E-voting Implementation in Egypt

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Manual elections processes in Egypt have several negative effects; that mainly leads to political corruption due to the lack of transparency. These issues negatively influence citizen's participation in the political life; while electronic voting systems aim to increase efficiency, transparency, and reduce the cost comparing to the manual voting. The main research objectives are, finding the successful factors that positively affects E-voting implementation in Egypt, in addition of finding out the reasons that keep Egyptian government far from applying E-voting, and to come up with the road map that Egyptian government has to take into consideration to successfully implement E-voting systems. The findings of the study suggest that there are seven independent variables affecting e-voting implementation which are; leadership, government willingness, legal framework, technical quality, awareness, citizen's trust in government and IT literacy. Technology-Organization-Environment (TOE) theory was used to provide an analytical framework for the study. A quantitative approach (i.e., survey questionnaire) strategy was used to collect data. A random sampling method was used to select the participants for the survey, whom are targeted voters in Egypt and have access to the internet, since the questionnaire was distributed online and the data is analyzed using regression analysis. Practical implications of this study will lead for more citizen participation in the political life due to the transparency that E-voting system will create, in addition to reduce the political corruption.

Keywords: Egypt, e-voting, implementation, transparency, corruption, trust, e-participation, edemocracy

Introduction

During the past decade, many governments have begun to introduce modern technology into their voting procedures. Mahrer and Krimmer (2005) argued that Electronic voting (Evoting) is one of the most significant parts of E-democracy, which refers to the use of computers or computerized voting equipment to cast votes in an election. E-voting aims to increase the speed of voting process, reducing cost and improving the accuracy of the results comparing to traditional paper based voting (Moynihan, 2004). An electronic voting system creates and manages data securely and secretly, so it must meet security requirements such as confidentiality, integrity, fairness, privacy,

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and verifiability. There are a number of voting systems adopted all over the world with each of them having its particular advantages and problems. Everett, Greene, Byrne, Wallachand (2008) mentioned that the traditional elections methods are no longer preferred due to the long period of preparation, fake voting, faulty voting, mistakes made during vote count, long period of counting and high cost of voting process. In contradiction with this, the manual voting systems still appears prominent among the developed and developing countries. Moreover, in some countries, deliberately introduced manipulations of the votes take place to distort the results of an election in favor of certain candidates.

Manual voting is often tedious, non-secure, and time consuming (Achieng, Mourine&Ruhode, 2013), which leads us to think about using electronic facilities to make the process more efficient and to reduce the political corruption that appear every election in Egypt, as well as to provide more transparency. E-voting systems aim to address many challenges associated with costs of physical ballot paper and other overheads, electoral delays, distribution of electoral materials, and general lack of confidence in the electoral process. Egypt However, , had taken some steps toward E-voting but has not leveraged the whole opportunities that Evoting presents.

A research that was trying to find a suitable framework for adopting E-voting in Jordan by exploring the readiness of the Jordanian society to trust E-voting technology, including identifying the requirements that should be considered to build this trust, and investigating the social and technical issues that can play a role in accelerating or slowing down the adoption process. Nu'man (2012) developed and examined a trust model comprised of two components which are E-voting trust parameters and E-voting issues; social and technical, authentication type, the conduit digital divide, and user expectation.

The author raised two main questions, first;"is the trust factors like security, usability, audit, privacy, reliability and equity of access affect E-voting implementation?"And second question is;"do some E-voting issues like social and technical; authentication type, the conduit digital divide, and user expectation influence E-voting system implementation?" (Nu'man, 2012, p. 133).

The results show that a considerable trust should exist in technology and its ability to provide users with the needed E-voting systems. Trust in E-voting is positively affected by the fulfillment of the trust requirements that came from citizen's perspective with different priorities.

For the second question, the outcomes showed that these issues; authentication type, the conduit digital divide, and user expectation also have a positive relation with creating a trust environment for E-voting system.

A previous research has discussed the factors that could influence the adoption and diffusion of E-voting technologies within the South African context, Achieng, Mourine andRuhode (2013) argued that technological challenges and voter education considered two main big challenges for E-voting adoption. The findings of the study revealed that relative advantage, compatibility and complexity (ease of use) together with other facilitating conditions such the availability of ICT

enabled infrastructure and resources, the perceived trust in E-voting technology digital divide within the Cape Town area and the awareness of the technology are important in the potential adoption of E-voting technologies in South Africa.

Rodrigues,Jose, Alexander, Cynthia, and Batista (2006) argued that E-voting systems shall increase voter confidence in the political system, promote citizen engagement in political life, and nurture the evolution of democracy, the data analysis showed that citizens are very much welcoming the new technology, and it will encourage them more to participate in the political life. E-voting is considered a significant alternative to manual system, as the emergence of E-voting will undoubtedly enable voters to cast their vote from a place other than the poll site in their voting district, facilitate the casting of the vote by the voter, facilitate the participation in elections by those who are entitled to vote, widen access to the voting process for voters with disabilities or those having other difficulties in being physically present at a poll site, increased voter turnout by providing additional voting channels, reduce over time, the overall cost to the electoral authorities of conducting an election, deliver voting results reliably and more quickly amongst many other benefits (Okediran, Omidiora, Olabiyisi, Ganiyu&Alo, 2011). Many researchers recommended that any electronic voting system should have four core properties that include accuracy, democracy, privacy and verifiability (see, for example, Cranor&Cytron, 1996; Okediranet al., 2011).

E-voting implementation considers from the most important systems in the democratic countries since Egypt is going through critical way for reaching democracy and this study area is new especially for Arab spring countries. The study aims to explore how Egypt can leverage on the opportunities of the electronic voting presents and come up with recommendations for the road map that Egyptian government has to take into consideration to successfully implement Evoting system.

Manual elections processes in Egypt have several negative effects that mainly leads to political corruption due to the lack of transparency, affecting negatively citizen's participation in the political life (Lawson, Chappell, Lenz &Baker, 2010), while electronic voting systems aim to increase efficiency, transparency, and reduce the cost. High percentage of the public employees get very low salaries due to the weak economy in Egypt, so they try to raise their salaries in an illegal way by getting bribery from citizen's visiting the front disk to get their government services. In 2002 E-government has been established in Egypt and several government services have been launched through E-government website and that reduced the level of corruption by allowing citizen's to get some of their government services done without the need to visit the front disk.

The purpose of this study is to find out the most successful factors that will lead to successfully implement E-voting in Egypt in order to improve the efficiency and effectiveness of internal government operations, communications with citizens, and transactions with both individuals and organizations, in addition to prevent the political corruption, especially after two revolutions in the past five years in Egypt, more voting events occurred, as two presidential elections, two parliament elections, and five times voting on the new constitution. This study has seven

independent variables which are leadership, government willingness, legal framework, technical quality, awareness, citizen's trust in government and IT literacy, while the dependent variable is E-voting implementation. Testing on the relationships of these variables may be able to provide objective evaluation of the needed electoral reforms in the country. The parameter estimates derived from each association will serve as a basis in establishing and prioritizing electoral reform agenda.

Electronic voting and electronic counting means that people can get official election results within hours, instead of weeks. In addition, technology will be a useful way of improving voter education and registration, increasing citizen's engagement and voter turnout. It's also vitally important that everyone who is eligible to participate in elections can do so. Electronic voting is a convenient way of making voting more accessible, as well as E-voting is much easier for disabled people to vote independently.

According to Competence Center for Electronic Voting and Participation, all of administration, voters, and politics will reach higher enhancement by applying E-voting system. For the administration side automation of certain processes, faster, easier and accurate results, facilitation of processes, reduction and facilitation of logistics, ecological impact, long-term economic efficiency, facilitation of communication with voters, increase of data quality, innovation and finally transparency of processes, and for voter benefits will be found within the independency in time and place, higher voter mobility, increasing accessibility, simplicity of the casting process, self-determined access for handicapped voters, citizens trust and satisfaction as well as for politics they will find it more easier accessing to new voters, faster and more accurate results, potential to increase voter turnout, direct communication with the voter, leader of innovation and change in electorate.

In the digital age, democratic systems increasingly resort to technology to achieve a better quality and performance, so the main goal beyond this research is to prevent the political corruption that clearly appears in every Egyptian election, and that could be done by applying Evoting systems.

From a theoretical perspective, this study makes use of theoretical analytical framework of the technology-organization-environment (TOE) framework was created by Tornatzky and Fleisher (1990). It describes factors that influence technology adoption and its likelihood, in addition TOE describes the process for technological innovations adoption and implementation, Tornatzky and Fleisher (1990) explained that there are three components for successfully implement the new technology which are as follow, the technological

context includes the internal and external technologies that are relevant to the field, technologies may include both equipment as well as process. The organizational context refers to the characteristics and resources, including degree of centralization, degree of formalization, managerial structure, human resources, amount of slack resources, and linkages among employees. The environmental context includes the regulatory environment and citizen's awareness (Tornatzky&Fleisher, 1990), while researchers like Awa, Ojiabo and Emecheta,

(2015) added that citizens trust as important factor from social respective on the environment context. These three components present both constraints and opportunities for technological innovation (Tornatzky& Fleisher, 1990).

Quantitative data will be obtained through online questionnaire which will include several questions; "Do you think E-voting system will be more trusted than manual voting system? Do you believe that E-voting system save time?" so we can measure the relationship between each variable that we found through the literature to reach which of this variable positively affects the implementation of E-voting in Egypt. Online survey questionnaire will be conducted among 350 samples. After that, the data will be collected from the respondent answers in order to be analyzed to find out the most successful factors for E-voting implementation in Egypt.

LITERATURE REVIEW

Qadah and Taha (2007, p. 1) define the term electronic voting as the "use of computers or computerized equipment to cast votes in an election." The authors continue to point out that Evoting aims at increasing participation, lowering the costs of running elections and improving the accuracy of the results. According to Saebq, Rose, and Skiftenes Flak (2008), electronic voting is an activity within the E-participation field where E-participation actors (citizens, politicians, government institutions, and voluntary organizations) conduct such an activity in the context of some factors (such as: information availability, infrastructure, underlying technologies accessibility, etc.) which then result to certain effects such as civic engagement, deliberative and democratic life.

This process comes through providing convenience in areas such as different text sizes, color and audio voting; also E-voting can solve the mother tongue problem by allowing voting in different languages. All these benefits are in addition to the rapid and more accurate process of counting the votes that E-voting allows (Kitcat, 2004). Although these benefits are attractive and can solve many problems of the paper-based voting system, the implementation of E-voting could present number of issues and challenges, including social, technical, political, legal and economic aspects. These aspects should be considered thoroughly before any decisions are made to unravel the hidden details that could affect the choice of suitable solutions and the overall success of the system.

An electronic voting (E-voting) system is a voting system in which the election data is recorded, stored and processed primarily as digital information. It uses an electronic means of casting and counting votes, E-voting systems have been in use since 1960 when the punched card system appeared and was used on seven different states in US for the presidential elections of

1964 and nowadays it has become a very practical way of voting (Ansolabehere, Stephen, & Stewart 2005). E-voting has many advantages over the traditional way of voting, and some of these advantages are; less cost, faster tabulation of results, greater accuracy, and lower risk of human and mechanical errors. It offers improved accessibility for the people with disabilities,

and it provides multiple language support for the ballots (Zissis, Dimitrios, &Lekkas, 2011).Evoting is gaining in popularity around the world, and it has become well established and deployed in many European countries like UK, Denmark, France and Ireland. Electronic voting is a term that may encompass several different types of voting, embracing both electronic means of casting a vote and electronic means of counting votes.

In this research there will be one question to be answered, which is: What are the successful factors of E-voting implementation in Egypt? This question will investigate the most successful factors that positively affect E-voting implementation in Egypt, and the goal beyond finding this factors is to make sure that there will be high transparent voting process in addition to reduce the cost, as well as to achieve a fair political race among the Egyptian politician participants in both presidential and parliament elections; so we can come up with the way that Egyptian government shall follow to implement E-voting.

Theoretical Framework of the Study

The basic concept of the conceptual model of this study is to examine the factors that may positively influence E-voting implementation in Egypt, as well as to test each factor and find out to what extent it affects the implementation process. The model has been constructed based on the TOE theory, in addition to different e-Services literature related to government implementation of E-voting. The model consists of dependent variable which is E-voting implementation and seven independent variables which are; (Government Willingness,

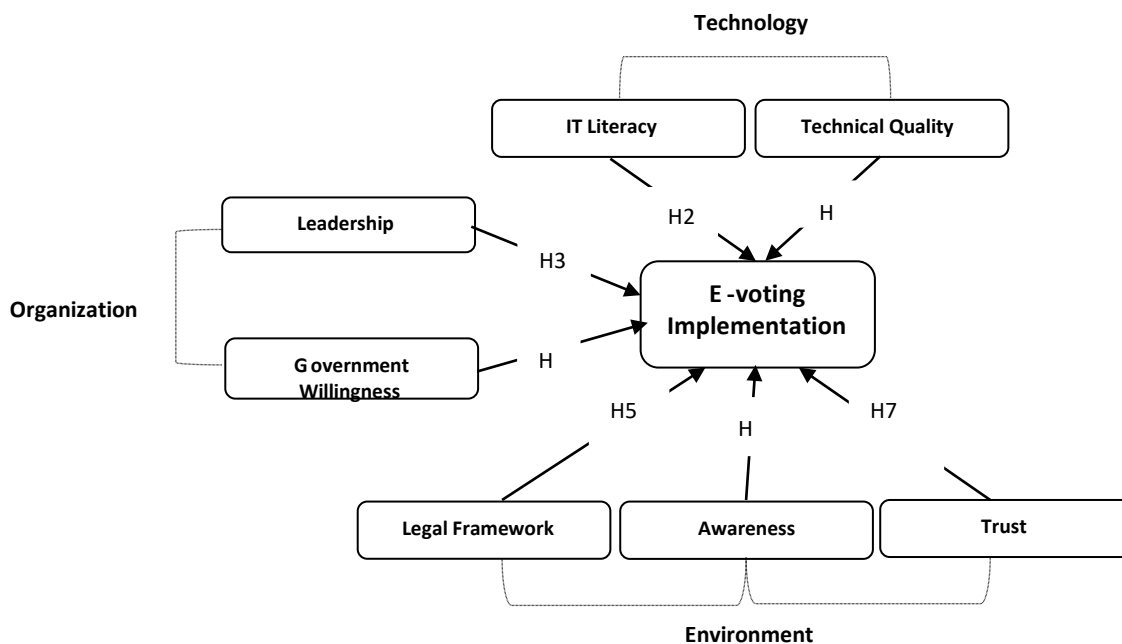Leadership, IT Literacy, Service Quality, Trust in government, Awareness and Legal Framework

Figure 1. Conceptual Model of the Study

Technological Challenges

According to Scott (2007) technological challenges explains the technologies in use and new technologies available to the citizens, the technological context is refined into the new technology technical quality which are security concerns, reliability, and deplorability and the Information technology literacy.

Technical Quality

Many researchers have used different means to assess E-voting technical quality. However, , the use of appropriate measures to gauge E-voting technical quality for a citizen centric model would require fulfilling user-defined expectations of the system technical quality. The technical quality of E-voting services is another incentive that will positively affects Evoting implementation, which will lead to sustainable E-voting services that is a basis of full participation of democracy process of related stakeholders (Kumar &Mukerji, 2007).

According to Porrawatpreyakorn, Quirchmayr and Chutimaskul (2003)there are main four principles in order to provide a high quality and successfully implement E-voting systems which are; First quick and correct access to the services at any place by related stakeholders of all educational levels and quick response from government organizations, second is interoperability of E-government services between related governments organizations, third is security level and the protection of user privacy is also a significant point that should be considered to create trust and increase the confidence of related stakeholders to use the systems, fourth is reliability and efficiency of E-voting systems.

Bhattacharya, Debjani, Gulla and Gupta (2011) explain the fact that poor infrastructure has been a major challenge towards speedy implementation of many E-governance projects across the world. Similarly, there are technical challenges involved in implementation of E-voting systems. Another technological challenge is the connectivity in remote areas. Cetinkaya, Orhan and Centinkaya (2007) state that from a technological view accepting E-voting is not a problem as a significant part of the population are using technology in different aspects of their daily life. Therefore, the challenge comes from the high sensitivity of E-voting systems towards some subjects such as security, privacy and trusting. Mutula, Stephen andPieter (2006) emphasize that the required trust must develop from the dependability of the system, not because people are required to rely on it; consequently, the public choose to use the system even though they are aware of its potential risks and problems. Therefore, before introducing E-voting systems as a reality to citizens, an environment of trust should be created to assure people that this system can be adopted.

Hypothesis 1: The higher the quality of E-voting system will positively influence its implementation.

IT Literacy

According to McNeil, Elfrink, Beyea, Pierce and Bickford (2006) IT Literacy includes the ability to read and interpret media, to reproduce data and images through digital manipulation, and to evaluate and apply new knowledge gained from digital environments. The explosive growth of technology in every aspect of society offers us a unique opportunity to engage citizens in economic and civic life; government must continually acquire and develop new knowledge and skills to the citizens.

In digital transformation, the International Information and Communication Technologies (ICT) Literacy Panel (2002), argues that the conception of the digital divide must be expanded, focusing on building infrastructure should be complimented by an effort to identify those without an ability to manage, integrate, evaluate, and create information in a traditional sense and to provide them with the necessary tools to acquire these skills.

As society changes, the skills needed to negotiate the complexities of life also change. In the early 1900s, a person who had acquired simple reading, writing, and calculating skills was considered literate. Only in recent years has the public education system expected all students to build on those basics, developing a broader range of literacy, To achieve success in the 21st century, students also need to attain proficiency in science, technology, and culture, as well as gain a thorough understanding of information in all its forms (Panel, 2002).

Hypothesis 2: High levels of IT literacy will positively influence E-voting implementation in Egypt.

Organizational Challenges

According to Scott (2007) organization challenges very important section for the technology adoption and E-voting implementation, many studies like (Scott, 2007; Awa, Emecheta and Ukoha, 2012; Zhu, Kraemer and Xu, 2002) mentionthe main factors to explain the tangible and nontangible factors in the organizational context; which are: leadership, Extent of coordination, and the willingness to implement the new technology.

Leadership

Heeks and Stanforth(2007) mentions that leadership in ICT context is closely linked with the political context as success depends on the level of commitment and innovative vision shown by the leadership who govern a country at the time of the E-government implementation. Egovernment projects such as; E-voting or any other electronic services are long-period projects, and thus need strong leadership in order to avoid most challenges.

Esteves and Joseph (2008) explain leadership and vision as crucial elements for the success of E-voting systems. In this norm, innovative leaders provide innovative solutions for citizens and businesses Furthermore, in general, leadership is considered as an inevitable contributor for

survival. It derives from the level of inspiration, commitment generated and corporate determination to perform.

Hypothesis 3: *Trusted Leadership will positively influence E-voting implementation in Egypt.*

Government Willingness

According to Alshehri, Drew, Alhussain, and Alghamdi(2012) government willingness to use ICT is very important to provide high quality information and effective communication tools for the specific purpose of empowering people for able participation in consultations and decision-making, both in their capacity as consumers of public services and as citizens.

Kals, Schumacher, and Montada(1999) mention that to demonstrate Political Willingness, there is need to determine the scope and content for the implementation of the new technology, government willingness is receptiveness to reform by implementing Information and communication technology systems for better services.

Hypothesis 4: *Government Willingness for adopting new technology will positively influence Evoting implementation in Egypt.*

Environmental Challenges

According to Neuroni, Alessia, Riedl, andBrugger (2013)E-voting is located between the conflicting factors of legislation, technical feasibility, and society. To offer the planned systems electronically, it is required that the deployment of the environmental factors, legal framework, citizens awareness and citizens trust in the government are coordinated, which is essential for its success.

Legal Framework

Heeks (2002) mentions that E-voting systems require many regulations and legislative acts to deal with the changes and differences between the technological systems and the manual one, these legislations probably consist of electronic signatures, archiving data protection, preventing computer crimes and hackers, and the freedom of information.

Holmes and Watts(2008) mention that in order to hosting activities from procurement to service delivery, regulatory changes are required. Moreover, legal risks in terms of technology may expose public agencies to serious liabilities, and therefore new technology systems legislative acts have to be developed and updated periodically to avoid unexpected results or the delaying of projects and weak legal framework may cause failure of the E-voting systems.

Hypothesis5: Strong Legal Framework for E-voting systems will positively influence its implementation.

Awareness

According to Jamrah, Al-Omari, and Sharabi (2006) and Reffat (2003)if the citizens have limited awareness about what E-voting is and what its benefits are, this lack of awareness might prevent the citizen from participating in E-voting systems. Therefore, development and implementation of E-government and E-services will greatly depend on marketing and spreading about the new technology and its advantages to enrich citizen' awareness. Moreover, Venkatesh (2000) specify that older people often lack awareness in technology. Additionally, Fang (2002) mentioned that governments often tend to cooperate more with the elderly due to the generation gap and lack of expertise in the use of modern technology.

> Hypothesis 6: High levels of awareness about E-voting systems will positively influence Evoting implementation in Egypt.

Trust

According to Braun, Adriana, Musse, Oliveira, and Bodmann (2003) social framework is the most important influencing factor for the implementation of E-voting, even the technically most secure system will never enforce, if the trust of the citizens is missing. For a successful introduction of E-voting, the citizens have to accept this voting channel (Braun et al., 2003). The acceptance is connected to the benefit of a new service provides, for that reason the success of Egovernment depends on the so called e-benefit. The e-benefits a surplus value for citizens, economy and administration, which results, if theE-voting systems offered administrative services yield an added benefit, compared to the manual voting.

If these challenges are not matched, the oldway of working and structures won´t be replaced by the new electronic systems. This benefit can result in a faster service, an improvement of service and quality, an organizational improvement, reduced costs and introduces a stronger transparency (Reinermann, Heinrich, & von Lucke 2002). The Egyptian context may face a great challenge on e-Voting implementation; this may be due to the political turmoil and people's active participation in governance. To satisfy and achieve citizen's trust, any government initiative should be tainted with high confidence on the goals and mission, for instance, the e-Voting system.

> Hypothesis 7: High levels of trust in government will positively influence E-voting implementation in Egypt.

RESULTS AND DISCUSSION

Sample Characteristics

Table 1. Demographic Characteristics of the Respondents

Contents	Dimension	Frequency	Rate (%)
Gender	Male Female	154	51.5
		145	48.5
Age	18-24	48	16.1 41.5
	25-34	124	33.1
	35-44	99	7.4
	45-54	22	
	55-64	6	2
	65 above	0	0
Education	Primary	7	2.3
	Secondary	7	2.3
	Undergraduate	45	15.1
	Post-Graduate	191	63.9
	PhD	38	12.7
Job	Professional/vocational	11	3.7
	University Student	52	17.4
	Public servant	139	46.5
	Law/Legal	28	9.4
	Private Employee	80	26.8

Descriptive Statistics

Through the analysis we found that citizens gave the highest positive perceptions for leadership and legal framework and that may suggest the importance of this two factors for the implementation process on the other hand the lowest perceptions was found to IT literacy and awareness and that may because on the case of Egypt the government already take into its consideration great steps of awareness of the new system in addition to the lowest rate of the computer literacy in Egypt this days.

Table 2. Descriptive Statistics of Variables

Variables	Minimum	Maximum	Mean	Std. Deviation
Independent Variables				
Leadership	2.00	7.00	5.78	1.01
Government willingness	1.00	7.00	5.26	1.27
Awareness	1.00	7.00	5.17	1.26
IT Literacy	1.00	7.00	4.80	1.49
Trust	1.00	7.00	5.76	1.16
Legal Framework	1.00	7.00	5.84	1.12
Technical Quality	1.75	7.00	5.57	1.11
Dependent Variable				
E-voting Implementation	1.67	7.00	5.90	1.22
Demographic Variables				
Gender	1.00	2.00	1.48	.50
Age	1.00	5.00	2.38	.91
Education	1.00	6.00	3.93	.85
Job	1.00	4.00	2.45	1.06

Exploratory Factor Analysis

As the results shows, leadership, technical quality, awareness, trust, IT literacy, legal framework, E-voting implementation and government willingness grouped distinctly andseparately with factor loadings from .432 to .849 satisfying the threshold laid by Klein (1999). The Kaiser-Meyer-Olkin (KMO) value of .854 provided strong evidence that the extracted factors are acceptable and useful for the measurement model. See table 3below.

Table 3. Independent and Dependent Variables

Rotated Factor Matrix[a]

Factor

	Leadership	Quality	Awareness	Trust	Literacy	Legal	Implementation	Willingness
leadership3	.730							
leadership 2	.723							
leadership 1	.702							
Leadership4	.615							
Quality2		.849						
Quality1		.799						
Quality3		.671						
Quality4		.432						
Awareness2			.808					
Awareness3			.699					
Awareness1			.687					
Awareness4			.599					
Trust2				.798				
Trust1				.791				
Trust3				.722				
Literacy2					.847			

Literacy1		.830	Literacy3	
	.629	legal2		.771
legal1			.707	legal3
	.609			
Implementation2			.834	
Implementation3			.614	
Implementation1			.585	
Willingness2				.817
Willingness1				.613
Willingness3				.492

Extraction Method: Maximum Likelihood.

Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 7 iterations.

Cronbach's Alpha Analysis

Table 4 revealed the high reliability as Cronbach's alpha value located from .74 to .89for each factor.

*Table 4.*Cronbach's Alpha Values (Reliability Analysis)

Variables	Items	Alpha
E-voting Implementation	3	0.84
Leadership	4	0.84
Government Willingness	3	0.74
Awareness	4	0.82

IT Literacy	3	0.86
Trust	3	0.89
Legal Framework	3	0.86
Technical Quality	4	0.85

Confirmatory Factor Analysis(CFA)

The analysis provides information on the fitness of the measurement model with regards the data employed in the study and the distinctiveness of the constructs. Results of the CFA, for instance the correlations and standardized estimates were utilized to validate the parameters though the stats tools package by Gaskin (2014; 2015). The analysis provides information on convergent and discriminant validity of the measurements. The results shows that the model fits the data well as evidenced by the CMIN/DF = 2.37(<3 is acceptable), RMR = .06(<.08 is acceptable), IFI = .91 (>.90 is acceptable), CFI = .91 (>.90 is acceptable), and RMSEA = .07 (<.08 is acceptable). Figure 2 show the CFA results and model fit.
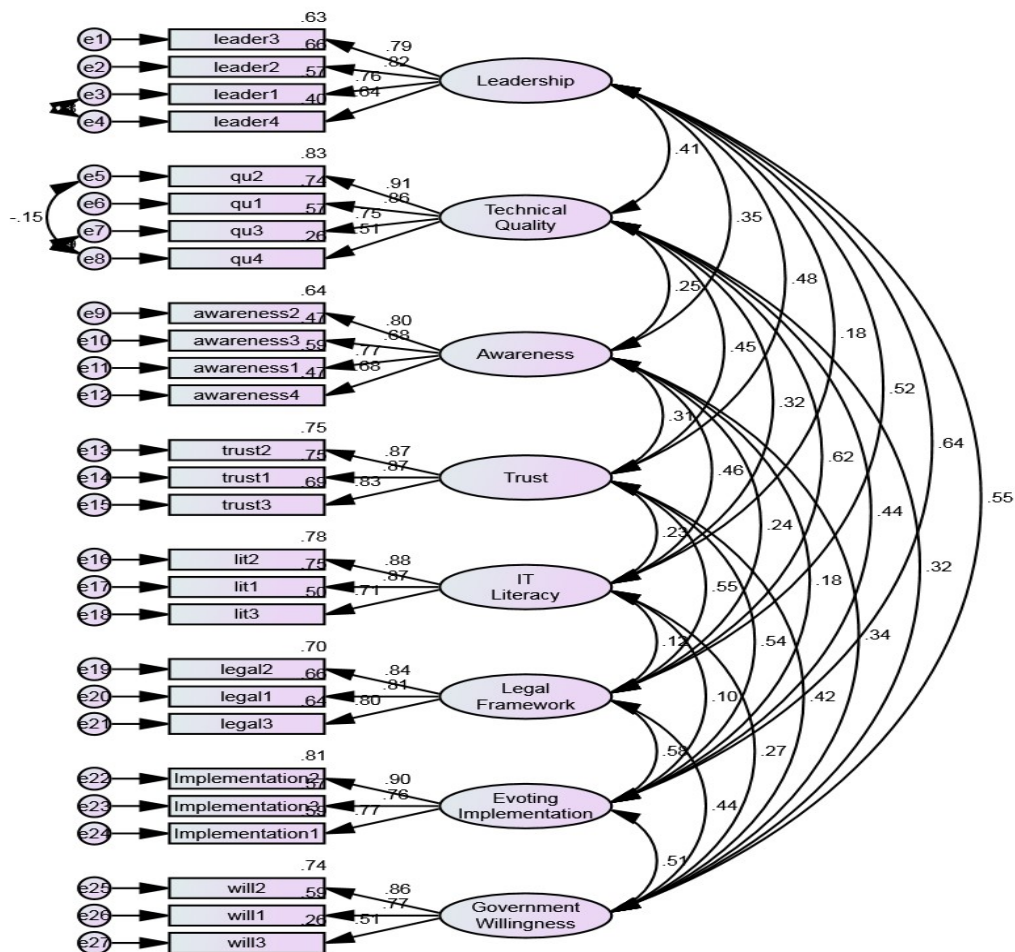
CFA Model Fit Summary

Model	Chi-square/df	AGFI	SRMR	GFI	CFI	RMSEA	IFI	TLI
Suggested Cut-off Values	<3	>.85	<.09	>.90	>.90	<.10	>.90	>.90
Model	2.37	.81	.06	.86	.91	.07	.91	.89

Discriminant Validity Analysis

To further establish the robustness of the measurements, the study determined the internal consistency index (CR Index) and convergence validity—average variance extracted (AVE). Table 9 summarized the results which are, for E-voting implementation—CR=.85, AVE=.66; leadership—CR=.84, AVE=.57; technical quality—CR=.85, AVE=.60; awareness—CR=.83, AVE=.54; trust—CR=.89, AVE=.73; IT literacy—CR=.86, AVE=.68; legal framework—CR=.86, AVE=.67 and government willingness—CR=.76, AVE=.53.

The discriminant validity analysis provides that the threshold for CR which is higher than .7 and AVE which is higher than .5. Testing on the discriminant validity, the square roots of the AVE support the psychometric parameters of the study, for instance E-voting implementation=.81, leadership=.75, technical quality=.77, awareness=.73, trust=.85, IT literacy=.82, legal framework=.82and government willingness=.73; all values greater than .7 which is a good and acceptable value.

Table 5. Discriminant Validity Analysis

	CR	AVE	MSV	ASV
E-voting Implementation	0.85	0.66	0.41	0.22
Leadership	0.84	0.59	0.41	0.22
Technical Quality	0.85	0.60	0.38	0.17
Awareness	0.83	0.54	0.21	0.10
Trust	0.89	0.73	0.30	0.19
IT Literacy	0.86	0.68	0.21	0.07
Legal Framework	0.86	0.67	0.38	0.22

Constructs	1	2	3	4	5	6	7	8
Government Willingness	0.76	0.53	0.30		0.18			

Constructs	1	2	3	4	5	6	7	8
E-voting Implementation	0.81							
Leadership	0.64	0.75						
Technical Quality	0.44	0.41	0.77					
Awareness	0.18	0.35	0.25	0.74				
Trust	0.54	0.48	0.46	0.31	0.85			
IT Literacy	0.10	0.18	0.32	0.46	0.23	0.82		
Legal Framework	0.58	0.52	0.62	0.24	0.55	0.12	0.82	
Government Willingness	0.51	0.52	0.32	0.34	0.42	0.27	0.44	0.73

Regression Analysis:

After running the regression leadership (β =0.382 and P = 0.000); government willingness (β =0.114 and P = 0.019); awareness (β = -0.055 and P = 0.254); IT literacy (β= 0.065 and P = 0.128); trust (β =0.227 and P = 0.000); legal framework (β=0.183 and P = 0.003); technical quality (β =0.136 and P = 0.029).R-Square found with a value of (0.465) which means that 46.5%, of the variation of the dependent variable has explained by the independent variables.

Table 6. Results of Regression Analysis with Control Variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Gender	-.101	.111	-.041	-.909	.364
Age	-.094	.062	-.070	-1.503	.134
Education	.053	.069	.037	.766	.444
Job	.052	.052	.045	1.004	.316
Leadership	.382	.064	.316	5.956	.000

Government Willingness	.114	.048	.119	2.351	.019
Awareness	-.055	.048	-.057	-1.144	.254
IT Literacy	-.065	.042	-.079	-1.525	.128
Trust	.227	.056	.216	4.083	.000
Legal Framework	.183	.062	.169	2.957	.003
Technical Quality	.136	.062	.124	2.198	.029
F			22.694		
R			.682		
R2			.465		
Adjusted R^2			.445		
N			299		

a. Dependent Variable: E-voting implementation
*** $p < .001$, ** $p < .01$, * $p < .05$

Table 7. Results of Hypotheses Testing

variables	Hypotheses	Direction	Test Result
Technical Quality	H1: The higher the quality of E-voting system will positively influence its implementation	+	Supported
IT Literacy	H2: High levels of IT literacy will positively influence Evoting implementation in Egypt.	-	Not Supported
Leadership	H3: Trusted Leadership will positively influence E-voting implementation in Egypt.	+	Supported
Government Willingness	H4: Government Willingness for adopting new technology will positively influence E-voting implementation in Egypt.	+	Supported

Legal Framework	H5: Strong Legal Framework for E-voting systems will positively influence its implementation.	+	Supported
Awareness	H6: High levels of awareness about E-voting systems will positively influence E-voting implementation in Egypt.	-	Not Supported
Trust	H7: High levels of trust in government will positively influence E-voting implementation in Egypt.	+	Supported

CONCLUSION

This study identified the determinants that could have an influence on the implementation of E-voting technologies within the Egyptian context. The findings of the study revealed that relative advantage, compatibility, complexity and secure system (Technical Quality) together with other facilitating conditions such the availability of ICT - enabled infrastructure and resources, the perceived trust in E-voting technology together and hand by hand with trusted leadership are important in the potential adoption of E-voting technologies in Egypt. Also Government willingness to adopt the new technology with strong legal framework could perhaps assist electoral management body in Egypt on how they could leverage the opportunities that Evoting presents.

This study found that trusted leadership is one of the most important factors that will positively influence E-voting systems implementation, government should work on reducing the trust gap with the citizens because trust is one of the most important aspects to achieve a successful E-voting implementation. Leadership and clear vision are indispensable for successful IT implementation to promote co-ordination within individual agencies as well as across government. Especially, presidential leadership involvement is essential to ensure vertical Egovernment planning, to acquire the necessary resources, to motivate officials, to support dealings with external partners and stakeholders, and to ensure co-ordination across ministries and agencies (OECD, 2003).

Theoretical and Policy Implications

For the purposes of developing the country's economic and social development, the government needs to have a clear vision and a strong determination in embracing the IT revolution. No sooner does a nation develop E-government than it will achieve these above targets, it requires a strong IT leadership, which is captured by the following conditions:

The government should have policies and strategies to train leadership and attract talents; there is an undeniable fact in Egypt that talents or capable people who have good education background and good vision, they do not want to work for the government offices due to several reasons related to salary, policies. Additionally, the great numbers of people who have studied in overseas are lack of motivation to comeback home country to dedicate for their country development.

Strong Legal Framework

Government should review current laws and regulations related to election process to reject some laws and regulations which are not proper with current status and prevent from overlapping. It will create a transparent legislation environment forE-voting implementation. There is no doubt that transparent system of laws and regulations is very important to help local companies' development and attract foreign investors.

National Electoral Committee

Establishing national electoral committee responsible for organizing and coordinating all elections process is very important and this is a huge problem in Egypt because there are two different committees; one for the presidential election and the second one for the parliamentary election which cause not stable strategies and policies for every election so the Egyptian government should take into consideration the importance of making a suitable environment for all election process in Egypt.

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