Analysing the Impact of Attitudes, Subjective Norms and Perceived Behavioural Control on Information Technology Adoption and Employee Performance

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Abstract: This study analyses the impact of attitudes, subjective norms and perceived behavioral control on information technology adoption and performance of employees. For this purpose, the Theory of Planned Behavior (TPB) is used. In the proposed model, the dependent variable of employee performance was added and the independent variables influence attitudes, subjective norms and perceived behavioral control on the dependent variables of behavioral intention to use IT, the actual use of the system and employee performance is investigated. The statistical population 2160 people of administrative employees of three universities of universities in Isfahan (University of Isfahan, Isfahan University of Technology and University of Khorasgan) is formed. To descriptive analyse the demographic data the statistical methods are used. For article literature, the libraries method and for collecting data, the field method is used. Since, the purpose of this research is particular model test of the relationship between the variables that have with each other causality, analysis method used in this research is Structural Equation Model. Reliability and validity of the PLS Method in two parts is examined: the section on measurement models and the structural model. To check the fit of the first part means models fitting for measuring, the three cases are used: reliability index, convergent validity and divergent validity. The research results confirm the hypothesized model. This study presents results obtained of research are discussed.

Key words: Theory of planned behavior, employee performance, TPB, independent, behavior

INTRODUCTION

Key capital and operating of growth and development a community are information and the application of knowledge. Information technology is broader and more complex than computer science, so that in the links between the various activities of the organization and activities among regional and international organizations plays an essential role and usually refers to all technologies that in the five areas of the collection, storage, processing, transmission and display of information are used. Information technology consists of four basic elements (humans, mechanisms, tools, structures) is so that in this technology, information through the value chain which is created from a merger of this elements flows and continuous excellence and development organization learn its way puts. In the meantime sector employees of information the largest active classes of information technology and the main structure of the international community are considered investigate the use of technology and information technology in higher education employees play an important role in furthering educational goals and improve

the level of knowledge, attitude and skills of the new generation are responsible has particular importance. Theory of planned behavior is cognitive social theory which provides a useful framework for forecasting and understanding of social behavior which widely is used in the field of information technology. This theory focuses on the effect of motivation on behavior (Ajzen, 1991; Ajzen and Fishbein, 1970). The theory of planned behavior on the assumption that people behaviors and their actions based on rational considerations do and before do it pay attention to the availability of resources and information and evaluates it and then about doing or lake of doing it, the behavior decide are based. Therefore, individual the behaviors do about it take a conscious decision (Davis, 1993; Pan *et al.*, 2003; Spacey *et al.*, 2004). In theory, these social factors on human behavior are examined (Thong *et al.*, 2002). Based on the theory of planned behavior, behavior beliefs and evaluate the results, favourable or unfavourable attitude toward the doing behavior of the individual creates. Normative beliefs and motivation to achieve results other normative expectations reflected in the subjective norm and control beliefs also determine the perceived behavioral

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control. Overall attitudes about the behavior, subjective norm and perceived behavioral control are lead to formation of behavioral intention. In numerous studies of the theory of planned behavior is used as a theoretical basis (Harrison *et al.*, 1997; Hu *et al.*, 1999; Limayem *et al.*, 2000). This study theory of planned behavior to investigate the factors influencing the adoption and use of technology and its impact on employee performance develop and in order to achieve this goal: new dependent variable employee performance added to the TBP Model. Some relations available in TBP Models we changed. We define a new relationship between the variables in the model.

Theoretical principles of research: In recent decades, several models have been proposed in the field of technology adoption. The basic concept and infrastructural of all models of technology adoption by the user is shown in Fig. 1.

Given that the factors influencing the adoption of different technologies in terms of technology and users under the study and environmental conditions is different (Moon and Kim, 2001), so each of the acceptance models in different places will have different functions. In this study at first to research literature theory of planned behavior with the target of introduce the model and identifying the key assumptions, the introduction of structures and the concept of structure in the model is discussed. Theory of reasoned action by Fishbein and Ajzen (1975) proposed and based on this assumption that people act rationally. They collect all available data about the behavior of the target and regular evaluation as well as the effects and results of actions to consider then
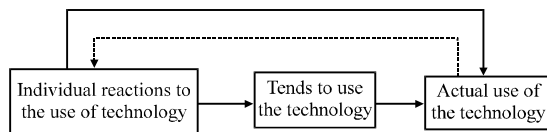

Fig. 1: The underlying factors in the models of technology adoption by user (Venkatesh *et al.*, 2003)
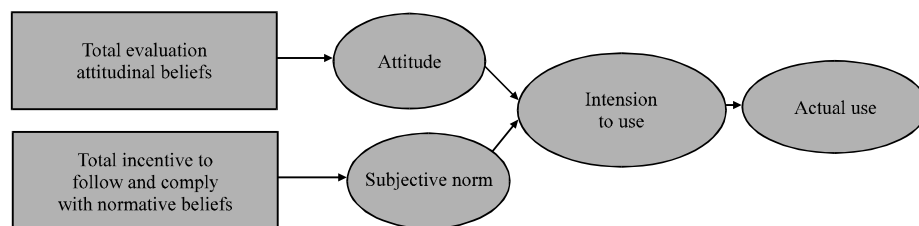
according to their argument, they decided to do action or do not (Pikkarainen *et al.*, 2004). Figure 2 shows this theory.

Subjective norm: To perceived social pressure to perform or not to perform the target behavior by individual refers. People often based on their perceptions from what others (friends, family, colleagues, etc.) they think should be doing, act and their intention to accept behavior potentially affected from persons who have close links with them (Mathieson, 1991). In the theory of reasoned action, mentally norm of person, the product of normative beliefs (perceived expectations from the people or specific reference groups) in personal motivation to perform target behavior is despite these expectations (Davis *et al.*, 1989).

Attitude: As positive or negative feelings about doing the behavior of goal is defined. Personal attitude toward the behavior, beliefs and attitudes product (subjective probability of person about doing the behavior of goal will follow particular outcome on target behavior) is to evaluate the outcomes (Fishbein and Ajzen, 1975).

Behavioral intention: Suggests the intensity of intention and will of the individual to perform the target behavior (Morris and Dillon, 1997). Shows the relationship between behavioral intention and behavior, people tend to engage in behaviors that they are going to do (Conner and Armitage, 1998). So, behavior always after behavioral intention and is connected to it. In the theory of reasoned action claimed that behavior is exclusively under the control of behavioral intention, therefore, this theory to intentional behavior (behaviors that to be done, just need the will and intention) is limited. If the behavior to the skills, resources and opportunities to ease and free are not accessible also needs that this item in applicable properties the theory of reasoned action is not considered or may be partially predicted by theory (Conner and Armitage, 1998).

The theory of reasoned action widely is used in the researches related to the adoption of information technologies (Liker and Sindi, 1997; Karahanna *et al.*, 1999).

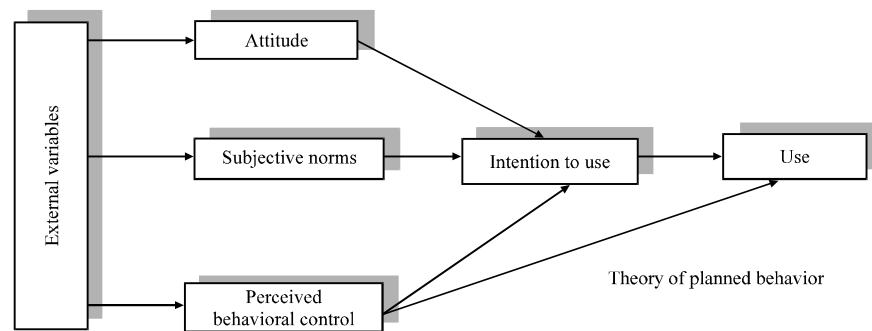Fig. 2: The theory of reasoned action (Vallerand *et al.*, 1992)

Fig. 3: Theory of planned behavior

Theory of planned behavior: Ajzen (1985) by entering the perceived behavioral control as the determining factor of behavioral intention and behavior has developed the theory of reasoned action. Theory of planned behavior despite the perceived behavioral control, tries to predict the behavior of involuntary (Madden *et al.*, 1992). Figure 3 shows the theory of planned behavior.

Perceived behavioral control: In theory of planned behavior, perception from the internal and external constraints reflects doing the behavior (Taylor and Todd, 1995). Perception of factors to facilitate or prevent doing the behavior known as self-control which factors include internal control factors (information, skills and personal abilities) and external control factors (opportunities, resources and capabilities) for doing behavior (Conner and Armitage, 1998).

Some of factors behavioral control regarding the use of various technologies is fixed while others are completely different from the one technology to another technology. A person may be having the same skills used in different situations for example in the field that is necessary same skills to perform tasks related to information systems the ability of the individual (internal control factors) is relatively stable and lasting. But generally the use of any technology specific controls is important factors. In theory of planned behavior, according to technology research, terms of use of specific control, set and are examined.

Based on the theory of planned behavior, beliefs of behavior and evaluate the results, favourable or unfavourable attitude toward doing the behavior in the individual. Result of normative beliefs and motivation to achieve other normative expectations reflected in subjective norm and control beliefs also determine the perceived behavioral control. In overall attitude about the behavior, subjective norm and perceived behavioral control are lead to the formation of doing behavioral intention.

In several studies from the theory of planned behavior is used as a theoretical basis. Mental conception of usefulness and attitudes toward the use of information technology has influence on the decision to the use of information technology. As a general rule of attitude and desired subjective norms and perception, rather than behavioral control, individual intention to perform the behavior as practical, strong will be and finally going into action and actual behavior is performed. According to the studies by Lu *et al.* (2009) and Taylor and Todd (1995), the impact of attitude on behavioral intention to use has been proven. Taylor and Todd (1995) stated that subjective norm effective factors on behavioral intention to use. Donnelly (2004) and Taylor and Todd (1995) stated that the behavioral intention to use perceived behavioral control is effective.

According to studies by Pynoo *et al.* (2011), the impact of attitude on the actual use from the system has been proven. Grandvn stated that subjective norm effective factors on the actual use of the system. Ajzen (1985) stated that perceived behavioral control on actual use of the system is effective.

Individual intention as a determining factor of direct determines whether the desired behavior will be carried out or not? In general, conversion behavior intention is to action and many researchers believe that the behavior are determined by intention of doing it.

Taylor and Todd (1995) and Lu *et al.* (2009) stated that the behavioral intention is to use information technology to actual use of the system is effective. Also, Nunn and Quinet (2002) and Moradi *et al.* (2010) stated that the actual use of the system affect the employee's performance.

Based on the issues raised in above, its proposed model as Fig. 4 offer in this model to explain behavior in terms of "attitudes, subjective norms, perceived behavioral control" as the independent variable on the behavioral intention to use technology information technology and actual use of the system and affect employee performance as dependent variables.
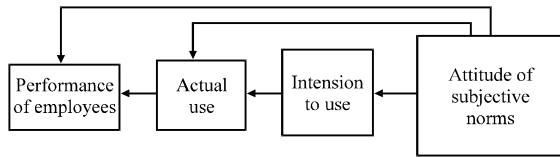
Fig. 4: Conceptual model of research

Behavioral intention to the use of information technology as an independent variable on actual use of the system as the dependent variable is effective and actual use of the system as independent variables effect on employee performance as the dependent variable. Based on this hypothesis of the present study are:

- Explanations behavioral in terms of (attitude, subjective norms, perceived behavioral control) on behavioral intention to use information technology are effective
- Explanations behavioral in terms of (attitude, subjective norms, perceived behavioral control) actual use of the system is effective
- Explanations of behavior in terms of (attitude, subjective norms and perceived behavioral control) are effective on employee's performance
- Behavioral intention to use information technology on actual use of the system is effective
- The actual use of system is effective on employee's performance

MATERIALS AND METHODS

In this study for descriptive and demographic data analysis used descriptive statistical methods. For literature of the issue from the method of library and field method for data collection (a set questionnaire based on a 5-point Likert-type) are used and since the purpose research testing a particular model of relationship between the variables that have with each other causality relation, the analysis method used in this research Structural Equation Modeling (SEM that one of categories available in a correlational study is). Statistical population of research administrative employees major three university in Isfahan (University of Technology, University of Isfahan and Khorasgan Azad University) in 2014 are form. With reference to desired universities and to obtain information about employees who are scheduled to participate in this plan, a list was prepared from the statistical population. In these three universities, 2160 people are employed in administrative departments that form the statistical population of study. In this study, the researcher on the one hand looking to assess and review

of subject of research in under the study organization is. And on the other hand is trying to generalize the results to the entire statistical population to increase the likelihood of sample and community and increase the accuracy of sampling multistage cluster sampling method is used. Therefore, among the universities, three university were selected and then each university to five homogeneous groups (training and further education, research and technology, student, cultural, social, administrative and support) were divided each group form the individuals that have same properties. After the division of society into homogeneous groups, sample size proportional to each group and then using simple random sampling method, the number of required elements of each group were selected. Cochran formula is used to obtain sample size and sample size used in this research 722 people was calculated. In the present study, a standard questionnaire is used to collect data from a total of 722 questionnaires that were distributed 486 questionnaires were completed in three university and given that the calculations were based.

To model analysis, in structural equation modeling with the approach of partial least squares procedure exist that are two main steps, check model fitting and then test research hypothesis. The first part means review model fitting is done in three sections:

Check the fit of the measurement models: To evaluate the fit of the measurement models, the three criteria of reliability, convergent validity and divergent validity is used.

Reliability: Reliability, by examining the coefficients of factor loadings, Cronbach's alpha coefficients combined reliability and shared values are calculated that the final standard will not be reported and calculated separately. So, first three criteria should be calculated and checked.

Convergent validity: The second criterion from check fitting the measurement models, convergent validity is to examine the level of correlation of each variable with its index deals. Average Variance Extracted (AVE) by Software Smart PLS is used for this purpose. Fornell and Larcker (1981) suitable value for the AVE, 0.5 to up have been introduced.

Divergent validity: Divergent validity is scores the third fitting measurement models. Based on method (Fornell and Larcker, 1981), if the amount of square root of AVE latent variables that are at places in main diagonal of matrix from the correlation value among them which lower-left places of main diagonal are arranged is

more it can be stated that latent variables in the model, more interaction with their indexes up with other variables. In other words, divergent validity of model is in suitable level.

Check the fitting of structural model: The section of structural model to observe variables (questions) do not have any work and only hidden variables associated with the relationship between them is investigated. Research from the several criteria is used to check structural model fitting.

Significant coefficients Z (values t-values): Structural model fitting by using coefficients of t is that these coefficients should be 1.96 more so can be approve their significant at 95%.

R^2 criteria: The R^2 coefficient related to hidden variables associated with the model. R^2 coefficient is a measure that indicates the influence of an independent variable on the dependent variable and three amounts of 0.19, 0.33 and 0.67 as the basis for the values of weak, medium and strong of R^2 is considered.

Q^2 criteria: This criteria specifies the predictive power of the model and if the its value on the dependent variable three levels 0.02, 0.15 and 0.35 obtain in the order indicated from the predictive power of the weak, medium and strong independent variables related to it.

Check the fitting the overall model: The general model both parts of measurement and structural models include and with the confirmation of its fitness, check fitting in a model is complete. To search for general model fitting, the GOF are used only one criteria. This measure is calculated by the following equation:

$$GOF = \frac{11}{(Communalities \times \overline{R}^{2})^{1/2}} \qquad (1)$$

In the above equation from the average values shared of dependent variables and independent and the average of dependent variables R^2 are used. Three levels 0.01, 0.25 and 0.36 as the values of weak, medium and strong for GOF is introduced (Wetzels *et al.*, 2009).

Testing the research hypotheses: According to the data analysis algorithm in the PLS Method after examining the model fitting will allow researchers to investigate and testing your research hypotheses discuss and reach to research findings. This study consists of two parts:

- Review the Z significant coefficients related to each of hypotheses
- Review the standardized coefficients load factor related to routes of each of hypotheses

Data analysis a total of 486 people, 44.4% were male and 55.6% were women. Among which 16.7% of respondents aged 20-30 years, 1/61% aged 30-40 years, 16.7% of 40-50 years old and 6.5% were over 50 years of age 11.1% of respondents were high school graduates, 33.3% have a bachelor's degree and 55.6 has have been MA and higher educated, the quality of the respondents in terms of answering questions is desirable. The 3.45% of respondents have 1-10 years of work experience, 37% have 20-10 years of work experience and 17.7% have 20-30 years of work experience.

RESULTS AND DISCUSSION

According to the results presented in Table 1, all the coefficients factor loadings of questions is >4.0 that show this measure is appropriate.

Combining reliability standards and Cronbach's alpha and average variance shared related to research variables is presented in Table 2. Given that an appropriate amount for Cronbach's alpha is 0.7 (Cronbach, 1951) and for the reliability of combined is 0.7 (Nunnally, 1978) and in accordance with the findings presented in Table 2 all of these measures about latent variables have taken the right amount can be confirmed the suitability of reliability situation of this study. Also amount of AVE is >0.5 that indicate proper convergent validity of the model.

According to the results presented in Table 3, divergent validity of the model is at appropriate level. As the Table 4 implies, the coefficient Z related to all routes among variables of latent, except the norm subjective to employee performance from 1.96 is more which significance of directions and shows proper structural model.

Table 1: Coefficients factor loading

Attitude (A)	Subjective Norms (SN)	Perceived Behavioral Control (PBC)	Behavioral Intention (BI)	Actual Use (U)	Employee Performance (EP)
0.85	0.89	0.84	0.87	0.89	0.63
0.83	0.41	0.93	0.94	0.93	0.97
0.75	0.87	-	0.97	0.78	0.93
-	-	-	0.89	-	0.63
-	-	-	-	-	0.97
-	-	-	-	-	0.92

The R^2 value for the dependent variable of Behavioral Intention to use IT (BI) and 0.81 times the actual use of the system for the variable (U) equal to 0.96 and for the variable of Employee Performance (EP) is calculated as 0.64. According to three of the criteria, the suitability of the model fitting of structural is confirmed.

Since, the amount Q^2 for the dependent variable of BI is equal to 0.68 for variable of U is equal to 0.7 and for variable of EP is equal to 0.45 is calculated, showed strong predictive power of model about this variables and proper fit of Research Structural Model once again confirms. And ensure 0.74 value for standard of GOF, pretty good fitting of overall model confirms.

Analysis related to first hypothesis: Z significant coefficient among the hidden variables attitude, Subjective norms, perceived behavioral control with behavioral intention to use information technology, respectively 2.55, 2.08 and 8 was calculated which represents a significant and positive impact of variables on behavioral intention to use information technology. Also standardized coefficient between these variables with the behavioral intention to use information technology, respectively 0.34, 0.6, 0.538 which indicates the fact that the attitude of 34%, subjective norms 60 and 53.8% perceived behavioral control changes behavioral intention to illustrate the use of information technology.

Analysis related to second hypothesis: Z significant coefficient among the hidden variables attitude of subjective norms, perceived behavioral control with actual use of respectively 3.9, 2.2, 8.5 was calculated that show

the significant positive impact of variables on the actual use of the system. Also standardized coefficient among the variables with actual use of the system, respectively 0.1, 0.62, 0.278 which indicates the fact that the attitude of 10%, subjective norms of 62%, perceived behavioral control 27.8% of the actual use of the system explained.

Analysis related to third hypothesis: Z significant coefficient among the hidden variables attitude of subjective norms, perceived behavioral control with employee performance equal to 2.12, 1.5, 9.3 was calculated that show the a significant and positive impact on attitude of variables and perceived behavioral control on the performance of employees but the results of the study variable of subjective norms has no significant effect on the employee performance. Also standardized coefficient between these variables with employees performance, respectively 0.62, 0.56, 0.24 which indicates the fact that the attitude of 62% of subjective norms of 56%, perceived behavioral control 24% of the employees performance explained.

Analysis related to fourth hypothesis: Z significant coefficient among the hidden variable of behavioral intention to use information technology with actual use of the system was calculated equal to 2.6 which show the positive and significant impact of behavioral intention to use information technology on the actual use of the system. Also standardized coefficient between behavioral intentions to use the information technology with actual use of system is 0.217 which indicates the fact that behavioral intention to use information technology 7.21% of changes the actual use of the system explains.

Analysis related to fifth hypothesis: Z significant coefficient among the hidden variable of Actual use of the system with employees performance 2.44 was calculated which shows positive and significant impact of actual use variable from system on the employee's performance. Also standardized coefficient among the actual use variables of system with employee's performance is equal to 0.26 which indicates the fact those actual use variables of system 26% of changes employee's performance explains.

Table 2: Results of criteria Cronbach's alpha, composite reliability and convergent validity

Index	A	SN	PBC	BI	U	EP
Average of variance	0.66	0.51	0.78	0.85	0.74	0.73
Reliability combined	0.85	0.70	0.87	0.96	0.89	0.94
Cronbach's alpha	0.75	0.89	0.73	0.94	0.82	0.92

Table 3: Results of divergent validity

Variables	BI	SN	A	PBC	EP	U
BI	0.92	-	-	-	-	-
SN	0.16	0.68	-	-	-	-
A	0.47	-0.83	0.46	0.87	-	-
PBC	0.61	0.18	0.45	0.41	-	-
EP	0.29	0.22	0.42	0.14	0.17	-
U	-0.06	0.30	0.15	0.11	-0.13	-0.06

Table 4: Significant coefficient Z

Variables	Attitude	Subjective norm	Perceived behavioral control	Behavioral intention	Actual use
Behavioral intention to use	2.55	2.08	8.0	-	-
Actual use	3.90	2.20	8.5	6.2	-
employee performance	2.12	1.50	9.3	-	2.4

CONCLUSION

This study examined the impact of behavioral explanations in dimensions of (attitude, subjective norms, perceived behavioral control) on the adoption and use of technology and employees performance in a corporate environment. Based on the results obtained, subjective norm does not effect on the performance but proposed model is confirmed in other variables. Thus, according to the research hypothesis and research literature study and also check performed research in this field and given that the results show the positive impact of attitude on the performance of employees with positive create attitude in employees towards the use of information technology can be achieved to higher productivity. It is better effective factors on adoption of information technology the viewpoints of managers and information technology experts to evaluate and compare its results with the results of this study. Also factors affecting the adoption of information technology in other universities evaluate and compare its results with the results of this research. The impact of other factors such as education, trust, complexity, etc. the adoption of information technology studies. The models used in this research for other technologies to check the validity of this model are used.

However, due to structural differences, cultural and individual results of this study cannot be generalized to other organizations. The findings of the study is limited to the time of data collection and its validity is limited to a short period of time and over time may be effect on the variables in this study and cause to change the results.

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