Key Factors Affecting Egyptian SMEs Performance with the Mediating Role of E-Commerce Adoption

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Abstract

The main goal of this paper is to enhance understanding of the factors that affect the adoption of e-commerce in small and medium-sized enterprises (SMEs) in Egypt, and how this affects their performance. The study seeks to analyze the role of e-commerce adoption as a mediator, considering technological, organizational, and environmental factors, on SME performance. The research methodology is quantitative, utilizing a cross-sectional survey approach. Data was gathered through an online questionnaire from Egyptian SME owner-managers, chief executive officers, or managers and analyzed using regression analysis and ANOVA in the SPSS program. Results indicate that technological, organizational, and environmental factors have a positive and significant impact on e-commerce adoption, which in turn positively and significantly affects SME performance. The study also found that e-commerce adoption mediates the relationship between technological and environmental factors with SME performance, but it does not in the organizational factors case. These findings hold significant implications for the Egyptian government, IT vendors, and SME owners, as they can use the results to create effective programs that encourage e-commerce adoption in Egyptian SMEs. Overall, this study contributes to both theory and practice by providing a realistic view of e-commerce adoption, the key factors that lead to adoption, and their effect on SME performance.

***Keywords**: Egyptian SMEs, Technological Factors, Organizational Factors, Environmental Factors, E-Commerce Adoption, Firm Performance.*

Introduction

Recent research indicated that electronic commerce (e-commerce) as an online business tool provides many benefits to Small and Medium-sized Enterprises (SMEs) with the availability of the latest information and communication technology (ICT) infrastructure (hardware and software). A wide range of benefits for SMEs in developing and developed economies include increased profitability and scope through reducing costs while simultaneously providing a better innovative service to many clients in the local business markets (Ainin et al, 2015; Shaltoni et al, 2018).

Many researchers in the area of e-commerce believe that the availability of the latest ICT setup provides many advantages to organizations at various levels. However, due to internal and external factors, adopting

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this innovative technology is still complicated for SMEs in most economies (Kapurubandara and Lawson, 2008). Because of this statement, this study focuses on the current situation of the various SME sectors in developing countries the different factors that influence the e-commerce adoption, and how that affects their performance. Recent studies (Ahmad et al 2013; Al-Somali et al 2015) have also reflected considerably on discovering different adoption factors related to e-commerce in the various sectors of SMEs. However, these studies were mostly conducted within developed economies. Exceptions of developing economies include the latest studies (Ajao et al, 2018; Awiagah et al, 2016; Dar et al, 2017; Kurnia et al, 2015; Rahayu & Day, 2015).

The findings of these studies showed various contextual factors that affected their local SMEs while adopting innovative technologies and provided opportunities for other researchers from various countries to study other factors or elements differently.

As discussed above, this study examines different SMEs' e-commerce adoption factors with the help of various theories, patterns, and related adoption dimensions. Geographically, it focuses on the local business environment of Egypt as a developing economy to further understand and discuss the following issues: overall characteristics and situation of the SMEs and the usage of ICT infrastructure units, factors that affect the e-commerce adoption, and its effect on SMEs performance.

This examination will help to study the different business activities of various SME organizations at different levels and find answers relating to e-commerce adoption. These include how and why e-commerce has developed, and how and why the owner-managers of the various organizations of different sectors should adopt it. Moreover, with the detailed discussion of the above issues, the study will also develop an extended framework and then apply it in Egypt to find out the key factors for e-commerce adoption in SMEs.

Literature Review:

SMEs Performance

SMEs' performance is considered a significant indicator of the effectiveness of organizations. SME's performance relates to an indicator consisting of firm profitability, market share, and firm growth which are the main elements of the performance of SMEs, and are used to measure firm effectiveness (Arsalan Hussain et al, 2020). The performance of SMEs was used as one of the main indicators to assess the growth of the businesses in the economy. The performance of the SMEs is an essential attaining indicator for the firm (Richard et al, 2009). Many prior researchers paid less attention to the indicators that should be considered in the performance of SMEs and how they should be measured (Richard et al, 2009). Most scholars have used profit, growth, value, survival, and public image to measure the SMEs' performance (Prasanna et al, 2019).

E-commerce in Small & Medium-Size Enterprises (SMEs)

SMEs play a basic role in the improvement and promotion of economic indices as a major economic sector of any country and thus adopting creative and modern methods and tools for performing business affairs and processes plays an essential role in the firm success for all organizations (Fatima Ajmal 2017; Abbasi et al, 2010). In the past, SMEs have been restricted from participating in the technological revolution because of costs and personnel limitations. In the present time and environment, the cost of evolving technology is far smaller when compared with past changes since most SMEs already have an IT infrastructure. SMEs are leaning toward the adoption of innovation and opportunities more quickly than larger firms (Lomerson et al, 2004). Recent studies show that an increasing number of SMEs are moving toward new internet-based technologies (Poon, 2007). However, SMEs are slow when it comes to the uptake and e-commerce usage (Al-Qirim, 2012), as most SMEs have an internet presence in the form of a corporate website but only a few use it to conduct transactions with customers and suppliers (Dholakia & Kshetri, 2004). SMEs are interested in e-commerce due to its potential to help them improve their business processes, reduce costs, and achieve a closer relationship with their clients.

Technology-Organization-Environment Framework (TOE)

Tornatzky and Fleischer (1990) developed a framework for organizations to adopt an innovation (e-commerce) and apply it in their business structure. The TOE framework identifies three main aspects of the context of SMEs that influence the process through which it adopts and implements e-commerce; Technological context, environmental context, and organizational context. TOE structure is a useful analytical framework that could be used in developing economies to study the e-commerce adoption.

Technological Factors

Technological contexts refer to the innovation's adoption using different ICT units and other related network technologies in the SME environment (Teo and Pian, 2004). This technological context represents a technology pool that can be adopted by an organization (Scupola, 2009). These can be the market-available technologies and the current ICT equipment of an organization. Technology adoption decision depends on what is available on the market and how these technologies correspond to technologies already owned by a firm (Chau & Tam 1997; Jeyaraj et al, 2006; Tornatzky and Fleischer, 1990).

Therefore, it refers to technologies available in SMEs and how technological contextual factors affect the e-commerce adoption in SMEs (Chau & Tam, 1997). Rogers introduced the Technology Innovation Model (1995) and this has been widely recognized in the social sciences and research in the information sciences. According to Rogers, five critical factors in the technological context have influenced SMEs in their adoption of technological innovations: relative advantages, compatibility, complexity, elasticity, and observability.

Organizational Factors

The organizational context represents the internal factors of an organization that influence the innovations' adoption and implementation (Tornatzky and Fleischer, 1990). Previous studies in both developed and developing countries have confirmed that contextual and organizational factors have both a positive and negative impact on organizations while they are integrating e-commerce technologies into their business (Awiagah et al., 2016; Hoti, 2015; Scupola 2009; Seyal et al, 2004). All these researchers identified organizational factors as internal factors influenced by the general characteristics and the current position of SMEs. This means that the organizational context refers to SMEs' characteristics and their resources. Research into the adoption of ICTs reveals many factors that can influence e-commerce adoption within SMEs.

Environmental Factors

The environmental factor is the area in which the organization establishes its activities (Tornatzky and Fleischer, 1990) or, in other words, concerns the external environment (Scupola, 2009) and the explanation of how such factors influence the e-commerce adoption (Teo and Pian, 2004). Trading partners' competitive pressure such as suppliers and customers (Jeyaraj et al., 2006) is critical environmental pressure related to the SMEs' adoption of e-commerce. Other national factors such as the government role, international trade policies (Al-Qirim, 2007; Ismail & Mokhtar, 2016; Yang et al., 2015), and natural disasters (Shemi & Procter, 2013), also influence the e-commerce adoption in SMEs.

Finally, in conclusion, this part presented a review of related literature on e-commerce adoption by businesses in general and SMEs in particular. Many studies regarding e-commerce adoption were presented and reviewed. The TOE model was described in detail and applied with modification for this study. This part also described how e-commerce adoption studies can be grouped. Finally, this part also described e-commerce development in organizations and the impact on the performance.

Research Gap

The demand for research investigating e-commerce and its influence on business performance will continue to grow. Although e-commerce is now in widespread use, in certain cases the e-commerce adop-

tion in SMEs is slow (Abed et al., 2015). Therefore, there is a continuous need for updated research studies to fill the gaps to understand the significant influence of e-commerce's effective adoption on organizations (Kaplan and Haenlein, 2010), specifically within the context of SMEs (Kietzmann et al., 2012). Studies that examine the affecting factors on the decision to adopt without focusing on the implementation phase and its affecting on the performance are very rare (Kawaljeet et al., 2014). In the extant literature, there are no studies were conducted that used the TOE model in investigating e-commerce adoption, particularly in the context of Egypt. Based on this gap the idea in this study was developed to use this model and integrate it with the business performance into a single framework for identifying the influencing e-commerce adoption factors and the effect on the business performance of SMEs in Egypt to investigate this area in depth. Accordingly, the research questions and objectives have been formulated to fulfill this gap.

Research Problem

The Arab Republic of Egypt is still in the early stages of e-commerce usage. Egypt's population was more than 113 million in early 2024 (Digital 2024: Egypt). The proportion of Internet users in Egypt is about 82.01 million which further means that only 72.2% of Egypt's population uses the Internet, and 27.8% of the population does not use it. Furthermore, only 45.4 million which represents only 40% of the total population are e-commerce users (Digital 2024: Egypt); a fact that gives a clear indication of the low rate of e-commerce users compared to the total population. Egypt's current situation further reflects the need to conduct intensive empirical studies to identify the causes behind the current lack of e-commerce adoption, and try to find the appropriate solutions to this problem, given the potential significance of e-commerce and the need to keep pace with the rapid technological developments that are taking place worldwide. Therefore, there is an urgent need to explore and identify the e-commerce adoption factors so that appropriate solutions can be proposed to address them.

Research Questions

Based on the research's objectives, the following research questions are proposed:

- Q 1) What is the effect of the technological, organizational, and environmental factors on the e-commerce adoption by Egyptian SMEs?,
- Q 2) What is the effect of e-commerce adoption on the performance of Egyptian SMEs?,
- Q 3) What is the effect of e-commerce adoption with mediating role between technological, organizational, and environmental factors and the performance of Egyptian SMEs?.

Aim of the Research and Research Objectives:

The primary objective of the study is to find out the influencing factors that affect the e-commerce adoption in Egyptian SMEs and how this adoption affects their performance. Our research aims to achieve the following objectives: 1) Investigate the correlation between technological, organizational, and environmental factors and e-commerce adoption in Egyptian SMEs. 2) Identify the impact of e-commerce adoption on the performance of SMEs in Egypt. 3) Examine the relationship between technological, organizational, and environmental factors and SME performance in the Egyptian market.

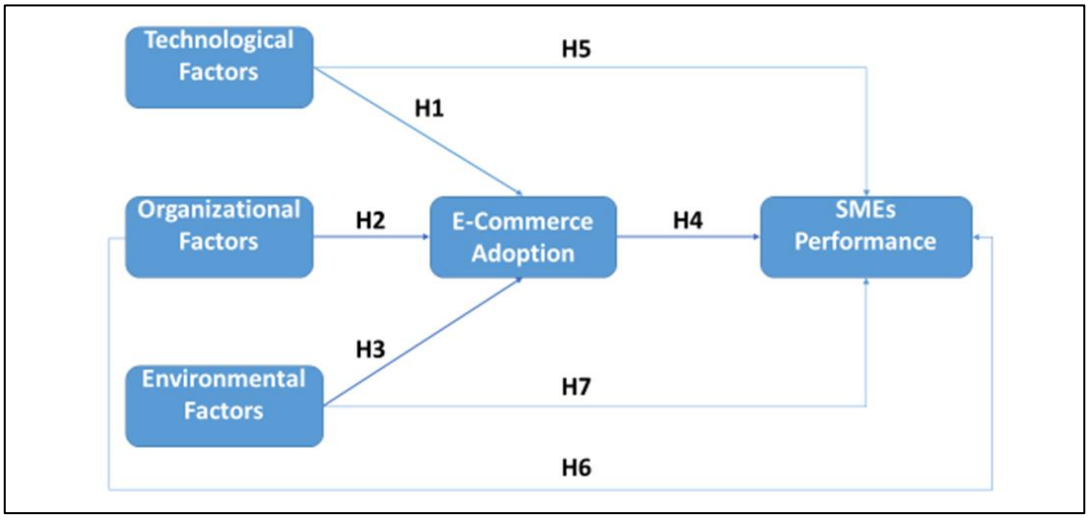
Importance of Study:

This research is intended to contribute to knowledge in the field of e-commerce adoption by expanding the body of knowledge in the field of e-commerce adoption and its usage in Egypt especially since the existing literature has failed to provide an extensive understanding of e-commerce in Egypt, understanding the e-commerce affecting factors by Egyptian SMEs as there is limited and fragmented literature that empiri-

cally tests e-commerce adoption by Egyptian SMEs, and developing a model that may be used to investigate and measure the factors affecting e-commerce adoption in Egypt and how that affects the performance of Egyptian SMEs.

Conceptual Framework and Hypotheses

After reviewing the theories associated with the e-commerce adoption by SMEs, this study will use TOE model and will create an extended model as shown in Figure 1. The proposed model explains the three contextual dimensions of TOE model (Technological, Organizational, and Environmental factors) and e-commerce adoption, with an additional factor, SME performance. This extended framework was used to collect relevant data for the study through distributed questionnaires with SME owners and managersto identify critical factors that influence the successful e-commerce adoption for Egyptian SMEs and how that affects their performance.



Source: Auther

Figure 1: Conceptual Model

Research Hypotheses

- H1: Technological Factors are expected to have a significant direct and positive effect on E-commerce adoption.
- H2: Organizational Factors are expected to have a significant direct and positive effect on E-commerce adoption.
- H3: Environmental Factors are expected to have a significant direct and positive effect on E-commerce adoption.
- H4: E-commerce Adoption is expected to have a significant direct and positive effect on SMEs' Performance.
- H5: The e-commerce adoption is expected to have a mediating relationship between Technological Factors and Firm Performance.
- H6: The e-commerce adoption is expected to have a mediating relationship between Organizational Factors and Firm Performance.
- H7: The e-commerce adoption is expected to have a mediating relationship between Environmental Factors and Firm Performance.

Research Justifications

This research is specifically important in Egypt, however, the study's results may apply to other countries that share similarities with it. Thus, the findings may be relevant to other developing countries and neighboring countries in the Middle East in general. In the wider context, the findings from this research will contribute to knowledge of ICT and e-commerce adoption from SME perspective. From a theoretical perspective, this study investigates how the potential benefits of e-commerce adoption can be effectively realized by SMEs. The study considers the practical dimension, known as the Technology-Organization-Environment (TOE) theory to explore the role the theory plays in developing and supporting an environment in which SMEs can create sustainable businesses

The study's main objective was to detect the extent of e-commerce adoption in practice, how it is implemented by SMEs, and how it can contribute to improvements and expansion in SMEs. The proposed framework explores which components of the model are appropriate and applicable to SMEs in Egypt. In addition, the proposed framework is an extension and modification of the developed conceptual framework that based on the TOE model. About Egypt's context, this research study will be value-added to the existing literature concerning Egypt's economy and SMEs' E-commerce adoption. Furthermore, from a practical perspective, the proposed framework for effective e-commerce adoption could be utilized by SMEs in Egypt.

Methodology

The plan of the study is based on the TOE model developed by Tornatzky and Fleischer (1990), it is about how technological factors, organizational factors, and environmental factors affect e-commerce adoption. The methodology has been described as follows:

1- Population: the targeted population is CEOs, owners, or top management of Egyptian SMEs in different sectors.

2- Sample size: the research sample size is 384 people according to Saunders' equation that calculates the required sample size by estimating the response rate and the actual sample size required (Saunders et al., 2012) who are working at SMEs using e-commerce, have more than a year of in experience e-commerce, and managerial level. Participants were drawn using a convenience sampling technique for those working at SME

3- Tools: a structured closed-ended questionnaire with a five-point Likert scale.

4- Data collection and analysis: The questionnaire is distributed via online Google Forms to collect the data till reaching 384 valid questionnaires. The data is analyzed using the SPSS program to analyze the quantitative data.

Data Analysis

Descriptive statistics which explain the features of sample data and inferential statistics which examine the relationships between variables using hypotheses are used in this research to explain and prove the worth of the outcome from survey data.

Descriptive statistics

1- **Gender Statistics**

It was found that, out of 384 survey respondents, the majority (83.3%) were male (N=316), while 17.7% of the respondents (N=68) were female. The disproportionate gender numbers suggest that males are more frequent users than females in using e-commerce.

2- **Age Statistics**

It was found that the majority of respondents (43.75 %) were in the range of 51-60 years of age (N=168) followed by the range of 41-50 years with a percentage (33.07%) and (N=127) while those who are in the range of 31-40 years are (N=80) representing (20.83%) of the respondents. Only (N=9) were in the range of 21-30 years with percentage (2.34%). The age profile indicated a great proportion of old-aged CEOs or top management. The biggest categories were those above 40 years old compared with those under 30 years old. It might suggest that many owners or CEOs of SMEs, were, also, founders of their businesses, and had expanded them over the years.

E-commerce Experience Statistics

According to the survey, most SMEs (36.5%) have been running their e-commerce activities for 1-5 years. This means that most SMEs have had an e-commerce work for a few years, and are conducting business based on them. Only 12.8% of companies have had e-commerce activities for more than 10 years, with this percentage showing that usage of e-commerce has become more prominent over the past 1-5 years. This is quite encouraging as in the past year; more companies (23.7%) are beginning to make use of e-commerce activities for their business while there were 27.1% have applied e-commerce activities over 5-10 years indicating that e-commerce usage is beneficial for them.

SME Industry Statistics

The analysis of this part looks for the main organization type to which SMEs usually belong. A total of 384 respondents from different SMEs have contributed to this study, most of them are linked to the Electrical and Electronic industry with a percentage of 23.18%. This is followed by respondents who are linked to the Construction field with a percentage of 14.06%, and then IT/Telecom with a percentage of 13.02%, Food and beverage sector (11.46%), Consultation services (10.94%), Healthcare industry (10.68%) and finally with low percentages for other industries.

SME Classification Statistics

This part is to identify whether the SME is a small or medium enterprise according to Egyptian law number 141 for the year 2004 which indicates that the enterprise is considered small if it has 1-50 employees and medium if it has 51-200 employees and more than that is not considered as SME. All respondents who answered that they have more than 200 employees were excluded from the survey. Among 384 valid respondents, there are 168 respondents with a percentage of 43.8% belonging to Small enterprises while there are 216 respondents with a percentage of 56.3% belonging to medium ones.

Respondent Position Statistics

Owners were the majority (n=122, 31.8%) while CEOs (n=49, 12.8%); and top managers (n=120, 31.3%). However, the remaining respondents were at the middle management level (n=93, 24.2%) of SMEs. The high-ranked levels of respondents delivered some indication of the validity of responses since respondents from senior management levels in SMEs could be expected to be more knowledgeable about their firm's e-commerce activities

Variables Descriptive Statistics

As shown in Table (1), Concerning the Technological Factors, there is a general agreement towards it from 384 respondents with a mean of 3.8, the standard deviation of 0.98, and the mode M=5. Regarding the Organizational Factors, most of the respondents gave a moderate rate with a mean of three. The 55, standard deviation of 0.95, and M=3. The majority of the respondents agreed about the Environmental Factors with a

Table (1): Variables Descriptive Statistics

	TECH_ FAC	ORG_ FAC	ENV_ FAC	EC_ ADP	PERFORMANCE
Mean	3.8663	3.5512	3.7370	3.6102	3.6914
Mode (M)	5.00	3.00	4.00	4.00	3.90
Std. Deviation	.98321	.95275	.98429	.98081	.66588

Source: Author

mean of 3.73, a standard deviation of 0.98, and M=4. Furthermore, the majority of the respondents accepted e-commerce adoption with a mean of 3.61, standard deviation of 0.98, and M=4. Moreover, the majority of the respondents rated SME Performance as high with a mean of 69, a standard deviation of 0.66, and M=3.9.

Reliability and Validity Analysis

The higher the Cronbach's Alpha, the higher the reliability of measuring the same construct. It was found that Cronbach's Alpha value of all constructs is 0.923 higher than 0.70, which is satisfactory and considered very good reliability. In addition, there is no need to delete any item because if we delete any item, the Cronbach's Alpha value will be almost the same or be reduced.

Corrected item-total correlations were used in measuring the study constructs and their indicators. Indicator loadings between 0.35 and 0.80 in corrected item-total correlations are deemed to show that the retained indicators are valid for measuring the one construct in question (Netemeyer et al., 2003). As the corrected item-total correlations are calculated jointly within the reliability statistics, all values of Corrected Item-Total Correlation are more than 0.35 and less than 0.80, which means that all items are valid.

Pearson Correlation Analysis

Table (2) shows the correlation between the different variables, all variables are positively correlated with each other. Moreover, there was a significant relationship between all constructs at the 0.01 level in the model except the relationship between the organizational factors and SME performance, which is not significant.

Table (2): Pearson Correlation between different variables

		TECH_FAC	ORG_FAC	ENV_FAC	EC_ADP	PERFORMANCE
TECH_FAC	P. Correlation	1				
	Sig. (2-tailed)					
ORG_FAC	P. Correlation	.486**	1			
	Sig. (2-tailed)	.000				
ENV_FAC	P. Correlation	.535**	.448**	1		
	Sig. (2-tailed)	.000	.000			
EC_ADP	P. Correlation	.547**	.412**	.457**	1	
	Sig. (2-tailed)	.000	.000	.000		
PERFORMANCE	P. Correlation	.269**	.093	.401**	.536**	1
	Sig. (2-tailed)	.000	.069	.000	.000	

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

Source: Author

Hypotheses Test

In this part, the hypotheses were tested where simple linear regression was done to test hypotheses 1, 2, 3, and 4 while mediating analysis was done to test hypotheses number, 5, 6, and 7 using hierarchical regression.

1- **Testing of Hypothesis 1**

From Table 3, the following conclusions were made:

Table (3): Simple regression analysis for Technological Factors and E-commerce Adoption

	R	R^2	B0	B	Std. Error	Beta	F	Sig
TECH_FAC	0.547	0.299	1.501	0.546	0.043	0.547	163.007	0.000

- R Square = 0.299 which means that the total influence of the Technological Factors on E-commerce adoption is equal to 29.9%
- Since $p < 0.05$, so, there is a statistically significant relationship between Technological Factors and E-commerce adoption ($F=163.007$, $p = 0$).

Dependent Variable: E-commerce Adoption

2- **Testing of Hypothesis 2**

From Table 4, the following conclusions were made:

- R Square = 0.17 which means that the total influence of the Organizational Factors on E-commerce adoption is equal to 17.0%

Table (4): Simple regression analysis for Organizational Factors and E-commerce Adoption

	R	R^2	B0	B	Std. Error	Beta	F	Sig
ORG_FAC	0.412	0.170	2.104	0.424	0.048	0.412	78.154	0.000

- Since p < 0.05, according to the decision rule, so, there is a statistically significant relationship between the Organizational Factors and E-commerce Adoption (F=78.15,p=0).

Dependent Variable: E-commerce Adoption

3- **Testing of Hypothesis 3**

From Table 5, the following conclusions were made:

Table (5): Simple regression analysis for Environmental Factors and E-commerce Adoption

	R	R^2	B0	B	Std. Error	Beta	F	Sig
ENV_FAC	0.457	0.209	1.909	0.455	0.045	0.457	100.829	0.000

- R Square = 0.209 which means that the total influence of the Environmental Factors on E-commerce adoption is equal to 20.9%
- Since p < 0.05, according to the decision rule, so, there is a statistically significant relationship between Environmental Factors and E-commerce adoption (F=100.829, p= 0).

Dependent Variable: E-commerce Adoption

4- **Testing of Hypothesis 4**

From Table 6, the following conclusions were made:

Table (6): Simple regression analysis for E-commerce Adoption and SME Performance

	R	R^2	B0	B	Std. Error	Beta	F	Sig
EC_ADOP	0.536	0.287		0.364	0.029	0.536	153.79	0.000

- R Square = 0.287 which means that the total influence of the E-commerce adoption on the SME's Performance is equal to 28.7%
- Since p < 0.05, according to the decision rule, so, there is a statistically significant relationship between E-commerce adoption and SME Performance (F=153.79, p = 0).

Dependent Variable: SME Performance

Mediating Analysis

The study examined the independent variables indirect effects of through mediation. Therefore, this study employed hierarchical regression to calculate E-commerce Adoption mediating effect and test hypotheses 5, 6, and 7.

Hierarchical Regression

For testing the research hypotheses H5, H6, and H7, a hierarchical regression was conducted, with four blocks of variables. The first block included the first independent variable (Technological Factors); and for block two, the second independent variable (Organizational Factors) was added; for block three, the third independent variable (Environmental Factors) was added; for block four, the mediating factor (E-commerce Adoption) was added to the three IVs.

Table 7 (The Model Summary), shows the R Square and the change of R square for each model; the initial R square value was 0.072. Furthermore, the R square change of 0.002 for the addition of the second variable, the R square change of 0.106 for adding variable number three, and the R Square change of 0.183 for the addition of the mediating variable to the independent variables. It

Table (7): The Model Summary

Model	R	R Square	Adjusted R Square	Std. Error	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.269[a]	.072	.070	.64217	.072	29.805	1	382	.000
2	.273[b]	.074	.069	.64236	.002	.775	1	381	.379
3	.425[c]	.180	.174	.60527	.106	49.132	1	380	.000
4	.603[d]	.364	.357	.53403	.183	109.138	1	379	.000

a. Predictors: (Constant), TECH_FAC
b. Predictors: (Constant), TECH_FAC, ORG_FAC
c. Predictors: (Constant), TECH_FAC, ORG_FAC, ENV_FAC
d. Predictors: (Constant), TECH_FAC, ORG_FAC, ENV_FAC, EC_ADP
e. Dependent Variable: PERFORMANCE

also shows the F for change in R Square, which is 29.805 for Model 1, 0.775 for Model 2, 49.32 for Model, 3, and 109.138 for Model 4. Therefore, the change in F is significantly larger.

Table 8 (Coefficients table), shows information on the significance of each independent variable. The table shows that in model 1, it shows that there is a significant relationship between Technological Factors and SME Performance (t = 5.459, p = 0) while in model 2, there is no significant relationship between Organizational Factors and SME Performance (t = -0.880, p = 0.379). In addition, Model 3 shows a significant relationship between Environmental Factors and SME Performance (t = 7.009, p = 0), and Model 4 shows a significant relationship between E-commerce adoption and SME Performance (t = 10.447, p = 0).

Table 8: Coefficients table

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.	Correlations		
	B	Std. Error	Beta		t	Zero-order	Partial	Part	
1	(Constant)	2.987	.133		22.437	.000			
	TECH_FAC	.182	.033	.269	5.459	.000	.269	.269	.269
2	(Constant)	3.047	.150		20.367	.000			
	TECH_FAC	.199	.038	.293	5.197	.000	.269	.257	.256
	ORG_FAC	-.035	.039	-.050	-.880	.379	.093	-.045	-.043
3	(Constant)	2.716	.149		18.272	.000			
	TECH_FAC	.087	.039	.128	2.197	.029	.269	.112	.102
	ORG_FAC	-.103	.038	-.148	-2.687	.008	.093	-.137	-.125
	ENV_FAC	.270	.038	.398	7.009	.000	.401	.338	.326
4	(Constant)	2.382	.135		17.647	.000			
	TECH_FAC	-.048	.037	-.071	-1.298	.195	.269	-.067	-.053
	ORG_FAC	-.157	.034	-.224	-4.573	.000	.093	-.229	-.187
	ENV_FAC	.200	.035	.296	5.794	.000	.401	.285	.237
	EC_ADP	.361	.035	.532	10.447	.000	.536	.473	.428

a. Dependent Variable: PERFORMANCE

However, in model 4 and after adding the mediating variable to the independent factors, it shows that the Technological Factors do not have a statistically significant effect on the dependent variable (t= -1.298, P = 0.195) but the Environmental Factors have a statistically significant effect on the dependent variable (t= 5.794, P = 0).

According to the above results, and according to the decision rules, the following conclusions were made:

5- **Testing of Hypotheses 5**

Since the relationship between Technological Factors and SME Performance is significant as in model 1, and the Technological Factors did not affect SME Performance significantly after adding the mediating variable to it as shown in model 4, so, the e-commerce adoption fully mediates the relationship between Technological Factors and Firm Performance.

6- **Testing of Hypotheses 6**

Since there is not a significant relationship between Organizational Factors and SME Performance, so, E-commerce Adoption does not mediate the relationship between the Organizational Factors and Firm Performance.

7- **Testing of Hypotheses 7**

Since the relationship between Environmental Factors and SME Performance is significant as in model 3, and the Environmental Factors affect SME Performance significantly after adding the mediating variable to the independent factors as shown in model 4, and the value of unstandardized coefficients (B) equal (0.200) which is lower than its value (0.270) before adding the mediating variable, so, the E-commerce Adoption partially mediates the relationship between Environmental Factors variable and Firm Performance.

Discussion

This research has developed the extended Technological-Organizational-Environmental (TOE) model. Therefore, a set of hypotheses related to the new factors has been added to the original theory to investigate their effect on the performance of Egyptian SMEs.

The new factor is the SME Performance (Dependent Variable). The original factors were represented in the Technological Factors, Organizational Factors, and Environmental Factors (Independent Variable) with mediating effect of E-commerce Adoption (Mediating Variable). The Five constructs generate the structure of the research model. Twenty-three measurement items, which constituted the research survey, were adopted from the literature in purpose of measuring the main research constructs. Hypotheses One, Two, and Three have been confirmed. In other words, Technological Factors, Organizational Factors, and Environmental Factors were found to affect e-commerce adoption in Egyptian SMEs. Furthermore, hypothesis four, Ecommerce Adoption was found to affect SME Performance. Results of the hierarchal regression showed that the mediating variable of e-commerce adoption has a fully mediating effect in the Technological Factors case while it was a partially mediating effect in the Environmental Factors case and there is no mediating effect in the Organizational Factors case.

Research Findings about the Research Objectives

The first objective is fulfilled, as according to this research study, a positive large correlation was found between technological factors and e-commerce adoption (R= 0.547), a positive moderate correlation was found between organizational factors and e-commerce adoption (R= 0.412), and a positive moderate correlation between environmental factors and e-commerce adoption (R= 0.457).

The second objective is fulfilled, as according to this study, there is a positive large correlation between E-commerce adoption and SME performance (R= 0.536).

The third objective is fulfilled, as according to this study, e-commerce adoption has a fully mediating effect between technological factors and SME performance, e-commerce adoption has no mediating effect between organizational factors and SME performance, and e-commerce adoption has a partially mediating effect between environmental factors and SME performance.

Conclusion

This study has investigated the key factors that affect e-commerce adoption among SMEs in Egypt and how that affects their performance. By employing the TOE model, the study has revealed that three main variables affect e-commerce adoption by Egyptian SMEs: technological factors, organizational factors, and environmental factors. Furthermore, firm performance factor was added to the TOE model to explore how e-commerce adoption is affecting the performance of the enterprise. The study used the sequential explanatory research design using quantitative analysis to help interpret the findings revealed from the study. The questionnaire was used to collect data from different SMEs from different sectors. 384 valid questionnaires were collected from owners, CEOs, and managers of SMEs. The managers of SMEs perceive technological factors, organizational factors, and environmental factors as the key factors to e-commerce adoption. Meanwhile, they believe that adoption will positively enhance their performance.

Recommendations

1- The SME owners have to allocate some resources towards adopting e-commerce.

2- For IT vendors, it is recommended that they address their services and products to the innovative SME owners to actively give information about the potential benefits of e-commerce to their clients and provide assistance during, and after if needed, the implementation process.

3- It is recommended that the Egyptian government give their support to solve the problem of lacking of technology infrastructure by enhancing the quality of telecommunication services.

4- Enacting laws and legislations for various aspects of e-commerce to provide elements of security, safety, trust, and protection for SMEs.

Limitation of the Study

1- This study is limited to the time period of collecting the data while SME e-commerce adoption factors might develop over time but because of the time constraint of the study, this longitudinal perspective was not investigated.

2- Since the used data in this study is driven from SMEs in Egypt, then it limits the generalizability of this study to an Egyptian SME-based study.

3- Data collection was only confined to the Egyptian capital of Cairo and Alexandria. Accordingly, the empirical study did not cover other Egyptian governorates in the Nile Delta, Upper Egypt, which have some e-commerce activities.

Future Research Direction

1- Expanding this study to other national groups to identify e-commerce adoption national behavior like the industrial sector, commercial sector, or services sector.

2- An investigation to validate this study may be conducted by expanding the study within the same region with the same kind of sample to reach a comparative conclusion.

3- To construct a longitudinal study to first observe the intentions to use e-commerce and then the actual use by the same sample.

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