

INVESTIGATION OF THE CRITICAL FACTORS AFFECTING E-GOVERNMENT ACCEPTANCE: A SYSTEMATIC REVIEW AND A CONCEPTUAL MODEL

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ARTICLE INFO

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Keywords:

E-government, Technology acceptance model, Systematic review, Conceptual model

ABSTRACT

In this study, it was aimed to investigate the factors affecting user behaviors in e-government acceptance by applying critical and systematic review. For the purposes of the review, a search was applied in October 2017 through three electronic databases from 2005 and 2017. All academic articles investigating the e-government acceptance by technology acceptance model are included in the study. As a result of these examinations, 31 studies were included in this paper. The results showed that the most commonly used variable in the studies was perceived ease of use. The most examined interactions was the positive effect of perceived usefulness on intention. In addition to the TAM model, the most commonly used model was theory of planned behavior. Conceptual model was suggested in this study for e-government acceptance based on technology acceptance model, theory of planned behavior, diffusion of innovation and trust.

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Introduction:

The development and improvement in the utilization of technologies, especially information and communication technologies, their integration into professional and private life of users, and also acceptance or rejection of these technologies by users are still open questions. In recent years, the increased studies on technology acceptance has led to the development of technology acceptance theories and models (Marangunić & Granić, 2015). There are many theories about technology acceptance such as Technology Acceptance Model (TAM) (Davis, Bagozzi, & Warshaw, 1989), Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980), Theory of Planned Behaviour

(TPB) (Ajzen, 1991), The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003) and so on. Many researchers (e.g.; Hung, Chang & Yu, 2006; Weerakkody & Dhillon, 2009; Janssen & Shu, 2008; Kumar, Mukerji, Butt, & Persaud, 2007) debated that the effective e-government acceptance provides potential benefits for agencies, businesses and users. Besides this, some researchers (e.g. Özen, Çam, & Pourmousa, 2017; Nunes, Martins, Branco, Gonçalves & Au-Yong-Oliveira, 2017; Wu, & Chen, 2005; Bélanger, & Carter, 2008) have

examined the effective factor affecting e-government acceptance.

The purpose of this study is to examine and determine the factors affecting the e-government acceptance. This study is started with review of the concept of technology acceptance model then research method is described and finding of the systematic review and conceptual model is presented and concluded with the discussion of results.

Technology Acceptance Model:

The technology acceptance model (TAM) uses Fishbein and Ajzen's Theory of Reasoned Action as a theoretical basis for explaining the causal relationship between variables (Davis et al., 1989). TAM was proposed by Davis et al. (1989) to measure behavior of people in acceptance of new technologies. Some terms such as user's internal beliefs, attitudes and intentions can explain technology acceptance (Turner, Kitchenham, Brereton, Charters & Budgen, 2010). Perceived usefulness is one of the primary drivers for technology acceptance that defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" and perceived ease of use is another primary drivers for technology acceptance that defined as "the degree to which a person believes that using a particular system would be free of physical and

mental efforts" (Davis et al., 1989). Perceived ease of use on perceived usefulness affect user's attitude towards technology acceptance and use, and attitude towards technology acceptance and use affect user's intention to technology acceptance and use, which identified actual behavior and usage (Davis et al., 1989) (see figure 1).

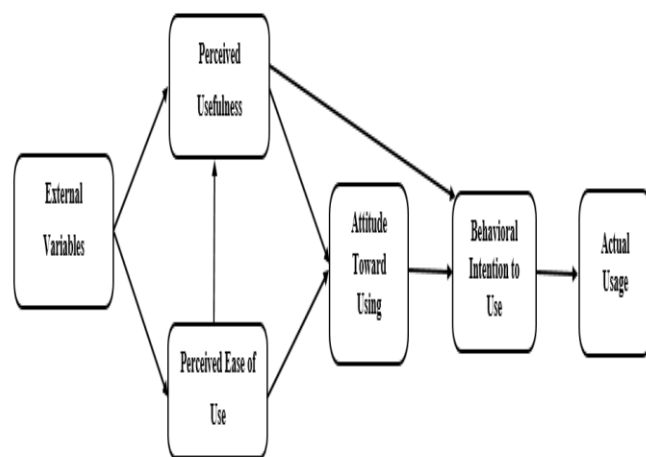


Figure 1: Technology Acceptance Model (Davis et al., 1989)

Data:

Perceived usefulness variable was used in 29 studies, perceived ease of use variable was used in 30 studies, and intention variable was used in 28 studies (see Table 1).

Table 1: Total use of variables in studies:

| Variable | Frequently | Percentage % |
|------------------------------|------------|--------------|
| Perceived Usefulness (PU) | 29 | 93.55 |
| Perceived ease of use (PEOU) | 30 | 96.77 |
| Intention (IN) | 28 | 90.32 |
| Attitude (ATT) | 12 | 38.71 |
| Actual Usage (AU) | 6 | 19.35 |

Most of the studies examined perceived usefulness and intention relationship (21 studies) and 15 of the studies examined perceived ease of use and intention relationship (15 studies) directly, and a small number of studies followed the original model and examined the perceived usefulness and attitude relationship (9 studies) and perceived ease of use and attitude relationship (11 studies). The effect of perceived ease of use on perceived usefulness in the main model was not taken into account in most studies and only 11 studies examined this effect. When we look at the studies, only 1 study used the main model and other studies have used the model by making changes (see Table 2).

Table 2: Total interaction of variables in studies

| Interaction of variables | Frequently | Percentage % |
|--|------------|--------------|
| Perceived Usefulness (PU) - > Attitude (ATT) | 9 | 29.03 |
| Perceived ease of use (PEOU) - > Attitude (ATT) | 10 | 32.26 |
| Perceived Usefulness (PU) - > Intention (IN) | 21 | 67.74 |
| Perceived ease of use (PEOU) - > Intention (IN) | 15 | 48.39 |
| Perceived ease of use (PEOU) - > Perceived Usefulness (PU) | 11 | 35.48 |
| Attitude (ATT) - > Intention (IN) | 12 | 38.71 |
| Intention (IN) - > Actual Usage (AU) | 6 | 19.35 |

In 9 studies studying perceived usefulness effect on attitude, 2 studies suggested a conceptual model and 6 of the other 7 studies were supported positive effect of perceived usefulness on attitude. Also, In 10 studies studying perceived ease of use effect on attitude, 2 studies suggested a conceptual model and 7 of the other 8 studies were supported positive effect of perceived ease of use on attitude (see Table 3).

Table3: Supported interaction of variables

| Interaction of variables | Supported | Conceptual Model |
|--|-----------|------------------|
| Perceived Usefulness (PU) - > Attitude (ATT) | 6 | 2 |
| Perceived ease of use (PEOU) - > Attitude (ATT) | 7 | 2 |
| Perceived Usefulness (PU) - > Intention (IN) | 14 | 3 |
| Perceived ease of use (PEOU) - > Intention (IN) | 6 | 3 |
| Perceived ease of use (PEOU) - > Perceived Usefulness (PU) | 8 | 2 |
| Attitude (ATT) - > Intention (IN) | 9 | 2 |
| Intention (IN) - > Actual Usage (AU) | 3 | 2 |

In the original model, different external variables can be included on the perceived usefulness and perceived ease of use variables. Trust was included as the external variables on perceived usefulness (5 studies) but in most studies, external variables were not included. This showed that trust is an important variable according to researchers. Also, the positive effect of trust on perceived usefulness was supported in most studies. For this reason users think that the system is more useful when they are safe.

In some studies, other models included in the TAM model. Theory of planned behavior (TPB) and Diffusion of Innovation (DOI) are the most widely used models (see Table 4).

Table 4: The Other models:

| Interaction of variables | Frequently | Percentage % |
|--|------------|--------------|
| Theory of planned behavior (TPB) | 8 | 25.81 |
| Diffusion of Innovation (DOI) | 7 | 22.58 |
| D&M IS Success Model | 3 | 9.68 |
| Self-service technology model | 1 | 3.23 |
| Unified theory of acceptance and use of technology | 1 | 3.23 |

Perceived Behavior Control (PBC) was used 8 times and was the most used variable in studies that applied Theory of planned behavior and Compatibility (COM) was used 7 times and Relative Advantage (RA) was used 6 times and were the most used variables in studies that applied Diffusion of Innovation. Also, image and complexity were used in some studies that applied Diffusion of Innovation.

Conceptual Model:

In this section, a conceptual model was developed by examining the above relationships and relevant studies for e-government acceptance. This conceptual model is specifically based on technology acceptance model, and theory of planned behavior and diffusion of innovation were included in this model (figure 2).

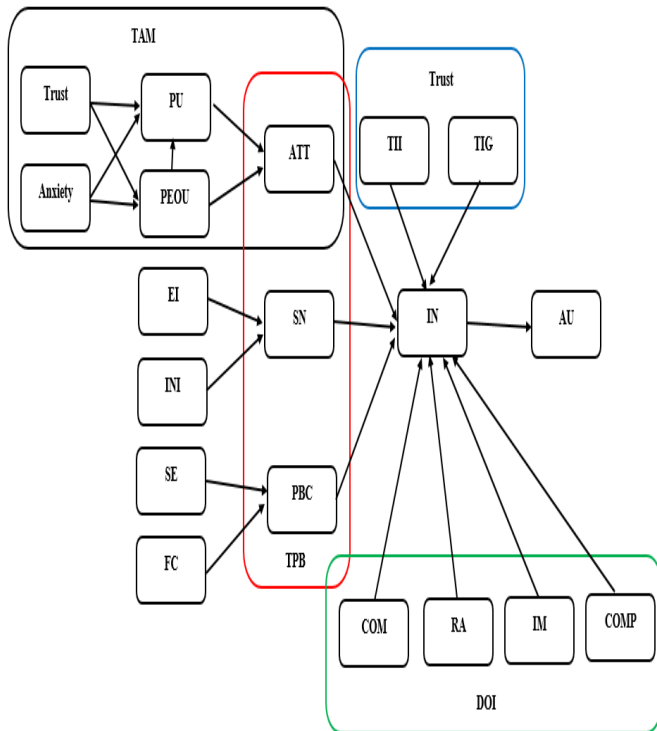


Figure 2: Conceptual Model

PU = Perceived usefulness, PEOU = Perceived ease of use, ATT = Attitude, IN = Intention to use, AU = Actual Usage, TII = Trust in Internet, TIG = Trust in Government, EI = External influence, INI = Interpersonal influence, SN = Subjective Norms, SE = Self-efficacy, FC = Facilitating conditions, PBC = Perceived Behavior Control, COM = Compatibility, RA = Relative Advantage, IM = Image, COMP = Complexity

Özen et al. (2017) showed that anxiety has negative effect on perceived usefulness and perceived ease of use, so anxiety included in conceptual model as external variable. Some researchers (e.g. Rehman & Esichaikul, 2011; Shajari & Ismail, 2013; Christian Schaupp & Carter, 2005; Carter, 2008) argued that trust in internet and trust in government have positive impact on intention to use of e-government. Hung et al. (2006) showed that external influence and interpersonal influence have positive effect on subjective norms and self-efficacy and facilitating conditions have positive effect on perceived

behavior control. Some researchers (e.g. Lean, Zailani, Ramayah & Fernando, 2009; Christian Schaupp & Carter, 2005; Alomari, Woods & Sandhu, 2012) showed that compatibility, relative advantage, image and complexity have positive effect on intention to use. Also, some researchers (e.g. Rehman & Esichaikul, 2011; Shajari & Ismail, 2013; Christian Schaupp & Carter, 2005; Alomari et al, 2012; Carter, 2008; Rehman, Esichaikul & Kamal, 2012) showed that trust in internet and trust in government have positive effect on intention to use of e-government system.

Experimental Design, Materials, and Methods:

In order to examine and determine the factors affecting e-government acceptance, a formal systematic literature review process was carried out for this study. Following steps have been progressed in order to find out related studies.

For an effective review, the question of study is determined as first: what are the critical factors affecting users' acceptance of e-government? Then, for the purposes of the review, a search was applied in October 2017 for literature published in English between 2005 and 2017. The terms of 'e-government acceptance' were selected as a primary search term. Other Search terms included "e-government adoption" and "utilization of e-government". Full search structures and terms are given in below.

- e-government acceptance in title
- acceptance of e-government in title
- e-government adoption in title
- adoption of e-government in title
- e-government in title and TAM in full text or technology acceptance model in full text

Studies were selected from three electronic databases: IEEE Xplore, ScienceDirect and emeraldinsight. As a result of this strategy, 100 studies were selected in the first stage. The abstract and results of studies were reviewed to ensure that they met specified criteria. Only 31 of the selected studies were suitable for the study criteria and were subjected to the study. The list of studies is given in the A appendix.

Conclusion:

A systematic review was applied in order to make a detailed analysis of the factors affecting the behavior of users in the e-government acceptance. Firstly, the studies which are examined e-government acceptance were collected and then the

studies using the TAM model were included in the study. As a result of these examinations, 31 studies were included in this paper. The most commonly used variables in the studies were perceived ease of use, perceived usefulness and intention. The most examined interactions were the positive effect of perceived usefulness on intention and positive effect of perceived ease of use on intention. The effect of perceived usefulness on intention was supported in most studies but the effect of perceived ease of use on intention was not supported in most studies. Users' intention increase to use the e-government system when they find it's useful. Trust was the most used as external factor. In addition to the TAM model, the most commonly used models were Theory of planned behavior and Diffusion of Innovation. Perceived behavior control and subjective norms were the most used in Theory of planned behavior and compatibility, relative advantage, image and complexity were most used in Diffusion of Innovation.

Conceptual model was suggested in this study for e-government acceptance based on technology acceptance model, theory of planned behavior, diffusion of innovation and trust. It has been tried to present a comprehensive framework by including all the factors affecting users' behavior in e-government acceptance. In addition, the most effective factors examined by other sources were included in the model.

Limitation and further research directions:

There were limitations in this study like any other studies. The results of this study are based on secondary data that examine the factors affecting the behavior of users in the acceptance of e-government. For this reason, the conceptual model proposed in the study can be fully evaluated in the future by supporting it with the primary data. Another limitation is that the literature search is done from only three electronic databases. For this reason, more detailed relationships can be discovered and comprehensive results can be obtained by examining all electronic databases in future studies.

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