

# SCOT Theory: Theory for Engaging the Citizen's' Self-Knowledge in the Decision Making of E-Government

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**Abstract**—A stable theory that will fit with decision making in E-Government is a major point for establishing the E-Government platform. This would contribute to lessen the gap generated from ICT system application with users, and reduce the gap between the government and citizens. However, the E-government platform is facing many items which obstruct its application. One of these items is the gap between the public sector and the decision making in the e-government. This study will contribute to lessen the gap generated from ICT system applications with users, and reduce the gap between the government and public. This paper focuses on three major steps. The first step is the theories related with the decision making in the E-government, the second step is a stable theory with the decision making in E-government, and the third step is the Social Construction of Technology Theory (SCOT). This research attempts to suggest and discuss the possible solutions to develop the decision making model in the E-government by depending on the SCOT theory. The results of this article are as follows: This study has realised the necessity to develop a suitable model, which could support the current case of a decision making system in the Iraqi e-government, and generally, this study has realised the necessity to support the citizens' participation in the decision making of the e-government.

**Index Terms**—Social Construction of Technology Theory; Citizens' Self-Knowledge; E-Government; Decision Making.

## I. INTRODUCTION

E-government is web services platform from agencies of the e-government, local, and state. The government uses particularly the Internet and ICT to support employing citizens and government performance, and to provide government services to the public. E-governance offers is ICT's platforms at various opportunistic steps of the public sector and government services and support to enhance the governance [1, 2]. Both e-government and e-governance have been utilized interchangeably. The e-government idea is a content subset of e-governance. The e-governance is a wide idea and contains the use of civil society and ICT by the government to increase greater citizens' participation in the governance of political organizations [3]. This research will focus on the decision making in the e-government.

Decision-making is indeed the most important management function. No other control functions, such as planning, organising, directing and controlling and employment can be carried out without a well thought out and rigorous decision

making analysis [4]. Bryer (2013) shows that if citizens were not invested in governments especially in participatory operations, and citizens were not active participants in the decision making operations, the country would not be democratic enough to harness openness and transparency in the government [5]. There are various models and techniques to support the decision making model in management or e-government.

Since the mid 70's, various researchers have been interested in the factors that explain or predict the use of different technologies. Such research was founded on the theoretical framework which lies on a much broader scale of resolution. The theoretical framework dwells on time tested theories that embody the findings of numerous investigations on how the phenomena occur. Research work needs to be planned to reduce errors and costs, and get the best results [6].

Self-knowledge is a term used in various fields (i.e., Sociology and psychology) to describe the information that an individual draws upon when finding an answer to the question "What am I like?" or "What do I know about X". Self-knowledge is a component of the self. More accurately, self-knowledge can be defined as one's self-concept. It is the knowledge of one's self and one's properties and the desire to seek such knowledge that guides the development of the self-concept. Pertinent to this study, self-knowledge informs us of our mental representations of ourselves, which contain attributes that we uniquely pair with ourselves, and theories on whether these attributes are stable, or dynamic. It requires ongoing continuous reflection on one's self-awareness and self-consciousness. Human beings can be homogenous or heterogeneous. We can be very similar or different with one another. We all have our own opinions and perceptions on various issues and events. We accumulate experiences from our daily work and routines under the effect of many factors, such as the culture, environment, the nature of the job, political affiliation, level of education, and economic level [7].

## II. LITERATURE REVIEW

The literature review of this paper aimed to propose the possible commitment to upgrade the model of the making of decisions in the Iraqi electronic government by consisting of the characteristics of the citizens' self-knowledge. In the literature review the article clarifies the past view of decision

making in the e-government. The article also focuses on the scope of study of Iraq and how the Iraqi government is engaged with various groups and entities.

*A. Over view of the Decision Making in the E-Government*

The literature in this field confirms the fast development of the electronic government and has suggested a new paradigm: multi-agents technique and decision-making support system. This model was created to support the making of decisions in administrations. This system analyses and supports the managerial decision making on the basis of a multi technological system structure, the executive agent, and the mechanism of this system in detail. Coordination, distribution, and self-organisation support the system, which improves the quality and efficiency of administrative decisions. In addition, they also promote the scientific decision making procedures and democracy [4]. In another study, Luoguifa (2011) suggests shifting the decision-making mechanism into the realm of the e-government environment. The website of the government becomes a bridge between the authorities and the public. Thus, the quality of the information and services from public websites provide the quality of popular participation in decision-making which is key to determine the effectiveness of the information transfer. The Malaysian experience in e-government is a testimony of success on e-government initiatives and political decision-making. The past work of e-government statement that supports e-participation can improve the quality of the public sector management [8]. This is important for the country’s survival and progression.

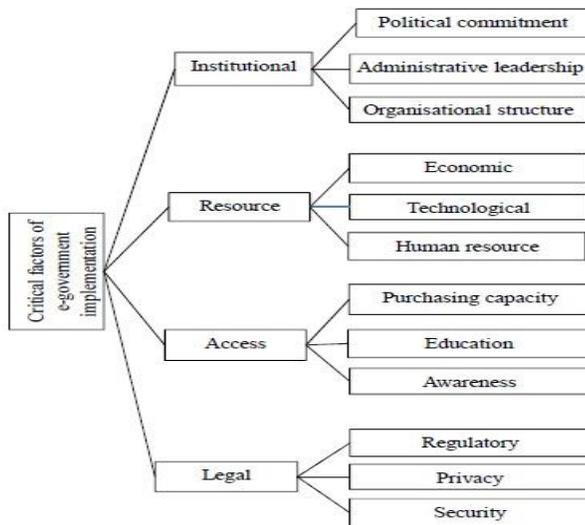


Figure 1: The proposed conceptual framework, AHP

In another interesting study, the Bangladeshi experience with the application of the Analytic Hierarchy Process to maintain the information security decision-making process using the analytic hierarchy process (AHP) model can be used to help the decision-maker to assess the implementation of the information security policy. The information management and technology aspects of security place the highest concerns on the economic and cultural aspects. Similarly, with respect to the information security element, the security represents a top priority in the state systems. The Bangladeshi experience

focused on the real critical factors related to the implementation to apply the e-government in Bangladesh. There were two important factors for the e-government in Bangladesh, the successful implementation of the institutional bodies and the associated access. The first factors like political awareness and commitment were the most important factors while the second factor likes security, privacy, and economic issues were less important. Furthermore, developing nations must give higher estimation for the citizens to access information on awareness, regulatory issues and education for successful application of the e-government [9]. Rahman and his partners (2014) explained the framework of the AHP as shown in Figure 1.

The modelling process of the AHP included four levels as follows;

- Level one: determination of the main factors. The first level included the determination of the main factors of the government application. 12 factors were classified and identified into four factor groups (look at Figure 1).
- Level two: organising the dilemma as a hierarchy. The organising level depended on dividing any complex multiple criteria making of the decision dilemma into a sequence of hierarchies or groups of integrated steps.
- Level three: This level was the implementation of the prioritisation execution to locate the relative significance of the criteria (factor-categories) in each step.
- Level four: The final level of the AHP was the synthesis and definition of the normalised loads. The normalised loads were specified utilising either of the eigenvector model or the simple line rate model.

In another study conducted by Ahmad, Saman, Mohamad, Mohamad, & Awang (2014), they presented a new model known as the Guided Ranked Analytic Hierarchy Process (GRAPH). This is a model that makes use of a table matrix automatically filled in, established on the ranked information. The generated values in the matrix tables of the decision can still be changed by trending the guidelines which in turn serves the aim of changing for the improved uniformity of the matrix table of decision and improves the decision-making. Kamal et al. (2014) studied the factors influencing higher management’s decision making operations whilst selecting integration technologies. They suggested that these are vital for facilitating local government authorities’ process reforms, and the prosperity of an institution's processes relies largely on understanding the behaviours and individual’s attitudes, the briefing context and the kind of decisions taken. The last study in this section compared the e-governments in many countries to find the differences and similarities amongst them, like social media tools to enhance the open participation in the e-government. The public input their opinions and use them in political decisions [10].

*B. Scope of the study*

In this research, the scope of the e-government applications was limited to the usage of the Internet as the technology framework by the government, its citizens, and organisations for the purpose of distributing, communicating and/or conducting the exchange of information and business

transactions with any government sector and other relevant clients [3].

This study focused on employing the citizens' self-knowledge in the characteristics of the decision-making model in the e-government through the planning term. The government engaged with various groups and entities. These involved engagements between the Government and Government (G2G), Government and Citizens (G2C), Government and Employee (G2E), and Government and Businesses (G2B). Various types of information and knowledge went back and forth between all these engagements. In all of these situations, the government needed the citizens' participation (i.e. in decision making, giving opinions or the suggestions about the e-government to evaluate the decision-making process in all of the components of the e-government) as shown in Figure 2.

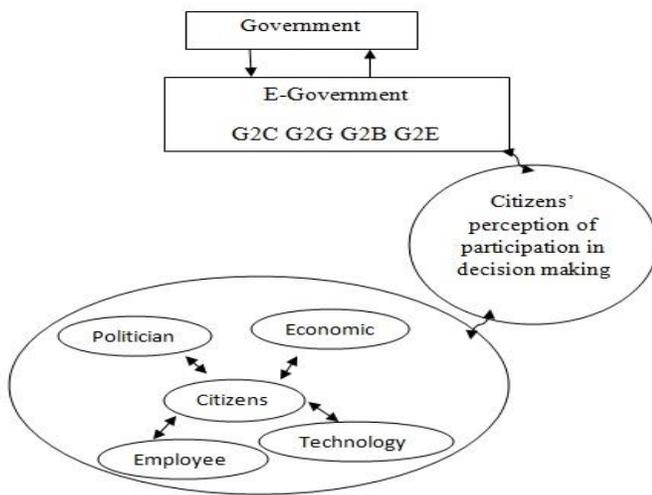


Figure 2: Scope of the study

This research also examined the current issues on the relationship and trustworthiness of the citizen as the most important client towards the government's existing homepage, and other amenities that belong to the federal and local government in the country. These included overall services, speed of responsiveness, and other relevant aspects of interest to this study. This research also enabled the research participants to give their opinions to help the government establish a decision making model that was collaborative in nature, one that took into account what the citizens wanted and needed. As a result, this research hoped to accomplish a good research work, one that helped to attain the objectives of this research. Most important of all, this research hoped to contribute to improve the e-government initiatives that are collaborative in nature and one that is built based on accountability, responsibility, fairness, integrity, equity, and openness with a community that is more efficient and responsive.

### III. METHODOLOGY

The methodology of this paper will discuss three theories. These theories are related with the decision making in the e-

government. The study summarises the three theories in Table 1 to explain the application of these theories and identify the construction of the technology theory (SCOT) which was the best theory for this study. The next section will discuss the results.

#### A. Social Cognitive Theory (SCT)

SCT was established by Bandura (1989). It relates to the study of human behaviour. This study was carried out to guide the performance of future human behaviour. The theory explains how humans can improve and monitor human behaviour, and they can take advantage from this experience to improve programmes or technology [11].

This theory has three phases. The first phase is Modelling. SCT involves learning and knowledge acquisition related directly to the observation of models. Effective models to deal with different situations and dealing with various issues can also benefit stakeholders. The second phase is Outcome Expectancies. The people need to know what the potential result is when behaviour is repeated. The observers do not expect another result for similar behaviour or when they do the same behaviour. Culture and the environment affect these behaviour results. The third phase is Self-efficacy which refers to the observers' belief about themselves; whether they have good skills or not. When the observers have high self-efficacy, learning can happen better [11].

Social Cognitive Theory is the front leading theory for e-learning. This theory works on the analysis of the human action, and human behaviour. SCT clarifies the behavioural factors, environmental factors, and personal factors affecting each other [12]. Language science has used the social Cognitive Theory to explain and identify different approaches by obtaining the best scientific theorisation and critique for the language. Communication between humans through language exhibits proponents of the SCT to support human interaction [13]. The health science has shown that SCT is the best theory to study health behaviour [14]. Other studies tested the physical activity for women in America living in the black communities using SCT. In summation, various data is required to develop a specific technology type. Developing a website design for example needs the collection of various important data to ensure that the design is of a certain quality and standard.

#### B. Technology Acceptance Model (TAM)

Davis' (1989) technology acceptance model (TAM) explains the determinate of the acceptance of computer acceptable from a user, and can explain the behaviour of users across a wide range of computing techniques and user populations. The stages of this theory are as below:

First stage: Perceived Usefulness (PU): Notes on people's tendency to use or not to use the application, and they believe it will help them to accomplish their work better. This means the benefits of the application of the system outweigh the effort to use the system.

Second stage: Perceived Ease of Use (PEOU): the user's view about the simplicity of the use of the system; it will affect the use of the system.

Third stage: Attitude Towards the use of the System (A): Users attitude towards the use of new information technology.

Fourth stage: Behavioural Intention to use (BI): Behavioural intention to use the system is based on the Users' acceptance of the system.

Fifth stage: Actual Use: Writing a detailed report of the case study and documenting it [15].

Cheung and Vogel explained enhancing the TAM on an application of Google and the elements that impact obtaining Google Applications for cooperative learning. Shroff and his partners refer to the TAM in order to investigate the behavioural intention of students to employ an e-portfolio method. This means how the students fit and use it within the specific framework of a course. Lin and his partners showed the TAM when employing the e-Government initiatives of the Gambian government. It positively influenced the government, even with the cultural variance within the country [16].

### C. Social Construction of Technology Theory (SCOT)

SCOT is a social theory, which studies the humans' knowledge, their skills, and cultures. All the theories of society such as the social exchange theory, Social Cognitive Theory, and Social Learning Theory were derived from the main theory, which is the Social Construction of Technology Theory. It is not just a theory, but it is also a framework [17].

Table 1  
Table of Application Theories

Theories (Author)	Factors	Usage	Selected Articles Using the Theory
Social cognitive theory (SCT) Bandura (1989)	Modelling	Social cognitive of innovation of	[18]
	Outcome Expectancies	relevance to health communication such as e-learning and social	[19]
		communication.	[12]
	Self-efficacy	Acceptance of innovation of	[20]
Technology Acceptance Model (TAM) Davis (1989)	Perceived Usefulness (PU)	technology such as mobile, e- initiative, PDA, e- government	[21]
	Perceived Ease Of Use (PEOU) (behaviour)	e-commerce, internet banking, and e-learning	[22]
		Behavioural study of social groups with any new innovation, to explain this technology and solve all the barriers such as (E- government, community, internet, websites, and science and technology studies).	[23]
			[24]
Social construction of technology theory (SCOT) Trevor Pinch and Wiebe Bijker's (1984-1987)	Relevant social groups.		[25]
	Interpretative flexibility.		[17]
	Design flexibility.		[26]
	Problems and conflicts. Closure.		[27]
			[28]

This theory has five phases. The first phase is relevant social groups: One must identify the relevant groups and basic groups like the producers of the technology or users, and other sub relevant groups. Also, the users must be divided into different groups like social groups and economic groups, and other related groups, such as politicians, journalists, civic

organisations, and etc. The second phase is Interpretative flexibility: Each different technology has different interpretations and meanings for various groups. For instance, when using a bicycle for transportation, some people find it comfortable; whilst, it is annoying for some other people. Also, how does one integrate aesthetics with speed and convenience. The third phase is Design flexibility: The technology has many meanings for many various groups, and there are different ways to design and build this technology. The fourth phase is Problems and conflicts: There are different problems in different communities and different groups to achieve several types of technology. In addition, there are different ways to build this technology. The fifth phase is Closure: The communities start to know the technology and the problems are being solved. Than the discussion process will be closed and the technology becomes known or is crystallized [17]. Table 1 shows the difference amongst the theories.

## IV. RESULTS AND DISCUSSION

In Section II of this paper, some of the past studies were explained; and in section IV, the theories related with decision making in e-government discussed the e-government adoption, ICT developed in the e-government, investigation or evaluation, corruption, transparency, and decision making. However, much is unknown or missing on an inclusive model or theory to link the factors, current cases of the decision making in the e-government, and the effect on organisations' actions. The literature also explained the evaluation of the e-government and the extent of its usage, and created software to improve the e-government. Nevertheless, such a review also suggested that there have been very few studies that have investigated decision making in the e-government current cases, and citizen participation in the e-government. Such a gap provided a new research opportunity. Because of this, one of the major reasons for this study was intended to develop a suitable model, which could support the current case of a decision making system in e-government, and support citizens' participation in the decision making. Generally, this study has aimed to seek, check, and investigate all the factors that drive the dependence of citizens' participation in decision making and develop a decision making system with its current status in Iraq. Gil and Ramon viewed the SCOT and argued that in the sequence to realise information technologies, it is required to study not only the technological factors, but also the organisational and social aspects on all sides of those factors. Edvardsson and his partners argued that the SCOT increased the understanding of value co-creation and service exchange and value co- initiation by complementing these central aspects of service-dominant logic by key concepts from the social construction of technology theory [25].

Whilst some of these theories are able to explain the organisational level of innovation adoption, others focused on the individual acceptance of the new technology. This research has selected the Social Construction of Technology theory (SCOT) by comparing it with other theories as depicted previously in Table 1. Evidently, SCOT matched the nature of this study [3]. As iterated before, this research was intended to study the behaviour, culture, education level, and nature of the

jobs of citizens. Table 1 elaborates the SCOT in great detail. The usage's column shows the application of this theory's various studies. For example, SCOT was used to study the behaviour of social groups with new innovation to explain possible challenges and solutions, such as the e-government with social networks, communities, Internet, websites, and science and technology studies. Because such research works on citizens' participation in decision-making or employing the citizens to participate in the decision making in the e-government had a lot of similarity with this research intent, SCOT was adopted in this study.

Trevor Pinch and Wiebe Bijker (1984-1987) explained the Social Construction of Technology Theory. The technology does not determine how the human works; but, it is the human that shapes how technology could be used and be of assistance to humans. Technology cannot be understood without an understanding on how a particular technology can be included in the social contexts. In addition, it involves not just understanding a particular theory, but it also requires a particular methodology. SCOT can be used to assess the success or failure of technology [29]. The study will explain the SCOT by steps, below and in Figure 2.

This theory has five phases. The first phase relates to relevant social groups: Here the intent is to identify the key players in the e-government that may include the political group, economical group, technology group, and worker or toiler group. These groups can elicit various types of citizens, their ideas, and beliefs that may be used to achieve better results. This in turn would offer the possibility of the convergence of the ideas that would create a unified system to serve all citizens. One must identify the relevant groups (i.e., basic groups like the producers of the technology, or users, and other sub relevant groups). The users must also be divided into different groups like social groups and economic groups, and other related groups, such as politicians, journalists, civic organisations, and etc. In view of the present study, it was imperative that this research employed the citizens' self - knowledge or the role of citizens' self-knowledge on the e-government initiatives and decision-making abilities. The study needed to identify the citizens' groups and characteristics for the analysis. The unification of all the groups' views is shown in Figure 2.

The second phase is the Interpretative flexibility: Different technologies may have different interpretations. Each class or group has its own distinct interpretation about technology or innovation. Some of these groups perceive innovation as good and useful; whilst, there are other groups that perceive it as not useful or not ethical. In this respect, the citizens' culture and nature of their jobs play an important role in order for the better understanding of innovation and its ability to match the groups. As iterated earlier, each technology has different interpretations and meanings for various groups. For instance, when using a bicycle for transportation, some people find it comfortable; whilst it may not be the best option or even annoying for others. Also, how does one integrate aesthetics with speed and convenience? The second phase and third phase complement each other towards the unification of the views as shown in Figure 2.

The third phase is design flexibility: Technology offers many meanings to various groups. There are also different

ways to design and build technology. Technology has many meanings for many various groups, and there are different ways to design and build a particular technology. After studying the two points above, technology is best designed for all groups. This phase relates to the second phase in particular on testing (H2) Hypothesis two. The factors that influence the employment of citizens' self-knowledge on decision making in the e-government is shown in Figure 2.

In Figure 2, the fourth phase relates to Problems and conflicts: Various problems can be manifested in different communities and groups in an effort to develop a particular technology or innovation. No technologies evolve without barriers and such challenges. As such, the demand for technology is different between the communities and segments of one country's population. In addition, there are different ways to build this technology. In this respect, this research has identified the level of agreement on the improved decision making in the usage of the proposed model between the government administration and the citizens.

In Figure 2, the fifth phase is Closure. The communities start to know the technology and that the problems are being solved. Then, the discussion process will be closed and the technology becomes known or is crystallised. As an innovation such as e-government evolves, the interpretation and design flexibility goes through a closure process as it stabilises. Closure can happen when the stakeholders achieve consensus on the best acceptable technology, and have successfully addressed all of the pertinent issues. This phase offers the best technology as it presumably has solved all of the pending issues. This phase establishes the best design for the proposed model for engaging citizens in the decision making in the e-government.

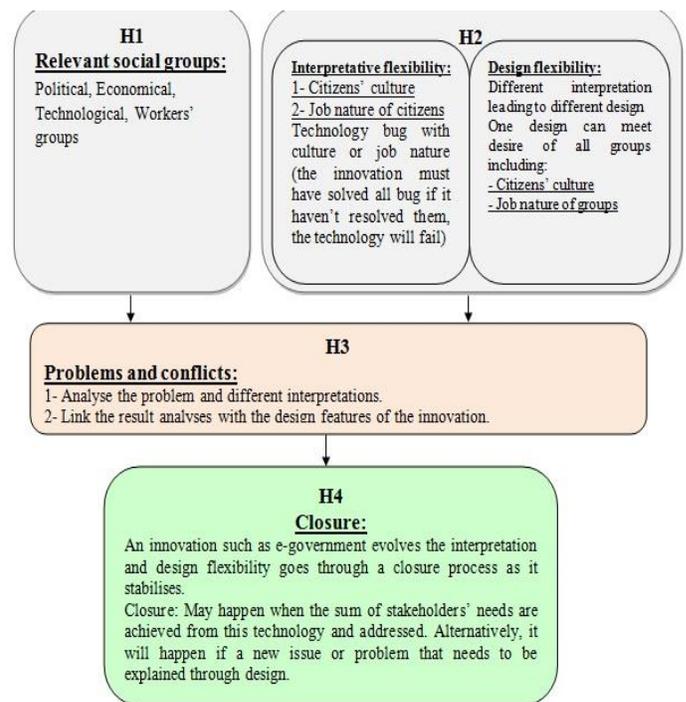


Figure 2: The proposed research process for employing citizens' self knowledge characteristics in the decision making in the e-government.

Edvardsson et al. (2011) offered the service dominant logic. It is clear that all of the service providers need to assess their customers because the customers are fundamental to improve this service. Social forces affect the evaluation of this service. Thus, it can be concluded that the Social Construction Theory is central to the service dominant logic. The key concepts of the SCOT are social systems, social structures, roles, positions, reproduction of social structures, and interactions. The basics of all these concepts are the knowledge and skills of humans. Last but not least, Selwyn's (2012) study supports the social learning theory. This study inserted that the SCOT is the fundamental theory of all the social theories. Subsequently, the social learning theory was generated from it.

## V. CONCLUSION

This study intended to develop a decision making model using the Social Construction of Technology Theory in the decision making model to enhance the e-government service with participation of the citizens in the e-government. This paper focuses on social knowledge to elicit, and the human thinking of what citizens want in the e-government, especially in the decision making model in the e-government. The Social Construction of Technology Theory was employed in this study to support the citizens to participate in the decision making but, indirectly. The new e-government initiatives encourage inclusivity and involve the partnership between the citizens and the government to become less complicated. This study shows that the SCOT is the best amongst the technological theories because the SCOT studies the relation between the social groups and the technology. These two factors are related to this study, this paper has passed on the outlines to debate this matter in detail.

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