Organizational Alienation, Organizational Support And Behavioral Intention To Adopt Information Systems

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ORGANIZATIONAL ALIENATION, ORGANIZATIONAL SUPPORT AND BEHAVIORAL INTENTION TO ADOPT INFORMATION SYSTEMS

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Abstract

Organizations invest a huge amount of resources to deploy information systems (IS) to improve their competitive position. Yet, stories of system failure are still reported frequently, and many organizations did not use these systems to the full extent. The acceptance and usage of ISs by organizational employees is one of the key factors to successfully deploy ISs. The implementation of IS, however, may induce organizational or social change. During the process of social or organizational change, the values, needs, and viewpoints regarding the environment of parties involved may easily deviate from new context. A sense of incongruence between the parties and the new context begins to emerge. People may be feeling meaningless and powerless toward the ongoing phenomenon, hence be careless to and alienated from the new organization. Since the frequency and strength of organizational change become larger and larger in recent years, the perception of alienation inside the organization should become more popular and worsened. The extant literature, however, provides no answers to the question that how will the alienation affect the adoption of IS. This study, based on the integrated model of technology acceptance model and innovation diffusion theory, tries to dig out the answers to the above question. 264 samples were collected from students (volunteer users of e-CAI) of a university located in Taipei city. The results of data analysis support the arguments of TAM, and reveal that alienation negatively influences compatibility, ease of use and usefulness. Organization should provide organizational support that increases the perceptions of ease of use, usefulness and compatibility.

Keywords: Technology Acceptance Model, Innovation Diffusion Theory, Organizational Alienation, Organizational Support, Computer Assisted Instruction, Adoption Intention
INTRODUCTION

Recently, the adoption and deployment of information systems (ISs) become critical to the operations for most of the businesses. Many enterprise systems, such as supply chain management, knowledge management and enterprise resource planning, are deployed. Businesses have devoted abundant resources in adopting and implementing different kinds of systems. For example, in 2008, the global expense of enterprise resource planning (ERP) is estimated to be around 370 billion USD. Some of the large companies may even spend more than 100 millions of USD in deploying ERP. The results, however, are disappointing with nearly half of the projects are end up with failures (Hsieh and Wang 2007). Even though the deployment is successful, IS systems are rarely being used to the fullest potential (Hsieh and Wang 2007; Ventkatesh and Davis 2000). Since the deployment of enterprise system is critical to business performance and competitive advantage, how to successfully adopt IS become managers' strategic trepidation (Ventkatesh and Davis 2000).

Adoption intention is the premise for organizational employees to use ISs to the fullest potential and realize their performance (Hsieh and Wang 2007). An IS, no matter how it is well designed, will not realize the promised return on investment if it is not being used. Many theories such as theory of planned behavior (Huh et al. 2009), expectation confirmation model (Larsen et al. 2009), task technology fit model (Larsen et al. 2009), change management (Martins and Kellermanns 2004), Technology Acceptance Model (TAM) (Hsieh and Wang 2007) have been used in explaining the derivation of adoption intention. Among all the theories, TAM has been widely considered to be the one with greatest explanatory power, and widely applied by researchers. When organizational members perceive the ISs as innovation, Chen et al. (2002) suggested integrating the Innovation Diffusion Theory (IDT) to TAM to provide further explanatory power.

TAM assumes external variables will indirectly affect intention through the mediation of personal beliefs about the system. It has been extended and tested with different external variables and in various applications (Amoako-Gyampah & Salam 2004; Burton-Jones & Hubona 2006; Igbaria et al. 1995; Igbaria et al. 1996; Igbaria et al. 1997; Martins & Kellermanns 2004; Moon & Kim 2001; Venkatesh & Davis 2000; Vijayasarathy 2004; Yi et al. 2006). This study will explore the role of alienation, a personal psychological state, which may have significant influence on behavioral intention but are rarely explored by scholars in information system area.

The perception of alienation commonly exists in people’s minds (DiPietro and Pizam 2008; Nair and Vohra 2010). The generation of alienation usually accompanied with process of social and organizational change, which requires people to adapt, and transit to a new mind set to fit the new environment. An individual’s existed values, needs, and viewpoints may depart from the new context. People may feel meaningless of and powerless to influence the ongoing phenomenon, hence be careless to and alienated from the new organization (Seeman 1972). For Instance, new technology may decrease the sense of job control, which may in turn deprive the motives to work and causes severe alienations to organizations (Ollman 1976). The changes of organizational structures accompanied with IS implementation such as the enforcement of formalization and centralization may cause a perception of organizational alienations (Allen & Lafollette 1977). Therefore, the adoption for ISs may entail a phenomenon of organizational alienation. Only a few researches in IS area investigated the role of alienation (Abdul-Gader & Kozar 1995; Akkirman & Harris 2004), however, these researches do not relate with the adoption of IS.

Since the adoption of IS and organizational change become quite popular in recent years, the phenomena of alienation should also become more popular. Extant literature, however, provides limited knowledge regarding how alienation affects the adoption of IS. Specifically, the objectives of this study include: (1) mitigating the above gap by integrating the concept of alienation into TAM; (2) and exploring the role of alienation in the adoption behaviour of IS; (3) hoping to conferring different factors in decision process and predicting IS adoption intention.
2 LITERATURE REVIEW AND HYPOTHESES

2.1 Technology Acceptance Model and Compatibility

Technology acceptance model (TAM, refer to figure 1) is widely deployed by studies of adoption of IS to predict and explain end users' behavior and system use. TAM assumes that an individual's beliefs about IS influence attitude, which in turn lead to intention, and then generate usage behavior. Behavioral intention refers to the subjective probability for individual in acting specific behavior. Attitude, the primary determinant of behavioral intention, refers to the positive and negative feelings of individual about performing specific behavior (Ajzen & Fishbein 1980).

TAM regards perceived usefulness (U) and perceived ease of use (EOU) as the two key beliefs about IS (Davis 1989). Perceived ease of use is defined as "the degree that the prospective users expect that using a specific application system will be free of effort" (Davis 1989). When using the system, if it is hard to use, the effort in learning the system or tackling operation problems may become a burden to users. People may, hence feel frustrated and incline to abandon the new IS (Lepper 1985). Compared to such systems, with the same level of time and effort, one can finish more tasks with greater effectiveness if the system is easy to use. Perceived ease of use is, therefore, also assumed to affect perceived usefulness (Davis 1989; Segars & Grover 1993). 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 (Davis 1989)”. Previous research found that usefulness is the main determinant of system use, especially in companies demanding for superior performance (Davis et al. 1989; Igbaria 1993).

TAM has been extended and tested with different external variables and in various applications. Effects of organizational variables, such as educations and training (Amoako-Gyampah & Salam 2004; Igbaria et al. 1997), influences from peers (Martins and Kellermanns 2004), organizational support (Igbaria et al. 1996; Igbaria et al. 1995) etc., are wildly discussed. Besides, the effects of individual’s characteristics, including personal innovativeness (Yi et al. 2006), educations or previous experiences (Burton-Jones & Hubona 2006), self-efficacy (Vijayasarathy 2004), the level of voluntariness (Venkatesh & Davis 2000) or internal motives like playfulness (Moon and Kim 2001) are widely investigated. Recently, the application of TAM is extended to e-commerce or e-business arena, including telemedicine technology (Chau & Hu 2001), PDA (Yi et al. 2006), e-learning (Gong & Xu2004), e-recruitment (Tong 2009), and electronic medical record (Seeman and Gibson 2009). Findings from previous studies indicated that the explanatory power of TAM is relatively high (Davis et al. 1989; Igbaria et al. 1995; Jackson et al. 1997).

Figure 1. Technology Acceptance Model

A just adopted system may be perceived as new by members of an organization to some certain extend (Rogers 1983). Hence, it is argued that innovation theory can be used to further improve the explanatory power of TAM (Chen et al. 2002). In the past, scholars used innovation diffusion theory (IDT) to explain the rate of adoption of an innovation by an individual, and noticed the adoption
decision will be affected by the characteristics of the innovation. Roger (1983) suggested three of the most important innovation characteristics:

- **Relative advantage**: The degree of innovation is perceived as better than the idea it supersedes.
- **Compatibility**: The degree of innovation is perceived as consistent with existing values, previous experiences and needs of the potential adopters.
- **Complexity**: The degree of innovation is perceived as difficult to understand and use.

Chen et al. (2002) considered TAM and IDT compensating with each other. Generally speaking, if an innovation performs better than the original one, users will think the innovation is useful. Hence, it is reasonable to consider relative advantage and usefulness as the same concept. Besides, if an innovation is perceived to be complex to understand and use, users are harder to get a sense of ease of use. Hence, complexity and ease of use can be viewed as the same construct (Chen et al. 2002; Vijayasarathy 2004). Therefore, Chen et al. (2002) suggest researchers to integrate compatibility into TAM.

2.2 Organizational Alienation, Organizational Support and Technology Adoption

Recently, a sense of alienation from outer social environment may somehow exist in people’s mind, which could be viewed as a popular phenomenon in modern society. Alienation refers to the deviation of values, behaviors and expectations between an individuals and the society (Seeman 1972). Marx (1975) may be the first scholar came up with the idea of alienation. He argued that, traditionally, labors were free to design, purchase materials for, manufacture by his skills and sell products. Therefore, product became the purpose and result of one’s will. In this way, a sense of self awareness, identity and esteem began to emerge.

Later on, modern production and management techniques were developed. The concepts of division, specialization and departmentalization started to influence production system; formalized and centralized organizations became popular. Under this circumstance, labors had become an element of the production system, and can only repeatedly perform one or few tasks. Hence, working became only a mean of living; Labor’s workforce became a commodity, hence people had to pursue their values by selling workforce under the regulation of market mechanisms, yet they had no or few rights to make decisions relates with their jobs, which more or less will reduce their volition (Ollman 1976). It turned out that markets have the power to dominate labors; on the other hand, labors could no longer confirm their values via the design, productions and sales of products (Ollman 1976). Since the values and meanings of existence are belittled, compared to those who owned and controlled this system, they were like aliens to the world (Marx 1975). In sun, one’s self-identity, sense of belonging, self-esteem or self-cognition is affected when changes are introduced to organizations, which in turn will affect his/her psychological states.

Sociologists and management scholars discovered many kinds of alienation commonly exist in organizations. For example, work alienation reflects a feeling of meaningless and dissatisfaction of the assigned jobs, and inability to show up and highlight one’s identity (Kanungo 1979; Moeh 1980). People may also feel alienated from technology. This is because people cannot comprehend the rapid progress of technology by his/her knowledge or experiences, hence, is unable to realize the values and meanings of technology to economics, society or personal career, such that he/she could not fully understand the relationship between technology and personal welfare (Dean 1961). While the subject of technology is IS, alienation from computer may cause negative attitudes towards IS (Abdul-Gader & Kozar 1995) leading people subjectively against using IS (Minch & Ray 1986).

So far, literature regarding the antecedents and effects of alienation in organizational behaviour is relatively abundant. For example, bureaucratic controls may trigger the key psychological ingredients of work alienation- powerlessness and meaninglessness (DeHart-Davis and Pandey 2005). Extant researches found other antecedents including perceived formalization (Ganesh and Joseph 2011), organizational injustice (Sulu et al. 2010), work characteristics such as autonomy and work
relationship (Nair and Vohra 2010), inappropriate management styles and practices (DiPietro and Pizam 2008) like performance review system complexity (Ganesh and Joseph 2011), centralization and routines (DeHart-Davis and Pandey 2005) etc. As for the outcomes of alienation, Vickers and Parris (2007) pointed out that contingent workers are very likely having a strong feeling of alienation, and therefore won’t be flexible enough to fit the needs of the organizations. Furthermore, alienation will inhibit one from engaging in job (Hirschfeld & Field 2000; Moch 1980), thereby reduce organizational commitment, job involvement, and job satisfaction (DeHart-Davis and Pandey 2005; Sulu et al. 2010); then, productivity may be decreased and the intention to resign may be intensified (Comer & Dubinsky 1985).

However, studies of information system or e-business know very little about the roles of alienation. To the best of the authors’ knowledge, Abdul-Gader and Kozar (1995) and Akkirman and Harris (2004) may be the only researches in extant literature. Abdul-Gader and Kozar (1995) studied the impacts of computer alienation on IS investment decision; while Akkirman and Harris (2004) investigated the effects of alienation on communication satisfaction in virtual workplace. Alienation is now a common social phenomenon. The effects of alienation on IS adoption is worthy of further research. However, none of the above papers investigate this issue. This paper will try to mitigate this gap.

To achieve their purposes, alienated people may incline to perform behaviors violating social norms such as using systems passively, idly and distractingly (Seeman 1972). Normless behaviors may damage the performance of organization. Organizations can and must adjust these behaviors through proper policies (Akkirman & Harris 2004). People’s perception of system is developed gradually from knowledge and experience of system use. While using IS to fulfill missions, users perceive and evaluate the pros and cons of the system, then learn and remember advantageous experiences, and set up their perspectives in regard to the system (Venkatesh & Davis 2000). To use system effectively, they must learn knowledge relate to new technology, conquer the obstacles and barriers from using the system, such as solving technical problems from system crash, and routinize system usage in their work (Cooper & Zmud 1990; Silverberg 1991). If users, after trial and error, encountered a plentiful complex functions, they may naturally feel that system is uneasy to learn (Dishaw & Strong 1999). People may, hence, need supports from organization, like supplementing hardware/ software, more educations, technical supports, etc. The more these needs are satisfied, the higher the probability of system success (Igbaria et al. 1997).

Igbaria et al. (1997) classified three dimensions of organizational support: management support, education and training, and computing support. The latter includes promotion, technical support, manuals, books, and help desk etc. Policies of organizational support will help users adopt IS and accumulate knowledge and experiences smoothly. For example, aggressive management support may enrich resources, and urge more users to aggressively adopt IS; Education and training may benefit learning and accumulating experiences; Computing support will help to solve problems. Once enough good usage experiences were accumulated, users will understand more clearly about the values and meanings of the system, consequently, will produce more positive perceptions. Hence, Igbaria et al. (1997) claimed that the three policies can benefit users to generate positive beliefs about the system. Previous research also found that organizational support may be an important antecedent to ease of use and usefulness (Davis et al. 1989; Igbaria et al. 1996). Lin and Wu (2004), based on the model of Igbaria et al. (1997), conducted a replication research in Taiwan and concluded that the above three organizational support policies all have positive impact on usage intentions.

3 RESEARCH DESIGN

3.1 Research Model and Hypotheses

Figure 2 shows the theoretical model of this study. By using a system that is easy to use, user may accomplish much tasks, he or she may then believe that advantages result from system usage. As a
result, ease of use should directly influence usefulness (Igbaria et al. 1996). Thus, this research proposes the following hypothesis:

**Hypothesis 1:** The higher the perceived ease of use, the higher the perceived usefulness.

According to the notion of performance expectancy, an individual’s preference for different behaviors (such as using old or new systems) partly depends on his/her belief about possible outcomes (e.g. new IS improves more job performance) and expected results (e.g. one actively improve his/her job performance) (Chau 1996; Igbaria et al. 1996). In short, people will evaluate the degree of usefulness of different behaviors, then choose their behaviors based on their preferences of usefulness. Thus, this research proposes the following hypothesis:

**Hypothesis 2:** The higher the perceived usefulness, the stronger the usage intention.

According to the argument of effort expectancy, people will subjectively evaluate their ability before taking actions. If they believe that they are capable of completing the task, their attitude towards performing action will become positive, and vice-versa (Igbaria et al. 1996). Since attitude leads to intention, the intention of people with high perception of ease of use will be stronger than those without such perception. Thus, this research proposes the following hypothesis:

**Hypothesis 3:** The higher the perceived ease of use, the stronger the usage intention.

Inferior performance or unexpected outcomes may more or less result from system usage. The higher the a priori perception of uncertainty, the more suspicious user will be in applying new technology. If an innovation is compatible with user’s value, demand and experience, the uncertainty perceived will be relatively less (Rogers 1983); and the rate of adoption will be higher than that of the user who perceived incompatibility (Hu et al. 2009; Rogers 1983). Theoretically, attitude towards and intention to use system for who tend to adopt systems quickly should be more positive and stronger than those who don’t. Empirically, evidence shows that compatibility is positively related to usage intention (Chen et al. 2002; Hu et al. 2009). Hence, this research proposes the following hypothesis:

**Hypothesis 4:** The higher the perceived compatibility, the stronger the usage intention.

Organizational alienation reflects a feeling of dissatisfaction with supervisors and fellows, and isolation from, and no belonging to organization; normally, a sense of incongruence in values between an individual and the organization will exist (Aiken & Hage 1966). The higher the alienation, the less the meanings of ongoing phenomena, such as deploying IS (Seeman 1972). Hence, for highly alienated people, whether the system is easy to use or useful is meaningless. Such careless attitude

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**Figure 2. The theoretical model of this research**
may lead to a perception of ease of use and usefulness lower than who are not alienated from organization. In addition, the demand, value, and expectation of high alienated people may easily depart from new systems, therefore the compatibility they perceive should be lower than that of low-alienated persons. Hence, this study proposes the following hypothesis:

Hypothesis 5: Organizational alienation will negatively influence the beliefs of the system.

Hypothesis 5a: Alienation will negatively impact perceived usefulness

Hypothesis 5b: Alienation will negatively impact perceived ease of use.

Hypothesis 5c: Alienation will negatively impact perceived compatibility.

According to Triandis’ (1977) IS success model, facilitating conditions are critical conditions to IS usage behavior. A comprehensive facilitating environment, such as sufficient education and training, computing technique support, satisfactory provision of resources etc., would improve users’ voluntariness of applying new technology (Thompson et al. 1994). According to previous studies, the learning and training facilities offered by organizations (Amoako-Gyampah & Salam 2004; Igbaria et al. 1995; Igbaria et al. 1997; Thompson et al. 1994), or the policies supported by organizations (Davis et al. 1989; Igbaria et al. 1997) is beneficial to improve the belief of systems, such as ease of use and usefulness. Accordingly, this research proposes following hypothesis:

Hypothesis 6: Organizational support will positively influence the beliefs of the system.

Hypothesis 6a: Organizational support will positively impact perceived usefulness.

Hypothesis 6b: Organizational support will positively impact perceived ease of use.

Hypothesis 6c: Organizational support will positively impact perceived compatibility.

3.2 Variables Definition and Operationalization

There are six variables in this study, including Behavioral Intention (BI), Ease of Use (EOU), Usefulness (U), Compatibility (C), Organizational Support (OS), and Alienation (A). To ensure content validity, the first draft questionnaire of the variables, except for compatibility, was primarily revised from prior studies for the context of CAI adoption. Karahanna et al. (2006) divided compatibility into four dimensions; in total 21 items were being used to measure this variable. The number of items for alienation is also large, the questionnaire for this study, hence, will include a huge amount of items, which may easily worsen the quality of data. Since most of the students have usage experiences of the first generation CAI, this study decides to adapt the dimension of experience only to measure compatibility. Furthermore, most of the participants of the pre-test (refers to next section) indicated that item2 (using the new system is different from the older one) and item 5 (the experience of using new system is different from previous experience) are quite similar, and suggested to combine these two items. Finally, compatibility was measured by five items related to experiences. All the constructs, except for the demographic variables, were measured on a five-point Likert scale. Table 1 summarizes the operational definition, source of measurement items, and number of items of the variables.

3.3 Questionnaire Developments

To testify the explanation power of the theory, the study conducts questionnaires survey to collect data. To assure the reliability and the validity of the questionnaire, some graduate students and professors from A University in Information Management field were invited to review the questionnaire and provide suggestions. In addition, 15 convenient samples of the target system were invited to participate in a pre-test. Since items of alienation described a psychological state that is difficult to depict specifically and precisely, many items were modified several times based on their suggestions.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational Definition</th>
<th>Sources</th>
<th>No of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usefulness</td>
<td>The prospective user's subjective probability that using 2nd generation CAI system will increase his/her learning performance within A university.</td>
<td>Davis et al. (1989)</td>
<td>6</td>
</tr>
<tr>
<td>Ease of Use</td>
<td>The degree that the subjects from A university expect that using 2nd generation CAI will be free of effort.</td>
<td>Davis et al. (1989)</td>
<td>6</td>
</tr>
<tr>
<td>Behavioral</td>
<td>The subjective probability for an individual to use 2nd generation CAI.</td>
<td>Moon and Kim (2001)</td>
<td>3</td>
</tr>
<tr>
<td>Intention</td>
<td>The perceived degree of compatibility between existing and previous experiences in using CAI provided by A university.</td>
<td>Karahanna et al. (2006)</td>
<td>5</td>
</tr>
<tr>
<td>Compatibility</td>
<td>The degree of perceived incongruence between the subjects and, isolation from, and a sense of not belonging to the university</td>
<td>Seeman (1972)</td>
<td>37</td>
</tr>
<tr>
<td>Organizational</td>
<td>The level of efforts by university in promoting, educating, training and supporting the deployment of e-CAI perceived by the subjects.</td>
<td>Lin and Wu (2004)</td>
<td>6</td>
</tr>
<tr>
<td>alienation</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Organizational</td>
<td></td>
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<td></td>
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<tr>
<td>Support</td>
<td></td>
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</tr>
</tbody>
</table>

*Table 1. Operational definition and sourcing of the variables*

Forty five students were further invited to participate in a pilot test. Some of the items of alienation required the informants to recall and report subtle mental feelings, and a serious deviation may also exist between the western and Chinese context and culture, which may make the items hard to comprehend. This study, hence, expected in advance the data quality may not easily reach desirable level. Exploratory factor analysis (EFA) and Cronbach’s were therefore used to evaluate and improve the reliability and validity of our measurement model. The reliability of variables was first examined by SPSS 12.0. BI1, OS6, and 12 items for alienation, including A1, A2, A12, A16, A18, A19, A20, A22, A23, A26, A29, and A35 were dropped to improve reliability. Most of the remaining items were loaded to expected variables. A6, A9, A10, A24, A30 were loaded into two factors, and the difference of the two factor loadings is smaller than 0.1. After deleting these five items, A31 and A14 became the only item in the factors they belonged, therefore, they were also deleted.

One of the reasons for why some alienation items were deleted is due to cultural and context differences. By and large, organizational members work together to achieve common objectives. Individual behaviour was regulated by written and/or unwritten agreements between organization and members. However, the relation between students and school in university is relatively loose. So long as students do not make any material mistakes, they can finish their studies and receive the degrees. The school has less power in constraining students’ behaviour. For example, the usage of CAI system is voluntary for students in university A. The differences between normal and university organizations make many items to be unsuitable and inapplicable. For example, an item asking if the subject would prefer a part time job or school activities was unsuitable and difficult for students who are suffering from financial problems. These students do not feel alienated mentally, but will still prefer a part time job than going to school for living problems. Items like the above one may decrease the reliability and validity of the measurement scale of alienation.

After several sessions of discussion with participants of the pre- and pilot-test, some of the items were further suggested to be deleted due to the specific characteristics of A University. For example, A1 asks informants if they enjoy participating in school activities. However, the campus of University A is narrow and the space is limited, the capacity for holding activities is hence restricted. Some informants do not agree to this question. Similarly, A22 asks interviewees if the activities inside school are useful to them. Yet, school activities frequently stretch out off-campus due to space limitation. As a result, some items could not be answered correctly, and these types of items were crossed out eventually.
3.4 Populations and Samples

Data was collected from a private university (abbreviated as A university) located in Taipei city. A first generation WBCM was widely adopted and infused in University A. Most students have related experience, and possess value and needs regarding WBCM. A university, however, was managing to abandon the older system, and promoting the second generation web based course management system (WBCM), students are either beginning or about to use the system. This new system, built on the Internet infrastructure, offers comprehensive functions to assist instructing and learning. Compared with the older system, the new one offers much more abundant functions; a two hundred pages instruction manual was provided to help users to learn operating this system.

To test the hypotheses, samples are drawn from students of university A. The reasons are as followed: (1) Sample must be drawn from organizations that are undergoing the implementation of and organizational change related with IS; and the deployment of WBCM is deemed as a critical change of learning process (Martins and Kellermanns 2004); (2) The usage of IS should be voluntary. Otherwise, sample may all possess high degree of intention due to other factors such as superior performance from system usage; (3) The number of alienated sample should be abundant enough to test the theoretical model. Wesch (2008) reported evidence of university students’ feeing of meaningless from leaning. They rarely attended classes and viewed a signific percentage of their assignments as irrelevant to their life. Modern learning aids may only make up creative and interesting tools, but not a reason for learning. Hence, we may easily find alienated students in university campus; (4) To test the effects of compatibility, the organizations should be undergoing the transmission between different generations of the same ISs. University A fits well the above criterion. The selection may bring some further benefits: (1) Bias from different characteristics of organizations can be avoided; (2) Samples can be collected with the lowest resources and efforts. There are around 10,000 students in University A, but we cannot acquire the exact name list and contact information, which inhibit the possibility of random sampling. Therefore, convenient sampling was used to collect data. The survey lasted for two weeks. In total, 264 questionnaires were delivered and retrieved afterwards.

4 DATA ANALYSIS

4.1 Measurement Model

An exploratory factor analysis (EFA) used principal components analysis with orthogonal rotation by varimax method was conducted. Nine factors with eigenvalues value larger than one were extracted (refer to Table 2). All the items of usefulness (U), ease of use (EOU) and compatibility(C) were loaded into predicted factors. Items for intention (I) and usefulness (U) were combined into one factor, this result may due to the high correlation (0.77) between these two variables. The items of alienation were divided into three factors. U6, EOU1, EOU3, C1, C5, A13 and A15 were loaded to two or even three factors, yet the difference of loading factors were all greater than 0.1. Hence, these items were all referred to factor with the greatest factor loading. Factor 8 and 9 were dropped since they didn’t possess any item with factor loadings greater than 0.5. OS5 is also eliminated, because it is loaded into two factors and the difference of the factor loading is smaller than 0.1.

4.2 Hypotheses Testing

Partial Least Squares (PLS) is a commonly used statistical analysis tool for latent variables. It can be used to confirm the validity of the constructs of an instrument and assess the structural relationship among constructs (Chin 1998; Gefen et al. 2000). We used structural equation modeling procedures in Smart PLS version 2.0 (Chin & Fryer 2001) to test the hypotheses. PLS Graph provides the ability to model latent constructs even under conditions of non-normality and small- to medium-size samples
The descriptive statistics of alienation and compatibility indicate that the distribution of these two variables may more or less deviate from normal distribution. The average of alienation is 2.37, which is relatively low in 5 point Likert scale. The kurtosis is 5.297 and skewness is 1.7606. Therefore, the distribution of alienation is positive skewed leptokurtic, which means the majority numbers of alienation samples are distributed in the right tail.

\[
\begin{array}{ccccccccc}
& 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8^a & 9^a \\
\hline
U1 & 0.827 \\
U2 & 0.856 \\
U3 & 0.911 \\
U4 & 0.871 \\
U5 & 0.856 \\
U6 & 0.693 & 0.417 \\
EOU1 & 0.474 & 0.723 \\
EOU2 & 0.689 \\
EOU3 & 0.642 & 0.419 & 0.908 \\
EOU4 & 0.824 \\
EOU5 & 0.800 \\
EOU6 & 0.793 \\
BI2 & 0.855 \\
BI3 & 0.605 & 0.835 \\
C1 & 0.715 & 0.416 \\
C2 & 0.815 \\
C3 & 0.841 \\
C4 & 0.820 \\
C5 & 0.418 & 0.654 \\
OS1 & 0.687 \\
OS2 & 0.862 \\
OS3 & 0.857 & 0.851 \\
OS4 & 0.794 \\
OS5 & 0.542 \\
OS6^a & 0.541 & -0.524 \\
A3 & 0.611 \\
A4 & 0.752 \\
A5 & 0.798 \\
A7 & 0.799 \\
A8 & 0.744 \\
A11 & 0.787 \\
A13 & 0.620 & -0.456 & 0.915 \\
A15 & 0.670 & -0.442 \\
A17 & 0.726 \\
A21 & 0.674 \\
A25 & 0.774 \\
A27 & 0.933 \\
A29 & 0.865 \\
A32 & 0.921 \\
A33 & 0.908 \\
A34 & 0.889 \\
A36 & 0.901 \\
A37 & 0.923 \\
\end{array}
\]

Table 2. Factor structure of principle components of variables

Note: factor loading<0.4 is not shown
Abbreviations: BI- Behavioral Intention; U- Usefulness; EOU- Ease of use; C- Compatibility; OS- Organizational support; A- Alienation

a, b: deleted

\footnote{Generally speaking, a distribution with kurtosis greater than 3 can be defined as leptokurtic, and if its skewness is greater than 0, represents that it is skewed to the right.}
In addition, the kurtosis and the skewness of compatibility is -0.792 and 0.006, respectively. Since the skewness for normal distribution is 0, it is obvious that the distribution of compatibility is close to normal distribution. However, negative kurtosis stands for that distribution of compatibility is platykurtic. In other words, the numbers of the samples in two tails for compatibility are more than that of normal distributions, but the numbers of the samples in middle part are less than that of normal distributions. Therefore, there is a certain amount of samples perceived low compatibility.

Since some of the variables may not confirm to the condition of normality, PLS is appropriate for comprehensively testing the proposed model. Consistent with the distribution free, predictive approach of PLS (Wold 1985), the structural model was evaluated using the R-square for the dependent constructs and the size, t-statistics and significance level of the structural path coefficients. The t-statistics were estimated using the bootstrap resampling procedure (500 re-samplings). The results of the hypotheses testing were shown in figure 3.

**Figure 3. The results of hypotheses testing**

The variance explained (R²) for usage intention is 67%, indicating that the research model has good explanatory power for IS usage intention. Hypotheses 1 predicted that ease of use positively impact usefulness, and is supported since the path coefficient is significant (β=0.464; t= 7.697; p=0.00). The effects of ease of use (β=0.272; t= 5.368, p=0.000) and usefulness (β=0.707; t= 18.416, p=0.000) on intentions are consistent with the hypotheses, both of them reveal positive correlations, and therefore the results for data analysis support hypothesis 2 and 3. However, compatibility is negatively correlated with intentions (β=-0.131; t= -3.412, p=0.000), which rejects hypothesis 4.

Hypothesis 5a and 6a predict that organizational alienation and support have negative and positive effects on usefulness, respectively. R² for usefulness is 0.303. Alienation, consistent with the prediction, negatively impact usefulness (β=-0.192, t= -3.495, and p= 0.001). Unexpectedly, organizational support negatively impact usefulness (β=-0.042); however, the effect is not significant (t=-1.146). In sum, the analyses tend to support H5a, but reject H6a.

Hypothesis 5b and 6b predict organizational alienation and support have negative and positive effects on ease of use, respectively. R² for ease of use is 0.137. Alienation, consistent with the prediction, negatively impact usefulness (β=-0.31, t= -7.326, and p= 0.001). Organizational support, consistent with the prediction, positively impact usefulness (β=0.15 t= 2.487). In sum, the analyses tend to support both H5b and H6b.

Hypothesis 5c and 6c predict organizational alienation and support have negative and positive influences on compatibility, respectively. R² for compatibility is 0.129. Organizational support indeed
has positive impact on compatibility ($\beta=0.17; ~t= 2.719$). Yet, the impact of alienation on compatibility is, though negative ($\beta=-0.044$), not significant ($t= -0.6.9$). Hence, the results of data analysis tend to support H6c, but reject H5c.

5 RESULTS AND DISCUSSIONS

5.1 Research Findings

Organizations deploy information systems for competitive purposes. Since organizations devote great amount of resources in IS, managers must concern how can the systems be beneficial to organizations. This study, based on integrated model of TAM and IDT, took the effects of organizational alienation and support into account, hoping to understand how they affect adoption intention. 264 samples from university A were used to test the hypotheses. Findings from this study may contribute to our knowledge regarding the behavioral intention to adopt information systems.

First of all, hypotheses of TAM (hypothesis 1 to 3) are all supported and the variance explained of usage intention is 67%. Usefulness is the most influential antecedent to intention, its effect is far more crucial than that of ease of use and compatibility. This result again concludes that TAM is one of the best theories in explaining IS adoption behavior. To exert the greatest performance of IS, the enhancement of ease of use, and usefulness in particular, become critical issues.

Secondly, organizational alienation and support significantly influence beliefs about the system. Organizational support, as expected, positively impacts ease of use and compatibility (hypothesis 6). Furthermore, the predictions that alienation negatively affects ease of use and usefulness are confirmed (hypothesis 5a and 5b).

Nevertheless, some of the hypotheses in the study are rejected. The rationales for these unexpected results are described below. First of all, compatibility is obvious to have negative impact on usage intention (Hypothesis 4), which is paradoxical to the previous research. This result may due to the huge differences between the two generations of WBCM systems. The first generation one is relatively simple. It is built upon a mainframe and provided function menu for executing specific functions to assist teaching and learning. For example, students can download instruction materials such as slides, supplement materials, test banks, or asking questions before or after class. The 2nd generation system uses web based interface, and is designed based on the idea of integrating virtual classroom and course management. Aiding by this system, students can extend their after-class learning; and teachers can conduct online exam or collect and return assignments. To use this system to its fullest potential, teachers and students have to participate in not only the management and usage of teaching materials, but also activities of classroom management, such as setting up student name list, or chatting or discussing online with colleagues. It is more comprehensive with operational techniques that are different and unique to that of the previous WBCM system.

Martins and Kellermanns (2004) asserted that, to students, introducing web based courses management system represents a critical change to learning process; therefore their perceptions, or viewpoints, such as values and needs of these two WBCM systems, may have great differences. The descriptive statistic of compatibility indicates that the number of low compatibility sample may be extraordinarily larger than normal (refer to section 4.2). A large portion of samples, might hence, possess perception of relatively low compatibility. Facing this great change, these students may be hard to apply their previous experiences in the usage of the new generation course management system. Hence, the derivation of the usage intention for these students may have nothing to do with the perceived compatibility.

Surprisingly, alienation has negative effect on compatibility (Hypothesis 5c). This result may be partly attributed to the problem of abundant samples perceiving low compatibility mentioned above. Moreover, the problems encountered during the development of measurement scale of alienation, and
insufficient strongly alienated samples may also be other causes. Translating and adapting the measurement scale of alienation in Sociology to Chinese and organizational context, then applying it in university, must conquer barriers from cultural, linguistic and contextual differences. Also the campus of University A is small; generally, students don’t stay in campus after the class, not to mention the high alienated students. The samples were drawn from students appeared in campus, who may all be low alienated.

Finally, organizational support is found to negatively affect usefulness, though the effect is not significant. This result may due to the facts that the 2nd generation WBCM system is too complex, and is still in early stage of implementation, hence, the organizational support may still be insufficient; which may lead to under usage of this system. The system, hence, may still not been used to its fullest potential. The statistics of WBCM usage behavior may support the above argument. Among all the samples, there are 141 (53.41%) students use WBCM only once per week, and the rest of the students (46.59%) use WBCM four to five times per week. There are 216 students (81.82%) use WBCM less than half an hour every time. Teachers in A university may face with the same troubles from abundant and complex functions. For example, a professor in law raised this problem to the authority in Jun. 2010, and requested for resolution of the barriers and difficulties of usage problem. A university responded with more training courses and promotions.

5.2 Implications, Future Researches and Limitations

Practically, managers should understand the main causes of alienation, and design effective solutions to control or reduce it. Findings from Akkirman and Harris (2004) may support this idea. They discovered that alienations among members of virtual team may decrease the degree of satisfaction of communication. This problem is resolved after certain organizational support policies were deployed. Therefore, it is better to deploy policies of the measurement, management and control of alienation in adopting information system.

From academic perspective, the findings from this research may open some opportunities for future researches. Since it is harder for high alienated people to perceive the meaning for what is happening in surrounding, people usually conduct behavior deviated from social norm such as gambling (Trevorrow & Moore 1998) to serve their purposes (Seeman 1972). Therefore, alienation may somehow make system users deviate from normal behaviors. Alienation is a psychological state which may impact personal beliefs and behaviors. Therefore, alienation may not only affect the adoption of IS, but may also impact various behavior intentions induced by the usage of systems. In other words, we can regard alienation as an antecedent to individual’s (negative) behaviors related with IS, and try to discover the role of alienation in various related theories.

Some further research opportunities specific to this research are provided below. First of all, researchers could inquire the roles of other types of alienation, like work and technology alienation. The effects of alienation on the adoption of other types of systems in other contexts, such as private or public organizations, NPO or NGO, can also be examined. In addition, this research does not investigate the antecedents of alienations, and therefore, managerial implications for controlling and reducing alienation are still limited. This may be a topic for future research. Lastly, the deployment of information system may induce organizational changes, leading to a new organizational structure, then the perception of alienation. The relations between the process of organizational changes and alienation and how these two factors affect usage intentions are worth further discussions.

Ultimately, the samples in this study are not randomly drawn from university A, the external validity, therefore, may be relatively insufficient. Readers should be careful in interpreting the meaning and applicability of the findings.
References


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