

User Acceptance of Desktop Based Computer Software Using UTAUT Model and addition of New Moderators

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Abstract— User acceptance of technology is an important field of study in predicting the use of the computer systems. Unified Theory of Acceptance and Use of Technology (UTAUT) model is current model that has attracted the attention of researchers in predicting usage of computer systems. Individual performance and organizational performance can only increase by increasing user acceptance of computer systems. The research focuses on user acceptance of desktop based computer software used in organizations by adding some new moderators like gender, age, educational level, experience, individual impacts, organizational impacts and memorability to UTAUT models. The findings of study tells about the relation between the moderators and core determinants of UTAUT like Performance Expectancy, Effort Expectancy, Attitude towards using, Social influence, Facilitating conditions, Self efficacy and Anxiety. In this research, a total of 120 students of different colleges were included and four desktop based software MS-Word, Tally, Adobe Photoshop and MS-Access were analyzed. The results of study tells that performance expectancy, effort expectancy, attitude towards using and facilitating conditions are the important constructs which are useful to predict software use. The correlation analysis tells that gender, age, educational qualification, experience, individual impacts and organizational impacts has significant influence on different constructs of UTAUT model.

Keywords: Desktop based computer software, User acceptance, End users, Technology acceptance model, Unified theory of acceptance and use of technology model.

I. INTRODUCTION

Many computer based tools or software are used by users and organizations to support planning, decision making and other tasks that lead to productivity of organizations. Organizations that supply or consume information technologies face risky investment decisions that can have major affects on their competitive positions [10]. These days the paper work of the organizations is automated by creating end-user computing tools like desktop based computer software for the organizations. However end users are often unwilling to use available computer system that, if used, would generate significant performance gains [1]. Software application development began with desktop applications, which could be used as standalone machines only. Word processors, graphics software, accounting software are the example of desktop based computer software. A desktop application means any software that can be installed on a single computer and used to perform specific tasks [11]. Due to the difficulty in deeply understanding the requirements of the users and factors that affect software use, the designers or vendors of the software require better understanding of willingness of the users to use that system. Over the last two decades, a significant body of research has focused on identifying various factors that influence user acceptance behavior advancing several theoretical models [9]. Many researchers have studied the impact of user's belief and his attitude to predict system usage. These internal beliefs and attitudes are in turn influenced by some external variable that include system features and users behavior. Many studies have proved the validity of internal beliefs or core determinants of Unified Theory of Acceptance and User of Technology (UTAUT). Before UTAUT model, Technology Acceptance Model (TAM) was used for predicting the usage of Information systems. But research on TAM may have reached saturation level [3], so UTAUT is new model developed by Venkatesh for predicting the usage of computer systems. There can be some external variables or moderators that can better help in understanding end-user system usage, like gender, age, education level, experience, individual impacts, organizational impacts, memorability etc. UTAUT model is comprised of constructors, which were included in the model by use of questionnaire to validate the constructs. To have more

authentic results moderators are to be applied to UTAUT model. It can help vendors of software to predict the usage of their software. Also it will help in better communication between vendors and end users, so that acceptability of desktop based software increases. Information technology has become an essential tool for a large number of organizations, with workplaces regularly affected by the implementation of new or upgraded technology [14].

The research paper is divided into three more sections. Section II is comprised of literature review, in which various technology acceptance models and some issues in UTAUT model are discussed. Section III comprises of methodology used in survey. Section III is comprised of the experimental results of study and Section IV is about conclusion and future scope.

II. REVIEW OF LITERATURE : VARIOUS TECHNOLOGY ACCEPTANCE MODELS

In 1970's increasing failures of systems decreased the adoption of system in the organizations. Information technology offers the potential for substantially white collar performance [2]. But performances of information systems depend on user acceptance or rejection. Davis proposed that system use is a response that can be explained or predicted by user motivation, which in turn depends on the features and capabilities of the system [3].

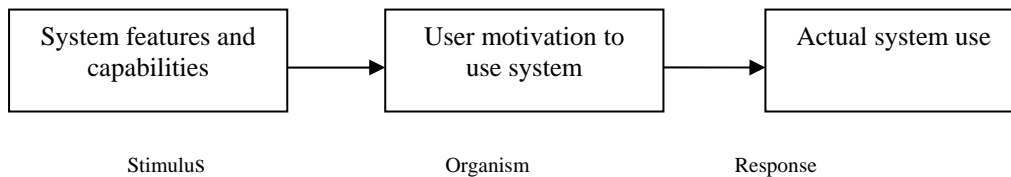
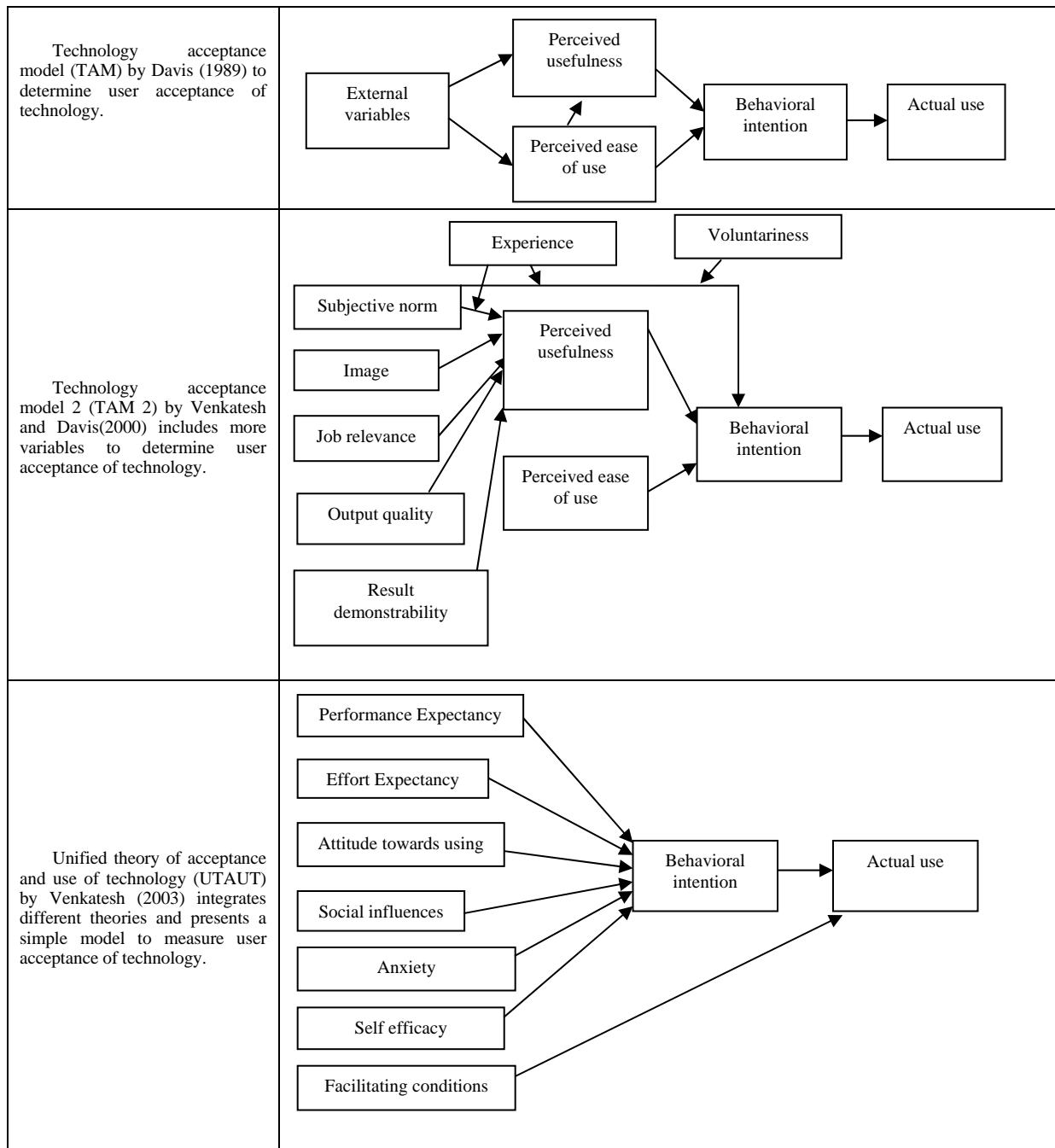


Fig1. Conceptual model for Technology acceptance.

Unified theory of acceptance and use of technology model is derived from different theories of predicting system usage. Venkatesh concluded that it was lot better at predicting user acceptance than each of previous models [8]. Table 1 shows various models and constructs used in different theories of user acceptance.

TABLE 1: VARIOUS MODELS USED IN TECHNOLOGY ACCEPTANCE

Models	Constructs
<p>Theory of reasoned actions (TRA) by Fishbein and Ajzen (1975) derived from psychology to measure behavior.</p>	<pre> graph LR BE[Beliefs and evaluations] --> ATB[Attitude towards behavior] NBM[Normative Beliefs and motivations] --> SN[Subjective norm] ATB --> BI[Behavioral intention] SN --> BI BI --> AU[Actual use] </pre>
<p>Theory of planned behavior (TBP) by Ajzen (1991) adds new construct Perceived behavior control to TRA.</p>	<pre> graph LR BE[Beliefs and evaluations] --> ATB[Attitude towards behavior] NBM[Normative Beliefs and motivations] --> SN[Subjective norm] CB[Changing behavior] --> PBC[Perceived behavioral control] ATB --> BI[Behavioral intention] SN --> BI PBC --> BI BI --> AU[Actual use] </pre>



Theory of reasoned actions (TRA) is a widely studied model from social psychology which is concerned with the determinants of consciously intended behaviors [1]. Behavioral intention is a measure of strength of user intention to perform specified behavior. Attitude is positive or negative thinking for performing targeted behavior. Subjective norm means what people around him think that he should perform that task. Belief means what the user think about using the system and its consequences. Normative beliefs means what the specific group think about using the system. Theory of planned behavior (TPB) extends TRA by adding new construct perceived behavior control. It explains that user may not have control on his behavior; it may change with time or other reasons. TPB asserts that behavior is direct function of perceived behavior control and attitude [4]. Technology acceptance model derives from TRA and TPB, which omitted the use of those constructs that were not necessary to be applied in information technology field. A prospective user’s overall attitude towards using a given system is hypothesized to be a major determinant of whether or not he or she actually uses it [5]. Perceived usefulness, Perceived ease of use and Behavioral intention were the core determinants of this model. TAM 2 models becomes more complex by addition of more variables, so for reducing the complexity new model UTAUT was developed by Venkatesh, who derived various construct from different models. Seven constructs appeared to be significant and directly determined the intention of information technology usage [6].

There are not many reviews of literature about the comparison of information technology adoption models at individual level and to the best of our knowledge there are smaller number at the firm level [13].

A. Constructs used in UTAUT and various issues

Performance Expectancy: The degree to which user thinks using a system will improve his performance.

Effort Expectancy: The degree of simplicity to use a system.

Attitude towards using: Positive and negative feelings to use a system.

Social influence: The degree to which individual perceives what other believe he should use a system.

Facilitating conditions: The degree to which an individual believe that organization and technical infrastructure will support the use of particular system.

Self efficacy: The degree to which an individual judges his ability to use a system.

Anxiety: The degree of emotional reactions associated with the use of a particular system.

Out of these seven constructs, six are indirectly influencing actual usage while facilitating conditions have direct influence over the actual use. Venkatesh adds that the TAM is a good model but that it does not help understand and explain the acceptance of technology in a way that promotes the development of strategy having a real impact on usability and acceptance of technology [12]. This UTAUT model lacks the introduction of moderators or variables like gender, age, experience as used in previous models. Some new moderators like education level, individual impacts, organizational impacts and memorability can also be added. Adding moderators like gender, age, experience may better predict the usage behavior indication [6]. On reviewing literature on software acceptance, we found that moderators like individual impacts- what the users think about the software to be used in an organization? Organizational impacts- what the senior management thinks about the software? And memorability- how much fast is it to remember the functioning of software? Such factors or moderators should be added to analyze software acceptance. To study the factors that influence user technology acceptance and adoption in different contexts continues to be a focal interest in information system research [15].

II. RESEARCH METHODOLOGY

A. Subjects and Procedure

In this research, the subjects were the students of Government colleges affiliated to Himachal Pradesh University, who were using Tally, Ms-word, Adobe Photoshop and Ms-Access and had experience with these software. Analysis of different types of software was done for the purpose of generalization. The responses to questionnaire were given by total of 120 students. The data collected from questionnaire was then analyzed using PSPP data editor tool, which is an open source software and results were derived from it.

B. Questionnaire and PSPP data editor tool

The questionnaire was distributed to the students having previous experience with the software. The questionnaire first asks to fill the software they are using or had experience with. For every software, students were asked to rate their Performance Expectancy(PE), Effort Expectancy(EE), Social Influence(SI), Facilitating Conditions(FC), Self Efficacy(SE), Anxiety(AX), Behavioral Intention(BI). The students were also asked to rate the questionnaire related to their Gender, Age, Educational level, Experience, Individual impacts, Organizational impacts and Memorability. For ratings, 7- point likert scale was used as suggested by Ajzen and Fishbein, where

Strongly disagree		Neutral			Strongly agree	
1	2	3	4	5	6	7

Fig.2 Seven point likert scale

1- completely disagree, 2- moderately disagree, 3- somewhat disagree, 4- neutral, 5- somewhat agree, 6- moderately agree and 7- completely agree. After collecting the questionnaire, data was fed into PSPP data editor tool, which is software for analyses of sampled data gathered in a survey.

III. RESULTS

A. Cronbach’s alpha analysis

Cronbach’s alpha is used to determine whether the questions used in the survey are reliable or not. Generally, an alpha higher than 0.800 is acceptable range recommended by the literature[8], but sometimes an alpha of 0.700 is also acceptable. From cronbach’s alpha analysis it is clear that cronbach’s alpha reliability is more than .80 for three constructs “performance expectancy”, “self efficacy”, “gender”, “organizational impacts” and “memorability”. For remaining constructs cronbach’s alpha reliability is more than .70, which is also acceptable. Thus, the scales are valid for determinants and moderators.

TABLE 2: RELIABILITY FOR CONSTRUCTS

Performance Expectancy	0.83
Effort Expectancy	0.73
Attitude towards using	0.72
Social influence	0.82
Facilitating conditions	0.84
Self efficacy	0.73
Anxiety	0.70

TABLE3: RELIABILITY FOR MODERATORS

Gender	0.85
Age	0.75
Experience	0.74
Educational level	0.75
Individual impacts	0.74
Organizational impacts	0.81
Memorability	0.87

B. Correlation analysis

Correlation analysis is used to determine that how much strongly each determinant is bounded to behavioral intention and how much strongly each moderator like gender, age, experience, educational level, individual impacts and memorability is associated with behavioral intention.

TABLE 4: CORRELATION ANALYSIS

Corr	BI	Gender	Age	EL	EX	II	OI	MEM
PE	0.81	0.75	0.41	0.48	0.37	0.30	0.61	0.32
EE	0.84	0.30	0.66	0.78	0.38	0.77	0.41	0.57
AU	0.73	0.31	0.58	0.46	0.39	0.45	0.42	0.46
SI	0.64	0.41	0.31	0.38	0.36	0.48	0.32	0.31
FC	0.85	0.44	0.42	0.33	0.62	0.32	0.33	0.37
SE	0.72	0.46	0.34	0.43	0.37	0.43	0.42	0.47
AX	0.58	0.42	0.26	0.41	0.31	0.44	0.30	0.45

From correlation analyses “gender” is considered as moderator for “performance expectancy” which is 0.75. The negative responses of females were more than males. “Age” is considered as moderator for “effort expectancy” and “attitude towards using” which is 0.58. More positive responses were given by 18-25 age users. “Education” is considered a moderator for “effort expectancy” which is 0.78. More positive responses were given by higher education users. “Experience” is a moderator for “facilitating conditions” which is 0.62. “Individual Impacts” is a moderator for “Attitude towards using” which is 0.74, which concludes more user will use the system if it is as required. “Organizational Impacts” is a moderator for “performance expectancy” which is 0.61, if performance is good organization supports the use of software. “Memorability” is a moderator for “effort expectancy”, which is 0.57, which concludes that if software is easy to remember, it requires less effort of users.

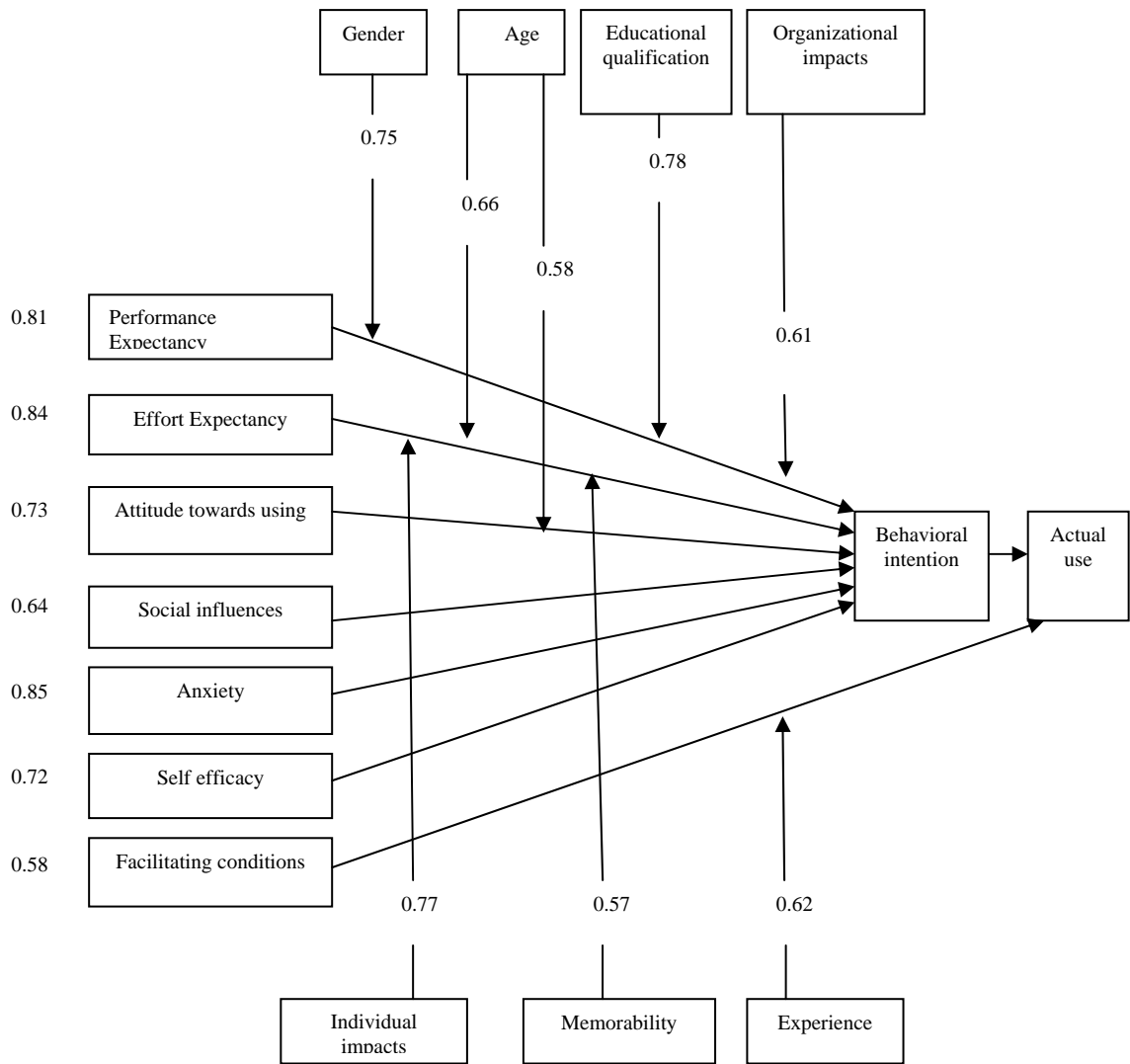


Fig 3. Correlation between constructs and moderators in UTAUT.

C. Regression analysis

This analysis is used to interpret the findings of research and is used to determine how much affect each determinant has on behavioral intention. From regression analyses it is clear that “performance expectancy”, “effort expectancy”, “self efficacy” and “attitude towards using” is having more positive influence on behavioral intention, whereas “social influence” and “anxiety” is having negative influence on behavioral intention.

TABLE 5: REGRESSION ANALYSIS

Performance Expectancy	Behavioral Intention	0.51
Effort Expectancy		0.54
Attitude towards behavior		0.57
Social influence		0.48
Self efficacy		0.55
Anxiety		0.40

IV. CONCLUSION AND FUTURE SCOPE

The experimental study concludes that there is strong relationship between the different constructs of UTAUT model. For desktop based software, performance expectancy, effort expectancy, attitude towards using and facilitating conditions are important constructs, which are useful to predict software usage by including moderators like gender, age, experience, educational level, individual impacts, organizational impacts and memorability. Future studies should focus on the inclusion of other moderators or factors and retest the UTAUT model.

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