國科會八十八年度研究計劃結案報告

資訊系統接受度之外在因素探討

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ABSTRACT

This study investigates the determinant factors that influence user's perceived usefulness of IS. The results show that three categories of factors influence perceived usefulness: system quality, user factors and organizational factors. Among user factors and organizational factors, user's job demand is a critical user factor, and psychological climate towards IS and MIS specialists' interaction with top managers are critical organizational factors, identified as significant forces to determine perceived usefulness of IS.

INTRODUCTION

The technology acceptance model (TAM) has been one of the most influential theory in accounting for information system/information technology (IS/IT) acceptance of end users [1]. In this model, as illustrate in Figure 1, the central constructs are perceived ease of use and perceived usefulness of IS, which affects the intention to use and further affects the actual use of IS. The constructs of perceived usefulness (PU) and perceived ease of use (PEOU) have been proven to have high validity. Furthermore, the correlation of PU and system use can be as high as .85 and that of PEOU and system use, .59 [2].

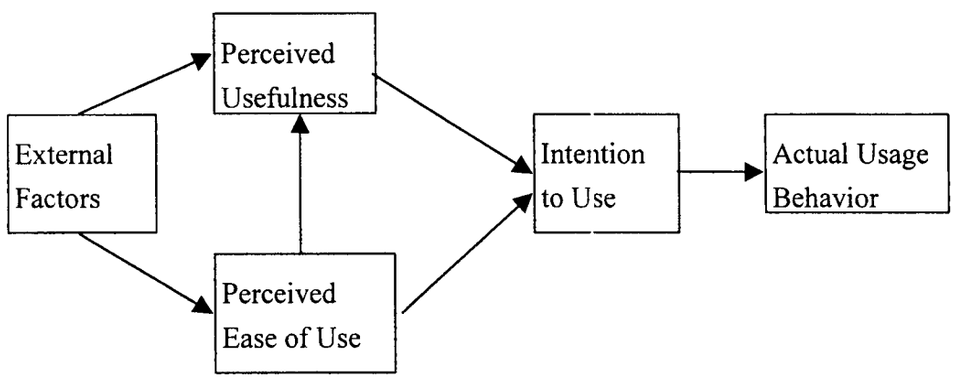

Figure 1: Technology Acceptance Model

TAM successfully demonstrates that user's perception and belief about IS strongly determines system use behavior. However, the external variables are not analyzed in TAM, and the exploration of the external variables has theoretical and managerial significance. Therefore, this paper will provide an extended model to account for the external variables in TAM. In particular, this project will only focus on the external variables of PU because the effect of PEOU on system usage has been challenged, whereas the effect of PU has been very robust [3].

THE THEORATICAL FRAMEWORK

The literature of behavioral science has identified three factors that affect human perception process: the perceiver, the perceived object and the environment of perception [4]. The factors that affects perception of IT can thus be hypothesized as the characteristics of IT user, the characteristics of IT and the organizational environment where IT is used.

H1: the determinants of perceived usefulness of IS can be categorized into three separate constructs: user factors, system factors and organizational factors.

The study of Igabaria, Guimaraes & Davis supports this hypothesis [5]. However, in their study, the categorization of those determinant factors was a summary of previous studies of IS use and lacked an a priori hypothesis. Moreover, Igabaria et. al. assumed that the critical characteristics of the user variable were training and experience, and those of the organizational variable were EUC support and management support. This assumption is too strong in the sense that the factors listed for each of the two categories might not be exhausted. Therefore, the main purpose of this project is to explore other possible factors in the user and organizational categories to explain PU of IS.

User Factors

The relationship between individual factors and IS success has been extensively investigated and received controversial results. For example, user's cognitive style appears to fail to account for IS success. Nevertheless, the fit between user's needs and system were emphasized in the literature [6]. So, individuals who have high job demand and find IS fits their needs might have positive perception towards IS. For instance, users who have high needs in editing text should perceive work processor more favorably than those who have less such job needs. Hence, it is hypothesized that user job demand will influence their perception towards the information system that fits their job needs.

H2a: User job demand will influence perceived usefulness of IS.

User anxiety and affect towards IT was another individual factor found to significantly affect IS use [7]. Individuals' affective attitudes usually have an impact on their cognitive attitudes (e.g. perception, belief). Therefore, it is hypothesized in this paper that user affects will also influence their PU of IS.

H2b: User affects will influence perceived usefulness of IS.

In addition to the factors of experience and training, user's job needs and affects are proposed to affect PU of IS and are classified into the user category.

Organizational Factors

Organizational factors for IS use and acceptance have been extensively discussed in MIS literature. In addition to top management support and end user computing support,

social aspects of organization, such as the relationship between MIS specialists and end users, have been reported to be significant for IS success [8]. If MIS specialists have excellent interpersonal skills to level out suspicion about effectiveness of IS and to provide satisfactory consultation of IT skills to end users, then users should have more positive perception about IS. Therefore, it is hypothesized that the interaction quality of MIS specialists and other members in the organization will have a significant impact on user's perceived usefulness of IS.

H3a: The interaction of MIS specialists and other members in the organization will influence perceived usefulness of IS.

The other social aspect to be investigated in this project is psychological climate, namely everybody's perception of information system in the organization. In most cases, our perception can be affected by the values shared by the people around us. Moreover, psychological climate was found to affect IS usage and success [9]. Thus, it is hypothesized that psychological climate towards IS will have a significant impact on user perceived usefulness of IS.

H3b: Psychological climate towards IS will influence perceived usefulness of IS.

In sum, two user factors and two organizational factors are investigated in this project to account for user's perceived usefulness of IS, which are user's job demands, user's affects towards IS, the interaction of MIS specialists with other members in the organization and lastly, psychological climate towards IS.

RESEARCH METHOD

Sample and Procedure

A questionnaire titled as a survey of computer acceptance was distributed to 17 companies in Taipei, Taiwan, with eight banks, five insurance companies, 3 computer companies, one transportation company. All of the surveyed companies have been at least partially computerized, and have been using electronic spreadsheet to process information, which was chosen as our target software in this survey. There were 170 questionnaires in total sent out, and 128 of them returned, representing a response rate of 75.3%. Out of the 128 questionnaires, 24 questionnaires were not complete and excluded from further analysis. The profile of the 104 valid respondents is demonstrated as Table 1.

Table 1: Profile of Respondents

Age	mean	29.4 years		
Gender	Male	63%	Female	37%
Education	Master's	19%		
	Bachelor's	73%		
	High School	8%		
Organizational Level				
Professional staff	43%	Clerks	44%	
First-level supervisor	7%	Middle Manager	4%	
Executive	2%			

Data Analysis

Three statistic techniques are used to analyze the data: factor analysis, correlation analysis and regression. Factor analysis is used to examine if the responses of the test items

can be grouped into the hypothetical constructs. Correlation and regression analyses are used to investigate the relationship between the determinants and user's perceived usefulness.

RESULTS AND DISCUSSION

To see if the responses can be clustered into the hypothetical constructs, factor analysis is conducted and the results are demonstrated as Table 2.

Table 2: Factor Analysis of the Determinants of Perceived Usefulness

	1	2	3	4	5
1. debug	.69	.21	.44	-.03	-.15
2. concise output	.66	.29	-.01	-.04	.35
3. help function	.67	.14	.18	.00	.07
4. handy	.73	.25	-.02	.05	.29
5. vivid display	.63	.20	-.05	.05	.32
6. multi-task	.78	.13	.03	.13	-.09
7. liking	.43	-.20	.22	.01	-.01
8. orgniazational attitude	.09	.64	.32	-.00	-.11
9. organizational competitiveness	.18	.89	-.04	.01	.05
10. organizational efficiency	.25	.85	.02	-.01	.09
11. organizational productivity	.18	.83	.06	.09	.08
12. communication with end user	.15	.01	.75	.07	.06
13. explain menu	-.03	.02	.62	.01	.04
14. end user satisfaction	.30	.13	.65	.08	.10
15. data editing	.05	-.00	.03	.71	-.11
16. process graphics	-.01	.07	-.13	.79	.04
17. process number	-.05	.17	.16	.71	.02
18. required by task	.16	-.18	.17	.60	.17
19. relationship with CEO	.13	.10	.44	.06	.56
20. support from CEO	.03	.28	.34	.21	.47
21. promotion of MIS staff	.05	-.18	.04	.09	.70
22. conflict	-.29	-.04	.14	.06	.53
23. overall automation	-.11	.21	.31	-.31	.48

Construct: 1. System Quality
2. Psychological Climate
3. Interaction with End Users
4. User Job Demand
5 . Interaction with Top Managers

Table 2 shows a Varimax rotated principal components factor analysis of the twenty-three test items, with a 1.0 eigenvalue cutoff criterion. A five-factor solution is obtained. Those factors are system quality, psychological climate, interaction with end users, user job demand and interaction with top managers.

The factor analysis shows that the constructs of system quality, psychological climate and job demand are single dimensional, as predicted by the hypotheses. However, the other two constructs, user's affect and interaction of MIS specialists with other members, reveal to belong to more than one dimension. The loadings of user's affect, distributed among the constructs of system quality and job demand. Compeau & Higgins (1995) also found it to be multidimensional. As for the concept of interpersonal relationship between MIS specialists and other members, the factor loadings are classified into two factors: interaction with end users and interaction with top managers.

For the assessment of the measures, internal consistency reliability and discriminant validity of these five factors are examined. For discriminant validity, items should load higher on their own construct than on other constructs in the model. As illustrated in Table 2, for each of the test items, the highlighted numbers, which are the loadings on the its own construct, are higher than the loadings on other constructs. In addition, the item loading of its own constructs are all higher than .50 (except 3 of them are a little slighter than .50).

The reliability (Cronbach's alpha) of each construct is shown as Table 3. The reliability values of the constructs of system quality, psychological climate and perceived usefulness are at least as high as .85. The reliability of job demand is .68, just a little lower than .70. However, the reliability of the two interaction factors does not seem to be

adequate. The scales of the constructs of user affect and MIS specialists' interaction with other members need further modification and re-examination in order to reassess their impact on perceived usefulness.

Table 3: Reliability of the Hypothetical Constructs

Factors	1	2	3	4	5	6
ICR	.85	.86	.58	.68	.62	.89

ICR refers to internal consistency reliability.

Factors 1-5 are the same factors in Table 2, and factor 6 indicates perceived usefulness.

So far, the independent variables, namely the determinants of perceived usefulness, have been investigated. Let's look at the explanatory power of these independent variables, the five constructs developed from the factor analysis. Table 4 demonstrates the correlations of these five constructs with the dependent variable, user's perceived usefulness. The correlations between these constructs and PU are highly significant, except the correlation between PU and interaction with end users. These results support the hypotheses of H1, H2a, H3a and H3b.

Table 4: Correlations of Perceived Usefulness and the determinants

	Perceived Usefulness
1. System Quality	.388**
2. Psychological Climate	.221*
3. Interaction with End User	.069
4. User Job Demand	.254*
5. Interaction with Top Manager	.245*

** $p<.01$ *$p<.05$

The analysis of regression reveals similar result pattern obtained from the correlation

analysis. In total, the model explains 33.6% of the variance in perceived usefulness. Each of the independent variables, except the construct of interaction with end users, has significant contribution in explaining the variance of perceived usefulness. Again, the results of regression analysis support the hypotheses of H1, H2a, H3a and H3b. Nevertheless, user's affect is not a significant factor to account for user's perceived usefulness. It could be because users have more computer experience than before and the personal experience of computer can reduce negative affect to some extent.

Table 5: Regression Analysis of the Proposed Model

Equation	R^2	Adjusted R^2
PU=S+JD+IT+PC+IEU	.336	.307
= S	.151	.142
=S+JD	.224	.208
=S+JD+IT	.288	.265
=S+JD+IT+PC	.336	.307

PU: perceived usefulness
S: system quality
JD: job demand
IT: interaction with top managers
PC: psychological climate
IEU: interaction with end users
Note: each variable enters the model at the significant level of .05.

CONCLUSION

The results in this project yield three main insights regarding perceived usefulness of IS:

(1) IS system quality is a significant determinant of perceived usefulness.

(2) User's specific job demand, is a significant determinant of perceived usefulness.

(3) The organization factors, such as psychological climate and MIS specialists' interaction with top managers, are significant determinants of perceived usefulness.

The match between user's job needs and the functions provided by the IS plays a

significant role in accounting for user acceptance. This result is congruent with the studies of user involvement of IS [10], which illustsrates that user involvement can enhance the probability of IS success by conveying user's needs to the system designers. Similarly, to enhance user's acceptance for IS, user's job needs should be fulfilled. That is, when choosing or desinging an IS, the decision maker and IS specialists should take the perspective of the users.

Another interesting result in this project is the impact of psychological climate on user's perceived usefulness. If everybody else in the organization harbors a positive attitude towards IS, then users are more likely to assume the same attitude. This result implies that to enhance user acceptance of IS, organization culture is also an important factor.

The other organizational factor, the interpersonal ability of MIS specialists was investigated in this project. The results show that the interaction quality between MIS specialists and end users does not contribute to the variance of perceived usefulness. It might be because electronic spreadsheet, the target information system studied in this project, appears as software package, such as Lotus 123, or Excel. Therefore, there is no design stage and hence no need for user involvement. So, the interaction quality of end user and MIS specialists does not seem that important. On the other hand, the interaction quality of MIS specialists and top management has an impact on user's perceived usefulness. As mentioned in the former paragraph, organizational culture is an influential factor for user's perceived usefulness of IS. Organizational culture usually reflects the value system of the top management, which includes the attitudes towards IS and IS specialists. Therefore, the interaction quality between top management and MIS specialists might reflect, besides the interpersonal ability of MIS specialists, part of the organizational culture towards IS, which

further influence user's perceived usefulness of IS.

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