Analyzing the Use and extensions of UTAUT Model

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Abstract

In the investigation that is being developed, one of the important aspects is to know and adopt/ nominate/choose one of the existing models that explains the adoption and use by individuals of a new technology, in an organization. Of the various models that exists in the literature, UTAUT is our choice. From the literature review that has taken place so far, on the implementation of the UTAUT model, we have particular interest on the results obtained in cases of complex technologies adoption and of voluntary use. The use of models such as the UTAUT also serve as tools that enable information systems professionals to forecast the adoption / resistance before it takes shape and to advance interventions in order to streamline the impact on individuals adopters.

Keywords: adoption model, constructs, UTAUT, other extensions

1. Adoption and use of information systems

The adoption and use of technologies by individuals in an organization has been one of the most enriched/increased current by information systems researchers, with the existence of several models that explain the main constructs: the intended use and actual/effective use of the system (Sykes, Venkatesh, & Gosain, 2009). The intended use is defined as the subjective probability that an individual will perform a behaviour and the effective use of the system is the frequency, duration and intensity of an individual interaction with a particular system.

Information systems researchers, organizations managers and especially information systems professionals have the tough task of explaining why and predict how the users react towards the adoption and use of new technology (A. Beaudry & A. Pinsonneault, 2005). For these authors there are currently two research currents to answer these questions: the current research on the process with the focus on the adoption and the effects on the results of such adoption (the effects can be, for example, the group performance) and the current which applies the variance, whose focus is related to the adoption antecedents and the use of new technologies (which includes the UTAUT model).

2. Choosing a model

The choice of a model of technology acceptance is important for researchers to be able to perform their work successfully. This choice allows the results to be as much as possible close to reality, so they can be generalized, on the perspective of evaluating the adoption of technology by the individual. For Venkatesh et al (Venkatesh, Morris, G. B. Davis, & F. D. Davis, 2003) researchers tend not to choose a model, but the constructs of several models, or choose one with which most are identified, thus ignoring other existing models.

2.1 What is UTAUT

The UTAUT, Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003) was developed with the aim of achieving a unified model that accounts for the impact on individuals of a new technology introduction in a particular organization. According to the authors, this impact will have an explanation with greater relevance if shown some resistance on individuals.

Being a unified model, it is based on some of the constructs of eight models. The models that were analyzed by the UTAUT authors were: Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), motivational model, theory of planned behavior (TPB), a model that combines the TAM and the theory of planned behavior, the use of the PC mode, the model of innovations diffusion (DOI) and social cognitive theory (the social cognitive theory).

For the UTAUT authors, Venkatesh et al., the model should be used to assist managers and administrations in adopting a new technology and should be applied in the initial adoption, in compulsory or voluntary use technologies.

2.2 The constructs of UTAUT

The UTAUT model features four constructs that helps explain the intended use (user acceptance) and actual use (usage behavior): the perceived usefulness (performance expectancy), the expected performance (effort expectancy), social influence and facilitating conditions. Over these four constructs there are four moderating variables that influence them, which are: sex (gender), age, experience and voluntary use (voluntariness of use).

The perceived usefulness/performance expectancy (Venkatesh et al., 2003) is defined as the degree to which the individual believes that using technology will help him improve his professional performance. In this model this construct affects directly the intended use, and its weight is influenced by the moderating variables age and gender, in which the authors suggests that the weight is greater if individuals are male and in a lower age group.

The construct effort expectancy is defined as the degree of comfort that the adopter feels in the use of technology. This perception affects with more weight on the intent and use if individual's adopters are female, in a lower age group and if they are in an early stage of technology use.

Social influence is defined as the degree to which the individual understands that the use of new technology is influenced by what others think. The intended use is directly influenced by this assumption, and with the highest weight, according to the authors, if the adopters are women, in an older age and in an early stage of technology adoption.

The facilitating conditions are the fourth construct of this model which are defined as the degree to which the adopter believes that the organization has made infrastructure and other technical requirements available to help him on technology use and eliminate potential barriers. This construct does not affect the intended use but it directly affects the effective use and is influenced by age and experience of individuals, in which the authors suggests that it will have greater impact if individuals are in a higher age group and as they have more experience.

2.3 The choice of model UTAUT

Given the need to choose a model of adoption and use of technology to conduct our research, we choose the UTAUT model, seeing that this is the model recently proposed for the scientific community and in particular to the research community in the information systems area.

Throughout the review, were also made other observations that led to the conclusion that this is the correct option. Some of those observations are:

a) The size of the organizations: There are few researches devoted to small organizations. Some authors emphasize that the new technologies adoption on these organizations is different from the technologies adoption on large organizations because of its size and different economic factors. The UTAUT model was not designed for small businesses but produces results that serve as reference (Yang & Fu, 2008).

b) A solid foundation: This model, by presenting an aggregation of theories, enables the view of the interdisciplinary phenomenon, and this does not arises when using the TAM model. Both TAM2 as UTAUT have an exploratory power stronger than the TAM, however Shareed et al (2009) reported that the use of more variables can bring greater complexity to its use (Shareef, V. Kumar, U. Kumar, & Hasin, 2009).

c) The individual: While the TAM model is simpler and more intuitive, the UTAUT model explains in a more realistic way the individual adoption. Given that this last one is a consolidation and improvement, which is based on other models of information technology adoption, it should be used as a reference to all the new models that are being proposed,in the same way that TAM was during the last 15 years. Thus the UTAUT model is more efficient in order to gain access to the technology adoption probability of success and allows us to understand the acceptance factors by helping management to take action and step in (Rosen, 2004; Lu, Yao, & Yu, 2005).

d) The constructs: They are synthesized in the model, on decades of behavioral theories that contains the main constructs and moderating factors that affects the intended use and actual use. The identification of these constructs and moderating factors allows researchers to engage with particular attention on determining the characteristics of new technologies that have great potential for adoption. The methods associated with the model constructs are available to implement and the instruments construction can cause them to be recycled for other situations, leading to longitudinal studies that provide data to those who develop the technologies from the outset and during the life cycle of the same (Genuardi, 2004). There is, moreover, a versatile model that allows UTAUT constructs that are assumed by the authors as not significant given the existence of other interactions can be included, depending on the technology evaluation intended to be done from the user's perception of that new technology. The constructs of the UTAUT model, the relations between them and the behavioral intention have been frequently tested and may also be treated as control variables (Chiu, Huang, & Yen, 2010).

e) Behaviors: This model can be applied in situations where one wants to study the new technology adoption and also in situations in which they intend to study the behavior by continuing technology use already adopted. It is the most comprehensive model that has been prepared so far and it may be associated with other constructs related to specific technologies that are being adopted, such as the risk perception factor to a study conducted about the e-services government adoption (He and Wei, 2009, p.827; Carter et al, 2008, p.2) (Carter, Schaupp, & Evans, 2008).

f) Different cultures: The UTAUT model has the advantage of being a model easily translated in multicultural context, and can be used when it is important to study and analyze the differences in technology acceptance within different cultures (Oshlyansky, Cairns and Thimbleby, 2007). Aiming to validate the UTAUT model in a eastern country, the researchers used a derivation of this model, suitable to this oriental culture and applied it to individuals who voluntarily used a new technology. They found that the use of this model is valid in these cultures and that, although they haven't reached the value of variance Venkatesh et al (2003), the results are positive (Al-Gahtani, Hubona, & Wang, 2007).

g) Anti-comfort: it is not by using a model that dominates the attention of researchers on the adoption of new technologies in recent times, such as TAM, that the whole community benefits. Using previous models to UTAUT can promote the convenience and lack of innovation, situations that do not serve the research community that focuses its research on technology adoption (Benbasat & Barki, 2007).

h) Final results: During the investigation on information systems, were developed and studied several models that aim to indicate how and why individuals adopt new technologies. There were several ways, examples being those who are concerned with the study of successful implementation at the organizational level or on the level of technology appropriate for a task. Of them all, they identify the UTAUT as one that produces better prediction results (Agarwal, Rastogi, & Mehrotra, 2009).

The UTAUT, unlike other models, explained 70% of the behavior of intended use, while the other models only could explain about 50% (Venkatesh et al., 2003).

The UTAUT authors indicate that it is necessary that similar models to UTAUT can be used in applied complex technologies studies that help managers of those organizations.

3. Extensions to the models

We consider an extension to the models that explain the adoption/use those constructs that aim to enrich the original model and assist the information systems professional on decision making. We present two extensions that can, according to the authors, be applied to existing models.

3.1 Extensions to the model of technology adoption: The case of emotions

Emotions are identified as important drivers (Anne Beaudry & Alain Pinsonneault, 2010) to explain the behaviour of individuals in their new technology use and adoption. These authors declare that the cognitive models that are used to explain the new complex technologies use and adoption, such as UTAUT, are restricted models that can not explain all the previous related behaviours. Besides UTAUT the current models do not differentiate and do not explain the individuals emotions and relationships they create with the new technologies adoption and use. To the authors emotions are defined as a current state of mental promptitude that arises triggered by an event related to the new technology adoption, and the individuals on the organization will have adaptive behaviour and will have to use these technologies in their work.

These authors therefore propose a model that explains the emotions that affect the use and adoption by the emotions identification / classification and the adaptive behaviours, which appear as bridges that are necessary to characterize the gap that exists between the transition to a new technology and their use, and

when individuals begin to think they have to recast their work routines and thus anticipate the need to interrupt their routines to make this transition.

Propose the construction of emotions classes which are: lack of emotion class, the emotions deterrent class, the achievement emotions class and the challenge emotions class. The first class, lack of emotions, is related to the perceived threat in an new technology event, by the individuals perception of the lack of control and its consequences. To this class the following emotions are associated: anger, dissatisfaction, disappointment, boredom, frustration and disgust. For these authors, these emotions adversely affect the use of technologies but can positively affect if the individual seek support within the organization (Anne Beaudry & Alain Pinsonneault, 2005).

The deterrent emotions class shows as examples of emotions: anxiety, fear, worry and discomfort, and this class is described as the class that portrays the time of technology adoption that is realized by individuals as a threat but at the same time they feel they have some control over the technology adopter. This class emotions affects the technology use, positively if it seek support and negatively if there is a gap in time between the adoption and disclosure of adoption within the organization.

The achievement emotions are those that describe that the adoption and use event will generate only positive consequences.

For these authors, if individuals feel they have some control and recognize the adoption as an opportunity with positive consequences, they describe their emotions as those which fall within the class of challenge emotions. These emotions are then considered as a positive reinforcement in the new technology use as it will be positive during the adoption step.

The authors conclude that emotions are an important factor for the adoption, both in the advanced technology implementation period (announcement within the organization) and in their adoption and use, which is strongly correlated with the new technologies adoption / use, working as amplifiers on adoption performance or as mitigating if sought / found support within the organization.

Thus, for these authors, this work presents a complement to existing models becoming emotions instrumental to understand the adoption and resistance to new technologies. They classified emotions for one to notice the individuals behaviours, who are the managers who can influence the adoptive feelings within the organization, both showing new work routines with the technologies or creating extra benefits to encourage the use and / or fostering support within the organization, with meetings, and / or creating working groups, and / or creating information sharing digital tools, and / or informal meetings that helps to explain the best practices on using new technologies.

3.2 Extensions to the model of technology adoption: the case of national culture

Cultural differences between countries have impact in the efficiency and effectiveness of technology introduction of the international context (Srite & Karahanna, 2006). Such cultural differences are translated by these authors, such as exposure to the national culture and represent important values that should be taken into account as moderating factors in evaluating the adoption and use of technologies by individuals.

These authors suggest that it should complement the current models with four moderators of the national cultural factors and they suggest: masculinity/femininity, individualism/collectivism, the distance from the source of power and uncertainty avoidance.

With masculinity/femininity is intended to indicate the degree to which gender inequalities are exposed by an individual, i.e., individuals who exhibit values of masculinity emphasize the organization's goals, as gains, progress, competitiveness, performance and assertion. Individuals who exhibit values of femininity tend to emphasize personal goals, such as work environment, working comfort, quality of life and tend to foster personal relationships.

The individualism/collectivism is the degree to which the individual stands in relation to the needs of the group where he belongs.

The distance from the source is characterized as the degree to which the individual accepts as normal the differences of power and inequality within the organization, i.e. the distance from the source which will condition the individual accepts as being the power that their superiors have.

The uncertainty avoidance reflects the level of risk accepted by the individual in the face of ambiguous situations. This level is influenced by obeying the rules, rituals for their behavior and the possibility of labor mobility.

This research aimed to assess the effects of national culture in the relationships involving the constructs: subjective norms, ease of adoption, perceived ease of use and intention to use. The results of the study indicate that: The national culture is a factor to take into account the adoption of technology in specific stages of adoption which may influence the use of technology.

Thus, they conclude that the social environment is one way in which it expresses the national culture and the behavior of individual suffers impacts, social norms should lead to more elaborate concepts that can capture / capture the nuances of social environments and that a mobilization of the social environment provides mechanisms to effectively help the adoption and use of technology.

4. Conclusion

The UTAUT model is a model that suits as a research base related to analysing and developing strategies for new technologies implementation in organizations. It is a model synthesis that combines the key constructs of another older models. Researchers also report the importance/need for this model to be tested, either with other technologies or with different groups and organizational contexts. They also report that it is through further research that one can identify the constructs that help predict and understand the intentions and behaviour, having as reference the existing or proposing new ones (Venkatesh et al., 2003).

In our future research work we intend to contribute to the literature related to the UTAUT implementation on an organization, where voluntary complex technology is used and where the method is applied at a stage where this technology has already been adopted by its users.

Acknowledgment

Author research program is co-funded by PROTEC and PROFAD programmes since April 2010.

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