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Information Systems Success and Technology Acceptance within Government Organization

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ABSTRACT

Organizations are investing heavily in information technology. To reap the true benefits from the technology, managers want to ensure that employees are using the technology to complete their daily tasks. There is a compelling need to assess the success of IS and IS applications and this has been a very popular but challenging topic of IS research. Numerous models of IS success and their extensions have been proposed and applied in empirical studies to identify those factors that affect IS success. This study continues this tradition and will extend the body of knowledge on the topic of IS success by developing a more comprehensive model for measuring IS success and technology acceptance within a government organization. The proposed model builds upon existing models such as DeLone and McLean (2003), Venkatesh et al (2003) UTAUT, and Wixom and Todd (2005).

Most of the research on information systems success has focused on the use of a single application. This study assesses an entire set of IS applications used by the employees of a local municipal government. Assessment of IS success cannot be fully and accurately accounted for without understanding the nature of the application. This is because the application is related to the functions and features it serves. Who (and how many) uses it; who sponsors, owns and manages it; and whether the use is mandatory or optional are just a few examples of application variables. An instrument is developed to assess all the constructs of IS success along with those variables that capture differences among applications. Data for this study are collected from the entire employee population of the municipal government. This dissertation makes two unique contributions. Firstly, it provides a new comprehensive IS success assessment model which will be tested for the entire set of IS applications used by employees of a local municipal government. Secondly, it fills a gap in the IS success literature by assessing whether and how the IS success models are influenced by application variables.

Keywords

IS Success, Technology Acceptance, User Satisfaction.

INTRODUCTION

Organizations are investing heavily in the information systems as they seek to remain competitive and survive in the market place. Seddon, et al. (1999) estimate that worldwide expenditure in information technology would be in excess of one trillion dollars per year and continue to grow at a rate of approximately 10% annually. Even with such large investments, the implementation of the information system may still result in failure. As organizations seek to achieve return on investments from implementation of an IS, they must assess and understand what factors lead to the success of IS and IS applications (Lassila and Brancheau, 1999).

Numerous models of IS success and their extensions have been proposed and applied in empirical studies that identify those factors that affect IS success. This study continues this tradition and extends the body of knowledge on the topic of IS success by developing a more comprehensive model for measuring IS success and technology acceptance within a government organization.

The DeLone and McLean model (1992) had been the dominant model for measuring information systems success. It has been cited 285 times between 1993 and mid-2002. In 2002, DeLone and McLean updated the original model after taking into account the suggestions and criticisms of researchers who used the model over the ten-year period. The revised DeLone and McLean model (2003) is currently the dominant model for measuring IS success.

Acceptance of the information systems has been recognized as a major factor affecting the successful implementation of an information system. Venkatesh, et al. (2003) proposed a unified model of eight of the most prominent models that measure technology acceptance. Wixom and Todd (2005) suggested that there is a need to integrate research on technology acceptance and user satisfaction. These two major areas IS success have been studied independent of each other, although they complement each other. The Wixom and Todd (2005) model integrates user satisfaction and technology acceptance to gain a better understanding of systems usage. Researchers are still interested in finding out a more comprehensive and better model to assess IS success. In this study we propose a c model that builds upon the three model -- DeLone and McLean (2003), Venkatesh et al (2003) UTAUT, and Wixom and Todd (2005).

LITERATURE REVIEW

Numerous studies have examined information systems success (DeLone and McLean, 1992; DeLone and McLean, 2003; Larsen, 2003; Seddon and Kiew, 1994; Seddon, 1997; Shin, 2003). The updated DeLone and McLean (2003) model builds upon the original DeLone and McLean's (1992) IS success model -- one of the most cited models used to measure IT success. Its main purpose is to synthesize IS success and create a comprehensive taxonomy for evaluating the factors that influence IS success. The updated model consists of six main dimensions of IS success: system quality, information quality, service quality, use/intention to use, user satisfaction, and net benefits. System quality refers to the quality of the performance of the system. Information quality refers to the quality of the output of the information system. Service quality refers to quality of the services rendered to the customers. Use refers to how well the outputs of the information are used. User satisfaction refers to the users' overall approval/disapproval of the IS system. Net benefits includes various impacts such as customer impact, societal impact and inter-organizational and industry impact. It is the sum of all past and expected future benefits, less all past and expected future costs, attributed to the use of an information technology application. The model suggests that information quality, service quality and system quality would have an effect on use and user satisfaction; user satisfaction would have an effect on intention to use; use would have an impact on user satisfaction; and use and user satisfaction would influence on net benefits. The model is presented in Figure 1 below.

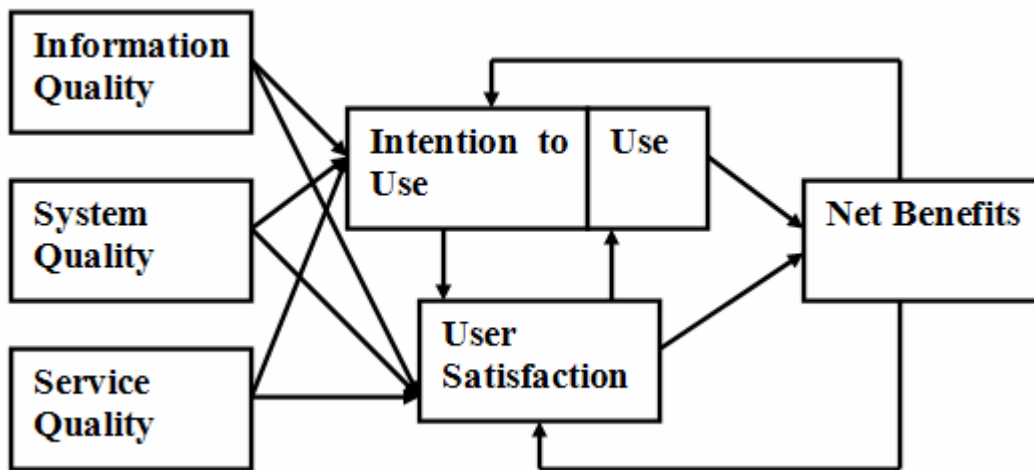


Figure 1: DeLone and McLean's Updated IS Success Model.

Technology acceptance is one of the key measures for evaluating IS success. Extensive research has been conducted to measure technology acceptance and numerous models have been proposed to measure (Ajzen, 1991; Bandura, 1986; Davis et al., 1989; Davis et al. 1992; Fishbein and Ajzen, 1975; Rogers, 1995; Taylor and Todd 1995a; Thompson et al., 1991). Venkatesh, et al. (2003) integrated the eight most prominent models of technology acceptance to gain a better understanding of this field of study. They developed the Unified Theory of Acceptance and Use of Technology (UTAUT) model by integrating these models. These eight models included the theory of reasoned action (Fishbein and Ajzen, 1975), the technology acceptance model (Davis et al., 1989), the motivational model (Davis et al. 1992), the theory of planned behavior (Ajzen, 1991), a model combining the technology acceptance model and the theory of planned behavior (Taylor and Todd 1995a), the model of PC utilization (Thompson et al., 1991), the innovation diffusion theory (Rogers, 1995), and the social cognitive theory (Bandura, 1986).

The key dimensions of the UTAUT model are performance expectancy, effort expectancy, social influence, facilitating conditions, behavioral intention to use and use of the technology. Performance expectancy refers to the degree to which an

individual believes that using the system will help him or her to attain gains in job performance. Effort expectancy refers to the degree of ease associated with the use of the system. Social influence refers to the degree to which an individual perceives that important others believe he or she should use the new application. Facilitating conditions refers to the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. Behavioral intention refers to the willingness of individuals to work hard and exert effort in order to achieve the given behavior. Use refers to the utilization of an IT application. This model asserts that performance expectancy, effort expectancy, and social influence would affect behavioral intention to use the technology; facilitating conditions and behavioral intention would affect systems use. These constructs are moderated by age, gender, voluntariness of use and experience. This model which was empirically tested and supported is presented in figure 2 below.

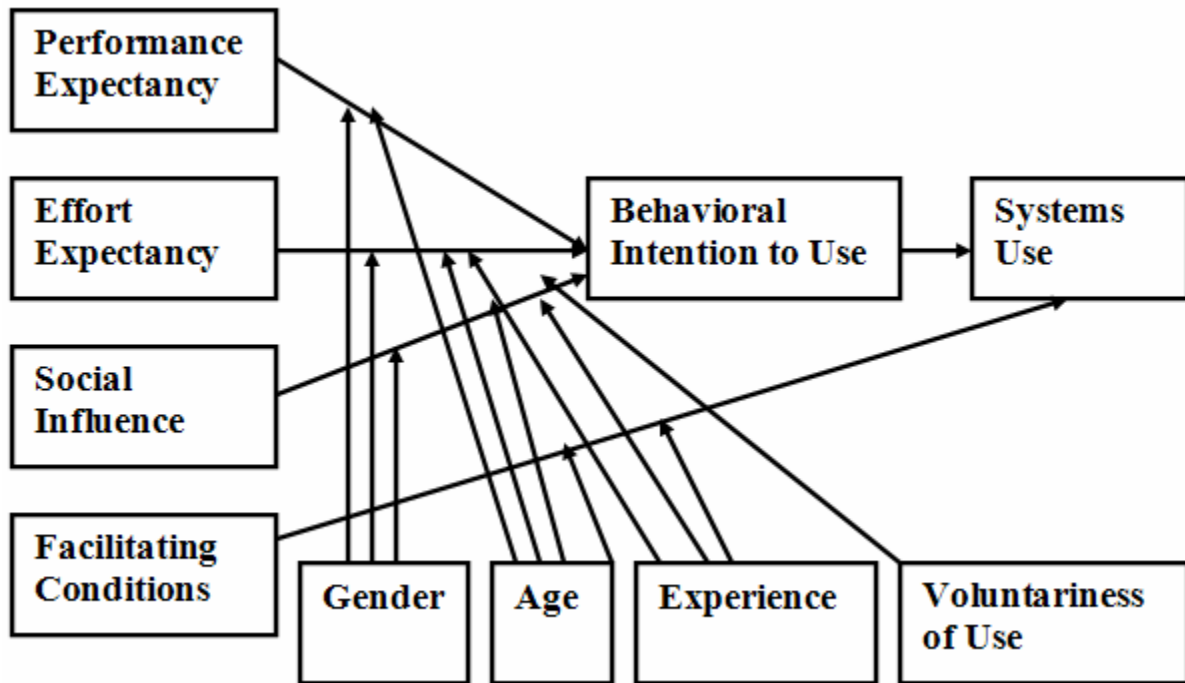


Figure 2: Venkatesh et al., 2003 UTAUT Model

User satisfaction is also a major source of determining the success of an information system. It is considered a weaker predictor of information systems success than technology acceptance (Wixom and Todd, 2005). However, it has been proposed that integrating technology acceptance and user satisfaction would provide a better means of predicting usage and information systems success (Wixom and Todd, 2005). Using Ajzen and Fishbein’s (1980) conceptualizations of attitudes, object-based versus behavioral beliefs, Wixom and Todd (2005) integrated these two streams of research and developed a new model for measuring information systems success. Eight key dimensions for measuring information systems success were identified which consist of information quality, systems quality, information satisfaction, systems satisfaction, usefulness, ease of use, attitude, and intention. Information satisfaction refers to how satisfied or dissatisfied the user is with the overall information systems encounter. System satisfaction refers to the degree of favorableness with respect to the system and the mechanics of interaction. Usefulness refers how an individual believes that using a particular system would enhance his or her job performance. Ease of use refers to the degree to which an individual believes that using a particular system would be free of effort. Attitude refers to how an individual reacts to using a system. They propose that information quality would affect information satisfaction; system quality would affect satisfaction; system satisfaction would affect information satisfaction; information satisfaction would affect usefulness; system satisfaction would affect ease of use; usefulness would affect attitude and intention; ease of use would affect attitude and usefulness; and attitude would affect intention. This study was empirically tested using employees in a data warehouse. The model is shown in Figure 3 below.

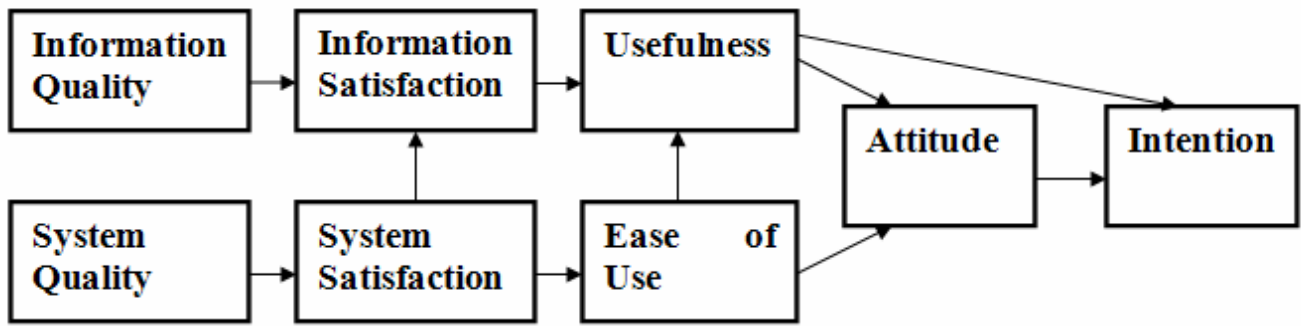


Figure 3: Wixom and Todd (2005) Model

CONCEPTUAL MODEL

The three models presented above provide various means of assessing information systems success but they each lack some of the important constructs. It is crucial that the users utilize technologies in order to gain competitive advantage and benefit from technology. There is therefore a need to better understand what factors influence the success of an information system. Therefore, we propose a new model which combines the De Lone and McLean (2003) updated IS success model, the Venkatesh et al. (2003) UTAUT model, and the Wixom and Todd (2005) model to gain a better measure of IS success.

The proposed model is developed using the performance expectancy, effort expectancy, facilitating conditions, social influence, behavioral intention to use, and use dimensions of Venkatesh et al. (2003) model. System quality and information quality constructs which were used in both the Wixom and Todd (2005) and DeLone and McLean Model (2003), is also included in the model. Also, service quality, user satisfaction and net benefits from the DeLone and McLean model were also used. In addition, attitude, information satisfaction and system satisfaction from the Wixom and Todd (2005) were incorporated. Ease of use and usefulness from the Wixom and Todd model were eliminated because performance expectancy includes usefulness and effort expectancy includes ease of use. The proposed model is shown in Figure 4 below.

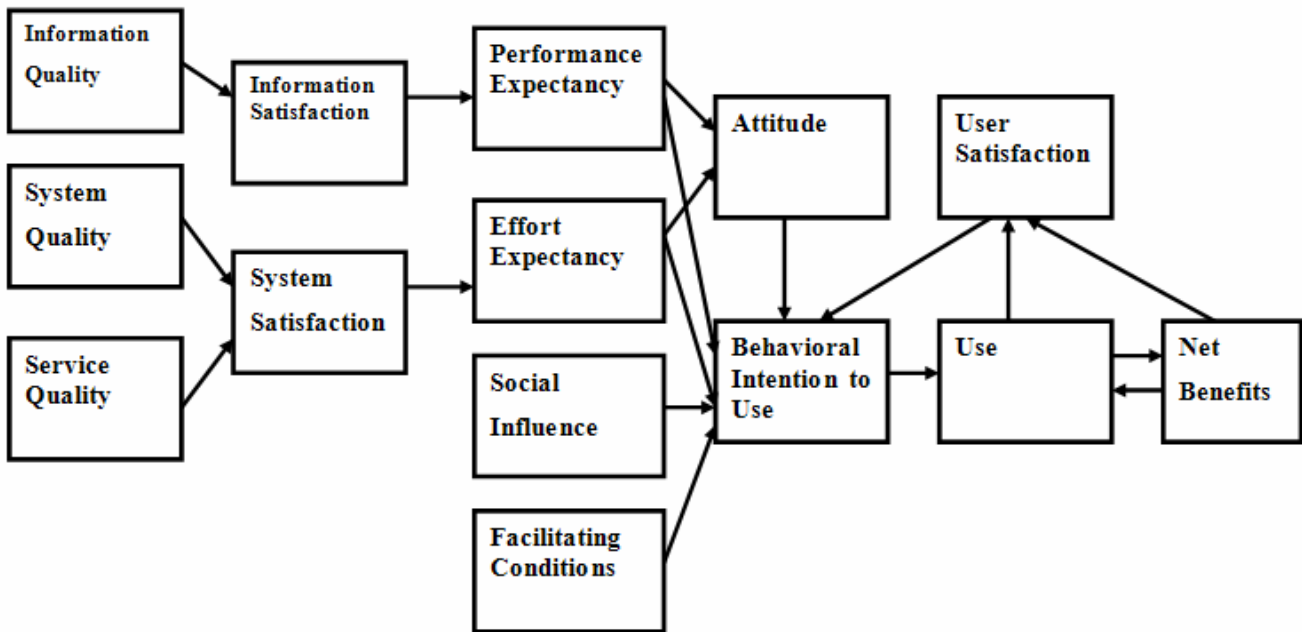


Figure 4: The Conceptual Model

METHODOLOGY

An online survey is administered to employees of a local municipal government. An instrument has been developed to assess all the constructs of IS success (see appendix). This instrument is based on prior scales and modified to fit the context of the

study. The scale items used to measure performance expectancy, effort expectancy, social influence, facilitation conditions and behavioral intention to use, and systems use were adapted from Venkatesh et al. (2003). Information satisfaction, system satisfaction, system quality, information quality, and attitude were adapted from Wixom and Todd (2005). Organizational impact were measured using Skok's et al. (2001) scale. User satisfaction were measured using Bhattacharjee and Premkumar's (2004)'s scale.

Interviews were conducted with managers of the technology services department of the local municipal. Data collection would be completed by the mid August. Exploratory and confirmatory factor analysis would be used to test validity and reliability of the constructs. Structural equation modeling would then be used to empirically test the proposed model.

CONCLUSION

As organizations continue to invest heavily in technology, understanding what factors would allow a user to accept, use and be satisfied with the technology would be crucial to the success of an information system. This paper presents a model which attempts to provide greater insights of the underlying factors of information systems success.

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APPENDIX

System quality (7 point Likert scale)

- In terms of system quality, I would rate the system highly
- Overall, the application is of high quality
- Overall, I would give the quality of the application a high rating

Information quality (7 point Likert scale)

- Overall, I would give the information from the application high marks
- Overall, I would give the information provided by the application high ratings in terms of quality
- In general, the application provides me with high-quality information

Service Quality (7 point Likert scale)

- The TSD staff does what it promises to do
- The TSD staff performs services right the first time
- When I have a problem, the TSD staff does its best to respond as soon as possible
- The people on the TSD staff gives me prompt service
- Members of the TSD staff are always willing to help.
- The TSD department responds quickly to my requests for help with software applications
- The behavior of the TSD staff instills confidence in me
- The TSD staff is continuously courteous with me
- The TSD staff is continuously courteous with me
- The TSD staff gives me individual attention.
- The TSD staff gives me personal attention.
- The TSD staff has my best interest at heart
- The TSD staff understands my specific needs

Information Satisfaction (7 point Likert scale)

- Overall, the information I get from the application is very satisfying
- I am very satisfied with the information I receive from the application

System Satisfaction (7 point Likert scale)

- All things considered, I am very satisfied with the application
- Overall, my interaction with the application is very satisfying

Performance Expectancy (7 point Likert scale)

- I would find the system useful in my job.
- Using the system enables me to accomplish tasks more quickly.
- Using the system increases my productivity.
- If I use the system, I will increase my chances of getting a raise.

Effort Expectancy (7 point Likert scale)

- My interaction with the application is clear and understandable
- It is easy for me to become skillful at using the application
- I find the application easy to use
- Learning to operate the application is easy for me

Social Influence (7 point Likert scale)

- People who influence my behavior think that I should use the application
- People who are important to me think that I should use the application
- The senior management of this business has been helpful in the use of the application
- In general, the organization has supported the use of the application

Facilitating Conditions (7 point Likert scale)

- I have the resources necessary to use the application
- I have the knowledge necessary to use the application
- The application is not compatible with other applications
- A specific person (or group) is available for assistance with the application

Behavioral Intention to Use (7 point Likert scale)

- I intend to use the system in the next 12 months
- I predict I would use the system in the next 12 months
- I plan to use the system in the next 12 months

Use

How much time do you spend with the system during the ordinary day when you use computers?

- .. Scarcely at all
- .. Less than ½ hour
- .. ½- 1 hour
- .. 1-2 hours
- .. 2-3 hours
- .. More than 3 hours

How often on average do you use the system?

- .. Less than once a month
- .. Once a month
- .. A few times a month
- .. A few times a week
- .. Once a day
- .. Several times a day

User satisfaction

- I am pleased with my use of the application
- I am content with my use of the application
- I am satisfied with my use of the application
- I am delighted with my use of the application

Net Benefits - Individual Impact (7 point Likert scale)

Overall, there has been a positive impact as to how much my performance was improved by the aid of CoD's Information Technologies

Net Benefits - Organizational Impact (7 point Likert scale)

- The application provides competitive business advantage
- The application provides improved client/seller relationships
- Overall the application is cost effective
- The application provides improved corporate image
- The application provides improved customer service
- The application keeps up with the organization's business requirements
- Overall, there has been a positive impact as to how much the CoD's performance was improved by the aid of Information Technologies