

A Review of Technology Acceptance Model (TAM) – Origin, Development & Future Directions

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Abstract - Technology is developing at faster pace and becoming a necessary need for human life in today’s technology driven environment. Thus, it is very essential to understand technology acceptance behavior with a popular Technologies Acceptance Model (TAM). The TAM model exists from many decades, but still today, it is one of the popular models used in the field of technology acceptance. The main aim of the paper is to present detailed review of TAM’s Origin form past to present, Applicability and future directions based on the literature review, and analysis of various models. This paper concludes that, even though TAM is a popular model in studying technology acceptance, but it is criticized for the variables, and relationships that are considered in the theoretical foundation, but still there is a lot of scopes for research with respect demographic factors, Trust, Security, and application of TAM model to E-Commerce.

Keywords: Technology acceptance, Information system, TAM, Application

I. INTRODUCTION

With advancement of the technology in field of information technology (IT), has made a human life easier to avail various services at their finger tip, but the important question regarding its acceptance or rejection of a technology still remains unanswered. In the last few decades, researchers are trying to address this question, which has resulted in the development of a number of theories and models of technology acceptance and its usage. The TAM model introduced by Davis F.D (1986) is still the popular & dominant technology acceptance model at present. The TAM presumes with two mediating variables called perceived ease of use and perceived Usefulness to understand the relationship between external variables, and an actual usage of the system. The TAM model is derived from theory of reasonable action (TRA) and theory of

planned behavior (TPB) by Ajzen and Fishbein which can predict human behavior under certain circumstances.

TAM model has been around for the decades and lot of development, extension of the TAM model has been introduced with supportive research, but still there is lot of unaddressed areas, upon which a researcher can work and validate the TAM model which can be universal accepted in all the area of a digital platform.

Objectives of the Literature review

1. TAM literature review
2. Development of the TAM Model
3. Future of the TAM Model

Origin of TAM Model

Figure 1: Shows Theory of Reasoned Action (TRA) proposed by Ajzen&Fishbein (1975)

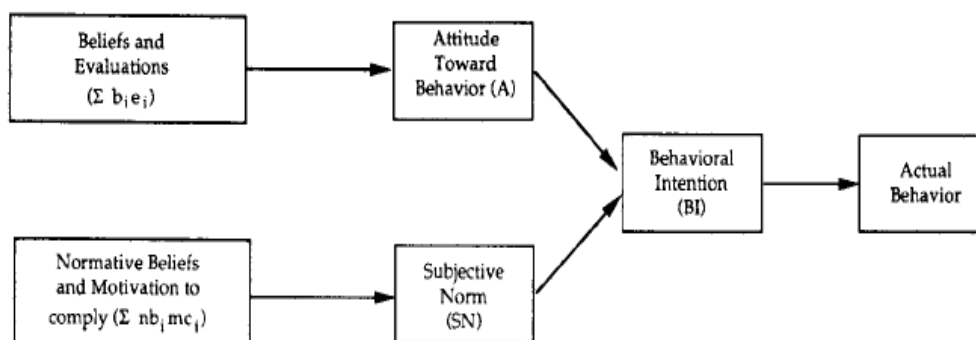


Figure 1: Theory of Reasoned Action

The Theoretical model suggested by Ajzen&Fishbein (1975) is based on Individuals rationality in decision-making and decision is taken after the proper evaluation with the relevant beliefs in the process of forming their attitude towards behavior. Fishbein and Ajzen (1975) referred that person’s prior behavioral intention to actual behavior intention is the measure of behavioral intention to perform a behavior. They defined attitude of person to be positive or negative about performing the actual behavior. They also suggested that attitude of an individual’s towards a behavior[A] can be measured by considering the sum of the product of all salient beliefs[bi] about the consequences of performing that behavior and an evaluation[ei] of those consequences of 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 person who is 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[nbi] that will be perceived expectations of other individuals or groups, and his or her motivation to comply[mci]

$$SN = \sum n_{bi} m_{ci}$$

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

$$BI = A + SN$$

According to the TRA, a main predictor of the behavior is the behavioral intention, while the influence of the attitude on the behavior is mediated through the intention.

II. THEORY OF PLANNED BEHAVIOR (TPB)

Figure 2: Shows Theory of PlannedBehavior (TPB) proposed by Ajzen (1985)

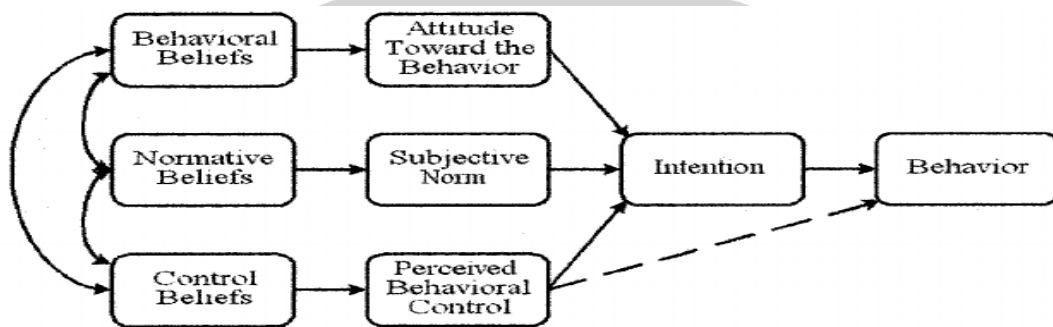


Figure 2: Theory of Planned Behavior (TPB)

As the TRA began to take prominent place in social science research, more research on the TRA was done by Ajzen (1985) and had find out several limitations. One of the most limitations was with people who have a little or feel they have little power over their behaviors and attitudes. Ajzen (1985) added a third element perceived behavioral control to the TRA theory which led to newer theory known as Theory of Planned Behavior (TPB).

According to TPB, the individual’s exhibiting certain behavior is determined by her/his intent to perform that behavior. According to Azjen (1985), an attitude towards behavior is a positive or negative evaluation of performing that behavior. The attitudes towards the behavior are informed by behavioral beliefs, the subjective norms are informed by normative beliefs and motivation to comply, and the perceived behavioral control is informed by control beliefs about the individual’s to engage in the behavior. TPB also includes a direct link between perceived behavioral control and actual behavior (shown in the figure 2). The purpose of the TPB theory is to understand predictable behavior of individuals and to determine the various motivational influences in the formation intention, which will lead to actual behavior

TPB was very good model in predicting behavior, but was more complex in nature with many independent variables and the beliefs defined in the model are specific to given system.

Fred Davis (1985) proposed the conceptual model for technology acceptance which was simpler than the TPB. Fred Davis (1985) proposed that the actual system use is influenced by the individual’s motivation to use the system, which in turn is directly influenced by system features and capabilities which was not enough to predict technology acceptance behavior

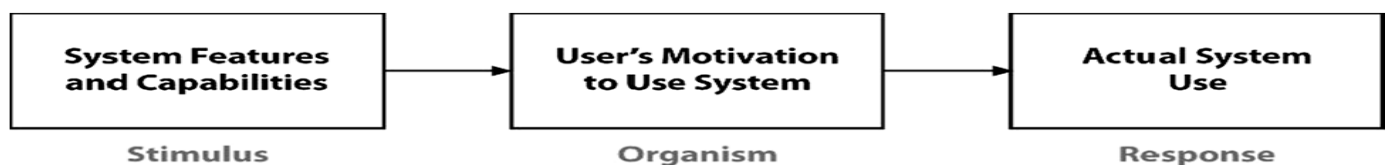


Figure 3: Conceptual Model of Technology Acceptance

III. DEVELOPMENT OF TAM MODEL

Davis F.D (1986) refined the conceptual model and added three variables, an attitude playing the mediating role, Perceived usefulness & Perceived ease of use where used to suggest the users motivations. Davis F.D (1986) proposed that attitude was the major determinant which leads to actual use or reject the system. The attitude of the user is influenced by two major beliefs Perceived usefulness- degree to which a person believes will enhance the job performance & Perceived ease of use - degree to which person believes that using the particular system would be freed from the effort Sharp J.H(2007). The beliefs are directly influenced by system design characteristics (represented by X1, X2, and X3 in Fig. 4).

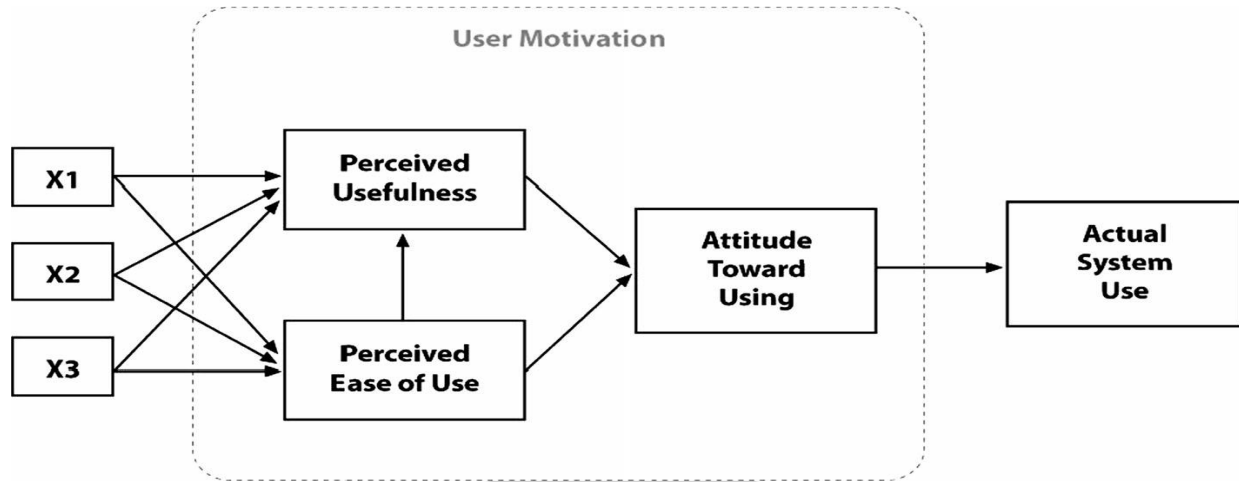


Figure 4: Original TAM proposed by F Davis (1986)

Major changes on TAM model were done by Davis, Bagozzi and Warshaw (1989) by adding a new variable Behavioral Intention in the original model. David and his Team found out that an attitude did not completely mediate the Perceived usefulness & Perceived ease of use. The variable Behavioral Intention was directly influenced by the perceived usefulness of the system (shown in the figure 5).

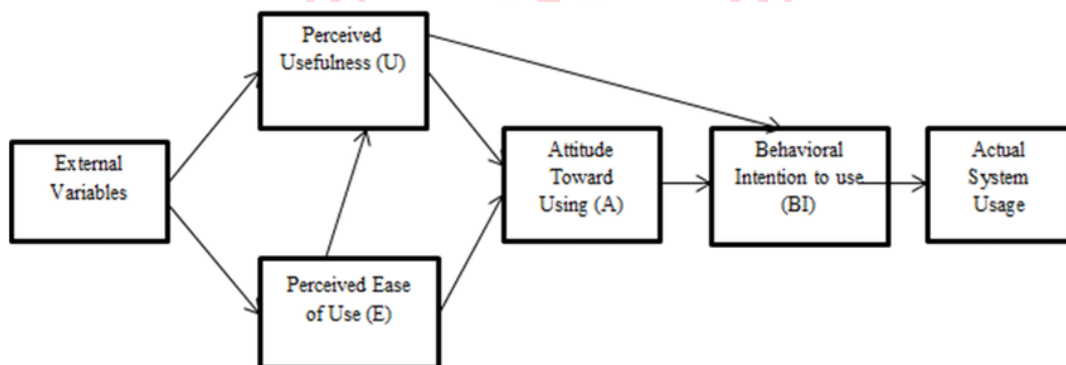


Figure 5: Modified TAM Davis, Bagozzi and Warshaw (1989)

Davis and Venketesh (1996) modified the TAM model by removing the attitude variable as they found that attitude played a minor role in system usage behavior and sometimes formed strong behavioral intention with our formation of attitude. It was also referred that external variables could like system characteristics, user training, user participation in design and nature of the implementation process might influence the belief of the person towards system (shown in the figure 6).

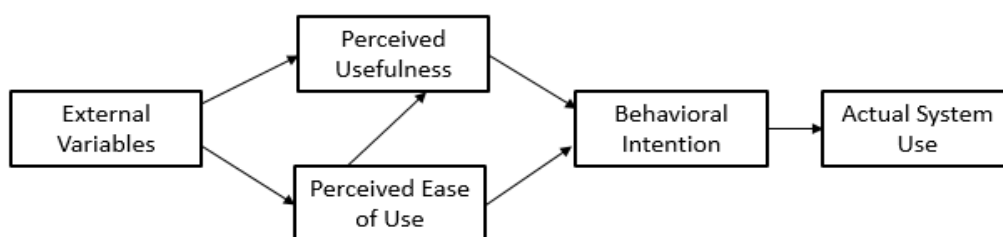


Figure 6: Final Version of TAM: Davis and Venketesh (1996)

Due to intensive research and their findings revealed Venketesh and Davis (2000) revealed that perceived usefulness was the major determinant to intention of use, which led to further changes to TAM and proposed TAM2 which can be seen in Figure 7. They added new variables as antecedents (Subjective Norm, Image, Job Relevance, Output Quality, result demonstrability) to perceived usefulness variable in TAM. In TAM2 it is shown that subjective norm, Perceived usefulness & Perceived ease of use was a direct determinant of the intention to use.

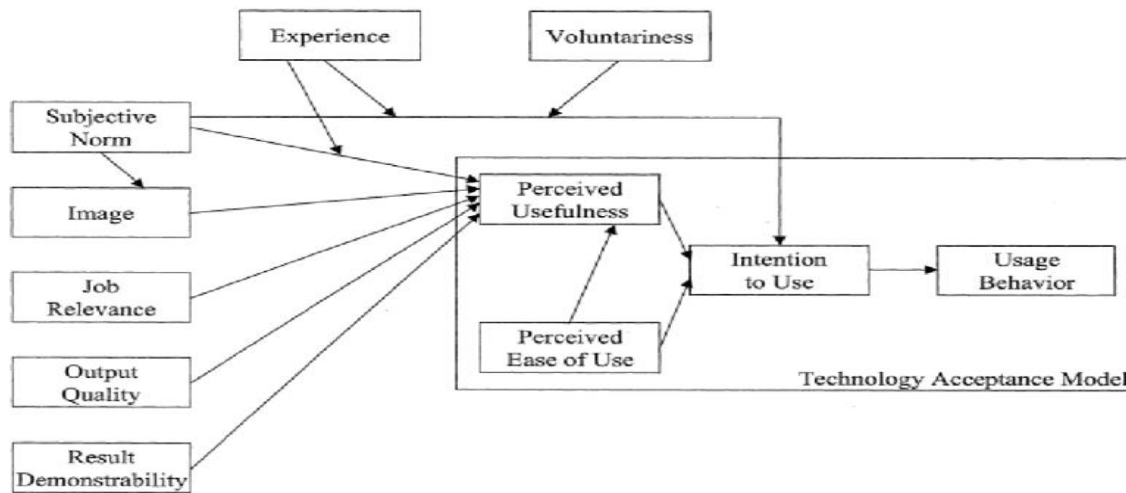


Figure 7: TAM2 (Venketesh and Davis 2000)

TAM had become a popular research model for technology acceptance. To understand the predictors of the TAM Model. Venketesh (2000) introduced an extension of the model. As shown in figure 8, two groups of antecedents for perceived ease of use which is anchors and adjustments were identified. Anchors were general beliefs of computers, and computer usage and adjustments included perceived enjoyment & objective usability.

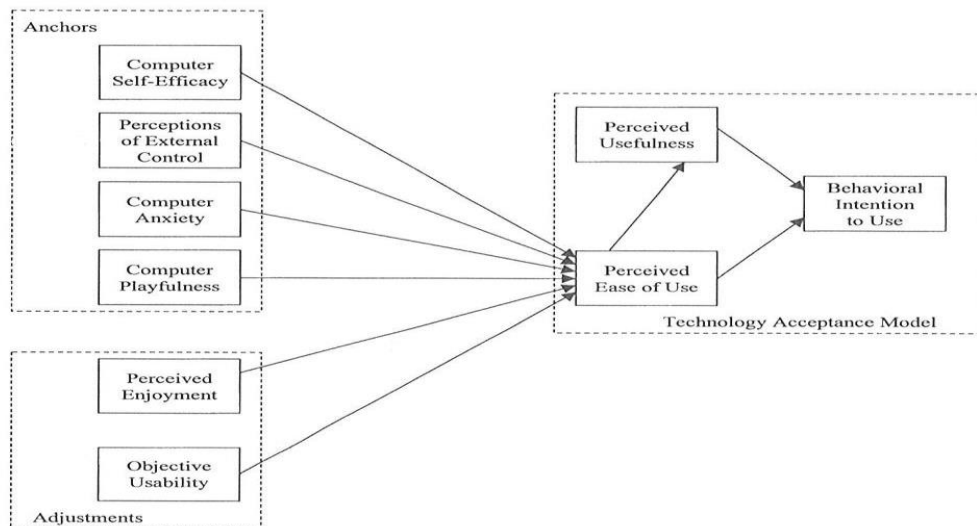


Figure 8: Extending TAM2 (Venketesh 2000)

IV. POSSIBLE FUTURE DIRECTIONS

Even though TAM model was first introduced in the year 1986 and with passage of time there were a lot of developments and extensions in the original TAM model, but still Today, it is one of the popular models to understand technology acceptance in various fields.

- Even though various variables are included in the TAM model to make it robust, but there are some other users characteristics that could be considered which may affect on the relationship between TAM variables and technology

acceptance (Sun, H., Zhang, P, 2006). The variables are cognitive abilities like spatial and reasoning abilities, processing speed, and memory abilities might contribute to the technology acceptance behavior (Arning, K., Ziefle, M., 2007)

- TAM Model has considered belief, external variables, antecedents in their extension models, but cultural differences, gender, emotion, habit, personality, demographic factors are not been considered in the technology acceptance, which are necessary in the near future.

• TAM model has been extensively researched by the researchers and the common variables used are perceived usefulness & perceived ease of use. However, there are only a few studies attempted to verify other relationship which might influence the buying intention relationships that are perceived enjoyment (Igarria, M., Iivari, J., Maragahh, H.1995, Jackson, C.M., Chow, S., Leitch, R.A.2007), Perceived Risk, Perceived Trust (Matthew LiU,James Brock ,Gui Cheng Shi,Rongwei Chu,Ting-Hsiang Tseng) & Perceived benefit. Therefore, new research is required to determine whether such variables are to be added to the existing TAM model to make it more robust.

• Technology is developing a faster pace, newer technology and fields like Data science, embedded technology, cloud computing, multi-user system and many more are emerging. So TAM model need to be applied to such field to check technology acceptance in the future studies.

V. CONCLUSION

The TAM model is one of the widely used models for understanding the acceptance of technology. The TAM model remains the most popular model for understanding technological acceptance of various platforms and application in the developing technological world and from time to time much research has been widely done and many extensions are given to the model, but there has been always few criticisms about the validity & saturation level of the model, but it has been felt that the model has received overwhelmingly response from research fraternity and been continued to used worldwide in understanding acceptance of information systems worldwide. In future there may be lot research and new models may be developed to suit the changing technological environment

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