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Research paper

Measuring the Success of Adoption and Acceptance of Technology in the Risky Environment: An Instrument Design

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Abstract

Electronic Government (eG) has become a very important tool to serve the beneficiaries; therefore, it has received the attention of many Information System (IS) researchers. Due to the importance of the IS successes, this paper identifies the emergence of a clear gap to measure the success of adoption and the acceptance of technology in unstable circumstances such as wars, conflicts and violence. Nowadays, the unsuitability issue is increasing remarkably. This paper expands on previous studies whose focus was on investigating the success of adopting electronic services in dangerous and unsecured countries in the world. Consequently, a need for a specific tool to measure the success of technology adoption and acceptance among the users in unstable and risky conditions has become urgent. Based on the findings, it can be confirmed that this instrument is reliable to measure the success of adoption and the acceptance of technology in risky environments.

Keywords: *Electronic Government, Conflict, Success, Questionnaire, Technology and Iraq.*

1. Introduction

The evolution of Information Technologies (ITs) has witnessed the emergence of Electronic Government (eG) in the late 1990s[1]. eG has become a very important tool to serve the beneficiaries and received the attention of many IS researchers. Nowadays, many countries are suffering from violence and unstable environment. In other words, most studies on adoption and acceptance of ICT services were conducted among citizens living normal lives[2] who are not really affected by abnormal circumstance. Besides, the results in conflict and unstable environment will be different in examining the same theories in a peaceful and stable environment and that lead to the creation of new knowledge[2][3][4][5]. Although some have been carried out examining eG services and successes[6].

Gradually, the researchers used new stage to increase the success of the innovation as the success of innovation (such as eG services) is contingent upon citizens' willingness to continue using these services[7]. In other words, an information system shows that its eventual success relying on its continued use of more than first-time use[7][8]. The motivations for designing the current questionnaire instrument come from two sides; first, there are very few papers or research empirically done to detect and recognize what are the factors that should be measured in the success of adoption and acceptance of technology.

The second side is developing a particular instrument to determine and evaluate the factors that have influenced the adoption and acceptances of technology. In brief, the instrument (questionnaires and items) for measuring the influencing factors on the success of the adoption and acceptances technology in unstable and conflicts circumstances should be considered and designed as the area of instability is increasing and its new area needs to be investigated by schools with new researchers.

2. Questionnaire design and literature review

Regarding to the importance of questionnaire design and survey[9]. The author added that survey research method has numerous styles of data collection techniques such as questionnaire of this research, observation, interviews, and content analysis. The questionnaire type is the usually and most universally used for data collection techniques, as cited in[10]. Consequently, the research questionnaire is divided into four main parts, as shown below in Table 1.

Table 1: Summary of the Structure Questionnaire

Part	Section	Contents
1		Personal profile
2		Current state EG serves in Iraq
3		Main Part
	A	Performance Expectancy
	B	Effort Expectancy
	C	Social Influence
	D	Facilitating Condition
	E	Continued usage Intention
	F	Use Behaviour to use eG services
	G	Perceived Intensity of Civil Conflict
4		Recommendation

The format of a questionnaire is its physical planning of questions. It concerns based on its general manifestation and is crucial to a successful study[11]. Therefore, the questionnaire consists of three parts. In addition to these, it also includes the cover letter, the title of the study, and logo, college, name of Universiti Utara Malaysia, four

squares for questionnaire number, purpose of the questionnaire and a statement guaranteeing confidentiality of the respondents. Additionally, this part includes the researcher's email address, date, and question to the respondent if he/she is interested in the research result. Finally, there is an important question in the rectangle as a filtering question, which is (are you an eG service's user?), If your answer is "no" go to the comments' space (last page) and state "why you have not used eG services yet?"[11]. If your answer is "yes", please proceeded to the second question. The questionnaire contains three main parts.

Sequentially, part one consists of eight questions about the respondent's demographic profile including an instrument that uses nominal and ordinal scales such as gender, age, marital status, occupation, resident place, education level, monthly income depending on Iraqi payroll and period using Internet technology. Additionally, the answer of these questions is tick the answer[11]. Part two consists of Information of eG status in the Republic of Iraq–it includes eight statements explaining the availability of services, satisfaction, benefit, routine, cost, time, flexibility, and internet speed. Alongside, the answer was to tick in the "yes" or "no" parentheses. Part three includes the measurement of the factors that influence eG services in Iraq. All the factors and the items are listed in Appendix 1. In part three, black background was used for the explanation of table, and at the same time, the rows were coloured to confirm the right answer by line. In part four, there are two questions; one question is related to the barriers and challenges facing eG, andin the second question, the researcher asks respondents for the comments he/she wishes to make. Then, on the very last page of the questionnaire, the researcher thanks the respondents for their contributions. Part three of the questionnaire was designed to measure seven (7) variables. These are (1) CUI, (2) UB, (3) PICC, (4) FC (5)PE, (6) EE and (7) SI. The respondents are asked to circle the appropriate response[11]. The questionnaire was designed by a booklet style questionnaire[11][12]. The author[12] states reasons for using the booklet style questionnaire:(1) makes it easy for using by the respondent (citizen) and to turn the questionnaire pages, (2), and within the booklet style, the questionnaire looks more professional, and at the same time, (3) it saves a space and makes it easy to use. The entire constructs items were measured on a seven point scale, ranging from 1, depicting strongly disagree to 7 depicting strongly agree as employed in prior study[13]. A seven-point scale was employed as it is superior to a five-point scale. Additionally, the psychometric literature indicates that more scale points is better though there exists a diminishing return after 11 points[14]. Therefore, employing seven-points establishes a good balance between enough points of discrimination and not having enough options[15]. Due to the huge number of variables in the current study's model and in order to have a strong instrument to ensure a high quality of the date, the researcher tried to take care of the following points.

1. The measures were chosen based on solid empirical literature;
2. The questionnaire was self-administrated to the respondents to increase the response;
3. To have a high response rate, the respondents were frequently reminded and presented with small symbolic gifts. In addition, some participation certificates were given to some respondents upon their request.

2.1. Perceived intensity of civil conflict

In more details, the current framework extended UTAUT by PICC construct as a moderator as Iraq is still facing a high level of conflicts, and is a very risky environment[5][16][17] and continued usage intention of eG services because eG services shows that its primary success depends on eG services continued use or (keep use) more than first-time use (one time use)[7][8]. Continued usage intention is defined as a function or response more than one times of users[18][19]. Nevertheless, continued usage behavioural of IT services is selected as the criterion variable of this present research because of the importance and unique contributions to the academic literature on user adoption of IT[20]. The majority of previous IT adoption research has failed to examine the difference in user's perceptions among the first time use (initial adoption) and continued use[7][21]. An information system generally reflects that its success hinges upon the continued use as opposed to first-time use[7][8].

2.2. Usage behavior

Behavioral psychology is attributed to several theories obtained from determining the reasons behind individual adoption of new IT. Empirically, some theories have been validated in their accounting for around 50% variance of individual use or intention to use IT, with researchers testing 32 of the constructs obtained from eight theoretical models to determine the top influential one in the light of IT use[20]. The eight acceptance models include UTAUT.

2.3. Performance expectancy

Performance expectancy (PE) refers to the level to which an individual is convinced that system use will assist in gaining job/life performance[20][22][23][24]. The different models have five constructs pertaining to performance expectancy cover perceived usefulness (TAM/TAM2 and C-TAM-TPB), extrinsic motivation (MM), job-fit (MPCU), relative advantage (IDT) and outcomes expectations (SCT). Moreover, performance expectancy (PE) refers to the level to which an individual is convinced that system use will assist in attaining job/life performance. Perceived usefulness TAM/TAM2 and C-TAM-TPB are important constructs of PE in Iraq where the conflicts are affecting Perceived Usefulness because the citizens cannot get usefulness and benefits from eG services due to the unstable services that are affected by the unstable electricity power and the high cost of the Internet use[25].

2.4. Effort expectancy

Effort expectancy (EE) refers to the level of ease related with the system use[20][22][24]. The three constructs in UTAUT that encapsulates the effort expectancy are perceived ease of use (TAM/TAM2), complexity (MPCU), and ease of use (TAM), whereby prior studies have highlighted the similarities among these constructs[26]. Effort expectancy has also been evidenced in studies conducted previously[20][27] as having a significant influence on behavioral intentions to use IT.

2.5. Social influence

Social influence (SI) refers to the level to which an individual perceives that others are convinced of his/her using of the new system[20][22][23][24]. According to this statement in Iraq, there are too many people who are unemployed because they worry about moving from working place to house under the conflicting conditions (kidnapping, killing, crisis, violence and bombs)[17].

2.6 facilitating conditions

Facilitating conditions are described as the level to which an individual is convinced that an organizational and technical infrastructure is present for system support[20][22][23]. Additionally, facilitating conditions in the UTAUT model consists of perceived behavioral control whereas in other models (TPB, TAM, MPCU and IDT models), it is in the form of compatibility[11][20][28]. Moreover, it was revealed that facilitating conditions is a construct that predicts IT

use[20]. Regarding FC and unstable circumstances, Iraq is suffering from the low level of infrastructure 29 such as Internet service which is very bad[25][30]. Also the electricity power is not stable, sometimes it is off, and sometimes, itis not stable at all[25].

3. Validity of research questionnaire

The findings of the quantitative study showed the validity for the items that constitutes the questionnaire that was adopted from prior studies[31]. In this regard, validity refers to an accurate measure to which a score represents the concept[32]. Similarly, described the validity as whether the question represents the concept in which case, the content validity measure is adequacy and representativeness of the items for the concept[33]. More specifically, content validity of an instrument is examined in two ways; first, the development of items from prior literature and second, the judgment of an expert panel. As mentioned, the researcher based the questionnaire items on prior academic research [34]. To ensure this, the expertise of 8 lecturers and high ranking officials in eG project in MOST (professors and assistant professors) from Malaysia and Iraq was solicited. Based on their feedbacks, improvement was made on the items asked, the sentence structures, appropriate choices of words and sentence arrangement [35]. On the basis of the discussions, it is evident that the research questionnaires employed in this study passed its content validity examination and its reliability is discussed in the next section.

4. Reliability of the instrument

Reliability indicates the internal consistency[32] and it is referred to as the level of the absence of non-bias indicating the stability and consistency with which the instrument measures the concepts and assesses goodness of measure[33]. Moreover, the inter-item consistency of the reliability examines the consistency of the answers provided by the respondents. In relation to this, Cronbach's alpha coefficient is an extensively used test for inter-item consistency reliability[33].

The researcher analysed sixty-nine questionnaires (Appendix1). The pilot study was carried out primarily to examine the reliability, validity and viability of the instrument used in the research and to confirm the time required to conduct the actual study. Each construct's reliability test was calculated through the use of data gathered from the pilot study. Among the conditions for past instrument selection is internal consistency of the scales using Cronbach's alpha reliability coefficients. Aside from this, the pilot test results, the feedback and recommendations of the sample were employed to enhance the final questionnaire items.

Table 2: Reliability Analysis

Constructs	No. items	Cronbach's Alpha
a-Social Influence	5	.853
b-Perceived Intensity Civil Conflict	5	.926
d-Effort Expectancy	5	.846
e-Performance Expectancy	5	.906
f-Facilitating Conditions	5	.849
h-Use Behavior	4	.945
g-Continued Use Intention	4	.952

The reliability coefficients (Cronbach's alpha) of all the main constructs included in the pilot study [36] are presented in Table 2 – the coefficients are compared to those obtained from prior studies. If the values are not lower than 0.70, then they are deemed to be reliable and suitable to be included in further testing [37]. The pilot test results are presented above in Table 2. From the table, it is evident that inter-item consistency between the constructs items Cronbach's alpha coefficient values are all higher than 0.70 [38].

5. Conclusion

In this paper, an overview of the way the research questionnaire measures the impact of relevant factors on adoption and acceptance of technology is developed, guided by prior studies. The pilot study results indicate the reliability of the questionnaire. Due process was followed thoroughly in developing the questionnaire, so that the contribution of the study findings is validated in theory and practice in terms of the adoption and acceptance of IT. Moreover, several statistical experts were requested to review and provide feedback on the questionnaire items prior to conducting the pilot study. Their feedback was taken into consideration whereby adjustments were made based on it. Finally, this study discussed a few antecedents of eG and neglected a lot of them such as the motivations, service quality, website features and habits which can measure the effect of surfing Internet habit on the adoption and acceptance of technology in risky environments.

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