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A Preliminary Qualitative Study towards the Development of an Adoption Model

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Authors' contributions

This work was carried out in collaboration between both authors. Author MS designed the study, wrote the protocol, and wrote the first draft of the manuscript. Authors SEM and MS managed the literature review and author SEM wrote the discussion section. The final manuscript was written by author MS. Both authors read and approved the final manuscript.

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ABSTRACT

Background: Almost all people in the societies are facing new e-Services everyday and it is essential for the implementers to have enough users for the new implemented service. An e-Service without users would be a failure. Therefore, before implementing the e-Services the adoption factors of the users must be considered. The problem is lack of an adoption model with the proper factors for all environments. Moreover, behaviour of the users changes over time and sometime even the impacting factors on the adoption will change too.
Aims: This study is developing and proposing an adoption model for the e-Services in an academic environment.
Study Design: Interviews with the Information Technology managers were done to find the important factors influencing the adoption of users.
Place and Duration of Study: Islamic Azad University - Dehaghan Branch. Between December 2013 and January 2014.
Methodology: Three Information Technology managers involving Information Services development were interviewed. First, factors influencing the adoption of users were introduced to

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them. They were free to add additional factors. The results were used to propose the final adoption model of the study.
Results: After gathering data from the interviewees, an adoption model is proposed with one dependent and four independent variables. This model will later be developed based on a quantitative method of factor analysis. "Perceived Ease of Use", "Perceived Usefulness", "Observability", and "Compatibility" were the four independent factors. The dependent factor is 'Intention to Use".
Conclusion: While this study is the pilot of a larger scale study, the model must be tested and the relation between the variables must be measured by a quantitative method.

Keywords: Information technology adoption model; electronic services (e-Services); technology acceptance model; adoption models.

1. INTRODUCTION

E-Services are being implemented all across the world especially in developed and developing countries. However, implementation of Information Technology (IT) is expensive [1], using e-Services have many benefits for societies such as reducing cost and time. Important issue for the e-Services' implementers is the number of the users. Even good implemented e-Services without users are not considered successful and implementers must be aware of the acceptance or rejection reasons of a technology [2]. Therefore, investigating about the users behaviour and adoption of the users to new technologies are becoming essential for the information technology (IT) managers. They want to make sure that their new services will be used by the users and they continue to use them.

Islamic Azad University as the biggest university in Iran is implementing the e-Services too. Students and staffs are using e-Services in the university and several new e-Services are being implemented and developing inside the university. One of the issues that must be considered before implementation of the services is the usage rate of the services. Therefore, using adoption models to predict and explain the users behaviour is important for the IT managers.

This study uses TAM as a model that has been used and tested by many researchers and will integrate it with other important factors. These factors will be revealed by interviewees.

2. RESEARCH OBJECTIVES

The research main objectives are: (1) to provide an adoption model for the educational environments; (2) to bring out important adoption factors in an educational environment. This is done by examining TAM and several related adoption factors, introduced in previous years.

3. BACKGROUND OF THE STUDY

While new technologies are rapidly introducing and these technologies have different characteristics and moreover every society has its own (and sometimes unique) situation, study about the users' needs and their behaviour are very essential for the implementers of these new technologies. There is a need to introduce prudent adoption model for these technologies [1].

While introducing TAM, Davis proposed two factors as the factors that can explain the usage of a system [2] and these factors are perceived ease of use (PEOU) and perceived usefulness (PU). Many researchers have used TAM and other related models to examine adoption of new technologies [3]. It has been proven that TAM is useful to explain users' intention to use a technology [4].

However, there are several theories used to explain the users adoption, Technology Acceptance Model (TAM) is one of the most used theory to predict users behavior. This model was proposed by Davis in 1989 with two main factors: perceived usefulness and perceived ease of use (Fig. 1). Perceived usefulness is "the belief that using a particular system would enhance one's job performance" [2]. Perceived ease of use was defined as "one's perceptions of the amount of effort required to use the system" [2,5]. TAM specify that these two factors directly will impact on the intention to use (ITU) a system.

Another model which is used to specify adoption of a system was introduced by Rogers. He named it diffusion of innovation (DOI). DOI (Fig. 2) have five constructs: relative advantages,

complexity, compatibility, trialability and observability [6]. Two first factors in this model show the same concept that has been used in TAM.

In the year 2003 another adoption model was presented by Venkatesh et al. [5] which is the Unified Theory of Acceptance and Use of Technology (UTAUT) and consist of three factors (effort expectancy, performance expectancy and social influence) with direct effect on the usage intention (Fig. 3). In this model there are two constructs with the same concept as TAM and DOI which are effort expectancy and performance expectancy.

4. RESEARCH METHODS

Qualitative research method is used to find the important factors influencing adoption of the users. Three separate interviews with three IT managers has been done. The interviewees were IT managers implementing e-Services in the university. They had more than 10 years of average work experience and were still working as developers of universities' e-Services. Data gathering has been done December 2013 to January 2014. The main objective of the interviews was to get their opinion about the important adoption factors.

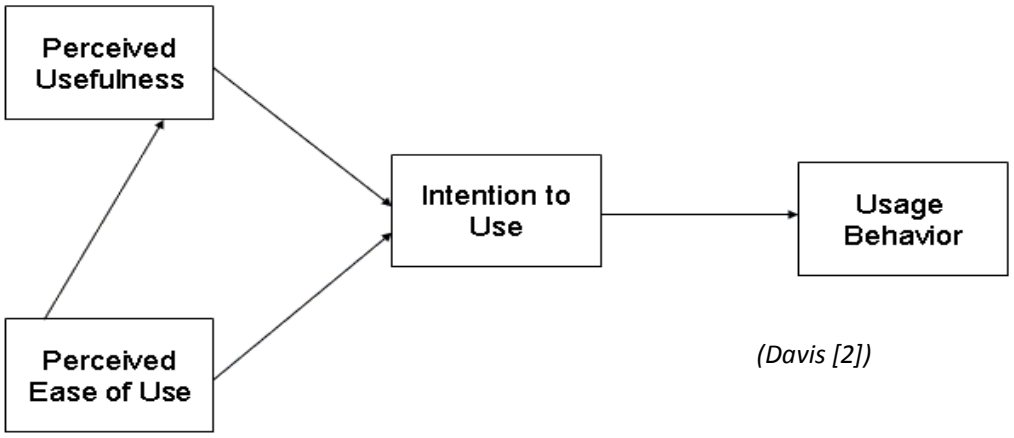

Fig. 1. Technology acceptance model

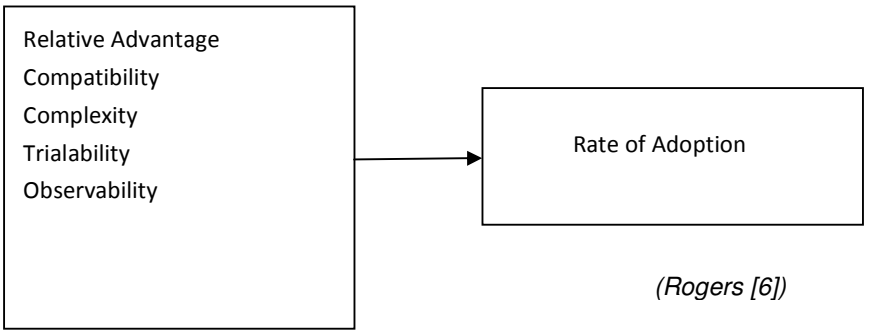

Fig. 2. Diffusion of innovation

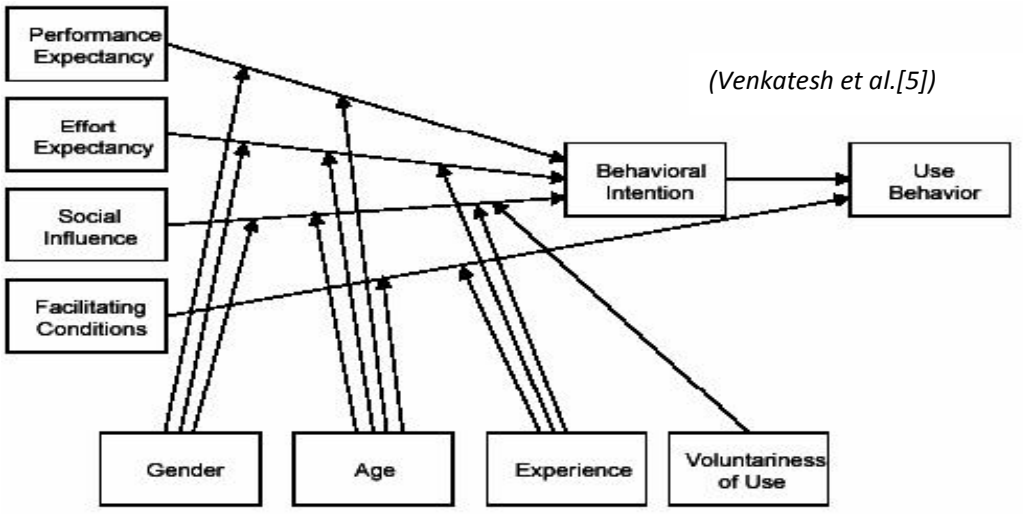

Fig. 3. Unified theory of acceptance and use of technology (UTAUT)

To get the needed results, firstly the importance of the study was explained and the adoption issue was discussed with them. Subsequently, the factors from the most used models in other studies were considered, explained and discussed with them. On one hand, the goal of the study was to develop model with the most important constructs, and on the other hand, the researchers wanted to propose a parsimonious adoption model. Therefore, numbers were used to indicate the importance of a factors (1 = not important, 5 very important). After getting the interviewees' opinions, we had a number for each of the adoption factors, and sums of these numbers were compared with each other. Maximum value of the result values could be 15 and minimum could be 3. The importance of the factor can be presented by the value they had and we could compare the factors and get the needed results. The IT managers did not proposed any other adoption factor.

5. RESULTS

The results indicate that there are four factors which can be used for the adoption model. The results can be seen in (Table 1). The interviewees named alphabetically from A to C. The most important factors are: Perceived Ease of Use (Complexity, Effort expectancy), Perceived Usefulness (Relative Advantages, Performance Expectancy), Observability, and Compatibility. These four factors can be used to make the proposed adoption model. Complexity from DOI, "Perceived Ease of Use" from TAM and Effort expectancy from UTAUT determine a similar concept. Furthermore, Relative Advantages from DOI, "Perceived Usefulness" from TAM and performance expectancy from UTAUT present the same concept too. Therefore, these factors were put in the category.

Table 1. Interviews results

Construct	Model	Importance					Points
		1	2	3	4	5	
Perceived ease of use	TAM				A		12
Complexity	DOI				B		
Effort expectancy	UTAUT				C		
Perceived usefulness	TAM				B	AC	14
Relative advantages	DOI						
Performance expectancy	UTAUT						
Compatibility	DOI		A	B	C		8
Trialability	DOI	A	C	B			6
Observability	DOI			AC	C		10
Social Influence	UTAUT	A	B	C			6
Trust	Trust	B	AC				5

6. IDENTIFYING FACTORS

Based on the review of the literature and results from the thematic analysis the important factors are identified and an adoption model is proposed. The model can be seen on (Fig. 1) with five main constructs. One dependent variable (Intention to Use) and four independent variables (Perceived Ease of Use, Perceived Usefulness, Observability, and Compatibility). The definitions of these factors are presented in (Table 2).

These constructs influence one's behavioral intention to use a system, which, in turn, determines actual system usage [7].

The model has a dependent variable (DV) which is intention to use and four independent variables from previous known adoption models (Fig. 4). These factors are perceived ease of use, perceived usefulness, observability, and compatibility.

7. LIMITATIONS

Our sample consists users of e-Services in one university, therefore this may limit the generalizability of the result. Although the structure of Islamic Azad University (IAU) - Dehaghan Branch is highly fragmented as in other Islamic Azad Universities branches and even other universities in the country, one must exercise caution in extrapolating the results geographically especially in other countries. Furthermore, this model cannot be considered as a final adoption model until it is examined by a larger sample size for other e-services. A quantitative method must be used to examine and confirm the model and other important factors must be tested in other environments.

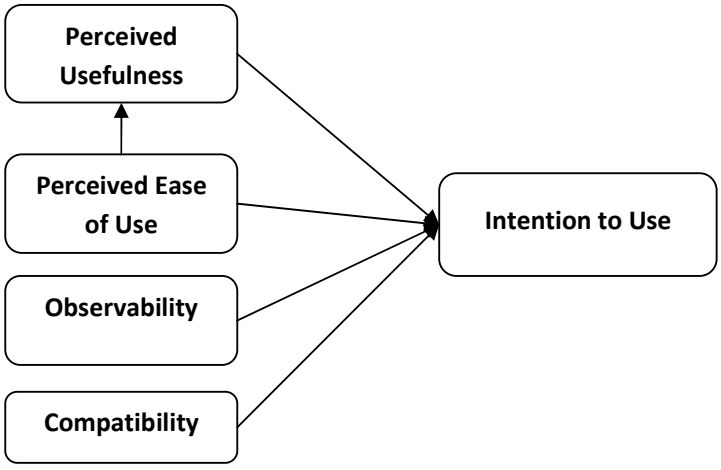

Fig. 4. Proposed model

Table 2. Factor definitions

	Variable	Definition
1	Perceived ease of use	The degree to which a person believes that using a particular system would be free of physical and mental efforts
2	Perceived usefulness	The degree to which a person believes that using a particular system would enhance his or her job performance
3	Observability	The degree to which the results of an innovation are visible to others
4	Compatibility	The degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopter

8. CONCLUSION AND SUGGESTIONS

New technologies are being introduced with a rapid pace. Rapid changes in technological development are forcing organizations to look continuously for innovative strategies to improve their competitiveness.

New technologies are becoming old in a short time and users must adopt to these technologies very fast. The primary objective of this paper was to present a parsimonious theoretical model that drivers of users' intention towards e-Services. The presented model is small enough to be tested and examined in other environments easily. Having Adoption models and being aware of the influencing factors will help the IT managers to develop successful e-Services.

Examining this model in an environment that recently is facing the new technologies can help the implementers of other new e-Services to develop their services with more success rate. Furthermore, this model can be used as a framework for other empirical researches examining the adoption of new technologies. It is interesting to note that trust was not pointed as an impacting factor for the e-Services in university. The reason might be the environment of the study. The users do have trust on the e-Services as this study was conducted in the university and the users were students.

Although, there are many impacting factors on technology adoption in different environments, it would be interesting to examine culture as a factor that was not consider enough in researches [8]. This study is the pilot of a larger scale study of e-Services in a larger scale. This study has proposed the model but the model needs to be confirmed by a quantitative study. Future study will be examining the model with Structural Equation Modeling (SEM). SEM has been used widely by the researchers in the behavioral science [9,10] and getting SEM results will be more confident.

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Maziar Shajari is Assistant Professor at Computer Department, Islamic Azad University, Dehaghan branch since 1998. His research interest focuses on Information Systems, Computer System Analyses and Design, and Knowledge Management. Most recently, he has been working on Information Technology Adoption Models for E-Government Services. He is working on introducing a more appropriate IT adoption model for developing countries. Shajari teaches computer system analysis and design and several other topics in Islamic Azad University. He holds a B.A. and M.S. in Computer Software at Islamic Azad University and obtained Ph.D. in Computer Science from University of Technology Malaysia. He has published several publications on the Adoption Information Systems and Knowledge Management.

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