

# **SUBJECT REVIEWER: A PROPOSAL FOR AN ELECTRONIC VOTING SYSTEM AS TRUST MEDIATION TO ADOPTING IN IRAQ**

1SAAD MOHSEN HASSAN, 2 AHMED HASAN KHANJAR, 3SUAAD ALI ABEAD

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**1SAAD MOHSEN HASSAN, 2 AHMED HASAN KHANJAR, 3SUAAD ALI ABEAD**

**Assist Teacher. Faculty of Basic Education, Al-Mustansiriyah University, 1  
Baghdad, Iraq**

**Assist Teacher Faculty of Basic Education, Al-Mustansiriyah University, 2  
Baghdad, Iraq**

**Department of Computer Science, College of Science for Women, 3  
University of Baghdad**

**Saad\_mm.edbs@uomustansiriyah.edu.iq, 2ahmeddany73@gmail.com 1  
saadmohsen84@yahoo.com, ahmeddany73@gmail.com,  
Suaad.ali555@gmail.com**

### **ABSTRACT:**

There are huge benefits that offered by e-government, which can increase the number of users with big platform for transparency, as in this time the use of information technology promises to revolutionize both the provision of government services and the vibrancy of democracy. One of the solutions in many developing and developed countries is electronic voting system (E-voting) which can eliminate the needs for subjective recounts, fast and reliable delivery services, with big possibility to prevent such kind of fraud, or manipulate in results during the delivering process. The aim of this paper is to find the factors that involved in applying E-voting systems in Iraq. Overall, the paper can reveal facts for Iraqi government about adopt an electronic voting system as a replacement for the paper-based system to perform voting electoral operation efficiently and effectively.

**Keywords:** Trust in E-Voting, Security, Privacy, Usability, and Reliability.

### **I. INTRODUCTION**

Any parliamentary elections in any country can determine the direction of this country in the present and future, of course, during this period the country's economy and its growth will be in a recession, because the plan and trends of the previous government will be expired waiting for the current government, which will put its own plans of trends to serve the country. Whenever the period between the elections and the announcement of results

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goes long, the longer the economy dormant, which is the main artery for the growth and development of countries.

Iraq, like many other countries, is suffering from various problems concerning the parliamentary elections (nation wide election), which happen every four years. the status of Iraq become unstable security situation from 2003 and until this day, which helps to increase problems with the electoral process, like the percentage of the money that spend every election up to tens of billions, in addition to the very long period of announcing results which can reach up to weeks from the date of the elections. For all that and more, a fast and reasonable solution need to apply to the electoral system in Iraq to change or enhance the use of paper-based voting system which been using for many years.

In this digital age, democratic systems more and more progressively resort to technology as a bolster, compliment, or perhaps remodel political processes. The developing utilization of assorted electronic, implies in decisions reflects, the final tendency of expanded digitalization, great outreach and improved quality of services in our societies. Administrations round the world of elections undergoes important transformations with the modernization of various procedures in the electoral cycle and experimenting with technological means to achieve a better quality and performance (efficiency, transparency, accuracy etc.). Because of the increased in size of the population with taking into consideration the different distances and also the importance of the time it takes to complete the electoral process, all that and more factors such as accuracy, efficiency (speed score), and comfort made the paper-based ballot not suitable for Iraq and rang the bell to change to the electronic vote system unavoidable.

The foremost vital objectives for schemes of electronic voting (E-voting) is privacy, robustness and universal verifiability. Elections allow individuals to select their own representatives, with honesty and integrity of electoral process which are powerful keys to uprightness associated with democracy by itself. An actual electoral system needs to be strong enough in order to endure the assortment of deceitful conduct behavior also should be adequately straightforward as well as easily understandable that both candidates and voters can accept such kind of outcome results from the determination [1].

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---

While pencil and paper voting have it own long record of voter fraud, many continues provided great solution by using the information and communication technology (ICT) in form of electronic voting system, as it strong solution to the diverse problems of the paper-based system. Cost effectiveness and time saver system [2] which it easy to verify without any particular skill or tool. Moreover, real-world experiences have contradicted the claimed usefulness of E-voting in terms of addressing declining voter turnout, exclusion of some social groups, and high costs [3]

Adoptions of successful and execution E-voting system (EVS) in Estonia, Brazil and India, also the pilot projects in Canada, Austria, United Arab Emirates (UAE), Australia, and many European countries such as United Kingdom (UK), Belgium, France, Germany, Ireland, Norway, Spain, Portugal and Switzerland, all demonstrates that adopting E- voting technology is secure, reliable, as well as solid, likewise; adoption E-voting system happen it took a place by other countries, just like recent developing democracies for example: Qatar, Ghana and Nigeria [4, 5]

## **II. 2010 IRAQI ELECTION**

After the end of the period allocated to the elected government in 2006, the time has come to start working to elect a new government, on March 7th, 2010 electoral competed almost '6281' candidates, after week of cutting off all institutions, schools, universities and all kinds of day jobs as a vacation to let people have more free time to elect. The Independent High Electoral Commission (IHEC) postponed the announcement of the final results until May 2014 instead of April 2014, due to disagreements over results and sorting/counting votes, forced to re-calculate the polls again in Baghdad on April 19, 2010. On May 14th the IHEC announced the final results, as an outgrowth of that; opened the new parliament on June 14, 2010. After more than two months from the actual election date, the announcement of the official results, and more than three months a new government began to work [6] As a result of the delay in announcing the results, Iraq continued without a government for more than ninety days after finishing the previous government its powers to make decisions and approval of any development projects. And unlike the conflict parties on the Iraqi streets through the bloody events that occurred in some provinces, particularly in the capital

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1SAAD MOHSEN HASSAN, 2 AHMED HASAN KHANJAR, 3SUAAD ALI ABEAD

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Baghdad before and after the elections to try to shake and withdraw any confidentiality that left in the new government even before it start.

### **III. 2014 IRAQI ELECTION**

The voting system used in the parliament Iraqi elections from 2005 until 2014 the paper-based voting system. The paper-base system has the advantage of being a simple procedure for most voters. By simple verifiable which provide couple original identification cards.

In 2014 election, first parliamentary election started since the United States invasion recession from Iraq in 2011, and the third since 2003. IHEC introduced a new component, implemented to reduce time that been spend in voting procedure of checking voter identification process. This extra component uses a smart card reader or smart identification card (SID) which saves a biometric fingerprint scanner and personal information for voters. '22' million Iraqis who must be voting in these elections, the number of candidate lists issued by IHEC is '9045' candidates, compete for '238' seats in the Chamber of Deputies [7], the election started on 30 April 2014 and the results were announced on 19 May 2014, which is more than nineteen days after the actual polling date.

### **IV. COMPLICATIONS THE ELECTION PROCSS IN IRAQ**

We live in a democratic country now, and voting is one of the basic tasks within the community. Iraq using manual voting system for many years and still until this day, many problems inherent in the paper- based voting systems; security as an example; it has a different kind challenge such as double vote, frauds and guaranteeing the secrecy. Also privacy of the ballot vote exposed after the voting period ends, the paper ballots are powerless to malice. Another element must be mentioned like distance; sometimes people could be in village/countryside registration, and because of that reason they don't feel fulfil as their duties do voting. Furthermore; the time required for the different levels of the electoral procedure tended to be extremely huge as printing votes, tabulation, distribution and tally votes. However, the voting process has caused some complications for the public:

A. Security consideration; especially there had been so many cases of threatening in Iraq at polling stations, led people to deny this process by avoid donating their votes.

B. Lots of wasting time and many problems are occurring on votes counting process and declaring the results from this activity is done manually.

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1SAAD MOHSEN HASSAN, 2 AHMED HASAN KHANJAR, 3SUAAD ALI ABEAD

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C. Due to manual voting process, there is lots of money spend on papers, forms... etc. before, during and after election.

D. Prevent voters from manipulation as a way of cheating, or sabotage their votes by checking more than one choice of a candidate, and that will be led to count the vote as a non-acceptable vote (terminate the vote.)

E. In a few cases, voter is registered in more than one area, so there are chances of a vote recorded twice.

## **V. THEORY APPROACH**

Based on the study of Diffusion of Innovation (DoI) theory by Rogers as a theoretical framework [8]. Rogers identifies the diffusion as “the process by which an innovation is communicated through certain channels over time among the members of a social society”. DoI usually a theory about why, what also how, the revolutionary ideas rate as well as technology that distributes among cultures, operate at the different firm and level. Models of diffusion usually not worried along with regardless of whether a good development may be adopted, yet or will not [9]. Lee and other researchers taking into account the model of DoI had offers underlined of how the properties of new technology associated as the innovation key to be determinant with the adoption [10.]

This really could be one of the several reasons that took into account to decide considering this study. The theory of DoI indicated by Rogers tries to clarify the factors and process that impact the adoption of new innovations. The study utilizes three constructs based on the DoI framework, compatibility, relative advantage and complexity. The three characteristics' innovation had a huge reliability connection with innovation adoption. They give a case expressing that “if the use of an innovation violates a cultural or social norm it is less likely to be adopted”[11.]

## **VI. WHY WE NEED TO ADOPT E-VOTING IN IRAQ?**

E-voting is the merge of ICT within the election system. An electronic device is used in the procedure of record, store and process the voter's ballot action directly in the mean of digital form into the device. In this manner, rather than dealing with old, standard, manual, paper-based physical ballots, voters can manage devices in form of an electronic interface that displays virtual digital advanced ballots. Subsequent to settling on voters' choices, they do not have to convey their ballots to the electoral board. An ICT based system can do this kind of job on voter's behalf of engaging communication

# **SUBJECT REVIEWER: A PROPOSAL FOR AN ELECTRONIC VOTING SYSTEM AS TRUST MEDIATION TO ADOPTING IN IRAQ**

1SAAD MOHSEN HASSAN, 2 AHMED HASAN KHANJAR, 3SUAAD ALI ABEAD

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networks, digital storage systems, and many more in the background, and that's called Electronic voting (E-voting) system. The existing ballots in a digital form (E-voting) in general, it has many numbers of potential benefits points over traditional paper-based voting systems, they are:

- A. Saves materials that needed for purpose of printing and distributing ballots.
- B. Speedup (advance) the process as well as the accuracy of the ballot tabulation.
- C. The design is perfectly flexible which can be modified until the last minutes.
- D. For disabilities and old people, the system Offers better accessibility.
- E. Multi languages supported for different type of voters.
- F. Prevents unexpected mistakes by voters.
- G. Permits accesses to any information with respect to voting choices.

## **VII. FACTORS DETERMINING ADOPTION E-VOTING IN IRAQ**

### **7.1 Security of E-Voting System**

Researchers exploration proclaims that E-voting system needs the preferable protection insurance against distinctive sorts of attack because it depend on computer-based system to access [12, 13]. Some of attacks may be from outside or even worst from inside actor and either have accidental or purposeful [14]. A multidimensional idea of E-voting security can be arrange as set of parameters for purpose of keeping security under radar; for instance Hoffman and other researchers define them as: physical security, data access, data integrity, control and authentication of all involved parties [12]

### **7.2 Privacy of voters**

Privacy is characterized as the incapability to connect any vote to a voter in middle or after the election researchers put privacy in two sections: first; user namelessness (the voter's decision could not be uncovered (seen) to anyone else except himself), second; data confidentiality or ballot's secrecy (the contained of votes must no else knows about it) [12, 15–19]. Other researchers contend that privacy ought to be secured at the time of electoral, as of now; also in the future against diverse other parties [20]

### **7.3 Usability of E-voting system**

Usability means in this discussion, the quality characteristic which assesses the simplicity regarding using the voter (as user) an interface interaction. Zahra and Nielsen says; additionally mention in purpose to serve techniques

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1SAAD MOHSEN HASSAN, 2 AHMED HASAN KHANJAR, 3SUAAD ALI ABEAD

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of improve and enhancing through the outline process [21]. Gritzalis contends which usability manages the consistency within the actual user interface [22], this presence with context delicate help; furthermore, accessibility of preparing materials on the nature of user documentation, because the actual E-voting system should give distinctive interfaces in order to conceal the diverse types and needs for different voters (users) (e.g. different disabilities, languages, etc ).

## **7.4 Reliability of E-voting system**

The IPI speak-out that whereas security is worried within system's imperviousness to serve the purpose of attacks, and also the ability of the system to manage as well as maintain in case of any failures [23], any system should function as it planned as it all goes underneath system reliability that must handle it for both software or hardware. Researchers all suggests that reliability of the whole voting system ought to work smartly with the goal of no votes will be lost regardless any failures happen [15– 17, 19]. Additionally; the system should guarantee that each one vote is checked and correctly counted. In the same manner.

## **7.5 Trust in the E-voting system**

Randell and Ryan state trust as it new products or services such as a computer-based system can influence people's acceptance [24]. Tassabehji and Elliman declare the idea about trust actually is gigantically intricate and also incorporates on numerous points besides the trouble of measure as well as watch trust itself straightforwardly [25]. Cetinkaya and Cetinkaya in 2007 declare that mechanical perspective accepted electronic form of election was not an issue as critical piece of the populace which they are using technology as a part of diverse aspects of their everyday activity [16]. Oostveen contends that if trust wants to be earn for voting system, the system should satisfy the major pillars of the computer-based system as they are accountability economic requirements, security and privacy [26]. Hoffman and researchers argue likewise as user point of view side, usability, security, audit, reliability, privacy and verification, as well as user desire, all are the components of expecting trust in [12]

# **SUBJECT REVIEWER: A PROPOSAL FOR AN ELECTRONIC VOTING SYSTEM AS TRUST MEDIATION TO ADOPTING IN IRAQ**

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## **VIII. CONCEPTUAL MODEL**

### **Figure-1 : Conceptual Model**

The public may have a confidence with a new technology as well as new election in particular. Which can return to equal rank with relative connected to self-assurance that men and women have trust in the political system and the government. Consequently an absence of trust as well as confidence in election processes perhaps lower the trust in the system, also the opposite means all- around. The unique attributes of this relation are subject for further research. In this particular part, a concentration on trust and the confidence of the public in security, privacy, usability and reliability regarding the election system as the main factors that affecting the adoption of EVS [27]. Figure-1 shows the conceptual framework for this research paper, beside the hypotheses that been used to build this framework.

## **IX. METHODOLOGY**

The research relies plan depends on the classification the way of which researcher collecting information from participants. A pursuit design of this research refers by executing the plan to capture and use the data so that it can obtain the required information accurately and transparently enough. The study made based on cross-sectional survey research methodology. Where the research approach and gather information on the population in one spot at the right time.

The unit of investigating of this study will be addressing to lecturers and students of Science College in selected universities in different provinces which their (University of Technology in Baghdad, University of Babylon in Babylon, University of Kufa in Najaf, University of Basrah in Basrah, University of Salahaddin in Erbil and University of Sulaimani in Sulaymaniyah), as shown their percentage in Figure-2, and use survey methodology to make decisions about the E-voting adoption that want to apply in Iraq. The sample that's been taken in this study was conducted from a technique that presented by Krejcie and Morgan 1970 [28], thus (299)out of (351) been selected.

The reasons of choosing those two categories are: Lecturers; they represent the best group to deliver and spread a good idea, where the Students are representing the mix of educated side and public side indeed. Plus part of the category (lecturers and students) having experiences in electronic technology



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1SAAD MOHSEN HASSAN, 2 AHMED HASAN KHANJAR, 3SUAAD ALI ABEAD

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as part of them pertains to IT department, and the last consider the hard-stone pillar of the electronic technology.

For all practical purposes, the data have to check and interpreted, by various statistical techniques that made for examining the data as per the nature of the study [29].

Figure-2: Universities Percentage Distribution

## **X. DATA COLLECTION AND RESPONSES RATE**

The quantitative research approach conducted to be able to measure and examined the relationship between different factors. Quantitative research is defined in 2003 by Aliaga and Gunderson as "collecting numerical data that are analyzed using mathematically based methods (in particular statistics)" [30]

For this study distributed (351) questionnaires to total members of respondents, (40) questionnaires were not filled and received back. After checking the questionnaires' answers, (12) response's discards because of not qualifying, randomize and wrong data provided, as (4) responses have not voted before (at any elections), and (8) responses provide random answers, furthermore; the (8) responses failed to pass the trip questions that made to test the reliability of the answers. Thus; any random data provided will effect on making discussion regarding E-voting adoption. Therefore, (12) responses had been removed, and the final number of valid responses was (299), thusly; rate of (85.18%) of the responses responded to the survey.

## **XI. CONCLUSION**

Whenever technologies thoughtlessly applied into elections, they may produce a number of challenges beside risks which can tremble in the public's self- confidence within elections. Nevertheless, the actual technology itself will offer correct solutions. It is important to boost the bar that associated with security standards to keep the ethics as well as self-confidence of elections. Beside public, election industry and election experts must get involved. The development of the electronic voting system addresses the common problems that arose in the traditional voting procedure. In such electoral system, voters are obligated to trust the result of the election as it is. They do not have the option to verify the authenticity of their cast ballot. Here, the election officials must be trustworthy. However, in most of the cases, their credibility is doubtful. As a result of this, with the evolution of information technologies, researchers have proposed implementation of the

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electronic voting system as a feasible solution. This particular research offered numerous contributions towards the literature upon trust in E-voting. At the beginning, the research pulls a plan for an appropriate framework associated with E-voting circumstances that match Iraq case, The idea of E-voting in Iraq being covered through examining the needs of citizens to trust the system as well as other prizes technical besides social issues associated with E-voting. Moreover, the research ties the actual requirements of trust in numerous models into a single framework associated with trust in E-voting. Hence, this research offered a better and bigger image to present such as work can cover the conceptual trust in numerous environments which could be implemented. Finally, the researchers predicted that the fairness of the accessibility would have to be an important parameter inside the trust in E-voting..

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# **SUBJECT REVIEWER: A PROPOSAL FOR AN ELECTRONIC VOTING SYSTEM AS TRUST MEDIATION TO ADOPTING IN IRAQ**

1SAAD MOHSEN HASSAN, 2 AHMED HASAN KHANJAR, 3SUAAD ALI ABEAD

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# **SUBJECT REVIEWER: A PROPOSAL FOR AN ELECTRONIC VOTING SYSTEM AS TRUST MEDIATION TO ADOPTING IN IRAQ**

1SAAD MOHSEN HASSAN, 2 AHMED HASAN KHANJAR, 3SUAAD ALI ABEAD

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