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RESEARCH ARTICLE

FACTORS AFFECTING SUSTAINABLE E-COMMERCE ADOPTION: EMPIRICAL EVIDENCE FROM BANGLADESHI SMES

Md. Mehedi Hasan Emon, Mehzabul Hoque Nahid

American International University- Bangladesh, Bangladesh.
****Corresponding Author Email: emonmd.mhasan@gmail.com, mehzab.nahid@aiub.edu***

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ABSTRACT

This paper aims to examine the technology-organization-environment (TOE) predictors of Sustainable E-commerce technology adoption in SMEs of Bangladesh. The study developed a conceptual framework based on the integration of technology-organization-environment (TOE) framework. 156 quantitative survey data were collected from engaging employees from different SMEs from different parts of Bangladesh. SPSS was used in descriptive statistics, Correlation, regression and structural equation modeling approach to test and analyze the data. This study found that Perceived Relative Advantage, Compatibility, Management Support, Resource Commitment, Regulatory Forces, Competitive Forces and Economic Performance in SMEs had a positive influence on the adoption of e-commerce technologies such as responsive website, e-CRM modules, e-payment, mobile app etc. All seven hypothesized relationships were supported be the study. In the context of an emerging economy, the results can be useful for practitioners and decision-makers because they will help them justify their adoption decisions and effectively contribute to strategies for sustainability.

KEYWORDS

E-commerce Technologies, Sustainability, Technology Organization Environment model (TOE), SME's, ICT

1. INTRODUCTION

Digital transformation is the new way to run a business by using digital technologies like the cloud, big data, social computing, analytics, and so on. Climate change, water shortages, deforestation, and other environmental issues have become increasingly pressing as the global population has grown. However, the developed world's economic growth for goods and services is on the rise. As a result of the industrial revolution, several startups entered the market and quickly adopted digital transformation strategies. E-commerce is the selling of products and services using telecommunication and telecommunication technologies (Babenko et al., 2019). Many organizations are moving toward sustainable solutions, which go beyond just being socially responsible. This is because they want to meet the needs of today without sacrificing the needs of tomorrow. Sustainable E-commerce technology has become a priority for many organizations because of its potential impact on long-term performance. Digital technologies have been adopted by E-commerce industry in their entire up stream and downstream supply chains from Product procurement, warehouse management and finally order processing.

To achieve our research objective, we follow a theoretical approach that integrates the Technological, Organizational and Environmental (TOE) framework.

SME is an independent, resource-constrained company that is classified as a small and medium-sized enterprise (Zahoor et al., 2020). From a business point of view, sustainability strategy focuses on a company's ability to meet its business goals and increase long-term benefits for its stakeholders by combining its social, economic, and human resources (Oláh et al., 2018)

Tornatzky et al. constructed the Technology-Organization-Environment (TOE) theoretical framework for the evaluation of conditions that influence a company's decision to adopt IT advancements. In the literature, there is a growing interest in the application of the TOE framework to determine how technology, organization, and environment factors influence the implementation, post-implementation, and performance indicators of IT systems and applications (Tornatzky et al., 1990). Several studies have been conducted on adoption of disruptive digital technologies by SMEs of different countries. However, there is dearth of research on exploring technology adoption factors of growing E-commerce SMEs industries of Bangladesh from their organizational perspectives. This study aims to examine the technology organization-environment (TOE) predictors of E- commerce adoption and Sustainability among Bangladeshi E-commerce SMEs.

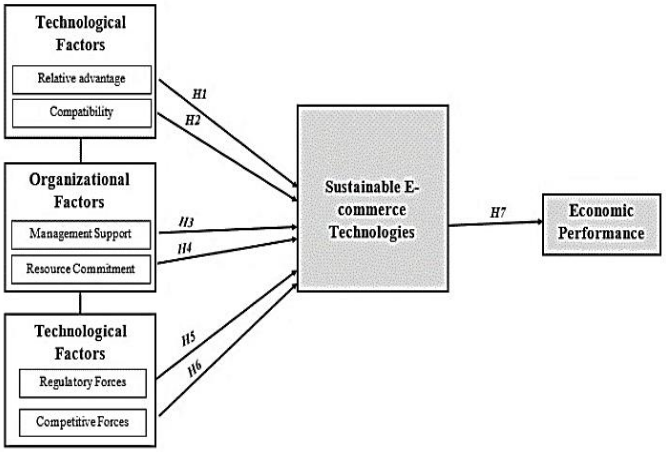

Figure 1: T-O-E theoretical framework

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2. Literature Review

ICT has a considerable impact on the operations of SMEs and is essential for their survival and growth, as well as the survival and growth of national economies in general. It is argued that through the use of ICT, small and medium-sized enterprises (SMEs) can improve competencies for resource management, lower transaction costs, establish a capacity for information collecting and dissemination on a global scale, and get access to the quick flow of information (Hoque et al., 2016). Governments around the world have acknowledged the significance of SMEs implementing Sustainable E-Commerce Technologies. But it has been said that SMEs are slow to adopt ICT (Escursell et al., 2021). The rapid growth of e-commerce makes it difficult for businesses to design e-commerce strategies. Given the seemingly constant introduction of new information technology and software applications, this is extremely difficult. Companies are marketing their e-commerce plans, in part out of concern that they would lose clients to competitors if they do not have e-commerce initiatives (Babenko et al., 2019). There is a lot of evidence in the academic literature that shows how important small and medium-sized businesses (SMEs) are to economic growth. Existing research suggests that small and medium-sized enterprises (SMEs) create new ways for the economy to grow by making new markets in international areas and giving people chances to use domestic resources (Pu et al., 2021). Since 2010, Bangladesh's government has taken steps to develop and control ICT and digital industry. 2010-2011 budget: 1.12 billion BDT. In 2019-2020, the budget is BDT 193 million, with BDT 164.5 million for development and BDT28.5 million for operations. In order to make Bangladesh digital, the Finance Ministry will construct a trustworthy digital retreat at the grassroots level, IT-based human resource development, and an export-oriented IT department. They've expanded their IT and digital company budgets. 2020-2021 budget: BDT 204.81 million (Rahman Rafid, 2021).

Many scholars in the field of information systems are interested in studying the phenomenon of innovation adoption. Consequently, a number of scholars have developed several models that attempt to figure out what characteristics can motivate and predict the adoption of innovations. The Theory of Attributes (TOE) framework is one such model; it suggests that three main factors can either assist or impede the spread of new ideas and methods, depending on how they are applied. In the theory of innovation adoption (TOE) framework, the technological component is concerned with the ways in which technological qualities influence the adoption of innovations. An organization's ability to embrace new ideas is influenced by a wide range of factors, many of which fall under the heading of "organizational dimension." Organizational practices, such as relationships with business partners and rivals, are examples of environmental factors. The theory of evolution (TOE) framework has been applied empirically in a variety of IT situations to prove its theoretical strength and practicality, making it one of the most well-known models for studying the adoption and spread of new IT advances. There are a variety of internal and external elements that the framework theories may influence the adoption of new IT, but it does not specify any of these factors explicitly (Abed, 2020)

2.1 Hypotheses and the Research Model

Relative advantage: This term refers to the quality of a product or service that makes customers think it is better than similar products or services. Organizations tend to use new technologies when they see that they have more benefits than similar technologies. The expected benefits of a new IT system can give employees a reason to use it. For example, the REA of the new system could be that it will make work more efficient and productive (Ullah et al., 2021). Studies that have been done so far suggest that the REA of an innovation will make users more likely to use it. Alsharji et al. (2019) also showed that REAs of social media technology make small and medium businesses in UAE more likely to use it. In the same way, we could say that the benefits of Sustainable E-Commerce Technologies can affect how many people use them. This leads to the following hypothesis:

H1: Perceived Relative Advantage has a positive effect on Sustainable E-Commerce Technologies

Compatibility: COM is "the degree to which potential adopters see a new idea as fitting in with their existing values, past experiences, and needs." High COM is seen as a strong way to help people adopt new ideas. From a business point of view, the way an organization uses new ideas should be in line with its standards and technical needs (Ullah et al., 2021).

H2: Compatibility has a positive effect on Sustainable E-Commerce Technologies

Management Support: MAS has been considered a key factor in getting service sector as a whole to use technology. (AlShamsi & Ajmal, 2018).

H3: Management Support has a positive effect on Sustainable E-Commerce Technologies

Resource Commitment: REC is defined as "the allocation of the firm's tangible and intangible assets that allow it to make a market offering that has value for some market segment(s) in an efficient and/or effective way (Kanwal et al., 2017).

H4: Resource Commitment has a positive effect on Sustainable E-Commerce Technologies

Regulatory Forces: Laws and regulations are thought to be one of the most important ways to get businesses to adopt Sustainable E-Commerce Technologies practices (Ullah et al., 2021).

H5: Regulatory Forces has a positive effect on Sustainable E-Commerce Technologies

Competitive Forces: COF are the external pressures from other organizations that can cause a business to lose its competitive edge and be forced to use new technology (Alrahbi et al., 2021).

H6: Competitive Forces has a positive effect on Sustainable E-Commerce Technologies

Economic Performance: This concept refers to how the organization's financial and marketing performance would improve if it used Sustainable E-Commerce Technologies. This would put the organization in a better position than the average in its industry (Agarwal et al., 2018).

H7: Sustainable E-Commerce Technologies has a positive effect on Economic Performance.

3. Methodology

3.1 Research Design

The data collection and analysis in this study are carried out using quantitative technique. The following study hypotheses have been investigated using a survey. To do this, we gathered information from Bangladesh's e-commerce sector, and more especially, from Dhaka, the country's capital and one of the most commercially active areas.

3.2 Unit of Analysis and Unit of Observation

The entity about which a study determines is known as the study's unit of analysis. Depending on the specifics of the investigation at hand, the subject might be an individual, a group, or an institution (Iacobucci, 2010). Adversely, a unit of observation is anything that a researcher keeps an eye on while looking into the unit of analysis (Garc'ia-Pozo et al., 2019; Yurdusev, 1993). Bangladeshi SMEs served as the unit of analysis, and the persons who should be working as Owner or the senior IT professionals (CTO, IT directors/managers, etc.) with at least three years of experience in the field of e-commerce technology served as the unit of observation. This group of upper-level managers and IT experts was chosen because they are constantly up-to-date on company happenings, including smart decisions like using cutting-edge tech (Thong, 1999).

3.3 Target Population and Sampling

Convenience sampling was used to choose respondents for the study, and a mix of online and in-person questionnaires was used to gather data. Those who are in responsible for implementing the company's e-commerce strategy were the intended recipients of the survey. However, the proprietor of the e-commerce business filled this function for the Retailer and Wholesaler. Everyone who may have provided a response was briefed about the study's goals and given assurances that their responses would be kept confidential. Over the course of around three months, 156 questionnaires were filled out to provide usable data.

3.4 Questionnaire Designing

Several measures were taken to design a reliable questionnaire for this study:

- Measurement items for Relative Advantage, Compatibility, Regulatory Forces, Competitive Forces, Management Support, and Resource Commitments were collected from the previously existing volume of peer-reviewed literature on information systems research and found to be reliable. Items were reworked to better fit the needs of the research. Measuring items and their relevant sources are listed in Table 1.

Table 1: Factor, Their Measuring Items, and Source		
Factors	**Measuring Items**	**Source**
Relative Advantage	I expect E-commerce technologies will help my firm increase its market share.	(Mouakket & Aboelmaged, 2021; Wang et al., 2016)
	I expect e-commerce technologies will help my firm achieve competitive advantage.	(Mouakket & Aboelmaged, 2021; Wang et al., 2016)
Compatibility	The changes introduced by e-commerce technologies are consistent with my firm's existing beliefs/values.	(Mouakket & Aboelmaged, 2021; Wang et al., 2016)
	E-commerce technologies is compatible with my firm's existing information infrastructure.	(Mouakket & Aboelmaged, 2021; Wang et al., 2016)
Management Support	Top management encourages employees to learn about e-commerce technologies.	(Lin & Ho, 2011; Mouakket & Aboelmaged, 2021)
	My firm provides resources for employees to learn about e-commerce technologies.	(Lin & Ho, 2011; Mouakket & Aboelmaged, 2021)
Resource Commitment	My firm has sufficient financial resource to invest on e-commerce technologies.	(Li, 2014; Mouakket & Aboelmaged, 2021)
	My firm has sufficient investment on software establishment resource training) for e-commerce technologies.	(Li, 2014; Mouakket & Aboelmaged, 2021)
Regulatory Forces	My firm applies national environmental regulations.	(Mouakket & Aboelmaged, 2021; Zhang & Yang, 2016)
	The governments provides support for e-commerce technologies practices.	(Mouakket & Aboelmaged, 2021; Zhang & Yang, 2016)
Competitive Forces	Competitors can achieve competitive advantage through higher environmental awareness.	(Mouakket & Aboelmaged, 2021; Zhang & Yang, 2016)
	Competitors can use e-commerce technologies to enter high-profit markets.	(Mouakket & Aboelmaged, 2021; Zhang & Yang, 2016)
E-commerce Adoption	My firm intends to use e-commerce technologies.in the future	(Mouakket & Aboelmaged, 2021)
	I predict my firm would use e-commerce technologies. in the future	(Mouakket & Aboelmaged, 2021)
Economic Performance	My firm has a better profitability improvement relative to competitors.	(Mouakket & Aboelmaged, 2021; Zhang & Yang, 2016)
	My firm has a higher return on investment relative to competitors.	(Mouakket & Aboelmaged, 2021; Zhang & Yang, 2016)

3.5 Measurement Scale

Multiple items on a five-point Likert scale were used to measure all of the constructs. Each item was measured on a Likert scale that went from "strongly disagree" (1) to "strongly agree" (5).

3.6 Data Collection Process

The survey link and the research's goals were sent to the target organizations via email. In order to get accurate data, each organization was asked to send the survey to officials and IT staff with experience and knowledge of e-commerce technology.

3.7 Data Analysis Technique

To analyze the survey data, such as Descriptive Statistics, correlation, regression, SPSS is used for quantitative data analysis.

4. Results and Discussion

4.1 Demographic Characteristics

Table 2, representing respondents' Demographic Characteristics. In this table, it is observed that most of the respondents were Male which is 68.6% of total respondents, and 31.4% respondents were Female. It can be observed that most of the respondents were from 10-25 Years of age group which is 19.9 Percent, 64.1% respondents were around 26-41 years old, 14.1 percent respondents were in 42-57 years age group and smaller number of respondents were in 57 and more year's category which is 1.9 percent. Out of 156 respondents, 51.3 Percent respondents were business owner which is the highest of total respondents, 23.1 Percent respondents were Manager/Executive, 12.2 Percent respondents were Director, 13.5 Percent respondents were others. 30.1 percent of respondents industry sector were Retail Trade, 21.2 percent of respondents industry sector were Wholesale Trade, 7.7 percent of respondents industry sector were Agriculture, 5.1 percent of respondents industry sector were Accommodation and food, 5.8 percent of respondents industry sector were Transport and logistics, 7.7 percent of respondents industry sector were Professional, Educational, scientific, and technical services, 12.8 percent of respondents industry sector were Healthcare services and 9.6 percent of respondents industry sector were Others

Table 2: Demographic Statistics				
Gender				
	Frequency	Percent	Valid Percent	Cumulative Percent
Male	107	68.6	68.6	68.6
Female	49	31.4	31.4	100.0
Age of the respondents				
10 – 25 Years	31	19.9	19.9	19.9
26 – 41 Years	100	64.1	64.1	84.0
42 – 57 Years	22	14.1	14.1	98.1
57 and more	3	1.9	1.9	100.0
Position				
Owner	80	51.3	51.3	51.3
Director	19	12.2	12.2	63.5
Manager/Executive	36	23.1	23.1	86.5
Others	21	13.5	13.5	100.0
Industry sector				
Retail trade	47	30.1	30.1	30.1
Wholesale trade	33	21.2	21.2	51.3
Agriculture	12	7.7	7.7	59.0
Accommodation and food	8	5.1	5.1	64.1
Transport and logistics	9	5.8	5.8	69.9
Professional, Educational, scientific, and technical services	12	7.7	7.7	77.6
Healthcare services	20	12.8	12.8	90.4
Others	15	9.6	9.6	100.0
Total	156	100.0	100.0	

4.2 Reliability Analysis

Table 3: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.858	.859	16

In reliability analysis (Table 3) the standard Cronbach's Alpha should be more than 0.7. In table 2, it is observed that our Cronbach's Alpha value is .857 which is more than 0.7 it's proved that this value is acceptable. So, it shows that the study variance is reliable

4.3 Correlation

In Correlation Analysis (Table 4),

- In a Pearson Bivariate Correlation "Technological Context" is correlated with "Organizational Context" variable at 61.4% where significance level (2-tailed) is 000. That means if we change 100% of the Technological Context then this will effect 'Organizational Context' by 61.4% and vice versa.
- In a Pearson Bivariate Correlation "Technological Context" is correlated with "Environmental Context" variable at 73.7% where significance level (2-tailed) is 000. That means if we change 100% of the Technological Context then this will effect 'Environmental Context by 73.7% and vice versa.
- In a Pearson Bivariate Correlation "Technological Context" is correlated with "Sustainable E-Commerce Technologies Adoption" variable at 68% where significance level (2-tailed) is 000. That means if we change 100% of the Technological Context then this will effect 'Sustainable E-Commerce Technologies Adoption by 68% and vice versa.
- In a Pearson Bivariate Correlation "Technological Context" is correlated with "Economic Performance" variable at 44.7% where significance level (2-tailed) is 000. That means if we change 100% of the Technological Context then this will effect 'Economic Performance by 44.7% and vice versa.
- In a Pearson Bivariate Correlation "Organizational Context" is correlated with "Environmental Context" variable at 56.7% where significance level (2-tailed) is 000. That means if we change 100% of the Organizational Context then this will effect 'Environmental Context by 56.7% and vice versa.
- In a Pearson Bivariate Correlation "Organizational Context" is correlated with "Sustainable E-Commerce Technologies Adoption" variable at 44.6% where significance level (2-tailed) is 000. That means if we change 100% of the Organizational Context then this will effect 'Sustainable E-Commerce Technologies Adoption by 44.6% and vice versa.
- In a Pearson Bivariate Correlation "Organizational Context" is correlated with "Economic Performance" variable at 76.4% where significance level (2-tailed) is 000. That means if we change 100% of the Organizational Context then this will effect 'Economic Performance by 76.4% and vice versa.
- In a Pearson Bivariate Correlation "Environmental Context" is correlated with "Sustainable E-Commerce Technologies Adoption" variable at 61.7% where significance level (2-tailed) is 000. That means if we change 100% of the Environmental Context then this will effect 'Sustainable E-Commerce Technologies Adoption by 61.7% and vice versa.
- In a Pearson Bivariate Correlation "Environmental Context" is correlated with "Economic Performance" variable at 48.4% where significance level (2-tailed) is 000. That means if we change 100% of the Environmental Context then this will effect 'Economic Performance by 48.4% and vice versa.

Table 4: Correlations

		Technological Context	Organizational Context	Environmental Context	Sustainable E-Commerce Technologies Adoption	Economic Performance
Technological Context	Pearson Correlation	1	.614**	.737**	.680**	.447**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	156	156	156	156	156
Organizational Context	Pearson Correlation	.614**	1	.567**	.446**	.764**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	156	156	156	156	156
Environmental Context	Pearson Correlation	.737**	.567**	1	.617**	.484**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	156	156	156	156	156
Sustainable E-Commerce Technologies Adoption	Pearson Correlation	.680**	.446**	.617**	1	.360**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	156	156	156	156	156
Economic Performance	Pearson Correlation	.447**	.764**	.484**	.360**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	156	156	156	156	156

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.111	.355		.314	.754
	Technological Context	.659	.122	.493	5.390	.000
	Organizational Context	-.001	.095	.000	-.006	.996
	Environmental Context	.300	.103	.254	2.900	.004

Dependent Variable: Sustainable ecommerce Adoption

Here in this model (Table 6), we will consider the variables which are significant at less than .05. So according to this coefficient table we can say that here two variables are considerable, and these two variables gives Economic Performance. The two variables are Technological Context which is significant at .000, Then Environmental which is significant at .004. In this analysis the highest Beta value is .493 which contain with Technological Context, the second highest Beta value .254 which contain with Environmental Context, Then the Beta Value was .000 which contain

with Organizational Context, if marketers can focus on those factors than it will be easier from them to adopt sustainable e-commerce technologies in Bangladeshi SM

5. Discussion

This study investigated the role of technological, organizational, and environmental drivers in influencing the intention to adopt Sustainable E-Commerce Technologies in Bangladeshi SMEs and its economic effects as demonstrated in the conceptual framework of the study. From the attitudinal perspective, the users' reflected their opinion that the TOE plays a significant role in Adoption of Sustainable E-Commerce Technologies in Bangladeshi SMEs. However, the respondents showed in different responses for using Sustainable E-Commerce Technologies to get better Economic Performance. In descriptive statistics perspective, it is observed that all of the items mean value is higher than 3.5 and standard deviation is less than 1. That result means in our findings all of the items have positive impact on adoption of Sustainable E-Commerce Technologies in Bangladeshi SMEs. Data also suggested that Technological Context is strongly correlated with Sustainable E-Commerce Technologies Adoption and Organizational Context Strongly correlated with Economic Performance. According to the correlation matrix data also suggested that the Technological context of the Sustainable E-Commerce Technologies was found to be the strong predictor of its Sustainable E-Commerce Technologies Adoption and organizational context of the Sustainable E-Commerce Technologies was found to be the strong predictor of Economic Performant he findings revealed that Organizational Factors is the most important driving force for Sustainable E-commerce Technologies adoption. This result highlights the importance of promoting how well Sustainable E-commerce Technologies fits with an organization's existing values and the needs of its employees. Our results have also reported that the most important expected outcome of Sustainable E-commerce Technology is the Economic Performance, which suggests that the drivers of Sustainable E-commerce Technology will mainly affect the Economic Performance of an organization. Even though our data have been obtained from an emerging economic country, the research findings provide a valuable reference for conducting similar research on Sustainable E-commerce Technology in other countries.

It has some limitations which open new avenues for future research. this study has identified only five variables which can influence the adoption of Sustainable E-commerce Technologies. Future research could include additional drivers which could contribute to a more detailed examination of the drivers of Sustainable E-commerce Technologies.

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