, among the highest number of SMEs that have expressed their tendency towards adopting mentioned e-technology; 12.0% has expected to have Electronic/computer base Data Management System (E-business platform) within 1 year, 15.0% has expected to use Internet base courses or tests (E-learning) within 3 years, 12.0% has expected to Sell goods and services online (E-selling) in more than 3 years.

Challenges in e-technology adoption in SMEs of Khulna City: In this section of the study, attempt was made to understand the major bottlenecks or challenges that inhibit the technology adoption among SMEs and thus answer the research sub questions number 3.

For the purposes of this study, items measuring the independent variables were simultaneously subjected to a component factor analysis to find out the answer of this question. To address six independent variables of the study, 17 items of inhibiting challenges were generated which have been compiled from the previous literature. The items were purified through the factor analysis.

Factor Analysis: There were 17 variables to the inhibiting challenges of e-technology adoption which loaded on six factors (Table 6). Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.762 which indicated that factor analysis was appropriate. Bartlett's test of sphericity with Significance (.000) meant the relationship among the variables was strong (Table 4).

Table 4: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.762
Bartlett's Test of Sphericity	Approx. Chi-Square	643.406
	Df	136
	Sig.	.000

The result yielded a 6 factor solution with Eigen values greater than 1.0. The factor analysis further revealed that all the items were retained within the 6 factors these are anticipated for the study that cumulatively explained 72.202% of the total variance (as shown in Table 5)

Table 5: Total Variance Explained

COMPONENT	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.121	30.126	30.126	5.121	30.126	30.126	2.553	15.019	15.019
2	1.936	11.386	41.512	1.936	11.386	41.512	2.088	12.282	27.301
3	1.761	10.362	51.874	1.761	10.362	51.874	2.015	11.853	39.154
4	1.354	7.967	59.841	1.354	7.967	59.841	1.980	11.649	50.803
5	1.092	6.424	66.265	1.092	6.424	66.265	1.912	11.246	62.049
6	1.009	5.937	72.202	1.009	5.937	72.202	1.726	10.153	72.202
Extraction Method: Principal Component Analysis.									

Table 6: Rotated Component Matrix

Variables of Inhibiting Challenges	Component					
	1	2	3	4	5	6
New technology adoption/use causes Fear of uncertainty	.781					
Capacity of understanding and using English language is low	.749					
Required awareness and education are not adequate	.686					
Skilled employee/staff to support e-technology is in need	.605					
Use of e-technology among suppliers is Limited		.854				
Use of e-technology among customers is Limited		.755				
Government's supportive role is Inadequate		.503				
Business concerns about security issues on using internet			.830			
Business concerns about legal issues, contracts and liability			.766			
Legal and regulatory system is Absent			.497			
Level of computerization within the business is Low				.824		
Knowledge about financial and business benefits is Unclear				.628		
Knowledge of the required technology is Inadequate				.532		
Internet service providers are at underdeveloped/developing state					.835	
Internet connectivity is Poor					.758	
Cost of computers and network technologies is High						.798
Business income level is Low						.767
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 9 iterations.						

Here, 1= Inadequate proficiency, 2 = External agents, 3 = Legal & Security barrier, 4 = Unfamiliar technology, 5 = Low network, 6 = Financial constraint

In table 6 the first factor was referred as Inadequate proficiency signifies that the inhibiting challenges rise from the lack of proficiency or skill. The statement loaded the highest was 'New technology adoption/use causes Fear of uncertainty' (0.781) which clearly represented strong fear of uncertainty towards the adoption of new e-technology. SME respondents in Khulna City believed that they had low capacity of understanding and using English language as well as inadequate awareness and education that would challenge their e-technology adoption process. Besides, lack of skilled employees or workforce also inhibited the adoption attempt of e-technology. This factor explained 15.019 percent of variance (Table 5). This is consistent with earlier studies (Woherem, 1993; Apulu and Ige, 2011;Apulu and Lathan, 2009) which argued that low level of education, lack of skills and training are barriers to ICT adoption by SMEs in Nigeria.

The second factor was titled as External Agents which explained that the inhibiting challenges also come from the outside of the business firm. The statement loaded the highest was 'Use of e-technology among suppliers is limited' (0.854) which clearly illustrated limited level of technology utilization works as hindrance from external environment towards the adoption of new e-technology. SME respondents in Khulna City believed that they had low tech customer base and inadequate government supports that had challenged their e-technology adoption process. This factor explained 12.282 percent of variance (Table 5).Ghobakhlooet al (2011) also identified from their literature review that customer, supplier IT vendors and government are important external groups who influence E-technology adoption in SMEs.

The third factor was titled as Legal & Security barrier which explained that the inhibiting challenges also rise from legal and security concerns of business firm. The statement loaded the highest was 'Business concerns about security issues on using internet' (0.830) which indicated high volt of insecure feelings worked as hindrance from legal and security concerns towards the adoption of new e-technology. SME respondents in Khulna City believed that they had high concerns for legal and security issues that had challenged their e-technology adoption process. This factor explained 11.853 percent of variance (Table 5).These findings are consistent with a study in Australia which presented that "Security issues, uncertainty about how to evaluate potential benefits of IT, and capital outlay with no guarantee of likely returns", respectively are three main risks of IT adoption identified in Australian SMEs (Love et al. 2005).

The fourth factor was referred to Unfamiliar Technology which explained that the inhibiting challenges also rise from lack of technological familiarity. The statement loaded the highest is 'Level of computerization within the business is low' (0.824) which indicated very low level of computer utilization due to unfamiliarity of technology worked as challenge towards the adoption of new e-technology. SME respondents in Khulna City also believed that they had inadequate knowledge regarding financial and business benefits of technology as well as even in case limited knowledge of required technology that had challenged their e-technology adoption process. This factor explained 11.649 percent of variance (Table 5).

The fifth factor was titled Low Network which explained that the inhibiting challenges also rise from low level of network technology infrastructure. The statement loaded the highest was 'Internet service providers are at underdeveloped/developing state' (0.835). SME respondents in Khulna City also believed that the internet had poor quality services. This factor explained 11.246 percent of variance (Table 5). Several other studies (Kunda and Brooks, 2002;Ihua, 2009;Oshikoya and Hussain, 2007) also reported this factor to be an inhibiting factor in ICT adoption in developing countries.

The sixth factor was referred to as Financial Constraint which explained that the inhibiting challenges also rise from financial issues. The statement loaded the highest was 'Cost of computers and network technologies is high' (0.798). SME respondents in Khulna City also believed that due to high cost of technology and low level of income, technology adoption was hindered. This factor explained 10.153 percent of variance (Table 5). This is also consistent with the findings of (Arendt, 2008; and Abor and Quartey, 2010).

Regression Analysis: This is a useful method for assessing the relative importance of extracted six factors when SME respondents are unable or unwilling to directly utter their views. It observes the extent to which the agreement ratings, given by the respondents on each of the inhibiting factors, are related to the adoption of new technologies specifically entry-level activities. Because this study has conceptualized that, entry-level activities are the enablers of advance-level e-technology adoption and research sub-question 1 of this study has found that on an average only 29.67% of the respondents have adopted e-technology entry-level activities, which is low. For this reason, aggregate means of entry level adoption responses were calculated to formulate the dependent variable Technology adoption where the extracted six factors were assumed to be independent variables.

Table 7: Regression Analysis Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.660[a]	.435	.399	.27952	1.849
a. Predictors: (Constant), Inadequate proficiency, external agents, legal & security barriers, inadequate knowledge, low network, financial constraints					
b. Dependent Variable: Technology Adoption					

"R-Square" measures the proportion of the variation in the dependent variable (Technology Adoption) that was explained by variations in the independent variables (Inadequate proficiency, external agents, legal & security barriers, unfamiliar technology, low network, financial constraints). From the table above, the value of R-square is .435 indicating that 43.5% variation of the technology adoption problems faced by the SMEs of Khulna City is explained by these independent variables.

Adjusted "R-Square" measures the proportion of the variance in the dependent variable (Technology Adoption) that was explained by variations in the independent variables. From the above table, the adjusted "R-Square" showed that 39.9% of the variance was explained.

Table 8: ANOVA of the Data

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.600	6	.933	11.945	.000[a]
	Residual	7.266	93	.078		
	Total	12.866	99			
a. Predictors: (Constant), Inadequate proficiency, external agents, legal & security barriers, inadequate knowledge, low network, financial constraints						
b. Dependent Variable: Technology Adoption						

The last column of table 8 showed the goodness of the model. The lower this number, the better it fits. Typically, if significance is greater than 0.05, it can be concluded that the model could not fit the data and if the significance is less than 0.01, then the model could good fit the data.

As the significance here is .000, thus it can be said that the model used in this research shows a good fit with F value 11.945 (p<.01). If significance is less than 0.01 then the model is significant at 99%, if significance is less than 0.05, then the model is significant at 95%, and if the significance is less than 0.1 then the model is significant at 90%. Significant implies that we can accept the model.

Table 9: Pearson Coefficients of Factors

Model		Standardized Coefficients	Sig.
		Beta	
1.	(Constant)		.000
	Inadequate proficiency	.245	.002
	External agents	.273	.001
	Legal & security barriers	.275	.001
	Inadequate knowledge	.387	.000
	Low network	-.252	.002
	Financial Constraints	.111	.156
a. Dependent Variable: Technology Adoption			

The table 9 of coefficients provides information on the confidence with which we can support the estimate for Standardized Coefficients Beta. If the significance value is less than 0.05 then the variables are significant. So, inadequate proficiency, external agents, legal & security barriers, inadequate knowledge and low network except financial constraints are found statistically significant (p<.05).

Here the Standardized Beta denotes the grading according to the weights. From the above table, inadequate knowledge has carried the highest weight among the factors considered. Then legal & security barriers, external

agents, inadequate proficiency, financial constraints and low network come in order respectively according to their weights.

Supports needed to overcome challenges in e-technology adoption: This section of the report focused on some suggestions perceived by the respondents as important for overcoming challenges in e-technology adoption in SMEs and tried to answer the research sub-question 4.
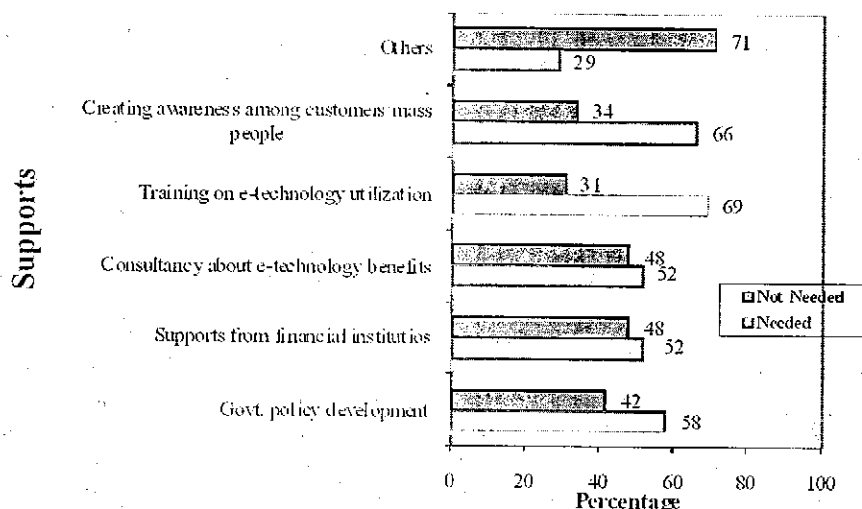

Figure 3: Respondents' responses about needed supports for overcoming challenges

Figure 3 above indicated that majority of the surveyed 100 SME respondents were in need of supports for overcoming challenges in adopting technological benefits. Among them Training on e-technology utilization got the highest percentage (69%) in favor of supports needed for adopting technology, which meant that it was the most important support initiative that SMEs needed to adopt technology for their business operations. All the other supporting activities got nearly the same range of percentage which emphasized on the fact that most of the SMEs were in need of those support activities for overcoming challenges in this regard. This finding is consistent with the findings of Olatokun and Kebonye (2010) who also argued that creation of more widespread awareness about e-commerce, better provision of the requisite technologies and adequate training and skills upgrading and updating are some are some of the support that would help SMEs plan their e-commerce optimization strategically in Botswana. On the other hand, only 29% respondents mentioned about other needed support services of which uninterrupted electricity supply was significant.

Conclusion

This study aimed at finding out the current usage of e-technology, tendency towards adopting e-technology, the inhibiting challenges faced and supports needed by the SMEs of Khulna city in Bangladesh. To this end, the e-technology adoption has been divided into entry-level and advance-level activities. The SMEs in Khulna city can be characterized as very low in e-technology adoption and with high reluctance of entrepreneurs in the technology adoption process. The major challenges faced by the SMEs were inadequate proficiency, external agents, legal and security barriers, unfamiliar technology, low network and financial constraints in e-technology adoption process. Among the six factors technological unfamiliarity has carried the highest weight and all of the extracted factors such as inadequate proficiency, external agents, legal & security barriers, unfamiliar technology and low network except

financial constraints have been found statistically significant in the way of creating challenges for new technology adoption.

It was also found that SMEs were in need of different support services from both government and private level initiative such as favorable govt. policy development, financial institutional supports, consultancy about e-technology benefits, training on e-technology utilization, awareness building among customers or mass people about the benefits of e-technology and uninterrupted electric supply etc.

Primarily this study is significant for the SME business of Khulna City as it has covered the SMEs operated only in this city. As this study was conducted based on the opinions of SMEs operating business in Khulna City, one of the divisional cities of Bangladesh; the results or findings may not be generalized reflection of all SMEs in the country. Yet an attempt was made to make a link between SMEs and e-technologies in this study since very few research of this was done in Khulna City earlier. This study tried to give an overview of e-technology usage in SMEs and thus expected to contribute to the existing science and literature on this field that may open up new avenue to explore into such as how to improve technology adoption, impact of such low adoption level on the performance and competitiveness of the SMEs etc.

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Appendix A: Factor Analysis

Table 10 : Communalities

	Initial	Extraction
Knowledge about financial and business benefits is Unclear	1.000	.642
Cost of computers and network technologies is High	1.000	.764
Knowledge of the required technology is Inadequate	1.000	.762
Use of e-technology among customers is Limited	1.000	.805
Use of e-technology among suppliers is Limited	1.000	.816
Government's supportive role is Inadequate	1.000	.552
Skilled employee/staff to support e-technology is in need	1.000	.699
Level of computerization within the business is Low	1.000	.711
Business concerns about security issues on using internet	1.000	.736
Business concerns about legal issues, contracts and liability	1.000	.696
Required awareness and education are not adequate	1.000	.761
Business income level is Low	1.000	.700
Legal and regulatory system is Absent	1.000	.695
Internet connectivity is Poor	1.000	.746
Internet service providers are at underdeveloped/developing state	1.000	.753
Capacity of understanding and using English language is low	1.000	.739
New technology adoption/use causes Fear of uncertainty	1.000	.698

Table 11: Component Matrix[a]

	Component					
	1	2	3	4	5	6
Skilled employee/staff to support e-technology is in need	.777	-.038	-.173	-.080	-.076	-.225
Required awareness and education are not adequate	.646	.135	-.515	-.040	-.118	-.212
Knowledge about financial and business benefits is Unclear	.638	-.189	.048	-.420	.046	-.137
Knowledge of the required technology is Inadequate	.633	-.523	.256	-.047	-.127	-.063
Capacity of understanding and using English language is low	.632	-.078	.012	.132	-.561	.044
New technology adoption/use causes Fear of uncertainty	.614	-.092	-.439	.110	-.317	-.088
Legal and regulatory system is Absent	.595	.470	-.109	-.032	.109	.309
Use of e-technology among suppliers is Limited	.569	-.190	.374	.448	.151	.305
Use of e-technology among customers is Limited	.537	-.276	.535	.276	.268	-.079
Business concerns about legal issues, contracts and liability	.534	-.144	-.446	.145	.361	.199
Business concerns about security issues on using internet	.530	-.075	-.407	-.083	.410	.330
Cost of computers and network technologies is High	.514	.052	.374	-.410	-.221	.375
Level of computerization within the business is Low	.463	-.228	.283	-.265	.286	-.462
Internet service providers are at underdeveloped/developing state	.236	.669	.183	.374	.048	-.271
Internet connectivity is Poor	.444	.642	.078	-.110	.239	-.249
Business income level is Low	.257	.520	.350	-.427	-.100	.219
Government's supportive role is Inadequate	.433	.221	.145	.510	-.184	.019

Extraction Method: Principal Component Analysis.

a. 6 components extracted.