

ERP and Assistance Systems

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Abstract: - User assistance systems are especially important in complex information systems. ERP (Enterprise Resource Planning) is an example of a complex system. On the other hand, users of those systems want a quick and precise answer to their problems in order to perform specific tasks. In this paper, we analyze the adoption of user assistance systems. In order to analyze, we use as theoretical framework the Technology Acceptance Model (TAM). We also proposed some characteristics related to the perception of ERP use that may influence the acceptance and adoption of user assistance systems.

Key-Words: ERP, TAM, Organizational Systems, Empirical Study, Assistance Systems

1 Introduction

The use of user assistance systems is especially important.

Nowadays organizational employees have to use ERP. Often, they must choose among several types of user assistance systems.

Investigating the factors associated with user acceptance of new software systems has been an important research stream in the field of information systems for many years.

The technology acceptance model has long been used to examine the acceptance of information systems. In this specific case, the assistance system is a support to other information system.

In our research we use TAM (Technology Acceptance Model) with the purpose of analyzing what factors influence the use of user assistance system.

In the following section we present broadly the TAM. Then, we present the main user assistance systems, used nowadays, that support information systems and specifically ERP. In the next section, we present the research hypothesis, supported in the TAM theoretical framework. Then, we report main results from the empirical work.

2 Technology Acceptance Model

Technology Acceptance Model (TAM) was introduced by Davis [5]. It aims to understand the process of user acceptance of information systems. TAM is one of the most cited theoretical frameworks. Specifically, the TAM specifies the

causal relationships between system design features, the perceived usefulness, the perceived ease of use, the attitude towards usage and actual the usage behavior.

In general, the TAM provides an informative representation of the mechanisms by which design choices influence user acceptance. Consequently it is helpful in applied contexts for forecasting and evaluating user acceptance of specific technology. The model aims not only to explain key factors of user acceptance of information systems. In fact, its purpose is also predicting the relative importance of the factors in the diffusion of technological systems [6].

TAM proposes that perceived ease of use and perceived usefulness of technology are predictors of user attitude towards using the technology, consequently intentions of behavior and actual technology usage. Perceived ease of use was also considered to influence perceived usefulness of technology. Figure 1 presents original version of TAM [5].

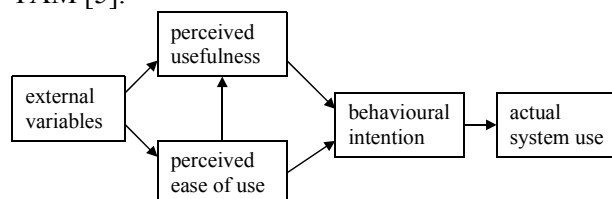


Figure 1 – TAM Technology Acceptance Model [6]

Venkatesh and Davis [16], proposed an extension of TAM, the TAM2. TAM2 includes

social influence process such subjective norm, and cognitive instrumental process such as job relevance, output quality and results.

TAM has been applied in numerous studies testing user acceptance of information technology. Just for example, TAM was applied to study the following technologies: word processors [6], spreadsheet applications [12], e-mail [15], web browser [13], telemedicine [9], websites [10], e-collaboration [4], elearning [11], ERP [2] and Lego Robot Mindstorms [3].

3 Problem Solution

Traditionally, user assistance was supported mainly in printed manuals. Then, other forms of user assistance system were developed. As well as techniques used in the context of authoring and publishing (e.g. DITA form OASIS).

But other systems start to be employed like: Digital manual, Tutorials, Help files, help desk, ticket systems, Remote Assistance, Forum and Wiki.

A tiny evolution of the printed manual is the digital manual. Tutorials are also interesting evolutions of the traditional printed manual. Nowadays, multimedia tutorials and small videos play an important role in user support,

Help files are also an interesting evolution of the traditional manual. They were very popular in office applications.

WikiWikiWeb was the first wiki [8].

Remote assistance is a form of assistance supported in a network infrastructure. In the remote assistance, the assistant may solve the problem without the intervention of the user.

FAQ is a very old form of presenting information. For example, Summa Theologica was presented in a Q&A format [1].

Forums were based in the bulletin board systems.

Help desk systems are a point of contact where users may obtain the answer to their problems. They used to be supported in a phone. Typically, the interface is a human person, but may also be an answer machine.

A ticket system is another way of implementing a help desk system.

4 Research Hypotheses

Supported in the TAM conceptual framework we analyze the level of acceptance of assistance systems.

We started by analyzing perceived usefulness (PU), perceived ease of use (PEOU) and Intention to use the system (INT).

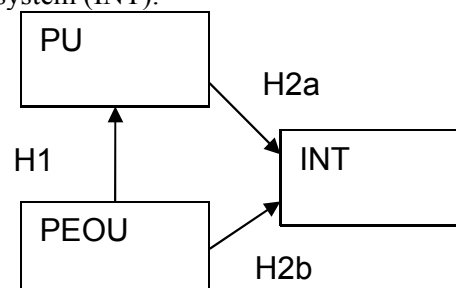


Figure 2 – Hypotheses H1, H2a H2b

Supported in the previous dimension, the following hypotheses were derived:

H1) Perceived ease of Use will have a positive effect on the perceived usefulness.

H2a) Perceived usefulness will have a positive effect on the users behavioral intention of using an assistance system.

H2b) Perceived ease of Use will have a positive effect on the user behavioral intention of using the assistance system.

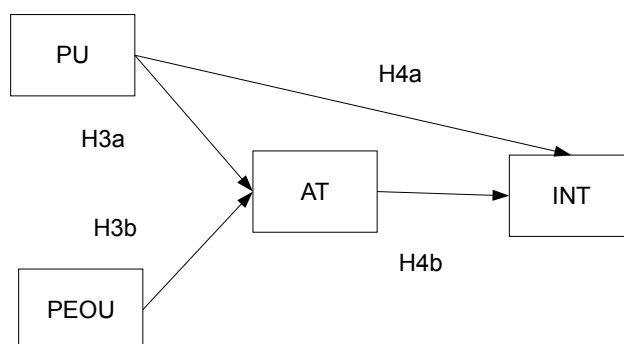


Figure 3 – Hypotheses H3a, H3b, H4a H4b

Hypothesis H3a, H3b, H4a and H4b were also supported in the TAM theoretical framework.

H3a) Perceived usefulness will have a positive effect on the users attitude towards using an assistance system.

H3b) Perceived ease of Use will have a positive effect on the user attitude towards using the assistance system.

H4a) The user attitude towards using the assistance system will have a positive effect on their intention to use the system.

H4b) Perceived ease of Use will have a positive effect on their intention to use the system.

The following hypotheses were supported in the observation. In fact, we observed that one of the purposes of the users is to be efficient, effective and have satisfaction in the use of the ERP system. So it was analyzed in what extent productivity and satisfaction have impact in the use of a specific support system.

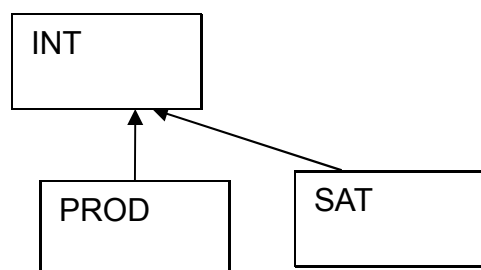


Figure 4 – Hypothesis H5, H6

H5) If the assistance system improves productivity of ERP use it increases the behavioral intention of using this assistance system

H6) If the assistance system improves satisfaction of ERP use it increases the behavioral intention of using this assistance system

5 Empirical Study

In order to evaluate research hypothesis, we used a group of students from management and industrial engineering as subjects. Those students had to performed several tasks using an ERP Open Source. Those students had a previous training and then were asked to solve a case study composed with a set of operations. In order to solve the case they also had to use several user support systems (Wiki, Remote assistance, FAQ, Forum, help desk, Manual, Tickets, Help Files). Then, they had to answer to a questionnaire with TAM questions to each support system.

The number of users that used ERP systems and ERP help systems were 50. The number of help systems evaluated by each user was 8. Consequently, the number of total observations was 400.

In order to evaluate the hypothesis, data from the questionnaire was subject to statistical treatment. Regression analysis was used.

6 Empirical Results and Hypothesis Evaluation

H1) Perceived ease of Use will have a positive effect on the perceived usefulness.

In order to evaluate those research hypotheses, we estimated a regression, where PEU (perceived ease of use) is independent variable and PU (perceived usefulness) is dependent variable.

SOURCE	DF	SS	MS	F	Prob.>F
Regression	1	224.899	224.899	205.875	0.000

Residual	398	434.778	1.092		
Total	399	659.678			

Dependent Variable: "PU"

R	R2	F	Prob.>F	DF1	DF2
0.584	0.341	205.875	0.000	1	398

Adjusted R Squared = 0.339

Std. Error of Estimate = 1.045

Variable	Beta	B	Std. Error	t	Prob.>t	VIF	TOL
"PEU"	0.584	0.613	0.043	14.348	0.000	1.000	1.000

Constant = 2.015

According to the results, the correlation between the two variables is not high. Nevertheless, values estimated were significant.

H2a) Perceived usefulness will have a positive effect on the users behavioral intention of using an assistance system.

H2b) Perceived ease of Use will have a positive effect on the user behavioral intention of using the assistance system.

In order to evaluate those research hypotheses, we estimated a regression, where PEU (perceived ease of use) and PU (perceived usefulness) are independent variables INT (intention to use the system) is dependent variable.

SOURCE	DF	SS	MS	F	Prob.>F
Regression	2	363.989	181.995	152.930	0.000
Residual	397	472.451	1.190		
Total	399	836.440			

Dependent Variable: "INT"

R	R2	F	Prob.>F	DF1	DF2
0.660	0.435	152.930	0.000	2	397

Adjusted R Squared = 0.432

Std. Error of Estimate = 1.091

Variable	Beta	B	Std. Error	t	Prob.>t	VIF	TOL
"PEU"	0.420	0.496	0.055	9.033	0.000	1.517	0.659
"PU"	0.320	0.360	0.052	6.883	0.000	1.517	0.659

Constant = 0.386

Like in the previous regression the explanatory power of the regression is not very high, with an R squared of 0.435 and an adjusted R squared of 0.432. On the other hand, PEU had a beta (and b) slightly superior than PU. It means that the Intention of use is more influenced by the perceived ease of use than the perceived usefulness.

H3a) Perceived usefulness will have a positive effect on the users attitude towards using an assistance system.

H3b) Perceived ease of Use will have a positive effect on the user attitude towards using the assistance system.

In order to evaluate those research hypotheses, we estimated a regression, where PEU (perceived ease of use) and PU (perceived usefulness) are independent variables and AT (Attitude toward the system) is dependent variable.

SOURCE	DF	SS	MS	F	Prob.>F
Regression	2	396.100	198.050	161.583	0.000
Residual	397	486.598	1.226		
Total	399	882.697			

Dependent Variable: "AT"

R	R2	F	Prob.>F	DF1	DF2
0.670	0.449	161.583	0.000	2	397

Adjusted R Squared = 0.446

Std. Error of Estimate = 1.107

Variable	Beta	B	Std. Error	t	Prob.>t	VIF	TOL
"PEU"	0.409	0.497	0.056	8.909	0.000	1.517	0.659
"PU"	0.343	0.397	0.053	7.475	0.000	1.517	0.659

Constant = 0.181

Like in the previous regression the explanatory power of the regression is not very high, with an R squared of 0.449 and an adjusted R squared of 0.446. Also like in the previous situation, PEU had a beta (and b) slightly superior than PU. It means that the Attitude toward the system is more influenced by the perceived ease of use than the perceived usefulness.

H4a) The user attitude towards using the assistance system will have a positive effect on their intention to use the system.

H4b) Perceived ease of Use will have a positive effect on their intention to use the system.

In order to evaluate those research hypotheses, we estimated a regression, where AT (Attitude toward the system) and PU (perceived usefulness) are independent variables and INT (intention to use the system) is dependent variable.

SOURCE	DF	SS	MS	F	Prob.>F
Regression	2	492.224	246.112	283.853	0.000
Residual	397	344.216	0.867		
Total	399	836.440			

Dependent Variable: "INT"

R	R2	F	Prob.>F	DF1	DF2
0.767	0.588	283.853	0.000	2	397

Adjusted R Squared = 0.586

Std. Error of Estimate = 0.931

Variab le	Beta	B	Std. Error	t	Prob.>t	VIF	TOL
"AT"	0.638	0.621	0.039	16.121	0.000	1.512	0.661
"PU"	0.194	0.218	0.045	4.889	0.000	1.512	0.661

Constant = 0.677

The explanatory power of the regression may be considered good in the context of social behavior, with an R squared of 0.588 and an adjusted R squared of 0.586. AT had a beta (and b) superior than PU. It means that the attitude towards the system influences more Intention of use the system than usefulness.

H5) If the assistance system improves productivity of ERP use it increases the behavioral intention of using this assistance system

In order to evaluate those research hypotheses, we estimated a regression, where PROD (assistance system improves productivity of ERP) is independent variable and INT (intention of using the system) is dependent variable.

SOURCE	DF	SS	MS	F	Prob.>F
Regression	1	198.852	198.852	171.742	0.000
Residual	398	460.825	1.158		
Total	399	659.678			

Dependent Variable: "INT"

R	R2	F	Prob.>F	DF1	DF2
0.549	0.301	171.742	0.000	1	398

Adjusted R Squared = 0.300

Std. Error of Estimate = 1.076

Variable	Beta	B	Std. Error	t	Prob.>t	VIF	TOL
"PRD"	0.549	0.517	0.039	13.105	0.000	1.000	1.000

Constant = 2.599

The correlation between the variables shows a modest explanatory power of the model estimated. But it was identified a positive effect in the intention

of using as result of the perception of productivity improvement.

H6) If the assistance system improves satisfaction of ERP use it increases the behavioral of using this assistance system

In order to evaluate those research hypothesis, we estimated a regression, where SAT (assistance system improves satisfaction in the use of ERP) is independent variable and INT (intention of using the system) is dependent variable.

SOURCE	DF	SS	MS	F	Prob.>F
Regression	1	297.196	297.196	219.352	0.000
Residual	398	539.244	1.355		
Total	399	836.440			

Dependent Variable: "INT"

R	R2	F	Prob.>F	DF1	DF2
0.596	0.355	219.352	0.000	1	398

Adjusted R Squared = 0.354

Std. Error of Estimate = 1.164

Variab le	Beta	B	Std. Error	t	Prob.>t	VIF	TOL
"SAT"	0.596	0.628	0.042	14.811	0.000	1.000	1.000

Constant = 1.810

Like in the previous model, the correlation between the variables shows a modest explanatory power of the model estimated. But it was also identified a positive effect in the intention of using as result of the perception of satisfaction improvement.

Note: "Tolerance" (TOL) is a measure of multicollinearity. The "Variance inflation factor" $VIF = 1/TOL$ is used instead, as it could be interpreted more easily. It shows directly how much the standard error of the estimation is inflated by the multicollinearity.

VIF>10 (equivalently TOL<0.1) would indicate a multicollinearity problem.

4 Conclusion

In this paper we analyzed the acceptance of assistance systems. In fact, success of ERP depends on capacity of using the system. As complex system, it depends heavily from user assistance. In this paper, we analyzed the acceptance of user assistance systems. In order to analyze, we used as theoretical framework the Technology Acceptance Model (TAM). This theoretical framework proved to be adequate to explain the level of acceptance and potential adoption of assistance systems by users. On the other hand, it showed that the ease of use is an important issue in the adoption of a specific user assistance system.

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