

International Journal of Advance Research in Computer Science and Management Studies

Research Paper

Available online at: www.ijarcsms.com

Understanding the evolution of Technology acceptance model

Priyanka S¹Research Scholar
Department of management studies
Karpagam University
Coimbatore - India**Dr. Ashok Kumar²**Director, MBA
Karpagam University
Coimbatore - India

Abstract: This document the widespread use of technology in almost all areas of life has led to a lot of studies in the field of IT acceptance. One of the most widely used models has been Technology acceptance model which has been used widely in understanding Information system acceptance. In order to study the information system acceptance it is imperative to study the evolution of Technology acceptance model (TAM). This paper tries to understand the evolution of TAM and the relevant information related to it by analyzing the available literature. It also concludes that although there is skepticism related to this model, but by far TAM has interested most of the researchers worldwide and is considered to be the most popular model in studying IT acceptance

Keywords: Technology acceptance model; Information system; Technology acceptance.

I. INTRODUCTION

The huge interest in the implementation of information technology worldwide has meant that user acceptance of technology is also becoming a key factor in the IT implementation. This has meant that there has been a considerable research being done to understand the acceptance of IT by users worldwide. The IT impact and its usage has been difficult to measure since IT has both tangible and intangible features. Most of the studies that were done were not able to correctly explain the user acceptance criterion.[1]

Among the earliest studies that probed to understand IT acceptance was done by F Davis in his doctor thesis at the MIT Sloan School of Management [2]. According to him the use of a system can be explained by user motivation, which can be influenced by external factor which consists of system features and capabilities.[2]

Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi & Warshaw, 1989) derived from the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) offers a powerful explanation for user acceptance and usage behaviour of information technology.

TAM is one of the most influential models widely used in the studies of the determinant of IS/IT acceptance. Many previous studies have adopted and expanded this model which was empirically proven to have high validity (Chau, 1996; Davis, 1989; Mathieson, 1991; Adams, Nelson & Todd, 1992; Segars & Grover, 1993; Igbaria, 1992, 1995; Igbaria, Zinatelli, Cragg & Cavaye, 1997; Jantan, Ramayah & Chin, 2001; Koay, 2002, Ramayah, Siron, Dahlan & Mohamad, 2002).

The evolution of TAM has been very interesting and has undergone numerous changes. It has been applied on a variety of information systems and tested empirically. This paper will be summarizing the different stages in TAM evolution and its relevance in the different information system. A number of models have been developed to understand the determinants of IT

acceptance. They include the Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) and Technology Acceptance model.

II. THEORY OF REASONED ACTION

The below figure presents the model proposed by Fishbein and Ajzen (1975)

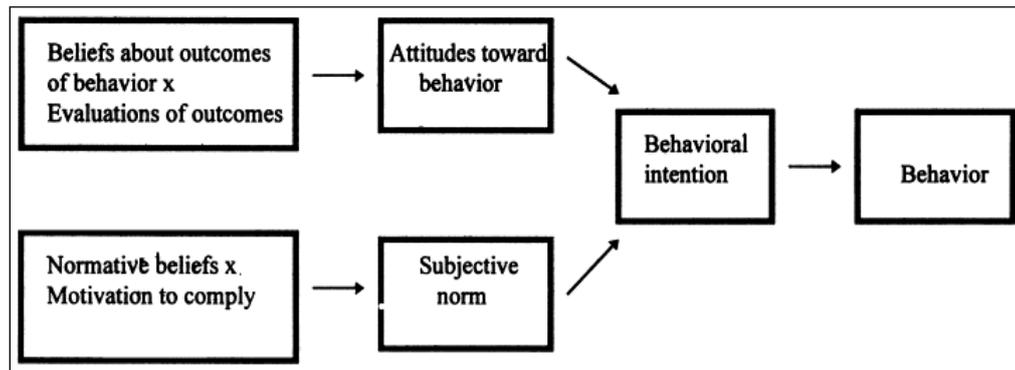


Figure 1: Theory of Reasoned Action

This model is based on supposition that individuals are rational in their decision making and they decide their by proper evaluation with the relevant behavior beliefs in the process of forming their attitude towards behavior. Fishbein and Ajzen(1975) defined behavioral intention as a measure of one's intention to perform a behavior. They defined attitude as an individual's positive or negative feelings (evaluative affect) about performing the target behavior. They also suggested that attitude of a person towards a behavior[A] can be measured by considering the sum of the product of all salient beliefs[b_i] about the consequences of performing that behavior and an evaluation[e_i] of those consequences as shown by the following formula:

$$A = \sum b_i e_i$$

Subjective norm is another important factor in TRA. Fishbein and Ajzen (1975) defined subjective norm as the person's perception that most people who are important to him think he should or should not perform the behavior in question. They suggested that subjective norm[SN]can be determined by considering the sum of the product of a person's normative beliefs[nb_i] that will be perceived expectations of other individuals or groups, and his or her motivation to comply[mc_i]

$$SN = \sum nb_i mc_i$$

Thus, behavioral intention [BI] can be calculated as follows

$$BI = A + SN$$

III. TECHNOLOGY ACCEPTANCE MODEL

TAM was developed by Davis to explain the acceptance of an information system by a user. The concept of TAM was based on the Fishbein and Ajzen's theory of reasoned behavior. The TRA was based on the concept that beliefs influence attitudes which leads to intention and ultimately behavior. TAM uses this connection to understand IT acceptance behavior. According to Davis the user's motivation to use can be explained by 3 factors which are Perceived ease of use, Perceived Usefulness and attitude toward using the system which is amply depicted in Figure 2. The attitude of a user towards a system can be influenced by the factors Perceived ease of use and perceived usefulness. The Perceived ease of use and Perceived usefulness has been considered to be directly influenced by system design characteristics represented by X1, X2 and X3.

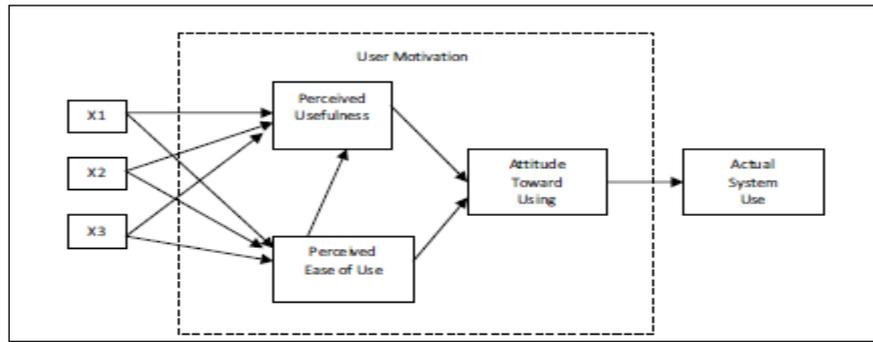


Figure 2: Original TAM proposed by F Davis

This original model has been refined by Davis later on to add more variables and modify the relationships among them. Simultaneously many researchers have applied and modified TAM in the different studies related to system usage and acceptance. TAM has been one of most leading models that have been used to understand technology acceptance among the users.

One of the prominent changes on TAM was done by Davis, Bagozzi and Warshaw(1989) in which they added a new variable Behavioral Intention in the original model. This variable Behavioral Intention was directly influenced by the perceived usefulness of the system. It was suggested that if the system is deemed to be useful the person will develop a stronger intention to use it. This led to the development a newer version of TAM as shown in the figure 3.

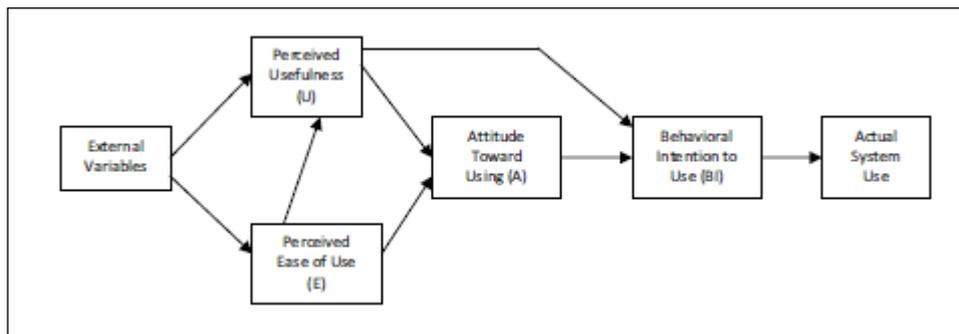


Figure 3: Modified TAM Davis, Bagozzi and Warshaw(1989)

Davis and Venketesh (1996) modified the above model and removed the attitude variable as they felt that attitude played a minor role in system usage behavior which was proved while doing a study. It was also analyzed that external variables could possibly contain factors like system characteristics, user training, user participation in design and nature of the implementation process.

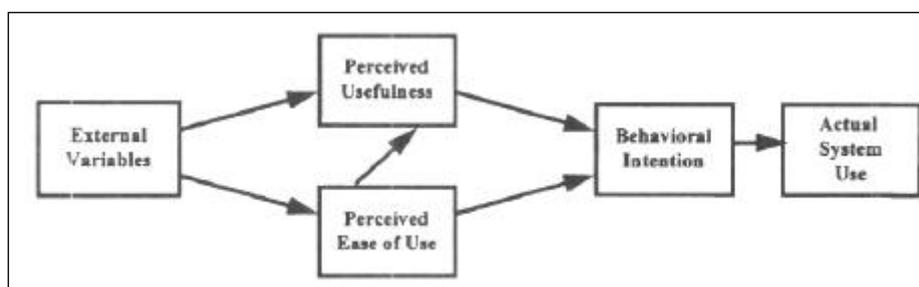


Figure 4: Final Version of TAM: Davis and Venketesh(1996)

Venketesh and Davis(2000) were able to bring in further changes to TAM who proposed TAM2 which can be seen in Figure 5. They added new variables as antecedents to perceived usefulness variable in TAM. In TAM2 model there was greater clarity in factors that make a system useful.

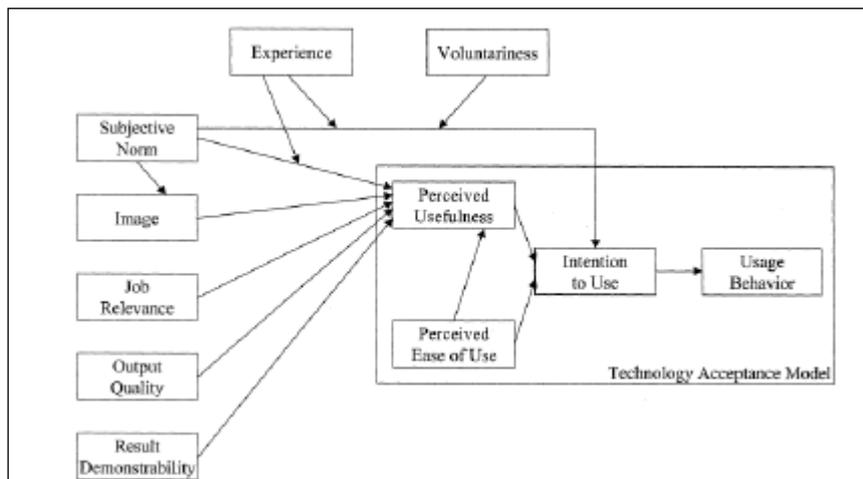


Figure 5: TAM2 (Venketesh and Davis 2000)

Another extension of the model was done by Venketesh who modified the above model to provide greater clarity to the TAM2 model. As shown in figure 6 Venketesh identified two groups of antecedents for perceived ease of use which are anchors and adjustments. Anchors were general beliefs of computers and computer usage and adjustments were believed as beliefs that are shaped based on direct experience with the target system.

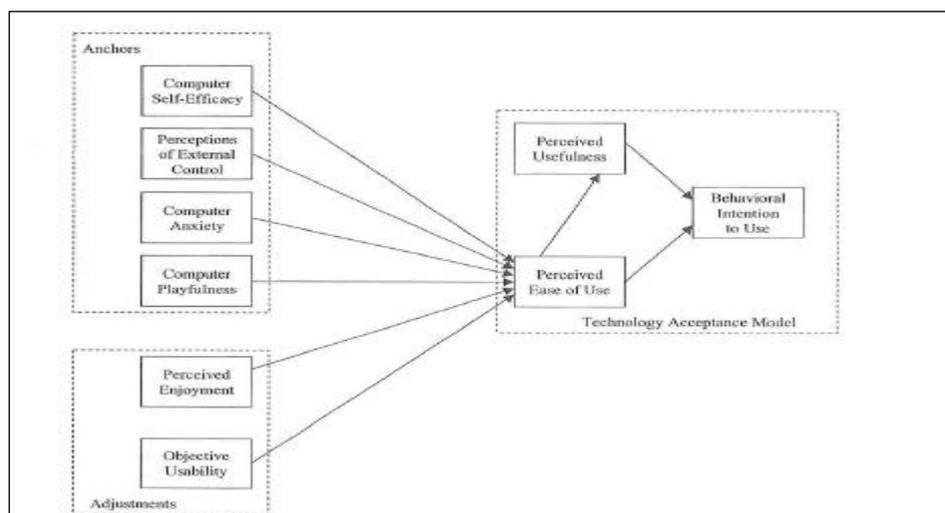


Figure 6: Extending TAM(Venketesh 2000)

IV. LIMITATIONS OF TAM

Although TAM remains to be most popular model in analyzing information system acceptance, still there has been widespread criticism of it which has led to many changes to the original model. The criticisms include the fact that many researchers feel that TAM is merely theory with questionable heuristic value and limited explanatory and predictive power, triviality and lack of any practical value.

The criticisms related to TAM have been mainly in three areas which are the method that is being used to test the reliability of TAM, the variables and relationships that exists and theoretical foundation. Most of the testing of TAM has been done with self reported use data which most of researchers feel are subjective in nature. It has also been that the variables and the relationships which have been tested under have been changed repeatedly based on the study that was being done. Many researchers like Bagozzi (2007) have repeatedly questioned the theoretical foundation of TAM and have felt that there model was not suitable to decide the suitability or acceptability of an information system.

Several researches have repeatedly tried to change or expand TAM in order to adapt it to the constantly changing IT scenario has made the theoretical foundation very confusing. In general TAM focuses on the individual 'user' of a computer, with the concept of 'perceived usefulness', with extension to bring in more and more factors to explain how a user 'perceives'

'usefulness', and ignores the essentially social processes of IS development and implementation, without question where more technology is actually better, and the social consequences of IS use.

V. CONCLUSION

The Technology acceptance model is one of the most popular models for understanding the acceptance of Information systems. This model has been very widely used by researchers worldwide in studies related to information systems. The model has also been modified by researchers in various studies that were conducted. There has been also few criticisms about the validity of the model, but it has been felt that the model has been overwhelmingly been used worldwide in understanding information systems worldwide.

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