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Toward a User Commitment Continuum

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ABSTRACT

User commitment to a new information system is critical to its success. But what does this mean? One explanatory theory is the Technology Acceptance Model (TAM), which has gained wide recognition, but has also been criticized for its inability to account for temporal and contextual differences as well as its failure to consider how user commitment grows and changes with system use. This paper suggests that "user commitment" is not a binary proposition, but rather is better described as a range of values on a continuum. We propose such a model with at least four major components.

Keywords

User commitment, technology acceptance, user participation, user involvement, IS success, user training.

INTRODUCTION

It is difficult to overstate the importance of user commitment in the successful implementation of a new computer information system. Related research includes such topics as (1) user training (Scharer, 1983; Bostrom, Olfman and Sein, 1990; Torkzadeh and Koufteros, 1993; Galletta, Ahuja, Hartman, Teo and Peace, 1995; Lee, Kim and Lee, 1995; Szajna and Mackay, 1995; Niederman and Webster, 1998), (2) user involvement (Ives and Olson, 1984; Franz and Robey, 1986; Barki and Hartwick, 1994), (3) user participation (Tait and Vessey, 1988; Barki and Hartwick, 1989), (4) user acceptance (Davis, 1989; Venkatesh and Davis, 2000; Venkatesh, Morris, Davis and Davis, 2003; Venkatesh and Bala, 2008), (5) user satisfaction (Doll and Torkzadeh, 1991; Kettinger and Lee, 1994; Gelderman, 1998), and (6) use and success (Robey, 1979; DeLone and McLean, 1992; DeLone and McLean, 2003; Benbasat and Barki, 2007).

Additionally, research suggests that many information systems (IS) failures result from a lack of user acceptance rather than from poor technical quality (Davis, Lee, Nickles, Chatterjee, Hartung and Wu, 1992; Beynon-Davies, 1999; Fowler and Horan, 2007). In one example, a study blamed a lack of training on the part of many top and middle managers concerning how best to use computers and computer-generated information in decision making (Brady, 1967). Yet, users can have a significant positive impact if the firm provides adequate computer training for both middle and top management (Nelson and Cheney, 1987).

The need for a more thorough understanding of user commitment can be seen in the many studies involving technology acceptance (Sumner, Haseman and Nazareth, 1999; Amoako-Gyampah and Salam, 2004; Chae and Poole, 2005; Jafari, Osman, Yusuff and Tang, 2006; King and He, 2006; Gumussoy, Calisir and Bayram, 2007; Venkatesh and Bala, 2008). Many of these works examine technology acceptance as user perceptions at one point in time and therefore do not consider how user commitment grows or changes (Amoako-Gyampah and Salam, 2004). Some authors also feel that "technology acceptance" is now a mature theory (Venkatesh, Morris et al., 2003). Yet, mixed results from recent empirical studies suggest that additional work on user commitment is needed (Qingxiong Ma and Liping, 2004; Darsono, 2005; Su-Houn, Hsiu-Li and Pratt, 2009).

In this paper, we propose that "user commitment to a new system" is best viewed as a set of values falling on a continuum that depends upon the user's exposure, experience, and familiarity with the system. Thus, we propose that users move through various stages of commitment, starting with a realization of the new system's existence, followed by a comprehension or understanding of how the system works, subsequent acceptance of the system as a useful tool to accomplish work assignments, and finally commitment to the system's use, with a vested interest in its success. Each of these stages may be affected by managerial change events such as formal briefings about the system, training, or personal experience.

In the next section of this paper, we review the relevant literature that examines existing theories related to user realization, comprehension, acceptance, and commitment and implementation. After this, we present several research questions based on this review. Lastly, we provide a new model suggesting that "user commitment" is best viewed along of continuum of time or series of change events.

LITERATURE REVIEW

Various researchers have attempted to integrate the theories of user involvement in systems work (Barki and Hartwick, 1989; Melone, 1990; Goodhue and Thompson, 1995; Seddon, 1997). Research efforts have also been devoted to extending the theory by examining the precursor of those two ideas underlying TAM. For example, the Unified Theory of Acceptance and Use of Technology (UTAUT) model attempts to synthesize what is known about user acceptance and provides a foundation to guide future research (Venkatesh, Morris et al., 2003). Figure 1 provides a schematic of this framework, which suggests that a host of factors influence a user's view about, and behavior with, a new system.

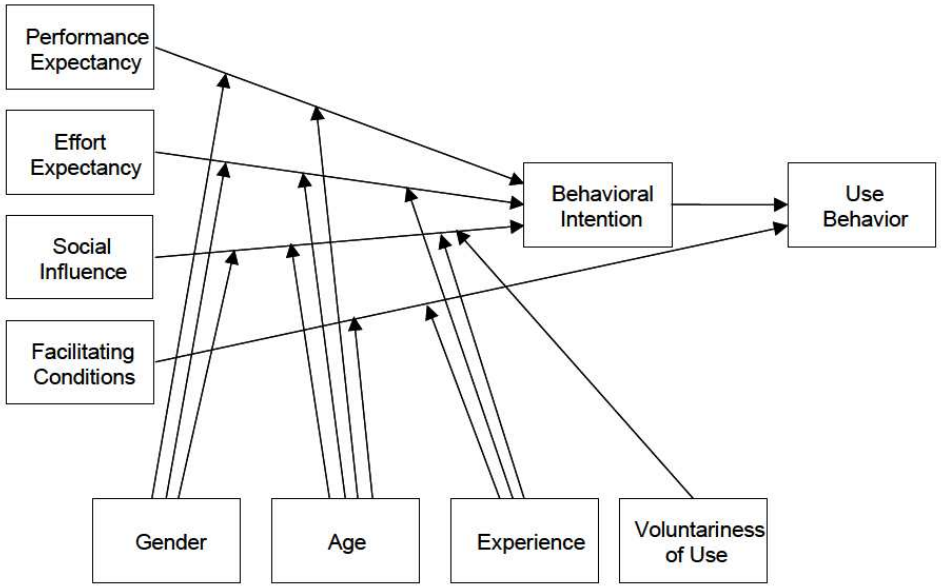

Figure 1 - UTAUT Model (Venkatesh, Morris et al., 2003)

As noted by Venkatesh and Davis (2000), a better understanding of how these variables influence user perceptions of a system enable us to design effective organizational interventions that increase user acceptance of new IT systems. For example, such understanding can help both researchers and practitioners enhance user involvement, participation, acceptance, system use, satisfaction, and success, leading to practical user commitment. Here, we consider six of them: (1) user training, (2) user participation, (3) user acceptance, (4) use, (5) user satisfaction and (6) IS success. Each provides a useful contribution to our understanding of users and system work. But we also claim that each tells only part of the user commitment story.

Realization, Awareness, Information Transfer, and Recognition – User Involvement

User involvement can take several different forms. It can be direct, as when a user formally participates in a prototyping session, or can be indirect, as when a user influences system work through intermediaries (Mumford, 1983). Similarly, user roles can also be classified as informative, consultative or participative. Informative role users act only as providers of information and as objects of observation. In the consultative role, users are allowed to comment on predefined design solutions, while in a participative role, they actively participate in the design process and have decision-making power in the design solution. The participatory design tradition has advocated the participative role for users in development, while in the human computer interaction (HCI) literature (where HCI specialists represent the users) user involvement is indirect—i.e., when users influence others through intermediaries. In this situation, it is interesting to consider the role of the HCI specialists. These individuals can also be classified as informative, consultative, or participative in ways similar to users. It might be that the HCI specialists are only allowed to act as providers of information or as commentators of predefined

solutions. However, users might also be allowed to participate and have decision making power regarding the solution (Iivari, 2009).

The first stage of the user commitment continuum involves "realization"—the point at which the user perceives a system as a real entity rather than a conceptual idea, understands why the system is needed, and perhaps identifies his or her role in its use. Realization or awareness constitutes the point of entry for all users into the world of information systems. Schmidt & Simone (2000) discuss "awareness" in this fashion – i.e., "competent members can develop a rudimentary awareness which enables them to align to accomplish work in an orderly fashion and infer the intentions and plans of colleagues." This means that users become aware of a new system that will enable them to perform work by learning the new system from co-workers or others assigned to increase awareness of users. Thus, "awareness" means being conscious of a system and its availability.

Closely related to the terms "realization" and "awareness" is the term "recognition." But "recognition" usually takes more time, is more formal, and requires that learners take a more active role in the training process (Wilson, de Zafra, Pitcher, Tressler and Ippolito, 1998). Trainees, following a well designed training course, are expected to develop specific skills and to be capable of applying knowledge gained through the process to solving new problems. To do this they must be exposed to the look and feel of the new system. Training is required for those employees whose role necessitates recognition of the system and its components. Not all employees require the same level of training; But all employees must first be exposed to the system (Katsikas, 2000). "Recognition" as used here is defined as identifying something that has been previously seen, heard or known.

Comprehension - User Participation

"Comprehension" means understanding concepts, technical skills, organizational skills, and knowledge about a specific product. In this case, user participation will lead to greater comprehension of a new system (Lertlakkhanakul, Choi and Kim, 2008). Similarly, we define "user participation" as the behaviors, assignments, and activities that users perform during the system implementation process (Barki and Hartwick, 1994). System quality and/or system acceptance studies ignore the important underlying cognitive and motivational characteristics of individuals affected by the changes (Ives and Olson, 1984).

The IS literature suggests that there are three distinct dimensions of user participation: (1) overall responsibility, (2) user-system relationship, and (3) hands-on activity (Hartwick and Barki, 1994). Overall responsibility typically means managerial assignments and activities that are typically performed by the project leader. This type of responsibility can include being the leader of the project and/or being responsible for the success of the system. The user-system relationship can include participation activities involving a relationship between the users and IS staff or development activities for users of the system. Initial evaluation and approval of work to be done by the system staff and being kept informed during the system implementation are two examples of the user-system relationship. Hands-on activity refers to design and implementation tasks performed by users (Barki and Hartwick, 1994). Hands-on activities give users real work to perform such as designing something on paper or operating a piece of software allowing users to test what they learned. While the three areas of user participation might be seen as different, they are likely to be empirically related. Users who engage in one set of participative behaviors are also likely to engage in the other two sets of behaviors (Hartwick and Barki, 1994).

Previous research suggests that there are two components of user involvement: (1) situational involvement and (2) intrinsic involvement (Hartwick and Barki, 1994). Situational involvement is the extent of participation in various activities related to technology development and implementation. Intrinsic involvement is the extent to which the object in question has personal relevance, psychological significance and significant consequences for the individual (Amoako-Gyampah, 2007).

User Acceptance

While acceptance of technology has a long, rich history in information systems research, it continues to produce conflicting results, suggesting further theoretical work concerning user attitudes is needed. In this proposition, technology acceptance represents a single point along a continuum, where users have already realized the system exist, been trained in the system and comprehend their role and how the system will affect their work. It is important to keep in mind that in this work technology acceptance should be thought of as how users grow and change in their attitude toward a system over time. This can be in variability of technology acceptance research.

Technology acceptance literature includes a large number of empirical tests, comparisons, model variants, and model extensions. TAM has been extended in two primary ways to provide greater understanding and additional points of use by managers in its use. The first approach involves introducing factors from related models, such as "self-efficacy," "subjective norm," and "perceived behavioral control" (Hartwick and Barki, 1994; Taylor and Todd, 1995; Mathieson, Peacock and Chin, 2001). A second approach involves additional or alternative belief factors to the model. This includes adding key

related factors from the diffusion of innovation literature, such as trialability, compatibility, visibility, or result demonstrability (Agarwal and Prasad, 1999; Karahanna and Straub, 1999).

TAM has also served as a basis for prior research in IS dealing with behavioral intentions and usability of IT (Amoako-Gyampah and Salam, 2004; Gumussoy, Calisir et al., 2007; Venkatesh and Bala, 2008). TAM was specifically tailored for modeling user acceptance of IS with the aim of explaining the behavioral intention to use the system as seen in Figure 2. TAM proposes that perceived usefulness and perceived ease of use are important in explaining the behavioral intention to use IS and therefore, the new system (Davis, 1989).

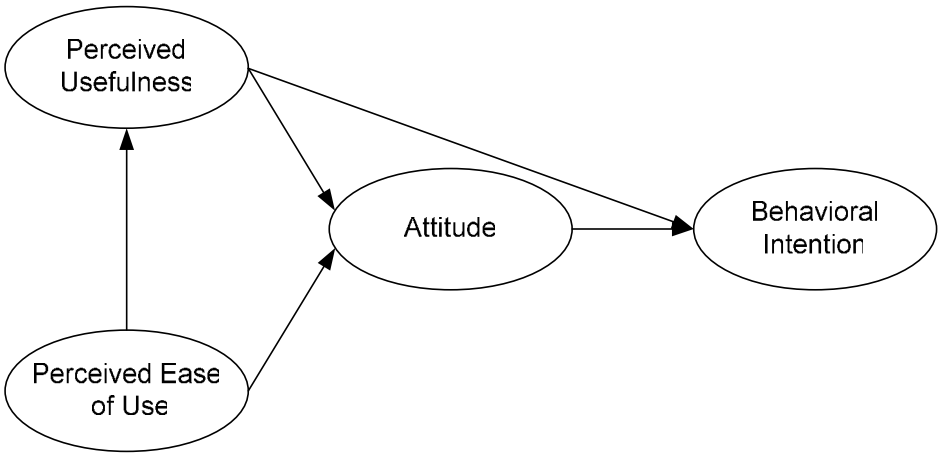

Figure 2 - The Technology Acceptance Model

Davis (1989) defined perceived usefulness as ''the degree to which a person believes that using a particular system would enhance his or her job performance'' and defined "perceived ease of use" as ''the degree to which a person believes that using a particular system would be free of effort'' (Venkatesh, Morris et al., 2003). TAM assumes that computer usage is determined by a behavioral intention to use a system, where the "intention to use" the system is jointly determined by a person's attitude toward using the system and its perceived usefulness.

Commitment - User Satisfaction and IS Success

"User satisfaction" is typically viewed as the belief that the new information system is now available and the extent to which it meets user requirements. However, "user satisfaction" has been termed a weak predictor of system usage (Davis, 1989; Melone, 1990). This is attributable to the fact that beliefs and attitudes about objects are generally poor predictors of behaviors (Ajzen, 1991). User satisfaction primarily has been measured by various beliefs about specific systems, information, and other related properties. The end-user computing satisfaction instrument is different in that it emphasizes the cognitive or belief aspects of attitudes in a short, easy-to-use, application-specific instrument using Likert-type scales (Doll and Torkzadeh, 1991). Although these instruments have been criticized for containing an arbitrary assortment of characteristics (Galletta and Lederer 1989), the items from user satisfaction measurements represent provide a useful means for identifying and examining the underlying structure of system and information characteristics (Wixom and Todd, 2005).

One of the key measures of implementation success (DeLone, 1992; DeLone and McLean, 2003) is achieving the intended level of usage of the IT. System usage is a reflection of the acceptance of the technology by users (Venkatesh and Bala, 2008). "Perceived usefulness" and "learnability" are determinants of user satisfaction with information systems. Among them, perceived usefulness has the strongest impact on user satisfaction. Perceived usefulness has an effect on user satisfaction. Users are likely to be more satisfied if they believe that using the system will increase their performance and productivity (Calisir and Calisir, 2004).

IS evaluation in terms of success metrics is widely held to be important in the assessment of whether the system meets the organizational objectives or not. The "system use" and "user satisfaction" as metrics of success have long been an elevated perspective, though, of course, systems are developed for many more reasons than happy users. Both of the measures (system use and user satisfaction) are well accepted and mostly used as surrogate measures of IS success. Researchers have made efforts to uncover a relationship that may exist between these two measures, but the previous research has failed to

reach an agreement about the nature and strength of this relationship. Both theoretical and methodological considerations have been offered as possible causes of these inconsistent findings (Bokhari, 2005).

Wixom and Todd (2005) believe in an opportunity to integrate other research that has been treated largely as distinct and believe in building on the unique strengths of each. Their research examines critically the past findings and resolves the existing inconsistencies. Bokhari's meta-analysis findings explain that there exists a significant positive but weak relationship between system usage and user satisfaction and empirically validates the relationship that has already been proposed by Delone and McLean (1992) in their IS success model. Bokhari (2005) also provides a guide for future research to explore the mediating variables that might affect the relationship between system usage and user satisfaction.

Nevertheless, the measurement of IS success has achieved prime importance among researchers. Measures of success include assessment of satisfaction as reported by key personnel, evaluation of the capabilities of the constructed system, measured in various terms such as system performance, effectiveness, quality, use, and users' satisfaction (Bokhari, 2005)

Mahmood (2000) notes that user satisfaction requires longitudinal studies that reflect changing attitudes over a period of use. Karahanna, Straub and Chervany (1999) found significantly different influencers pre- and post-implementation reflecting a temporal evolution of beliefs, attitudes, norms and behaviors across different phases of the innovation process. We agree with Mahmood (2000) that further analyses of this type are needed to influence the direction of more focused research. Figure 3 consolidates the user commitment continuum model and various theories discussed.

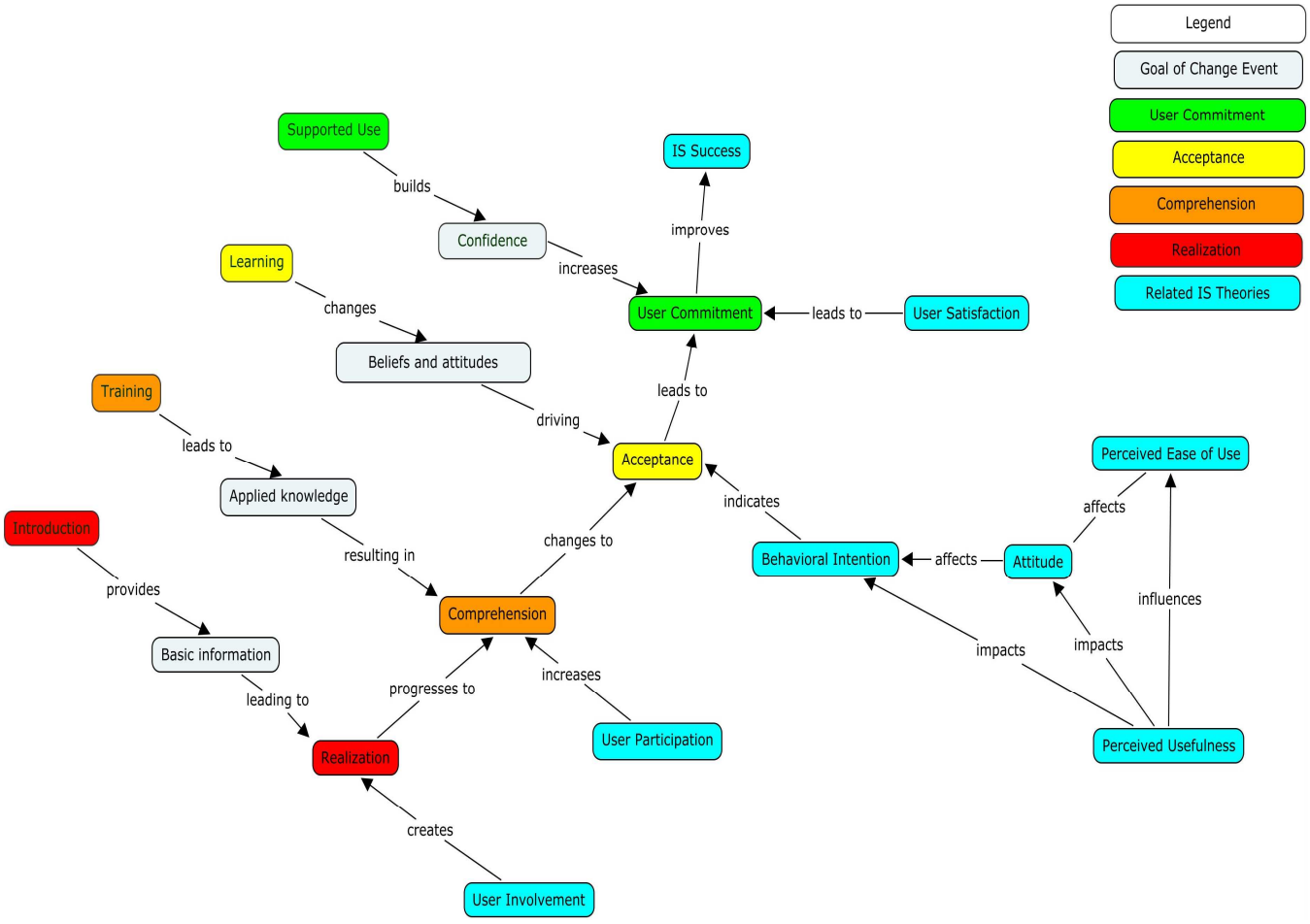

Figure 3 - User Commitment Continuum

A PROPOSED MODEL

We propose a model of user commitment derived from considerations of the literature outlined above and our own assumptions about how users interact with a new system. The model stipulates that change events will affect a user's commitment to a new system, as shown in Figure 3. In this figure, events such as an introduction to a new system, training in system use, continued learning and increased ability, and reinforcement of previously learned information through supported

use should increase a user's commitment to a system. We believe that specific change events related to introduction, training, learning, and supported use will help users move along the continuum resulting in greater system success.

The results of our analysis of juxtaposed acceptance results suggest that "user commitment" is not likely to be a bipolar value—either "on" or "off"—but rather a series or set of values falling on some form of commitment continuum. Figure 4 shows a graphic representation of the stages in the proposed model. The graphic suggests that "user commitment" changes with organizational training events, which might include (1) an introduction to a new system following an announcement of system selection—for example, an ERP system—leading to awareness, information transfer and recognition of the new system (realization), (2) one or more training seminars, informing users of how they might be affected, how to use the system and the goals of the system (comprehension), (3) more specific learning by groups of users and growing anticipation of the advantages that the new system appears to promise (acceptance), and over time, (4) increasing successful use and commitment to the new system and embracing its power (commitment). These changes in user perceptions are not likely to be continuous, but rather are more likely to depend upon specific change events happening at the employee's organization, as well as seminal, social discussions with managers and/or influential colleagues about the system.

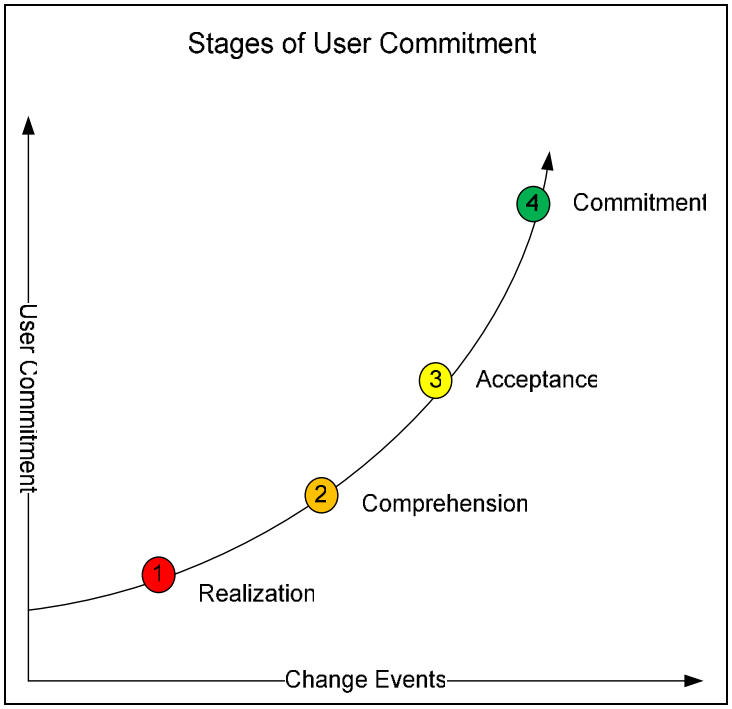

Figure 4 - Relationship between User Commitment and Change Events

We have drawn the relationship between the change events just described and user commitment as an exponentially-increasing curve, reflecting the idea that, generally, "user commitment" increases with them. But we consider the form of the curve shown here an arbitrary one. For example, a more-convenient relationship would be a linear one, as this is easiest to estimate empirically. We also suggest that an alternate relationship of decreasing marginal commitment (as time increases) is also possible. Finally, we propose that the relationship between change events and user commitment may also vary by industry or company—with users immediately embracing a new technology in some instances (for example, drivers accepting cruise control in a car), while only slowly accepting them in others (for example, cable TV). We also note that attaining user commitment to a new system is likely to come at some cost to an organization. This is because overcoming user resistance to new technology is rarely free, but rather must usually be "bought"—for example, with lost employee productivity during training.

If we substitute "costs of user commitment" for "user commitment" on the Y axes in Figure 4, speculation on the shape of the relationship becomes particularly interesting. Decreasing marginal gains in user commitment suggests that organizations should budget less dollars for obtaining it—because less commitment is purchased for each new dollar expended in obtaining it. Conversely, if the increasing exponential relationship shown in Figure 4 holds, then (up to some limit) firms may do well to spend additional dollars because they will buy marginally increasing amounts of employee dedication and good will for them.

Ultimately, our model must be subjected to rigorous empirical testing to validate our framework, but the theoretical issues involved seem well worth investigating. We also note that such investigations are likely to be challenging. As a practical matter, one question is how best to measure "user commitment" at any given stage. For any given organization, another challenge will be to identify major change events in the life of a new system, and to somehow measure "user commitment" from the same study participants after each of them. Finally, aggregating measures into meaningful values while simultaneously avoiding confounds may also prove difficult.

These practical concerns do not mean that nothing meaningful can be done. Some simple hypotheses, implicit in our model, are the following; (1) Is user commitment to an information system affected by the organizational change management process?, (2) Does initial training increase user commitment to a new system?, (3) How does a change management event affect early user commitment?, and (4) Can a change event involving awareness, information transfer and recognition affect user realization?

SUMMARY AND CONCLUSIONS

It is difficult to overstate the importance of user commitment to the success of new information systems. We know that users who enthusiastically embrace new systems practically guarantee their success in terms of use and satisfaction, while employees who actively resist them virtually ensure their demise. Thus, managers should strive to gain user commitment to a new system as this will enhance user realization, comprehension, acceptance, and ultimately productive use of the new system.

What does "user commitment" mean? One of the most oft-cited frameworks is technology acceptance—a popular framework, but one that does not adequately account for temporal differences (Orlikowski and Iacono, 2001). In this paper, we have identified several variables that prior research suggests should affect such commitment to a new information system. These include user participation, involvement, training, acceptance, and satisfaction. Our major thesis is that, for most new systems, such commitment is not a bipolar value, but rather, something that grows over time and in step with both formal and informal organizational change events. For this reason, we argue that it is useful to view "user commitment" on a continuum and propose a model that directly addresses three of the major concerns with technology acceptance: (1) any Boolean treatment of "user commitment," (2) the importance of "time" as a partial determinant of this commitment, and (3) context, which we propose depends in important ways on change management events within the organization.

The extensive work done so far on system quality and technology acceptance has yet to provide a reliable instrument for measuring overall system success. Researchers will find this work useful as it introduces "user commitment" as an important factor for measuring system success. Further research on this model may enhance findings related to user commitment as it relates to system success. This model may prove to be an important element in ensuring system success.

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