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User Acceptance of Technology and Success in IS Implementation

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ABSTRACT

To achieve business effects from IT investments it is important to understand the forces of user acceptance. This paper evaluates how useful the Unified Theory of Acceptance and Use of Technology (UTAUT) is to explain success within information system implementation.

The research has been done by investigating the user acceptance as success measure within the major IS implementation research streams, then comparing these success measures with the constructs of the UTAUT.

The findings of this paper are that the UTAUT is useful in explaining the success measures of the different streams in terms of user acceptance, but not the interaction between the measures in a process view. Thus, it fails partly in explaining all success dimensions of IS implementation.

INTRODUCTION

A recent article in MIS Quarterly Executive by Luftman and McLean (2004) states the top five key issues for IT executives. They are as follows: 1) IT and business alignment, 2) IT strategic planning, 3) Security and privacy, 4) Attracting, developing, and retaining IT professionals, and 5) Measuring the value of IT investments. Except for number 3) and 4), the key issues concern how technology is used in organisations. Use of technology to support business processes, enables competitive advantage and creating value is highly relevant for most businesses today. How to understand these forces are therefore important research questions that should be interesting for practitioners as well as researchers. One way to understand these forces is by researching user acceptance of technology. The research on individual acceptance of technology is a mature area within IS research (Venkatesh, Morris, Davis and Davis, 2003), and several theoretical models have been developed. In a recent paper by Venkatesh, Morris, Davis and Davis (2003) there is a proposal of a Unified Theory of Acceptance and Use of Technology (UTAUT). This theory builds upon eight different models within technology acceptance and innovation diffusion.

An information system (IS) not being used is most likely not a success. However, depending on the dimension investigated a system may be evaluated as a success even though it is not used. If evaluated solely in terms of technical functionality the system may well be a success, but still rejected by the intended users. Thus, implementation of the IS in the organisation is an important part of the utilisation of technology. Within research on IS implementation success there are different research streams focusing on different aspects on what influences successful implementation. Can knowledge about user acceptance improve the success of IS implementation?

There is a considerable research body on user acceptance of technology and IS implementation research (see respectively Venkatesh et al. 2003 and Larsen 2001, Kwon and Zmud 1987 for an overview). However, there is a lack of research studying the *usefulness* of the UTAUT in explaining success within IS implementation research. Thus, it is interesting to investigate how user acceptance models like the UTAUT, can explain and predict success within the different streams of IS implementation research.

This paper will discuss critically to what extent the UTAUT is useful in explaining success within the different streams of IS implementation research. The paper will be structured as follows. Section 2 will briefly present the UTAUT. Section 3 presents and discusses user acceptance within the IS implementation research streams, and then conducts a comparative analysis between the UTAUT and the success measures within the different research streams of IS implementation. Conclusions and recommendations are found in section 4.

A UNIFIED THEORY, THE UTAUT

The UTAUT builds upon eight different models within technology acceptance and innovation diffusion. These are:

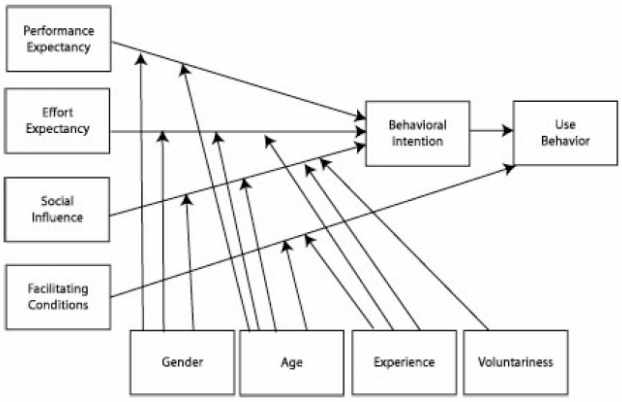
- *Theory of reasoned action* (TRA), (Fishbein and Ajzen, 1975),
- *Technology acceptance model* (TAM), (Davis,1989),
- *Motivational model* (MM), (Davis, Bagozzi and Warshaw, 1992),
- *Theory of planned behaviour* (TPB), (Ajzen 1991),
- *Combined TAM and TPB* (C-TAM-TPB), (Taylor and Todd 1995),
- *Model of PC utilization* (MPCU), (Thompson, Higgins and Howell, 1991),
- *Innovation Diffusion Theory* (IDT/DOI), (Moore and Benbasat, 1991) adapted the characteristics presented by Rogers (1983), and
- *Social Cognitive Theory* (SCT) (Compeau and Higgins, 1995, 1999).

The different theories have used different constructs for what can seem to be the same phenomenon. According to Venkatesh et al. (2003) this undermines the possibility of different research streams to combine results and findings, and ultimately sub-optimize research. To bring forth a possibility to unify the different theories, Venkatesh et al. have developed a unified theory and also tested it empirically. This theory adapts several of the constructs from the above described models and theories. Some of the constructs are believed to represent the same phenomenon, and thus combined to a new or single construct. UTAUT have four determinants of behavioural intention and actual use; *performance expectancy*, *effort expectancy*, *social influence* and *facilitating conditions*, see Figure 1.

Performance expectancy explains the degree in which an individual believes that using the system will help attain gains in job performance, *Effort expectancy*, the degree of ease in using of the system, *Social influence*, the degree in which an individual relies upon reference persons' beliefs in using the system, and *Facilitating conditions*, the degree in which an individual believes that organisational and technical infrastructure support system use. The UTAUT has been empirically tested and resulted in explaining 70 % of the variance in expectations (Venkatesh et al. 2003). This is a much higher explanatory power than found by any of the eight models used as foundation for the UTAUT.

The critique of the basic assumptions underlying the user acceptance models that the UTAUT is based on questions the usefulness of the model in explaining IS success (see for instance O'Keefe, 2002). The insufficient considerations of cognitive issues described within cognitive dissonance (Festinger, 1957) as well as Expectation-Disconfirmation Theory (Bhattacherjee and Premkumar, 2004) reduce the usefulness of

Figure 1. Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)



the UTAUT. Further research should therefore be aimed at developing the model within these cognitive issues, as well as developing tools to measure such cognitions. This will be necessary to improve the explanatory power of the model.

However, a benefit of the UTAUT is its unification of several models with overlap of constructs and measures of technology acceptance. To further understand the usability of the UTAUT one has to take into consideration the implementation of technology as an important part of the life cycle of technology acceptance. Venkatesh et al. (2003) also support this when they suggest that future research should look closer into the effects of implementation of IT on short and long term outcomes as productivity, as well as the relationship between success of individual adoption of technology and organisational success criterions.

The next section will review the different streams within the IS implementation research to find success measures that relates to user acceptance of technology. These success measures will then be compared critically against the determinants of the UTAUT.

ANALYSIS OF DIFFERENT STREAMS WITHIN IS IMPLEMENTATION RESEARCH

Within IS implementation research the different definitions can be understood as different perspectives on the effort to diffuse technology within the organisation. Researchers have identified several streams within IS implementation research, and four main streams have been described (e.g. Kwon and Zmud 1987, Larsen 2001, Bygstad and Munkvold 2002). These four streams are *the factor, the process, the political* and *the diffusion of innovation*. In this section the different streams will be investigated to find success measures that relates to user acceptance.

The largest research stream is the *factor stream*. This research focuses upon factors critical for successful implementation of IS. Examples are top-management involvement, quality of IS design, designer – user interaction and motivated and capable users (Kwon and Zmud, 1987). These factors lead to effectiveness and success and is measured as IS use and/or user satisfaction (Larsen, 2001). *User acceptance* is not by itself a success factor in this research stream. However, the different success factors lead to IS use and/or IS satisfaction if implemented successfully. One lesson learned is that user involvement in the implementation is important (Bygstad and Munkvold, 2002). Thus, user acceptance of technology within this research stream can be seen as a measure of success in IS implementation.

An important critique of the factor research stream is that it lacks a process view (Kwon and Zmud, 1987). The research stream focuses on factors critical for success, and not on the interaction between the different factors as a process. Thus, to improve the understanding of successful implementation of an IS one should investigate implementation as a process as well.

The process stream focuses on the implementation process as a sequence of generic stages. The research within this stream focuses on social activities rather than technical activities (Kwon and Zmud, 1987). Due to the longitudinal study of the organisation, and the fact that quantitative analysis can be troublesome when data change between the stages the research often relies on case studies (Larsen, 2001). Within this stream *user acceptance* is part of several stages in the implementation process, thus focusing on user motivation in accepting new technology. The behavioural aspects in the stages are also being investigated within this stream, and user acceptance is an important aspect. The process stream also includes stakeholder perspectives and diffusion of innovation (Bygstad and Munkvold, 2002). All together the process stream focuses on the interaction between several factors.

Within the organisation there can be resistance towards use or implementation of IT. The stakeholders have their individual agendas, and they act according to the perceived impact due to the implementation (Markus, 1983). The user is an important stakeholder in the acceptance of the systems, and by assessing the different stakeholders the behaviour of the stakeholders can be understood.

User resistance is well researched within organisational theory and practice as well as in IT implementation research. The user is of particular interest as the cooperation of the users is believed to increase the value and quality of the implemented IS. Research within *the political stream* has focused on user involvement and user participation as means to an end – IS usage. Their main concern is that a system not being used can not be a success. IS use is not necessarily equivalent with IS success if the use does not increase the value of the effort done in business. This has also been addressed by the theory of task-technology fit (Goodhue and Thompson, 1995), where the success of technology (IS) can be measured by the degree of fit between the technology and the task it is supposed to support.

Within *diffusion of innovation* (DOI) research, the implementation is but one stage in the adoption of innovation by the individual. Within the diffusion of innovation research user acceptance is a part of the adoption stage of the decision process (Rogers, 2003). Potential users gather information about an innovation from their social system (network), and thus decide whether to adopt the innovation (e.g. a new information system) based on the perceived benefits of the IS.

The different success measures found in the research streams can be summarised in the Table 1.

Comparing User Acceptance and IS Implementation Success

Based on the research findings referred, this section will analyse the two research areas with emphasis on IS implementation success measures and the UTAUT. To determine whether the UTAUT is useful in explaining success in IS implementation, the different success measures found within IS implementation will have to be explained by the UTAUT.

Comparison between the different streams within IS implementation success research and the UTAUT is presented in the Table 2.

Table 1. User Acceptance Success Measures in IS Implementation Research Streams

Research stream	Success measures found within the different research streams
Factor stream	User satisfaction (user involvement)
	IS use (actual usage)
Process stream	User acceptance (in different stages and the interaction between these stages)
Political stream	User involvement
	User participation
Diffusion of innovation stream	User acceptance
	Adoption

Table 2. Comparison Between Success Measures in IS Implementation and the UTAUT

Research stream	Success measures found in the different research streams (section 3)	Suitable variables in the UTAUT corresponding with the success measure	Correspondence	Comments
Factor stream	User satisfaction (user involvement)	Performance expectancy	Yes	User satisfaction is an evaluation of use and covered by perceived usefulness in the construct *performance expectancy* in the model of the UTAUT.
	IS use (actual usage)	Use behaviour	Yes	In the UTAUT usage is a result of the different variables in the model. The different determinants of the UTAUT explain actual usage as a result of the behavioural intentions.
Process stream	User acceptance (in different stages)	Behavioural intention	Partly	User acceptance as *Behavioural intention* to use is determined by the *performance and effort expectancy* and the *social influence* constructs in the UTAUT. The interaction between stages is not explained by the UTAUT.
Political stream	User involvement	Social influence	Yes	User involvement is a psychological state (Hartwick and Barki, 1994) and covered in UTAUT within the construct of *social influence*.
	User participation	Use behaviour	Yes	User participation is a behaviour, and explained by the UTAUT.
Diffusion of innovation stream	User acceptance	Behavioural intention	Yes	User acceptance as *Behavioural intention* to use is determined by the performance and effort expectancy and the social influence constructs in the UTAUT.
	Adoption	Behavioural intention	Yes	Adoption is here the decision to use the technology (innovation). Behavioural intention to use is determined by the performance and effort expectancy and the social influence constructs in the UTAUT.

Research Result

This comparison between the research streams and the constructs of the UTAUT shows that the UTAUT corresponds with all the success measures except one. UTAUT has limitations in explaining the *interaction* between the stages in the process view of implementation. Thus, the constructs of the UTAUT explain the success measures of the different streams in terms of user acceptance, but not the *interaction* between the measures. The effect of this limitation is that the usefulness of the UTAUT in explaining IS success in implementation is reduced.

Positive Correspondence

Within *the factor stream* the success measures of user satisfaction can be measured and explained within performance expectancy in the UTAUT. User satisfaction as an attitude will affect the beliefs of the users. Within the construct *perceived usefulness* the user may evaluate the IS to enhance job performance and thus satisfaction. IS use may be measured and explained by use behaviour in the UTAUT.

Within *the political stream* user involvement can be measured and explained within the construct of social influence. The argument for this is the belief that users as stakeholders are concerned with the perception of others in justifying usage. Within the social influence construct the user will decide whether using the IS will increase one's image in the social system. User participation in the political stream focuses on the participation of users in different stages of the process in contrast to the factor stream where user participation is linked to satisfaction.

In *the DOI stream* user acceptance and user adoption is measured and explained by the determinants of the behavioural intention in the UTAUT. Initial acceptance does not necessarily lead to continued use, and recent research discusses the limitation of the current acceptance models like DOI in explaining continuance behaviour as presented in section two.

Lack of Correspondence

The success measure user acceptance in *the process stream* can be measured and explained by the intention to use in the UTAUT. However, within the process stream the success of IS implementation depends on the user acceptance in different stages, and intention to use can only explain user acceptance in these particular stages and not the interaction between stages. *Thus, the explanatory power of successful implementation within the process stream is not sufficient.*

CONCLUSIONS

This paper has found user acceptance to be an important part within all the major research streams of IS implementation success. The constructs of the UTAUT explain the success measures of the different streams in terms of user acceptance. However, the *interaction* between the measures in a process view is not explained and a lack of correspondence is evident. Thus, it fails partly in explaining all the success dimensions of user acceptance in IS implementation.

These findings suggest that the UTAUT is promising in its explanatory power of IS success within the IS implementation research. Further development and possible inclusion of the cognitive elements discussed within this paper is necessary in order to improve the UTAUT and its usefulness in explaining and predicting user acceptance of technology in IS implementation.

Implications for Practice

This paper contributes to the development of knowledge important to practitioners in utilizing technology in organisations. Being able to explain and predict user acceptance of information systems is important, and the UTAUT is stated to be an improvement of the current available models within intentional behaviour. This paper questions the model in terms of success measures, and points out one significant weakness. Knowing the limitations of the model helps caution the organisations if applying the UTAUT. Hopefully it will nuance the results.

Implications for Further Research

The discussion in this paper leads to the need for further validation of the UTAUT and the constructs chosen for the determinants. The model has yet to be validated in leading journals, and needs further empirical research. This paper states that to be more successful in explaining and predicting user acceptance in IS implementation the UTAUT needs development to explain the process view of implementation.

Second, empirical research on the comparison between the constructs of UTAUT and the process view of IS implementation would be an important step in the further analysis of the usefulness of the UTAUT.

Finally, it is suggested that the UTAUT would profit from including cognitive aspects within cognitive dissonance theory better to explain changes in attitudes and beliefs over time. If this is accomplished, the UTAUT will truly be a unifying theory.

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