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APPLYING THE TAM TO DETERMINE INTENTION TO USE A DSS

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ABSTRACT

This research-in-progress paper provides a framework to determine end-users' intention to use a project plan Decision Support System (DSS) by applying the widely tested Technology Acceptance Model (TAM). The purpose of the framework is to serve as a foundation for collecting and evaluating further empirical evidence of end-users' acceptance of a DSS. The framework allows the researcher to establish whether the TAM fairly measures end-users' intention to use a DSS to support the creation of a project plan. The significance of the intended resulting research survey is to provide further evidence as to whether the TAM can be used in DSS research to measure end-users' intention to use a particular information technology application that aids management's decision process.

Keywords

Decision Support System (DSS), Technology Acceptance Model (TAM), project plan

INTRODUCTION

During the past two-and-a-half decades, Decision Support Systems (DSS) have evolved and solidified as an Information Technology (IT) that aids organizations' decision making processes. The emergence of DSS in the 1970s provided several perspectives. Definitions included the perspective of a natural advancement of IT from Electronic Data Processing (EDP) to Management Information System (MIS) to DSS; in addition, definitions also included the perspective of DSS being a subset of MIS (Sprague, 1980). Today, almost four decades later, organizations enjoy well-defined DSS IT applications that are designed to assist specific types of decision-makers with specific kinds of problems (Shim, et al., 2002), and to gain competitive advantage and efficiencies in business processes.

This paper will focus on end-users' intention to use a DSS to realize business process efficiencies by implementing a DSS to aid management's decisions in establishing a project plan. Specifically, this paper will present a framework that will include Money and Turner's (2004) revised Technology Acceptance Model (TAM) to outline the necessary foundations that enable the researcher to carry out an empirical investigation of a government agency's intention to use a DSS to establish a project plan.

Additional research, as proposed by this paper, is significant because it expands the already existing TAM body of research, and will provide further evidence as to whether the TAM should be used in DSS research to gauge users' intention to use a particular information technology application that aids management's decision process. While the TAM has been replicated successfully in systems usage research across persons, setting, cultures, countries, and times (Yousafsai, et al., 2007), the model's application to DSS research will become more significant as accessibility is expanded through mobile tools, mobile e-services, and wireless internet protocols to mobile phones and other wireless devices (Shim, et al., 2002). As the infrastructure technology enabling decision makers to "go mobile" constantly improves and becomes more affordable, there will remain a need for future research to determine users' intention to use newly developed mobile DSS applications.

The following sections will outline the methodology for a proposed research survey of the implementation of a DSS to aid in management's decision process in establishing a project plan. The first section will discuss the TAM model and the decision to use the revised TAM proposed by Money and Turner (2004) for this research survey. The second section will suggest six DSS research hypotheses that are based on the hypotheses proposed by Money and Turner in an application of the TAM to a knowledge management system. In the third section, the paper will describe the research survey environment and the suggested data collection and data analysis. Finally, the paper will provide a conclusion and suggestion for future research.

METHODOLOGY

The TAM was originated by Fred Davis in his 1986 doctoral dissertation *A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results* at the Sloan School of Management at Massachusetts Institute of Technology. Further articulated by Davis, et al. (1989) three years later, the authors present the TAM as illustrated in Figure 1 below.

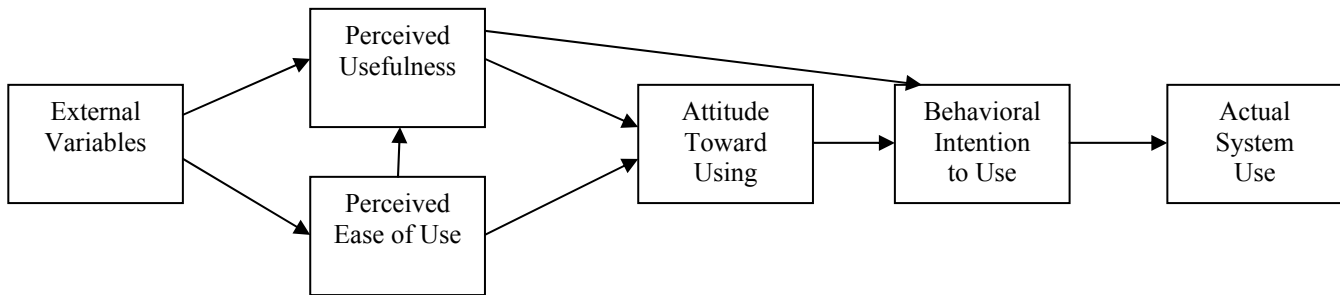


Figure 1. Davis, et al. Technology Acceptance Model (TAM)

The primary constructs of the TAM as presented by Davis, et al. (1989) are *perceived usefulness* and *perceived ease of use*. The authors define these two constructs as follows:

Perceived Usefulness is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context.

Perceived Ease of Use refers to the degree to which the prospective user expects the target system to be free of effort. (Davis, et al., 1989, **bold emphasis added**)

Money and Turner (2004) introduced a revised TAM to "assess the relationships among TAM's two primary belief constructs... and users' intention to use, and their usage of... [a] target knowledge management system" (Money, 2004, p. 3). Money and Turner's revised model is presented in Figure 2 below.

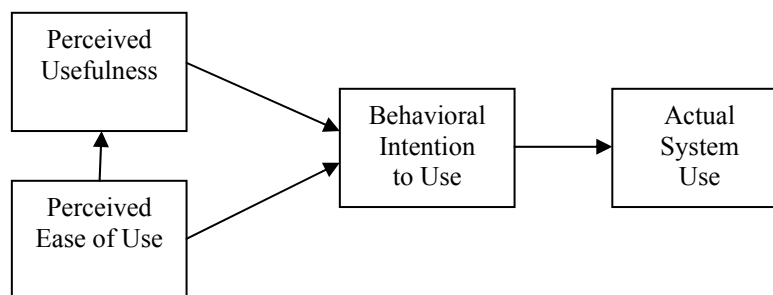


Figure 2. Money and Turner Revised Technology Acceptance Model (TAM)

Since the focus of this paper is to provide a framework to conduct an empirical investigation that determines whether end-users' intention to use a system is dependent on the DSS perceived usefulness and perceived ease of use, the *Attitude Toward Using* construct from Davis et al. original model can be dropped as it "was at best a partial mediator of the effect of perceived usefulness on intention to use, and that it added little casual explanatory power" (Money and Turner, 2004, p. 3). Also, the *External Variables* construct is dropped from this particular revised model, as we are not investigating any impact that external variables have on perceived usefulness or perceived ease of use of the project plan DSS.

Adapting Money and Turner's (2004) research hypotheses for applying the revised TAM to a knowledge management system, we apply similar hypotheses as part of our framework to investigate end-users' actual system usage. The hypotheses are stated in Table 1 below.

	Hypothesis
H1:	Perceived usefulness will exhibit a significant positive direct relationship with behavioral intention to use.
H2:	The effects of perceived ease of use on behavioral intention will be significant and positive but mediated by perceived usefulness.
H3:	Perceived ease of use will exhibit a smaller but significant positive direct relationship with behavioral intention to use when perceived usefulness is controlled for.
H4:	Behavioral intention to use the system will exhibit a significant positive relationship with system usage.
H5:	Perceived usefulness and perceived ease of use will have a significant combined positive relationship with behavioral intention to use the target decision support system information technology.
H6:	Perceived usefulness and perceived ease of use will have a significant combined positive relationship with usage of the target decision support system information technology.

Table 1. DSS Research Hypotheses

Money and Turner concluded that their research, compared to previous TAM research, confirmed five of the six hypotheses. In their research, they found that a user's intention to use a system is influenced by how useful the user finds the system, and how easy to use the user finds the system, which is consistent with previous research. However, if analyzed alone, the authors found that users are more likely to use a system that is easy to use, rather than a system that a user finds useful and relevant to their job duties. (Money and Turner (2004).

Proposed Research Survey

This paper proposes a similar research survey to that of Rigopoulos and Askounis (2007). Rigopoulos and Askounis use Money and Turner's revised TAM to evaluate users' perception towards online electronic payments. Similarly, this paper proposes a research survey to evaluate end-users' perception towards using a DSS to establish a project plan.

The particular organization proposed for this research survey is a medium-sized (130 employees) auditing organization located in the United States of America. The organization recently implemented a web-based decision support system to aid management in annually evaluating proposed project plans. The DSS is accessible both from the local area network, as well as from remote locations outside the office. The users can connect to the system via any web browser, including those available on mobile devices, such as PDAs and Smart Phones.

While every employee in the organization is encouraged to propose projects into the DSS, employees in senior- and executive-level positions enter the majority of proposed projects. The proposed projects contain certain data elements that are entered by the employee and used by the DSS to rank projects based on project risk, budgeted hours to complete project, and available resources to perform the work.

Once the due date for submitting the proposed projects has passed, a committee evaluates the resulting report of ranked projects and budgeted hours. While the DSS at this point has generated a project plan based solely on risk and available resources, the committee may decide, for example, to replace one high-risk project with several lower risk projects with smaller budgets (which as a whole present a higher risk than the high risk project alone that they are replacing). After collaborative adjustments have been made by the committee to the DSS generated work plan, the process may be repeated, and a second evaluation of the DSS proposed updated plan is considered. This process is repeated until the committee is satisfied and a final work plan is established.

Empirical Evidence Collection

After receiving approval from the appropriate authorities to conduct the research survey, the first step is to collect the data that is going to be used for empirical evidence and analysis. The data will be collected using a questionnaire that is accessible to the participants of the study from a web site. A query will be run against the DSS to determine the current users of the DSS, and an invitation to participate in the study will be sent to the current end-users via electronic mail. Responses submitted by the end-users will be anonymous and distinguished by using randomly generated ID numbers, which can only be used once.

Using the constructs discussed above and in Figure 2, the questionnaire will consist of the statements in Table 2, below, and ask the user to rate each statement from 1 to 5, where 1 signifies *Strongly Disagree* and 5 signifies *Strongly Agree*.

Constructs	Questionnaire Statements
Perceived Usefulness	<ol style="list-style-type: none"> 1. The DSS is useful in establishing a project plan. 2. The DSS makes it easier to establish the project plan. 3. The DSS makes it more convenient to establish the project plan. 4. The DSS makes it faster to establish the project plan.
Perceived ease of use	<ol style="list-style-type: none"> 1. The DSS is easy to use. 2. The DSS is easy to understand. 3. The DSS is simple. 4. The DSS is intuitive.
Behavioral intention to use	<ol style="list-style-type: none"> 1. I think that using the DSS is a good idea. 2. I think that using the DSS is beneficial to me. 3. I have a positive perception about using the new DSS.
Usage	<ol style="list-style-type: none"> 1. I intend to use the DSS frequently. 2. I intend to use the DSS more than any other applications used to establish project plans.

Table 2. Constructs and Questionnaire Statements

The questionnaire will also ask the respondents to provide demographic information, including, gender, age, years of IT use, years with Organization, and position. The demographic information will not be used as part of this study, however, it will be used by management of the organization to evaluate training needs.

Data Analysis Process

Using a statistical package, such as Statistical Analysis System (SAS), the next step will be to calculate the Cronbach Alpha scale reliability coefficients for each construct. As quoted by Money and Turner (2004, p. 4), the recommended minimum reliability of all measurement scales for social science research should be .70, and a desired level is above .80 (Hatcher, 1994).

After calculating the Cronbach Alpha for each construct relationship, the researcher should next create a correlation matrix that contains the constructs, Cronbach Alphas, and the associated “p-values”. This matrix will aid the researcher in evaluating whether the hypotheses presented in Table 1 above are consistent with previous research.

The construct correlations in the matrix can also be illustrated as in Figure 3 below.

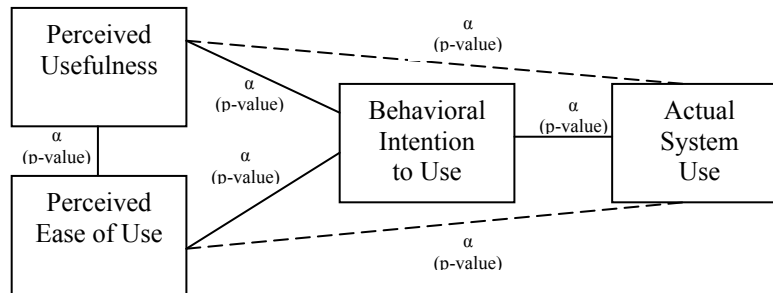


Figure 3. Money and Turner (2004) Research Model With Observed Correlations (p-values)

CONCLUSION

The intention of this paper is to provide a framework for the researcher to evaluate end-users' intention to use a project planning DSS. The paper uses a revised TAM (Money and Turner, 2004; Rigopoulos and Askounis, 2007) to evaluate how end-users' perceived usefulness and perceived ease of use determines the end-users' behavioral intention to use and actual system use. In executing the research survey proposed above, this research will determine whether the hypotheses proposed by Money and Turner (2004) in applying the revised TAM to a knowledge management system will also hold true in applying the revised TAM to a decision support system.

This research makes a valuable contribution to the DSS domain by showing how the revised TAM can be applied to investigate users' intentions to accept and use a DSS in the decision making process. The research will also add to the literature by empirically testing whether the revised TAM adequately determines users' intentions to accept and use a DSS.

FUTURE RESEARCH

DSSs have been fairly unrecognized in research using the TAM. Yousafzai, et al. (2007) analyzed TAM usage in 145 papers published between 1989 and 2004, and found that DSSs have only been analyzed in two of the papers. Future research needs to include applying the TAM to diverse implementations of DSSs in a wide range of different organizational settings and IT infrastructures. As mobile devices are becoming more popular and DSS applications are written to enable enterprises to extend IT supported decisions from employees' office desktops to mobile devices anywhere cellular coverage is available, there is a need for future research to apply the TAM to this relatively new extension of the corporate IT infrastructure.

Future research may also want to consider adding specific constructs that are specific to decisional processes or criteria. Widening the application of TAM to information technologies using DSSs will expand the body of TAM research and show whether the model can be successfully used to determine end-users' intention to use a DSS.

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