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Toward a Theory of User Value of Information Systems: Incorporating Motivational and Habitual Aspects

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Introduction

Organizations are increasingly relying on information systems (IS) (e.g., the Internet and the WWW) as a means for reaching and informing customers. Current projection estimates that business revenues via on-line are expected to climb to \$226 billion in 2000, more than double the \$95 billion of 1999, and six times the \$38 billion of 1998 (ActiveMedia Research, 1999). Given this level of opportunity, firms are clearly interested in how customers react to their Web sites in specific, information systems in general.

Considering the enormous potential of the Web, it would not be desirable for a manager's own intuition, which have never been verified, to entirely guide Web site designs. Accordingly, a large number of researchers argue the importance of collecting feedback from the users of the Web (Jarvenpaa and Todd, 1997; Abels et al., 1997). Based on the input from users, managers finally can come to a better understanding of how customers see their Web sites. Such information should be helpful in identifying previously unknown problems and in forecasting the success of the Web.

The challenge is to have a rational measure that helps in assessing the success of a Web site from a customer's point of view. The measure will serve as the indicator of the effectiveness of a Web site, and accordingly guide the Web site development efforts in a more productive way. However, it is not easy to develop such a quick and easy diagnostic tool because customer evaluations are subjective in nature. In other words, users have different experiences, tastes and needs, therefore, understanding those differences is critical in assessing customer perceptions (Seddon, 1997).

The Purpose of the Research

Despite the fact that there have been numerous studies on user evaluations (UE) of information systems (IS) (e.g., user *attitudes* toward IS, user IS *satisfaction*, IS *service quality*), there is little agreement about the principal construct to be investigated. It is also questionable whether the UE scales, mostly developed for the organizational use of IS, are applicable to online customers, whose experiences and motivational orientations greatly differ from organizational users. This paper critically reviews the conceptualization and operationalization of the UE constructs in the literature when applied to the new computing environment. A literature review reveals that most UE theories do not explicitly incorporate an individual's motivation and past

experiences into the systematic theoretical frameworks for explaining user evaluation and behavior.

To clarify the nature and structure of IS evaluations, a new concept—*IS value*—is proposed, which takes into consideration an individual's motivational orientation. In an effort to develop a comprehensive theory on IS value, this research has two main objectives:

- To investigate IS value formation processes. Users' reactions to a system are not exactly alike due to differences in expected benefits from using the system. This work examines how the differences in orientation regulates cognitive and/or attitudinal evaluations of the system.
- To develop a theoretical framework that explains (1) the relationships between IS value and outcomes, and (2) the impact that past use has on the relationships. Seldom does the extant literature bridge the gap between user evaluations and outcome variables. The rationale for studying IS value will be sustained only after the presumed relationship is justified from a theoretical perspective

Theory Development

Considering criticism of IS research's lack of attention to UE formation processes (e.g., Melone 1990), what should be avoided is the hasty and ad hoc inclusion of additional dimensions of motives and past use into the existing domains of UE concepts without any theoretical justification. It is necessary, therefore, to identify the origin, process, and consequences of IS value to develop a conceptual model of IS value.

Figure 1. A Hierarchical Structure of IS Use and IS Value

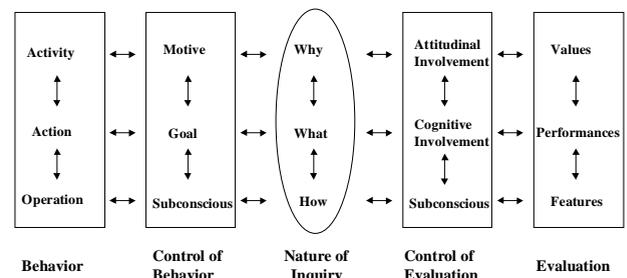


Figure 1 depicts a comprehensive theoretical framework of IS use and evaluation. The framework is based on activity theory in human-computer interaction and means-end chains (MEC) in marketing (Kuutti, 1996; Pieters et al. 1995). The proposed hierarchical model, intended to explain both user behavior and evaluation, represents that the *reason* to use a system strongly influences the paths of both behavior and evaluation. In particular, the right side of the theoretical framework (Figure 1) represents two important aspects of user evaluations: top-down regulation and bottom-up judgement.

Figure 2 depicts in detail how these two processes ultimately lead to user evaluation. The IS value process shows the temporal order of mental phenomena related to user evaluation. In addition, it represents that IS value is the smallest unit of analysis possessing the meaningful properties of UE, which are subjective and dynamic in nature.

Figure 2. IS Value Processes

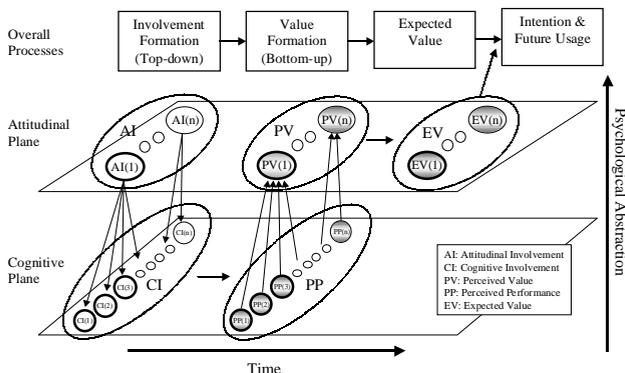
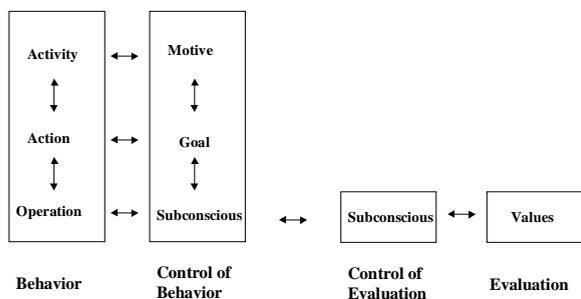


Figure 3. IS Use as an Operation and IS Value

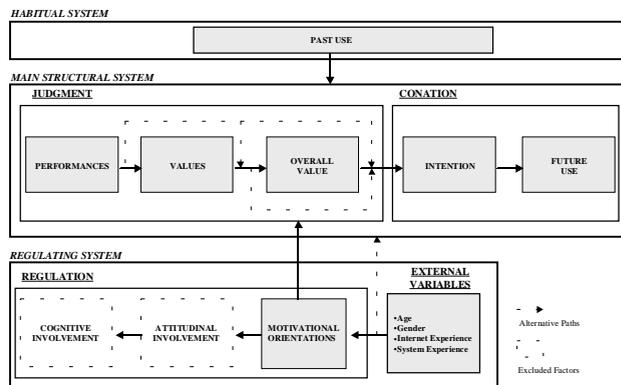


On the other hand, as a user becomes more skillful with the IT tool, IS use is transformed into a realm of operations (Figure 3). Little conscious efforts come into play as far as both IS use and evaluations are concerned. In this case, IS use has little connection with IS value, and it should be conceptually framed as an autonomic operation, which is tightly integrated with higher actions and activity.

Research Model

In an effort to develop a variance framework as much as consistent with the theory elaboration so far, UVIS (User Value of Information Systems) factor model has been specified in Figure 4. This figure is intended to show that IS use and evaluations consist of three related systems – main structural, habitual and regulating systems.

Figure 4. UVIS Variance Framework



First, main structural system is designed to propose causal relationships among IS assessment, intention and IS use. This causal flow is very similar to those of TRA/TPB/TAM since all of them maintain the judgment-conation link. The UVIS framework is, however, different from the traditional theories in the sense that it centers on overall value as an outcome of IS judgment. Second, past use is modeled as a determinant of the latent variables within judgment and conation boxes. In social psychology, there is ample evidence supporting the role of past behavior as a significant factor influencing human judgement and its behavioral outcomes (Aarts, Verplanken, and van Knippenberg 1998, Aarts and Dijksterhuis 2000, Ajzen 1991, Conner and Armitage 1998). Finally, the regulating system is intended to illustrate that the regulation factors (e.g., motivations and involvement) moderate the main structural system either by changing strength of relations and/or directly affecting the variables in the main flow.

In sum, perceived overall IS value is mediating the impacts of both determinants and moderators on other variables. Therefore, IS value can be regarded as the smallest unit that possesses the properties of user evaluation. One can look at even smaller units, for example, involvement or judgment, but the properties of user evaluation cannot be fully understood without understanding user value as a whole. In order to check if overall value fully mediates the impacts of performances and value factors on intention, alternative models are also evaluated. The alternative models will be constructed by adding overriding paths shown in the dashed arrow. In the UVIS conceptualization, motivational orientations are

considered as a summarization of individual differences such as gender, age and experiences. However, it is still possible that those demographic variables moderate the structural paths over motivational effects, and therefore this possibility is also tested.

Methodology

An instrument was developed through multi-stage processes, one of which involved 435 undergraduate students. The resulting survey questionnaire was administered to users of a local Web news site. 886 usable data were collected through a Web-based survey. A total of 398 users also participated in a follow-up survey one month later regarding the usage of the Web site then.

The measurement model, based on a confirmatory factor analysis, exhibited a satisfactory fit with data (e.g., CFI=0.975, GFI=0.913, RMSEA=0.032) in spite of its complexity (d.f.=475). The UVIS scales also were found to be psychometrically reliable. In order to test the proposed model and hypotheses, a structural equation modeling with latent score estimation will be employed. The latent score estimation is one of the two-step estimation methods, newly implemented in PRELIS 2.30 and LISREL 8.3 (1999).

Expected Contribution

A practical use of this work is to help managers who strive to measure the attractiveness and/or effectiveness of their Web sites. For instance, with the help of the UVIS instrument, managers do not have to entirely rely on metrics such as number of visits or duration of time, which are available only after implementing the system. Furthermore, the early assessment about the Web site will help them prevent wasting a type of unnecessary resources in Web maintenance.

It is expected that this research will contribute to the IS body of knowledge in the following ways: First, as an initial step towards developing a comprehensive theory of UE, a UVIS model is introduced. The IS community is challenged to interpret user evaluation in the context of the user's own value system. This is especially important in investigating IS use in non-work related environments. Second, a theoretical framework is provided that suggests the pivotal role of user motivation as the origin of IS use and evaluation. It is believed that the concept motivation could offer a frame of reference for studying effects of individual, organizational, social, and/or contextual characteristics. IS researchers are encouraged to focus on how such external variables change users' motivational orientations in ways that would effectively predict their impacts on user behavior. This would help to provide a basis for accumulating research results on the relationship between demographic characteristics and IS use. Third, this study reveals users' value systems as a hierarchical structure of involvement. This new view asserts that user involvement with (using) a system exists in the form of a multi-layered, multi-dimensional structure. Accordingly,

there is a need for analyzing the complex structure of involvement, in order to explain user evaluation. Fourth, this research project is expected to reveal the habitual use of the WWW, as compared to planned IS use, by investigating the impacts of past behavior. Finally, the proposed UVIS model will be empirically compared with traditional theoretical frameworks (e.g., user satisfaction, TAM) in terms of both predictive validity and explanatory power. Hopefully, this work will provide an opportunity for us to re-evaluate the suitability of theories and models, which have been generally accepted in IS research, in a comparative context.

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