An Integrated Model for User Resistance to Information Systems — The Taiwan Case

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ABSTRACT

One of the factors frequently cited as the major reason for the failure of information system implementation is "User Resistance." This article creates an integrated research model to investigate the relationships among user resistance, user involvement and some contextual factors in Taiwan. Path analysis is used to investigate both the direct and indirect effects of the contextual factors on user resistance. The results show that among others, the system service factor, system technology factor, user growth need factor and user existence need factor have the most important impact on user resistance in Taiwan's environment. The culture value difference between Taiwan and Western Nations and its implication to IS implementation are also discussed.

INTRODUCTION

The pace of the technological revolution in this century has heightened fears that humans are becoming subservient to machines. This threat is perceived in information systems which incorporate advances in process control, micro technology, teleprocessing, expert systems and distributed process. Implementation of change in computing as in other fields needs to identify and analyze why employees would oppose innovation. One also needs to develop strategies to raise acceptance of change [16]. Many theories or models have been proposed to explain and analyze the reasons for user resistance, but some limitations do exist in previous models, such as researches are rarely based on sound theories; variables/dimensions are too limited; there is no consideration about the interactions among various factors; dimensions are created based only on author's subjective opinions. The purpose of this research is to create an integrated research model to analyze and explain the user resistance phenomenon in Taiwan.

The research model created in this study has the following characteristics; they are:

1. Comprehensive: the model covers multiple dimensions, such as technical factors, organizational factors, user factors and Information System (IS) factors.

2. Multi-leveled: the model studies and discusses both the direct and indirect relationships among factors.

3. Objective: the factors/dimensions classified in this study are determined by scientific method rather than the author's subjective judgement.

4. Theory-based: the integrated model proposed in this study is formulated by using well-established theories, such as User Resistance Theory, Human Need Theory and User Involvement Theory, etc.

Besides the research model, the culture value difference between Taiwan and Western Nations and the impact of this difference on the IS implementation and user resistance are also analyzed.

LITERATURE REVIEW

The purpose of this study is to build an integrated research model to examine and verify the relationships among the factors which affect user resistance to IS. The basic theories which lay foundation for this integrated research model and are reviewed in this study are: User Resistance Theory, Human Needs Theory and User Involvement Theory.

User Resistance Theory (URT)

Two categories of URT have been proposed in previous researches. The first one is the so-called single-leveled URT: User resistance is regarded as a dependent variable (DV), while contextual factors (which include user's factors, technical factors, organizational factors, etc.) as independent variables (IV), and the direct relationships between DV and

IV are examined. In this type of research, neither interactive relationship among DVs nor indirect relationship between IV and DV is considered. The second category is the so-called multiple-leveled URT, which divides IV into many dimensions and uses the concept of intervening (intermediate) variables (INV) to explore the interactive relationships and indirect relationships among variables.

Single-leveled URT. Many researchers have identified various factors which have significant direct impact on user resistance. This study groups these variables into the following four categories/dimensions.

Technical Dimension. User's problems may be caused, or certainly influenced, by a variety of technical factors associated with the system. The following technical factors have been identified by many researchers:

- Ease of use: The degree to which the intended user sees the system as being unfriendly or difficult to use will add to the user's psychological cost of using the system. A high perceived cost of using the system requires its perceived benefits to be great [6].
- Cost and time: If the system was delivered over budget and/or later than promised, users tend to acquire negative feelings about the system [6].
- System response and reliability: Situations in which the system reacts too slowly, crashes, or is unavailable when needed have been known to create greater user dissatisfaction [6].
- Previous systems experience: There have been cases in which previous bad experiences with systems have carried over to new system activities in a negative manner [6].
- Data problem: If the data in the system is felt to be inaccurate or incomplete, users tend not to use the system [6].
- Structure of system: User involvement is more critical for certain systems than for others. For example, developing a highly unstructured system, user involvement will become very important for improving user acceptance [18].
- Quality of information: Quality of information has long been recognized as one of the most important factors for successful IS implementation and user acceptance of the IS [27, 4]. Srinivasan [40] suggested that the quality of IS can be measured by the following five factors: output contents, output form, problem solving capability, input procedure and system stability.
- Meeting the requirement: Users only accept systems which can meet their requirement exactly.
- MIS support: The quality of service provided by MIS includes the organizational support for developing and maintaining the system as well as the system product itself. This has been suggested as a major factor contributing to user acceptance [35, 19].

Organizational and Political Dimension. In this dimension, the following factors have been identified:

- Organizational climate: There are some instances in which the organizational climate has been so hostile that it is difficult for a user to accomplish change and accept the new IS [46, 6].
- Organizational commitment to change: Commitment to change means that the organization (both user and management) is willing to accommodate the changes that are likely to be required to avoid systems that fail to be implemented successfully [11].
- Power and control redistribution: Introducing a new system would result in the redistribution of organizational power and control, thus user resistance might occur [6, 16, 20].
- Conflicts among organizational subunits: The introduction of a new system will sometimes result in conflicts among each division's goals and interests. This would also lead to user resistance [31].

User's Dimension.

- Age of user: Younger users tend to be more flexible and more willing to accept new changes [27, 9].
- Educational level of user: Higher educated users tend to be more willing to accept new challenges [27].
- Perceived need: For a system to be used, and used successfully, a user must perceive a need for it [6].
- Communication and feedback channels: More effective communication channels lead to greater user acceptance of the system [29].
- Related training: Sufficient and good training courses lead to more comfort and easier acceptance of IS [38].
- Degree of expected use of IS: It has been suggested that the way users expect a system to contribute to their performance and their belief that performance is related to rewards they would receive are important to how the user will employ a system [46].
- Control of change: There is evidence to support the proposition that people do not resist change so much as they resist having no control over change [6].

Job Threatening Dimension. Argyris [3], Kotter & Schlesinger [23], Hussain & Hussain [16] have suggested that the following job related factors would cause the user to resist a new IS:

- Loss of status

- Economic insecurity
- Interpersonal relationships altered
- Change in job content
- Loss of power
- Change in decision making approach
- Uncertainty / unfamiliarity

Multi-leveled Model. Some researchers [36, 41, 28, 5] argued that the single-leveled model cannot truly represent the real situation in the world, the phenomenon of user resistance is more complicated than single URT suggests, there might exist intermediate variables and there are interactive relationships among independent variables.

Tait and Vessey [41] created a two-leveled research model to investigate the role of user involvement and treated it as an intermediate variable to explain user resistance. However, there are some limitations to the Tait & Vessey Model:

1. Too few variables included in the model (only six are studied).
2. Lack of organizational and political dimensions.
3. No scientific basis on dimension selection.

Lucas [28] developed a multi-leveled model (Descriptive Model) to explain the success of information system implementation. The model includes technical factors, system attributes, decision styles, individual and situational factors. However, the limitations of Lucas's model are:

1. Dimensions are created by the author's subjective opinions.
2. No consideration about political factors.
3. Relationships among variables are tested one by one separately, ignoring the interactive relationships.

Theory of Human Needs and Motivation

To motivate the end user to accept and use the system remains one of the most challenging problems faced by the MIS staff. Many theories concerning human motivation and needs have been proposed by the organizational behavior researchers. Examples of these are the Reinforcement Theory [39], Attribute Theory [13], Dual Factor Theory [14], Expectancy Theory [43], and Goal Setting Theory [26]. Among them the most highly regarded motivational theory is Maslow's Needs Hierarchy [32]. Maslow contended that individuals are motivated to satisfy the following set of needs: basic physiological needs, safety and security, social activity, esteem status and self-actualization. According to Maslow, fulfillment of these needs tends to be hierarchical. Individuals fulfill these needs sequentially, starting with physiological needs and ascending up the hierarchy to self-actualization. Based on Maslow's theory, Alderfer[1] created a new theory called the ERG Model (Existence Relatedness Growth). It involves three sets of needs:

1. Existence: needs are satisfied by such factors as food, air, water, and pay.
2. Relatedness: needs are satisfied by meaningful social and interpersonal relationships.
3. Growth: needs are satisfied by an individual being creative or productive.

Although the ERG Model corresponded to Maslow's Hierarchy of Needs, it suggested that in addition to the satisfaction-progression process that Maslow proposed, a frustration-regression process is also at work. If a person is continually frustrated in attempts to satisfy Growth needs, Relatedness needs reemerge as a major motivating force, causing the individual to redirect efforts toward satisfying a lower-order need category.

Because the ERG Model is consistent with other theories of rational choice and attributes freedom to the individual, it has since become very popular.

User Involvement Theory (UIT)

User involvement refers to participation in the system development process by the target user group. Two areas of organizational behavior theories are considered particularly relevant to UIT: "Participative decision making" and "Planned organizational change" [18].

Participative Decision Making (PDM) The goal of PDM is to add the input of subordinates into some management decisions that are related to their job. User involvement can be considered a special case of PDM in which users and system designers are substitutes for the superior and subordinates. User participation in system development is being predicted to increase user acceptance of the system by:

- Developing realistic expectations about system capabilities [10].
- Committing the user to the system [27, 31].
- Decreasing user resistance to change [27].
- Leading to system ownership by the user [37].
- Providing an area for bargaining and conflict resolution about design issues [22].

Planned Organizational Change (POC). In the theory of POC, implementation success (i.e. acceptance and use of a new system) is considered to be dependent on the quality of the implementation process [11]. Research on POC assumes that change entails either a joint effort [11] or negotiation between the manager and the change agent [45]. A process of open interaction and joint evaluation is expected to assure both high acceptance and a high quality solution [45].

Information system can be considered an example of POC. The development staff is the "change agent" and acceptance of the system is dependent on the relationship between the staff and the user [18].

Types and Degree of User Involvement. Mumford [33] proposed three types of participation from the least to the most direct : consultative, representative and consensus. The degree of involvement refers to the amount of influence the user has over the final product. Six categories provide a spectrum of increasing degree of user involvement [18]:

1. No involvement: Users are unwilling or not invited to participate.
2. Symbolic involvement: User input is requested but ignored.
3. Involvement by advice: Advice is solicited through interviews or questionnaires.
4. Involvement by weak control: Users have "sign-off" responsibility at each stage in the system development process.
5. Involvement by doing: A user is a design team member, or is the official "liaison" with the information system development group.
6. Involvement by strong control: Users may be paid directly for new development out of their own budgets.

RESEARCH METHODOLOGY

Research Model

Based on the theories mentioned above (i.e. User Resistance Theory, Human Motivation Theory and User Involvement Theory) an integrated, multi-leveled user resistance research model was initially created as in Figure 1. According to Figure 1, the aim of this research is to investigate the following questions:

(1) Does the user involvement have impact on user resistance in Taiwan society ?

The relationships between these two variables are inconclusive in western nations [18]. Here we try to explore the relationship between these two factors in a country with different cultural values (in our case, Taiwan).

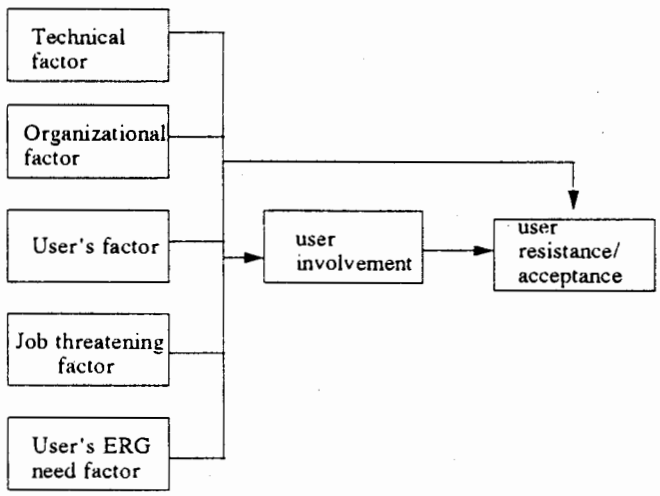
(2) Do the selected contextual factors (i.e. Technical, Organizational, User, Job Threatening, User's ERG) have direct impact on user resistance in Taiwan society?

Different cultural values might have different impact on user's attitudes, work ethics, perceptions and expectations. This study is trying to investigate these problems and issues under this previous assumption.

(3) Do the selected contextual factors have impact on user involvement and through this intermediate variable thus create indirect influence on user resistance?

Lin & Ashcraft [24] ever wrote about user involvement: "User involvement makes the new CBIS more acceptable to user ... . In many cases user involvement depends on other factors such as the personality and the background of the users, management style, organizational politics etc. ... These factors, which are part of the corporate culture, affect the attitude of a user toward system development and his willingness to be involved." In this study we not only investigated direct impact of contextual factors on user resistance, but also explored indirect impact of these factors through the intermediate variable (user involvement) on user resistance. Only when based on this multi-leveled research model, can a complex situation like user resistance to IS be explored more deeply and accurately.

Figure 1
The Initial Research Model



Research Variables

The variables selected in this study are based on previous researches mentioned in Section Two (literature review). They can be divided into three categories: contextual variable group, intermediate variable group and dependent variable group.

The Contextual Variable Group. Selected from the previous research the contextual variables used in this study are shown in Table 1.

Likert and Semantic differential scales were used to

Table 1
Variables and Dimensions Used in This Study

Technical Factors	Organizational/ Political Factors	User's Factors	Job Threatening Factors	ERG Factors
• Ease of use	• Organizational climate	• Age	• Loss of status	• Existence need
• Cost and time	• Organizational commitment to change	• Education	• Economic insecurity	• Growth need
• System response and reliability	• Power redistribution	• Perceived need	• Interpersonal relationships altered	• Relatedness need
• Previous system experience	• Conflict among organizational submit	• Communication and feedback channel	• Change in job contents	
• Data problem		• Related training	• Loss of power	
• Structure of system		• Degree of expected use of IS	• Change on decision making approach	
• Requirement meet		• Control of change	• Uncertainty	
• Support from MIS				
• Output contents				
• Output form				
• Problem solving capability				
• Input procedure				
• System stability				

measure most of the responses, for example, "Meeting user requirement" is measured as such:

Does the information provided by the IS meet your requirement ?

not at all ⌊_|_|_|_|_|_⌋ very much
1 2 3 4 5 6 7

Multiple Items are used for some independent variables. For example, "Output contents" are measured by four items (accuracy, relevance, adequacy and understandability), suggested by Srinivasan [40].

Intermediate Variable. Measures of user involvement refer to general involvement in IS development [37, 46] or to involvement in the design of a specific system (used in this study) [27, 28]. Generally these are Likert-type scales, based on self-reports of user perception of their own involvement [18]. The user involvement measurement used in this study asked the user to select one of the following involvement types (mentioned in Section Two):

1. No involvement
2. Symbolic involvement
3. Involvement by advice
4. Involvement by weak control
5. Involvement by doing
6. Involvement by strong control

The later the choice, the higher the degree of involvement is assumed.

Dependent Variables: Many variables have been used to measure the attitudes of the user toward system implementation, such as user resistance [2], user satisfaction [36], user acceptance [17], user's feelings toward IS [30]. The measurement used in this study is a semantic differential composite scale which contains four items (user resistance, user satisfaction, user acceptance, user's feeling about system). Therefore in this study user acceptance and user resistance are used interchangeably.

Data Collection

The data were collected using a questionnaire that had previously been pilot-tested initially by ten experienced computer end users, and their opinions were used to eliminate redundancy and clarify ambiguity. The first part of the questionnaire gathered demographic data on the respondents. The second part sought data on the user's background, job threatening factors, system factors and organizational factors. The final section addressed the level of user involvement and resistance/acceptance of IS. Three hundred questionnaires with cover letters were sent out to the participants of the Business Administration Training Program (BATP) offered by the College of Management, National Sun Yat-Sen University (located in Southern Taiwan). The participants were all full-time employees in industry and they were asked to answer the questionnaire only if they had experience in using and involvement in the development of an information system

Table 2
Respondents' Demographic Data

Sex	Male: 70 (62.5%)			Female: 42 (37.5%)	
Age	less than 30	31–40		40–50	more than 50
	37	42		22	11
	(33.0%)	(37.5%)		(19.6%)	(9.8%)
Education	high school or below	junior college		university	graduate school and above
	18	40		38	16
	(16.1%)	(35.7%)		(33.9%)	(14.3%)
Position	clerk	supervisor		junior manager	senior manager
	40	35		24	11
	(35.7%)	(31.3%)		(21.4%)	(9.8%)
Job work experience	less than 1 year	1–3 years	3–5 years	5–10 years	more than 10 years
	10	21	35	28	18
	(8.9%)	(18.7%)	(31.3%)	(25%)	(16.1%)

Table 3
The Result of Factor Analysis

Variable	factor loading	eigen value	explanation	cronbach
• ease of use	0.884			
• input procedure	0.807			
• control of change	0.770			
• requirement meet	0.739			
• previous system experience	0.683			
• structure of system	0.653			
• degree of expected use	0.548	4.4319	26.35%	0.8289
• support from MIS	0.749			
• output contents	0.737			
• related training	0.641			
• communication/feedback channel	0.600			
• problem solving capability	0.507	2.7481	15.83%	0.8364
• uncertainty	0.771			
• change in job contents	0.717			
• loss of status	0.684			
• loss of power	0.612			
• power redistribution	0.581	1.811	11.09%	0.7511
• perceived need	0.931			
• age	0.927			
• expected use of IS	0.889			
• system stability	0.790	1.3461	9.14%	0.6019
• organizational commitment to change	0.741			
• organizational climate	0.606	1.0017	6.36%	0.6211

(i.e. he or she must be, or have been, an end user of IS). One hundred and twelve useful responses were obtained for a 37.3% response rate. The demographic data of the subjects are described in Table 2.

DATA ANALYSIS

Factor Analysis and Validation

Factor Analysis was used to find the underlying dimensions of independent variables. The principle components factors analysis yielded five factors. Only the factors whose eigen values were greater than one were selected. The five factors are: System Technology Factor (F1), System Service Factor (F2), Job Threatening Factor (F3), User's Factor (F4) and Power/Political Factor (F5). The factor loadings resulting from a varimax rotation are shown in Table 3 (only the variables whose factor loading was greater than 0.5 were selected, others were deleted). Cronbach alpha coefficients of reliability for the above five factors were also calculated (0.82, 0.83, 0.75, 0.60, 0.62 respectively) and the points were higher than the coefficient alpha threshold level of 0.60 suggested by Nunally [34]. These results substantially validate the scales and are reliable measures of the five related dimensions. The Cronbach alpha coefficients were also calculated for the five composite scale factors which were used to measure the quality of IS. The resulting points were higher than 0.60 (output contents = 0.73, output form = 0.68, problem solving capability = 0.84, input procedure = 0.75, system stability = 0.62). Pearson correlation coefficients were used to test internal consistency among different items used in measuring user resistance (i.e., resistance, satisfaction, acceptance and feeling). The coefficients validate the scales and are therefore reliable in measuring user resistance (see Table 4).

The three human needs variables — Existence, Relatedness and Growth — are not included in the factor analysis mentioned above, for the ERG model is a highly recognized theory and a very mature one. There is no need to explore any other kind of underlying dimensions for the human needs.

Path Analysis

The method used to test the research model is path analysis. This is a multiple regression technique suited to

Figure 2
An Integrated User Resistance Research Model

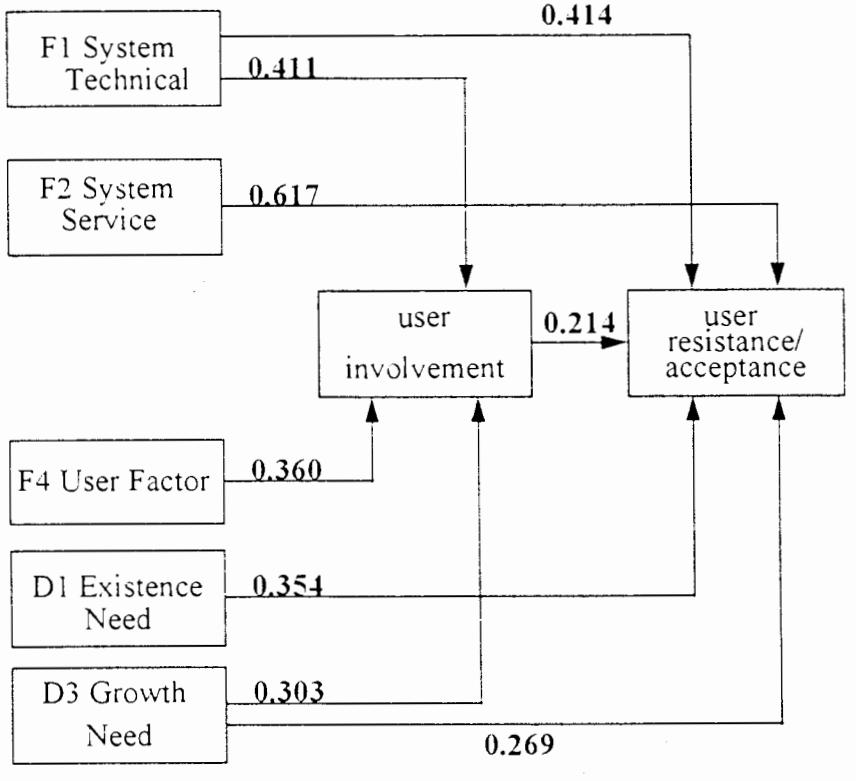


Table 4
Matrix of Intercorrelations Among the Four Dimensions for the User Resistance Instrument

Measurement	UR	US	UA	UF
user resistance (UR)	1.00			
user satisfaction (US)	0.901	1.00		
user acceptance (UA)	0.89	0.86	1.00	
user feeling (UF) about IS	0.79	0.84	0.90	1.00

investigate sequential models such as those proposed in this study [41]. One of the major strengths of path analysis is its ability to distinguish among the different effects of one variable on another. For this study's purpose, path analysis permits the research to determine: (1) the direct effects of one variable on another and, (2) the indirect effects of the first variable on the second through one or more intermediate variables. Path analysis of the model involves user involvement and user resistance. Figure 2 represents the model and the path coefficients, while Table 5 summarizes the results. The first regression was conducted with user acceptance as the internal variable, while user involvement, system technical factor, system quality factor, user's factor and job threatening factor were the external variables. Table 6 represents the direct, indirect and total effects of the model variables on user resistance.

Table 5
The Coefficient of Path Analysis

Factor	Y1=user involvement	Y2=user resistance
F1 (STF)	0.411*	0.414*
F2 (SSF)	0.164	0.617*
F3 (JF)	0.033	0.091
F4 (UF)	0.360*	0.089
F5 (OF)	0.101	0.143
D1 (E)	0.135	0.354*
D2 (R)	0.141	0.089
D3 (G)	0.303*	0.269*
Y1	--	0.241*

$\alpha = 0.05$

Table 6
Direct, Indirect and Total Effect of Factors on User Resistance

Factor	Direct	Indirect	Total
STF F1	0.413	0.088	0.503
SQF F2	0.617	0.101	0.718
JF F3	0.091	0.033	0.124
UF F4	0.368	0.033	0.401
OF F5	0.143	0.021	0.164
E D1	0.354	0.048	0.402
R D2	0.089	0.013	0.102
G D3	0.269	0.082	0.351
Y1	0.214	--	0.214

$\alpha = .05$

RESULT OF DATA ANALYSIS

User Involvement (Y1)

Among the eight factors, three of them were found to have significant impact on user involvement. These factors are system technology factor (0.411), user factor (0.360) and user growth need factor (0.303).

Impact of system technology factor (F1) on user involvement (Y1) (0.411) To be considered for user involvement in Taiwan, the information system must be simple, easy to use, the input procedure must be designed very friendly, and user requirements must be met; also users must hold control on change, and have a high expectation to use IS.

The impact of user factor (F4) on user involvement (0.360) In Taiwan, the characteristics of the user's background would affect user involvement. Younger users with higher perceived needs and expectations are more likely to be involved in the IS development and implementation.

The impact of user growth need (D3) on user involvement (0.303) The user in Taiwan with high growth needs will push himself (or herself) to accept the new challenge, to learn about new technology and force himself/herself to be involved in the system implementation.

User Resistance (Y2)

The following five factors were identified to be critical to user resistance:

The impact of system technology factor (F1) on user resistance (0.414) As was mentioned by many researchers [6, 27], technical complexity and difficulty of IS will frus-

trate the user. A welcomed IS must be simple, easy to use, meet user requirements and be easily controlled by the user (i.e. user-oriented).

The impact of system service factor (F2) on user acceptance (0.617) The F2 factor has the most significant positive effect on user acceptance, as demonstrated in the Taiwan case. The MIS which is capable of providing good service and relationship to the user, solving the user's problem, providing an effective communication channel between user and MIS, and providing high quality information would eventually lead to use acceptance.

The impact of the user's existence needs on user resistance (0.261) In Taiwan, if the user remains highly motivated or economically stable, he/she will push himself/herself to accept the new change.

The impact of the user's growth needs on user resistance (0.303) The high motivation on the user's growth needs will persuade him/her to learn the new technology and to accept the challenge.

The impact of user involvement on user resistance (0.214) Although the relationship between user involvement and user acceptance has been inconclusive [18], this positive relationship was confirmed in this study. It means that in Taiwan's environment, the higher the degree of user involvement, the higher the possibility that the user will accept IS.

Direct, Indirect and Total Effects

Table 6 shows the direct, indirect and total effects of a factor's impact on user resistance. Most of the results found in this table are consistent with the findings mentioned above.

CROSS CULTURE ANALYSIS

Culture is the shared beliefs, the ideologies and the norm that influence an organization's management practice. Different cultural values have impact on an employee's attitude, reactions, expectations, and work ethics [42].

To date, the implementation of IS tends to be rooted in western assumptions, values, and ideologies. There is really a need to add a cultural dimension where perceptions differ among users; for example, end users in Taiwan(Chinese) might have very different cultural values and attitudes compared to the end users in Western Nations. [15]

The Confucianism Cultural Values

To understand the cultural values of people in Taiwan, one has to understand " Confucianism." It is a controlling factor in Taiwan's culture. [25] Confucianism formulated social and moral systems intended to govern all the relationships within the family and the state in harmonious unity. It was basically a system of subordinations. It taught loyalty, filial piety, benevolence, propriety wisdom, righteousness, faithfulness and harmony as the norms for a good society and the standard of a "Superior man"[21].

Cultural Value Comparison Between Taiwanese and Western People

Hofstede [15] uses the following four dimensions to compare the cultural values between Taiwanese (Confucianism) and people in Western Nations.

(1) Power Distance Index (PDI) can be seen as a society's endorsement of inequality; on the other hand there is the expectation of relative equality in organizations and institutions.

(2) Individualism (IDV) is the tendency of individuals primarily to look after themselves and their immediate families; on the other hand there is the integration of people into cohesive groups.

(3) Masculinity (MAS) is an assertive and competitive orientation, as well as a sex-role distinction; on the other hand, there is a more modest and caring attitude toward others.

(4) Finally, the Uncertainty Avoidance Index (UAI) taps a feeling of discomfort in unstructured or unusual circumstance; its opposite side shows tolerance for new or ambiguous circumstances.

The results of this study indicate that compared to the United States, the Taiwanese have both higher scores in PDI and UAI, which means the Taiwanese tend to show higher acceptance to hierarchy authority, loyalty (PDI) and more tolerance toward uncertainty (UAI). In contrast to the United States, the Taiwanese have significantly lower scores in IDV and MAS, which implies that the Taiwanese tend to be more collectivistic, caring more about social harmony (IDV) and attitudes and are more modest (MAS).

Franke [8] found, compared to Western Nations, the Taiwanese have significantly higher scores in the Confucian Dynamic Index, which includes the following variables: Ordering relationship, Thrift, Sense of shame, Personal steadiness, Respect to tradition, and Protecting one's "face." Tricker [42] also indicates that Taiwanese belong to a "Large Power Distance with Collectivism" group, and most Western People belong to a "Small Power Distance with Individualism" group. These studies all confirm that, under the Confucianism culture, Taiwanese respect hierarchy authority, loyalty, are capable of tolerating uncertainty, care about harmony with others, are not individualism-centered, but are more modest, and more thrifty.

Involving Cultural Value Difference to IS Implementation

In involving cultural value study to IS implementation, Farn [7] indicated one of the most important Critical Success Factors (CSF) in IS implementation in Taiwan is the so called "Guan-Xi," which means "good relationships with others." Harrison [12] compares the factors of "User Satisfaction with MIS" in both Taiwan and the United States, and the results shows, compared to the United States, end users in Taiwan tend to care more about human-related factors, such as relationships with EDP staff, attitudes of EDP staff, communication with EDP staff, user training, user participation. In contrast, end users in the United States relatively care more about product-oriented factors, such as precision of output, relevance of outputs, accuracy of output, completeness of output, etc. In the study of user resistance to IS in Taiwan, Yu pointed out that the most important factors which lead users to resistance are relationship-oriented factors such as user participation and user relationships with MIS, and because of acceptance of social hierarchy (i.e. higher PDI), change in political power, change in control are not important for end users in Taiwan. Yu also concluded that, besides relationship factors, job challenging and self-esteem are also critical to user acceptance of IS in Taiwan.

Cultural Difference Implication to this Research

Some of the major findings in this research have confirmed previous discussed cross-culture value analysis, for example:

(1) The implication of lower IDV and MAS in Taiwan:

Human relationship is the most critical factor as far as the IS implementation is concerned: In this research F2 (System Service), which includes MIS support, communication, feedback, user training, etc., have the most significant total impact on the user's acceptance to IS (See Table 6).

(2) The implication of higher PDI:

Political conflict and power redistribution are not the major concerns to the end users in Taiwan. In this research power redistribution, loss of power, and loss of status (F3) were not found significant in the model.

(3) The implication of higher UAI:

Uncertainty tolerance(UAI) is a relatively higher concern to end users in Taiwan. The variable "uncertainty" (in F3) is also not viewed significant in the model. This conforms to the Hofstede's UAI findings [15, 44].

(4) User involvement in improving human relationship can have significant and positive impact on user acceptance in Taiwan.

Both Harrison [12] and Yu [44] have confirmed this relationship. Human relationship is so highly valued in Taiwan that it has more consistent influence on user acceptance to IS than that in the United States (still inconclusive).

CONCLUSION

This study has proposed and verified a multi-leveled research model of the factors which would affect user resistance in the Taiwan environment. Eight relationships stemming from the model are verified statistically. As far as user involvement is concerned, the most important affecting factor in Taiwan is the System Technical Factor, followed by the User Characteristics Factor and User Growth Need Factor. On the other hand, the System Service Factor has the most significant impact on user resistance, followed by System Technical Factor, User Growth Need Factor, User Existence Need Factor, and User Involvement Factor. The direct and indirect effects on user resistance are also discussed. Finally, the impact of different cultural values between Taiwan and Western People on the user resistance are analyzed and discussed. Some interesting findings are pointed out, too. The model and analysis results presented in this paper hold important implications for IS practicing managers in attempting to prevent or solve the problems of user resistance to IS, especially when a cultural value dimension is considered to be added as a necessity.

MIS practitioners in Taiwan — managerial level and system developers — should learn how to introduce the IS, under Taiwan's distinct cultures and environment, without causing the end-user's negative reaction. On this subtle issue, here are some suggestions :

Providing a smooth communication channel and excellent service to end users. Under prevalent Confucianism, harmony in interpersonal relationships is always viewed as a primary smooth-functioning factor in Taiwan's society. As such, it is "Guan-Xi" (interpersonal relationship) between system developers and end-users which determines whether an end-user would cooperatively accept the system introduced. Goodwill, benevolence and harmony would help invite the end-user's participation, and increase his or her acceptance to the system introduced.

Providing a high quality system. A high quality system is always a major concern, whether it is in Taiwan, or in western countries. Such characteristics as being easy-to-use, exactly meeting user's requirements, and being user friendly would definitely increase usage and acceptance to the new IS.

Urging user's active involvement. Involvement heightens contacts between developers and users. And through contacts, a mutual-respect bond would develop. The user thus tends to be committed to the newly introduced IS.

Under Taiwan's society, this is a better way, promising success in introducing a new system to users.

Choosing the right users to participate and communicate with. Different users, due to their individual backgrounds, will accept systems differently. In the Taiwan case, it is found that both categories of users — the ones with high user's existence needs and the ones with high user's growth needs — are on the first priority to be considered for getting involved in developing an IS. With their involvement and acceptance, they can be treated and trained as a "liaison" to teach, train and influence other users.

There are some limits in this study which need to be mentioned. The size of the samples was evidently not large enough to generalize the results. Also the measurements used in the study were self-reported as opposed to objectively measured and, due to the large number of variables introduced in the model, most of the variables were measured only by single-itemed scale rather than by multiple items. Future research may be needed to improve the reliability and validity of the measurement instrument.

REFERENCE

[1] Alderfer, C. P., " An Empirical Test of New Theory of Human Needs "," *Organizational Behavior and Human Performance,* May 1969, pp.142-175.

[2] Alter, S., "Development Patterns for Decision Support System," *MIS Quarterly,* Volume 2, Number 3, 1978, pp. 33-42.

[3] Argyris,C."Resistance to Rational Management Systems," *Innovation,* October 1970, pp.28-35.

[4] Bailey, J. E. and Pearson, S. W.,"Development of a Tool for Measuring and Analyzing Computer User Satisfaction," *Management Science,* Volume 29, Number 8, 1983, pp.519-529.

[5] DeBrabander, B. and A. Edstrom, " Successful Information Systems Development Project," *Management Science,* Volume 24, Number 2, 1977, pp.191-199.

[6] Dickson, G. W. and Wetherbe, J., *The Management of Information Systems,* McGraw-Hill, New York, 1985

[7] Farn, C. , Jiang, R. and Harrison, W., "Issues in the Use of Computers by Small Businesses: A Comparison of R.O.C. and U.S. Experience." *Proceedings of the 2nd International Conference on Comparative Management,* June 4-6 1989, Kaohsiung, Taiwan R.O.C., pp. 37-44.

[8] Franke, R. H. , Hofstede, G. and Bond, M. H. , "Cultural Roots of Economic Performance: A Research Note," *Strategic Management Journal* (SMJ), Volume 12, Summer 1991, pp 165-173.

[9] Fuerst, W. L., Cheney, P. H., " Factors Affecting the Percent of Utilization of Computer Based Decision Support System in The Oil Industry," *Decision Sciences,* Volume 13, 1982, pp.148-165.

[10] Gibson, H. L., "Key Recurrent Issues in the MIS Implementation Process," *MIS Quarterly,* Volume 5, Number 2, June 1981, pp.47-60.

[11] Ginzberg, M. J., "A Study of Implementation Process," *TIME Studies in The Management Science,* Volume 13, 1979, pp.85-103.

[12] Harrison, W. L., Farn, C. K. , and Coakley, J. R., "The Elements of User Satisfaction with MIS in Both the U.S. and the R.O.C.," *Proceeding of 4th International Conference on Comparative Management,* June 2-4 1991, Kaohsiung, Taiwan R.O.C., pp. 134-142.

[13] Heider, F., *The Psychology of Interpersonal Relations,* Wiley, New York,1959.

[14] Herzberg, F., "One More Time: How Do You Motivate Employee?" *Harvard Business Review,* Volume 46, Number 1, 1968, pp. 53-62.

[15] Hofstede, G. H., *Culture's Consequences: International Difference in Work-Related Value,* Sage, Beverly Hill California, 1980.

[16] Hussain and Hussain, *Information Resource Management,* Rivhard D. Irin, Inc. 1984

[17] Igersheim, R. H., "Management Response to an Information System," *AFIPS Conference Proceeding,* 1976, pp.877-882

[18] Ives, B. and Olson, M. H., " User Involvement and MIS Success: A Review of Research," *Management Science,* Volume 30, Number 5, May 1984, pp.586-603.

[19] Ives, B.,Olson, M. H. and Baroudi, J. J., "The Measurement of User Information Satisfaction," *Communication of ACM,* Volume 26, Number 10, 1983, pp.785-793.

[20] Joshi, K., "A Model of User's Perspective on Change: The Case of Information Systems Technology Implementation," *MIS Quarterly,* Volume 15, Number 2, June 1991, pp.229-242

[21] Kao, R. H. F., and Oh, M. D., "A Comparative Analysis of the Influence of Confucianism on Management Practices: The Cases of China, Japan, and Korea," *Proceeding of 4th International Conference on Comparative Management,* Kaohsiung Taiwan, pp. 164-170.

[22] Keen, P. G. W.,"Information Systems and Organizational Change," *Communication of ACM,* Volume 24, January 1981, pp. 24-33.

[23] Kotter, J. P. and Leonard, A. S., "Choosing Strategies for Change," *Harvard Business Review,* Volume 57, Number 2, pp. 106-114.

[24] Lin, E. and Ashcraft, P., "A Case of Systems Development in a Hostile Environment," *Journal of Systems Management* (JSM) , Volume 41, Issue 4, April 1990, pp. 11-14.

[25] Liu, A. H. and Rarick, C. A., "Ethics Guiding Manage-

ment Behavior in Confucian and Christian Society: Taiwan and the United States Contrasted," *Proceeding of 4th International Conference on Comparative Management,* June 2-4 1991, Kaohsiung, Taiwan R.O.C., pp. 171-173.

[26] Locke, E. A., "Toward a Theory of Task Motivation and Incentives," *Organization Behavior and Human Performance,* Volume 3, 1968, pp.157-189.

[27] Lucas, H. C., "User Reactions and the Management of Information Services," *Management Information,* Volume 2, Number 4, August 1973, pp.165-172.

[28] Lucas, H. C., Jr., *Implementation: The Key to Successful Information System,* Columbia University Press, New York,1981.

[29] Magal, S. R. & Strouble, D. D., "A User's Perspective of the Critical Success Factors Applicable to Information Center," *Information Resources Management Journal,* Spring, 1991, pp.22-34.

[30] Maish, N. R., "A User's Behavior Toward His MIS," *MIS Quarterly,* Volume 3, Number 1, 1979, pp.39-52.

[31] Markus, M. L., "Power, Political, and MIS Implementation," *Communication of the ACM,* Volume 26, Number 6, June 1983, pp.430-444.

[32] Maslow, A., *Motivation and Personality,* New York: Harper & Row, 1954.

[33] Mumford, E., "Consensus Systems Design: An Evaluation of this Approach," *Design and Implementation of Computer Based Information Systems,* Szyperski, N. and Grochla, E. (Eds), Sijthoff and Noordhoff, Gromingen, 1979.

[34] Nunnally, J. C., *Psychometric Theory,* Mcgraw-Hill, New York, 1976.

[35] Pearson, S., *Measurement of Computer User Satisfaction,* Ph.D. dissertation, Arizona State University, Tempe, 1977.

[36] Power, R. F. and Dickson , G. W., " MIS Project Management: Myth, Opinion, and Reality," *California Management Review,* Volume 15, Number 3, 1973, pp.147-156.

[37] Robey, D. and Farrow, D., "User Involvement in Information System Development: A Conflict Model and Empirical Test," *Management Science,* Volume 28, Number 1, 1982, pp.73-85.

[38] Sander, G. L. & Courtent, J. F., "A Field Study of Organization Factors Influencing DSS Success," *MIS Quarterly,* Volume 9, Number 1, March, 1985, pp. 77-89.

[39] Skinner, B. F., *The Behavior of Organisms,* Appleton-Century-Croft, New York, 1970.

[40] Srinivasan, A., "Alternatives Measures of System Effectiveness: Association and Implication," *MIS Quarterly,* Volume 9, Number 3, 1985, pp. 243-254.

[41] Tait, P. and Vessey, I., " The Effect of User Involvement on System Success: A Contingency Approach," *MIS Quarterly,* Volnme 12, Number 1, March 1988, pp.91-107.

[42] Tricker, R. I., "Information Resource Management — A Cross-Cultural Perspective," *Information & Management* (IFM), Volume 15, Number 1, August 1988, pp. 37-46.

[43] Vroom, V., *Work and Motivation,* McGraw-Hill, New York, 1970.

[44] Yu, T., Yang, S. and Lin, T., "User Resistance Factors for Information Systems—An Empirical Study," *Proceeding of 3rd National Conference on Information Management,* Hsin Chu, Taiwan R.O.C., May 1992, pp. 43-50.

[45] Zand, D. E. and Sorenson, R. E., "Theory of Change and the Effective Use of Management Science," *Administration Science Quarterly,* Volume 20, December 1975, pp.532-545.

[46] Zmud, R. W., "Individual Differences and MIS Success: A Review of the Empirical Literature," *Management Science,* Volume 25, Number 10, 1979, pp.966-979.