Measuring E-readiness for E-government in Developing Country: Comparative Study

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Measuring E-readiness for E-government in Developing Country: Comparative Study

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Abstract
Many models have been designed to measure the e-readiness for e-government such as Hofstede Model, Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT). These models have been classified as most used in e-readiness field. To investigate the country’s e-readiness for e-government acceptance, we use a comparative method to compare between the most influential and robust models (in terms of usage in E-readiness field) that explaining information technology adoption behavior. This comparison aims to produce suitable model for measuring the e-readiness for e-government in developing countries. The findings show that Hofstede Model and TAM were designed to examine IT/IS adoption in business organizations, where the employees are trained and forced to use them. In the other hand, UTAUT has been designed in the existence of Information and Communication Technologies (ICT). It expands the number of factors leading to behavioral intention and use behavior. The findings of research show also that UTAUT is the best model to measure e-readiness for e-government in the developing countries with some modification to meet the developing countries needs.

Keywords: E-readiness, e-governments, TAM, Hofstede Model, UTAUT.

1. Introduction
E-readiness (electronic readiness) is measures of the degree to which a country may be ready to obtain benefits which are arising form the e-government services (9). E-readiness models can be used as an information-gathering mechanism for e-governments. E-government is the use of Information and Communication Technologies (ICTs) to exchange information and improve on-line services in the public sector organizations (16). Many studies are exploring fundamental factors of e-government including national cultures of ICTs adoption that have been carried out (21). There have been several models explaining technology acceptance and technology use, particularly since the late 1980. Many researchers such as in (9, 25) have used some of these models to measure the acceptance of the new technology usage and e-government adoption. Some comparisons have been done to compare between the e-readiness models (38). Hofstede Model has been used in many researches specially these which were focused on the impact of cultural elements on the new technology (21, 7). TAM had been used to measure the acceptance of the new technologies such as information systems in the business area (33; 28; 3; 21).And UTAUT had been used to measure the factors that impact the adoption of e-government services (38; 25; 4). The paper is organized as following: section 2 for literature review, section 3: limitations of targeted models, and we conclude at section 4.

2. Literature Review
2.1 Hofstede Model
Hofstede Model has been introduced by Hofstede (17). It was developed to distinguish one group, organization or nation from another (35). Hofstede defined culture as being collective but often indefinable. It is, however, what distinguishes one group, organization or nation from another (14).

2.1.1 Hofstede Model Dimensions (17)
Hofstede defines five dimensions in his model. These dimensions define work-related values associated with national culture as follows (18, 21, 28):

- **Power Distance (PD):** How a society handles inequalities
- **Individualism/Collectivism (IC):** Behavior towards the group
- **Masculinity/Femininity (MF):** Behavior according to gender
- **Uncertainty Avoidance (UA):** The need for structure
- **Term Orientation (TO):** It describes a longer term, higher level view of life.

### 2.1.2 Hofstede Model Usage

Hofstede model has been used by many researchers to explore the impact of cultural elements on the acceptance of the new technologies (15, 21). Gover (15) made use of Hofstede's cultural dimensions in their study to investigate the similarities and differences in IT resource, apply, and its perceived success in the United States, France and Korea. They found that Koreans looked upon IT in a more traditional and operational manner than their US and French counterparts and that the perceived benefits of IT use varied among the three countries (28).

(21) used Hofstede model to explore the impact of the national culture on worldwide e-government readiness for 95 countries, the findings indicate that worldwide e-government readiness are related to culture.

### 2.2 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM), introduced by Davis (1989), is one of the most widely-employed models of individual acceptance and use of technologies and it is one of the most mature streams of information systems (IS) research (38). However, in using TAM for actionable guidance, it is essential to identify determinants that are tailored to specific classes of technologies and/or business processes (8). This model is grounded in social psychology theory in general and the TRA in particular (12). The model was initially developed and tested in the 1980s (10, 11) Later, the model has been extensively validated across a variety of settings and subjected to theoretical extensions (37, 38). TAM is based on the Theory of Reasoned Action (TRA) (2, 12). Another variant of TAM built on TRA is the Theory of Planned Behavior (TPB) (1, 2). The fundamental assumption of both TRA and TPB is that attitude toward an act or behavior and perceived behavior control are the main factors affecting behavioral intention (26).

#### 2.2.1 TAM Determinants

As shown in figure 1: the major determinants are defined by Davis (10) as main dependent factors:-

- **Perceived usefulness (PU):** is the degree to which a person believes that using a particular system would enhance his or her job performance (10; 33).
- **Perceived ease of use (PEOU):** is the degree to which a person believes that using a particular system would be free of effort, it has been suggested including information quality (24), enjoyment (34), and risk (23).

![Figure 1: TAM](image)

#### 2.2.2 TAM Usage

Generally TAM is used to predict the acceptance for new technology. Al-adawi, (2005) adopted the TAM to understand how citizens perceive e-government as a primary government interaction channel and the factors that affect their level of usage, the finding of this research was to present and highlight the nature of trust on e-government and proposed
a research model of citizen adoption of e-government.

Wangpipatwong (39) used TAM to understand the fundamental factors influencing the citizen's continuance intention to use e-government websites, the finding of this research showed that perceived usefulness and perceived ease of use of e-government websites and directly enhanced citizen's continuance intention to use e-government websites.

### 3.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT is created by (38), to present a more complete picture (as shown in figure 2) of the acceptance process than any previous individual models had been able to do. It expanded the number of factors leading to behavioral intention and use behavior. It includes 1) performance expectancy, 2) effort expectancy, 3) social influence, 4) facilitating conditions, 5) gender, 6) age, 7) experience, 8) voluntaries of use.

**Performance Expectancy**

Performance expectancy is defined as the extent to which an individual believes that using an information system will help him/her improve job performance (38).

**Effort Expectancy**: Effort expectancy is defined as the degree of ease users feel with respect to the use of an information system (38).

**Social Influence**: Social influence is defined as the extent to which a person perceives that significant others believe he or she should use a new information system (28).

**Facilitating conditions**: Facilitating conditions are defined as the support that individuals believe an organization or a technological infrastructure can provide for the usage of a new system (33).

**2.3.1 UTAUT Development**

The theory of UTAUT was developed through a review and consolidation of eight theories and models that conducted from previous researches (38; 33; 29). These theories and models are: The theory of reasoned action, The technology acceptance model, The motivational model, The theory of planned behavior, A model combining the technology acceptance model, The model of PC utilization, The innovation diffusion theory, The social cognitive theory. UTAUT was formulated by that integrates elements across the eight theories and models, and empirically validate the unified model (38).

**2.3.2 UTAUT Usage**

Many researchers used UTAUT to understand the user's behavior in using new technologies. Marchewka (25) used UTAUT for understanding student perception using course management software named Blackboard, their mean result showed that although students tend to agree that blackboard

<table>
<thead>
<tr>
<th>Performance Expectancy</th>
<th>Effort Expectancy</th>
<th>Behavioral Intention</th>
<th>Use Behavior</th>
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<tbody>
<tr>
<td>Social Influence</td>
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<td>Facilitating Conditions</td>
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<td>Gend</td>
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<td>Experienc</td>
<td>Voluntaries of Use</td>
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![Figure 2: UTAUT Model](image)
is a good idea and use it frequently, most of software's features are not being used to their fullest capability. (4) adopted the UTAUT to explore factors that determine the adoption of e-government service in a developing country, namely Kuwait, she found out that performance expectancy, effort expectancy and peer influence determine students' behavioral intentions. Also facilitating conditions and behavioral intentions determine students' use of e-government services.

3. Limitations of the Models

3.1 The limitation of Hofstede Model

Many cross-cultural IS researchers have adapted Hofstede’s model to qualitative studies (22) and quantitative studies (20). However, the researches recognized three major limitations of Hofstede model to Cross-Cultural IS researches. Firstly, Hofstede model deductively focuses on five dimensions only. The limitation to Hofstede’s five dimensions inhibits understanding of the cultural differences in other dimensions which might be more significant and important than those five dimensions (27) which have been addressed in TAM and UTAUT such as age, experience, and the intent to use. Secondly, cross-cultural IS researches are often criticized in terms of lack of theory building (19). Though the Hofstede model indicates the score of each of the five dimensions based on the “analysis of a large number of data for employee value collected in IBM between 1967 and 1973 covering more than 70 countries” (17), its reality to found a theory describing cause and effect between the dimensions is questionable (27). Thirdly, the Hofstede model focuses on qualitative scoring. While cultural homogenization (5), cultural hybridization (13) and multi-culturalism (32) are critical debates of globalization.

3.2 The Limitations of TAM

TAM is one of the most famous theories in Information Systems (IS) (11, 37). In this case, the originator of the TAM model realized that there were other significant factors external to the user and the user’s perceptions of usefulness or ease of use which did affect usage (26). However it is still not complete, due to the limitations of not addressing the difference between use the system because it is useful or use it because he or she must use it. For example, someone could perceive a system as not useful, but use it anyway because subjective norms require usage (25). Finally, TAM focus on prediction of usage and do not address barriers to usage.

3.3 The Limitations of UTAUT

From Raaij (30), some limitations of UTAUT have been noticed; first of all, UTAUT’s high R2 is only achieved when moderating the key relationships with up to four variables (gender, age, experience and voluntaries) in order to yield more significant coefficients. This makes the model less parsimonious than TAM. Second: the grouping and labeling of items and constructs problematic, especially for facilitating conditions and social influence.

3.4 Result

From the comparison results Hofstede model was originally created to measure the impact of culture on the acceptance of the new technology in the organizations, where the employees are expected to be trained and forced to use the new technology. In the situation of measuring the e-readiness for e-government the members of the society are not trained nor forced to use the new technology, Hofstede model does not fit the requirements to measure the e-readiness in all cases. From the above information about Hofstede model limitation, TAM can be proposed to be better model than Hofstede Model. In the other hand, the theory necessary to explain today’s context of usage should explains factors which both enable and hinder usage. For these reasons, the TAM is not a sufficient theory to explain general technology usage. In this case UTAUT can be used for e-readiness as it covers more factors which effect e-readiness. It is argued that the UTAUT model should now serve as a
benchmark for acceptance literature (4, 31). Although the UTAUT model is relatively new, its suitability, validity and reliability in technology adoption studies in different contexts have been proven (4, 31). From the above comparisons, UTAUT can be seen as best model to measure the e-readiness for e-government.

4. Conclusion
From the researchers' conviction, UTAUT meets the aim of this research for measuring e-readiness for e-government in developing countries. Some modifications suggested to fit the study aim. First, performance expectancy should not be included because using e-government services is not related to the performance personal job. Trust expectancy instead is a vital element to encourage the citizens to use e-government service. In addition, on-line trust simply refers to trust in a virtual environment (6). Second, Social influence as well should not be included. It is not expected in using e-government services. The era rival is the more likely used for e-government services. In the other hand, the experience could be titled as "computer and internet experience". This title focuses more on the required skills to use the e-government services. Also, "volunteers of use" can not be included, because using e-government services can not be considered as voluntary. Instead, personal income should be added to the model as it one of the most important elements for e-readiness in the developing countries. It has been noticed a lesser interest in using e-government services among the low income citizens (36). From these modifications, slight changes should be done to the UTAUT model (shown in figure 3), thus the definitions of the elements of the research model shown as follows:

Trust Expectancy: Trust expectancy is defined as the degree of confidence that individuals believe that using the e-government services will be safe and secure.

Effort Expectancy: Effort expectancy is defined as the degree of ease that users will feel also respect the usage of the e-government services.

Era rival: Era rival is defined as the extent to which individuals perceive that he or she should use the e-government services because it is the future way if he or she dose not use it, he or she would left behind.

Facilitating conditions: Facilitating conditions are defined as the support that individuals believe a technological infrastructure can provide for the usage of e-government services.

![Research Model Modified UTAUT](image)

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