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## A TAM Model to Evaluate User's Attitude Towards Adoption of Decision Support Systems

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**Abstract:** In this study, we present a revised Technology Acceptance Model (TAM) for measuring users' attitude towards adoption of Decision Support Systems (DSS). We present the model developed, as well as initial results from a survey at a Greek bank's target users group for the evaluation of a novel DSS. Our aim, except the specific evaluation results, is to validate the model and expand it towards a generic adoption framework for DSS within organizations.

**Key words:** Technology acceptance model, decision support systems

### INTRODUCTION

Although IT applications have been rapidly deployed in business environment during the last decade, a critical parameter of their success still remains users' adoption. In order to measure users' acceptance of IT applications as well as factors affecting adoption of similar technologies, several theories grounded on social psychology have been proposed in the previous years. The majority of them have been tested empirically in a wide variety of applications, establishing thus a valid set of methodologies for similar research. Some of the most well known approaches are the theory of reasoned action (Aizen and Fishbein, 1980), theory of planned behaviour (Aizen, 1985), diffusion of innovations (Rogers, 1983) and social cognitive theory (Bandura, 1986). Although each of these theories has many positive aspects, theory of reasoned action (TRA), theory of planned behavior (TPB) and the technology acceptance model (Davis, 1993), which is a modification of TRA, have received the most attention.

Technology Acceptance Model (TAM) was initially developed by Davis to provide an explanation of the

determinants of computer acceptance. In general it is capable of explaining user behaviour across a broad range of end-user computing technologies and user populations theoretically justified (Davis, 1993). TAM (Fig. 1) is based on the following core concepts:

- Perceived usefulness, which has been defined as a user's subjective perception of the ability of a computer to increase job performance when completing a task and
- Perceived ease-of-use, which is a person's subjective perception of the effortlessness of a computer system, which affects the perceived usefulness thus having an indirect effect on a user's technology acceptance.

TAM is derived from the Theory of Reasoned Action (TRA) model (Fig. 2), which was developed by Fishbein and Ajzen to explain a broader range of behaviours based on situation specific combinations of personal beliefs and attitudes and the effects of beliefs of others close to the individual (Szajna, 1996). The fundamental concept of TRA is that individuals will adopt a specific behaviour if

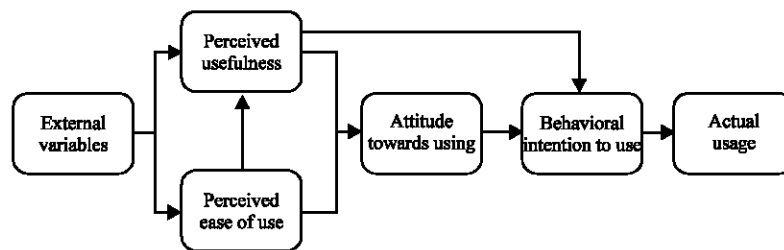


Fig. 1: Technology Acceptance Model (Davis)

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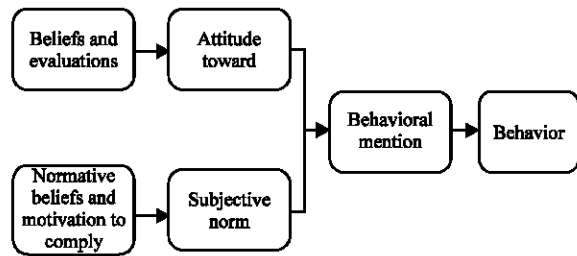


Fig. 2: Theory of Reasoned Action (Fishbein and Ajzen)

they perceive it will lead to positive outcomes (Compeau and Higgins, 1995).

Technology Acceptance Model (TAM) has been extensively incorporated as a methodology to measure attitude towards technology adoption from users in multiple domains. TAM variations have also been proposed and applied for measuring users' attitude towards adoption of several IT based services. An extensive body of subsequent research has confirmed the usefulness of TAM-and various extensions and revisions-as a tool for investigating and predicting user information technology acceptance (Taylor and Todd, 1995; Gefen and Straub, 2000; Doll *et al.*, 1998). However, there is no similar approach in the domain of Decision Support Systems (DSS), measuring adoption of users in the case where a DSS replaces existing decision procedures.

For this reason, in this study we demonstrate a revised TAM model for measuring users' attitude towards adoption of Decision Support Systems. In details, a Greek bank plans to enhance existing decision process with the introduction of a novel DSS for the payments division. Although IT usage is widely used within the division, mostly operational applications exist, while advanced support systems are relative rare. The specific DSS will substitute existing classification decisions replacing heuristic based procedure and will be operated by several users. Our main objective is to study employees' attitude towards the usage of the new DSS. Since there is no relevant approach in literature, we formulated a revised TAM model with appropriate hypotheses and executed a survey at the bank in focus group users. In the following, we present the model as well as the results from the relevant survey at the bank. The study was executed upon bank's potential DSS users, in order to measure attitude towards the new DSS and evaluate the model towards a more extended user survey.

### MATERIALS AND METHODS

In order to perform the research, we followed TAM methodology and concepts and used a revised TAM

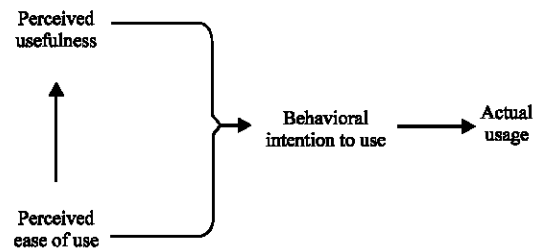


Fig. 3: Research model (Money and Turner, 2004)

Table 1: Research hypotheses

Hypothesis	
H <sub>1</sub>	Perceived usefulness will have a positive relationship with behavioral intention
H <sub>2</sub>	Perceived ease of use will have a strong indirect positive relationship to behavioral intention
H <sub>3</sub>	Perceived ease of use will have a less strong direct positive relationship to behavioral intention
H <sub>4</sub>	Behavioral intention will have a strong positive relationship to system usage
H <sub>5</sub>	Perceived usefulness and perceived ease of use will have a strong positive relationship to behavioral intention
H <sub>6</sub>	Perceived usefulness and perceived ease of use will have a strong positive relationship to actual usage

model (Fig. 3), as proposed by Money (Money and Turner, 2004), in order to identify relationship between Perceived usefulness and Perceived ease-of-use and users' intention to use and usage of the new DSS.

A number of factors affecting adoption of IT systems has been identified in relevant studies, however, for the scope of this study factors has been kept relative limited and the model was close to the original TAM model. Major objective was to execute a preliminary research, in order to identify correlations between key factors and gather data to initiate a broader study. For this reason, we formulated a number of six research hypotheses as shown in Table 1 based on the model stated above.

### RESULTS AND DISCUSSION

In order to test the proposed research model, a field survey was carried out. The study was conducted in collaboration with the Greek bank. A focus group was selected from the bank according to bank's experts. The population of interest was potential users of the DSS that execute existing heuristic based classification. Questionnaires based on the constructs depicted in Table 2 were used to collect the data. Items used Likert scales ranging from 1 = strongly disagree to 7 = strongly agree. Questionnaires were sent and collected through email. In total, 30 replies were collected, out of 40 users and 5 replies were discarded due to incomplete or insincere responses. Demographics of the sample are provided in Table 3.

**Table 2: Construct items defined to test hypotheses**

The construct items	
<b>Perceived usefulness</b>	
1.	With the new DSS decisions are easier.
2.	With the new DSS decisions are more accurate.
3.	With the new DSS decisions are faster.
<b>Perceived ease-of-use</b>	
1.	The new DSS is easy to use.
2.	The new DSS and methodology is easy to understand.
<b>Behavioral intention to use</b>	
1.	I think that using the new DSS is a good idea.
2.	I think that using the new DSS is beneficial for me.
3.	I have positive perception about using the new DSS.
<b>Usage</b>	
1.	I intend to use new DSS.
2.	I intend to use new DSS instead of the traditional procedure.

**Table 3: Demographics of Bank's employees sample**

	Total sample size (responded)	30	
<b>Gender</b>	Female	17	
	Male	13	
<b>Demographics</b>	<b>Mean</b>	<b>SD</b>	
	Age	29.3	5.6
	Years of IT use	8.2	2.5
	Weekly Hours of IT use	15.3	3.7
<b>Internet usage</b>	<b>Percentage</b>		
	Daily	63.5	
	Weekly	25.5	
	Monthly	10.5	
	A few times a year	0.5	

**Table 4: Cronbach alpha coefficients**

Construct	Cronbach alpha
Perceived usefulness	0.907
Perceived ease-of-use	0.922
Behavioral intention to use	0.841
Usage	0.869

For the data analysis, we calculated Cronbach Alpha reliability coefficients for each construct as shown in Table 4. The reliability of all measurement scales was above the recommended minimum level of 0.70 and the desirable level of 0.80 for social science research.

Due to the limited sample size, statistical analysis was limited to correlation and regression analysis. Correlation analysis results appear in Table 5 which includes the observed correlations. Figure 4 also depicts the results and the associated p-values in accordance with the research model.

In Table 6, we summarize the findings regarding the research hypotheses resulting from the above data analysis, where all six hypotheses are supported. From the above results, all six hypotheses are supported, which provides strong evidence that the new DSS supports efficiently the decision process and can replace existing heuristic procedure, which tends to be time consuming and less structured.

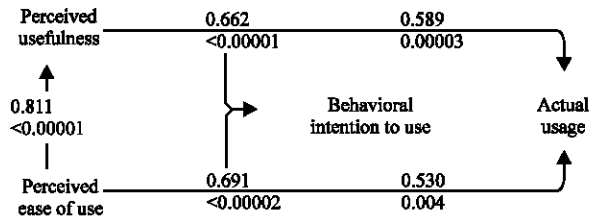
In this study, we present brief findings from a survey to identify customers' attitude towards a new DSS which replaces existing classification procedure. Our target aim was initially to evaluate the proposed TAM model within

**Table 5: Correlation of constructs**

Constructs	(1)	(2)	(3)	(4)
(1) Perceived usefulness	1	0.811	0.662	0.589
(2) Perceived ease-of-use	0.811	1	0.691	0.530
(3) Behavioral intention to use	0.662	0.691	1	0.467
(4) Usage	0.589	0.530	0.467	1

**Table 6: Hypotheses results**

Hypothesis	Support
H <sub>1</sub> Perceived usefulness will have a positive relationship with behavioral intention	Yes
H <sub>2</sub> Perceived ease of use will have a strong indirect positive relationship to behavioral intention	Yes
H <sub>3</sub> Perceived ease of use will have a less strong direct positive relationship to behavioral intention	Yes
H <sub>4</sub> Behavioral intention will have a strong positive relationship to system usage	Yes
H <sub>5</sub> Perceived usefulness and perceived ease of use will have a strong positive relationship to behavioral intention	Yes
H <sub>6</sub> Perceived usefulness and perceived ease of use will have a strong positive relationship to actual usage	Yes



**Fig. 4: Research model with correlations**

this setting and further to collect findings in order to continue to a wider research setting. Small sample is one of the limitations of the study. The sample was limited to one particular user setting, at one point in time and was therefore limited for broad generalizations. In order to generalize the results, further studies are needed in different contexts and settings. Another limitation was the distribution method of the survey instrument. The survey was delivered online by e-mail. Users, who did not answer the e-mail, may not have received or completed the survey. Results of the study may have been influenced by a larger number of respondents. However, while the study provides preliminary results, these results provide a foundation for future studies for DSS adoption.

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