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ABSTRACT

This research uses the Repertory Grid technique to understand intrinsic factors influencing benefit maximization of IS usage. The results show that domain-relevant skills, task motivation, cognitive/work style attributes, individual characteristics (identified as creativity traits) and personal characteristics (identified as innovativeness traits) influence benefit maximization of IS usage. The findings not only provide insights on ways to increase quality of IS usage in organizations but are also helpful for identifying approaches that foster attributes leading to increased benefit realization from IS usage.

Keywords

Benefit maximization of IS usage, creativity, innovativeness, repertory grid technique.

INTRODUCTION

Organizations have embraced information systems (IS) to gain competitive advantage. However, the maximum benefits that can be gained from IS are often not realized. For example, the successful implementation of an ERP package does not necessarily lead to its effective use. As Boudreau and Seligman (2003) highlighted, "it is common for complex IT to be successfully implemented, but unsuccessfully appropriated". Wu (2005) noted that "questions about truly realizing the benefits from… investment [in business intelligence solutions] persist…." Boudreau (2003) studied a state institution's successful implementation of an enterprise system but found employees struggling with using the new system – with some just able to perform their job responsibilities and lacking an understanding of the systems capabilities. One of the users in Boudreau's study even noted that employees knew how to complete certain tasks, but didn't know what else was available. As we can see from the above examples, expected benefits from IS are often only partially, if at all, attained. Therefore, the questions that emerge are: "why are the full benefits of an information system not achieved?" and "what factors contribute to benefit maximization of IS usage?"

LITERATURE REVIEW

Models such as Theory of Reasoned Action, Theory of Planned Behavior, Technology Acceptance Model, and the Decomposed Theory of Planned Behavior (Ajzen and Fishbein, 1980; Ajzen, 1985, 1991; Davis, 1989, Taylor and Todd, 1995) have been adopted to study IS usage phenomenon but their primary focus is on behavioral intentions and factors that predict the amount, rather than the quality or benefit maximization, of IS usage. Bagozzi and Warshaw (1990) noted that, "Since, by definition, reasoned behaviors are not subject to performance impediments, they cannot be considered goals per se. However, when impediments to performance do exist, even if only in the mind of the actor, actual performance will be problematic." (p.128) Bagozzi and Warshaw introduced the Theory of Trying and tested the Theory of Goal Pursuit and Theory of Planned Behavior in their research, while Beaudry and Pinsonneault (2005) expanded upon previous models and research on adaptation of technology by developing the coping model of user adaptation. Beaudry and Pinsonneault recognize that adapting or modifying technology can bring about a disruption to the work environment. When that happens, users cope with the change with a variety of strategies. For those individuals who follow a problem-focused approach, appraise the outcome of the IT event as an opportunity, and assess that they have control over the situation, a strategy of Benefit Maximization is highly probable. The participants in Beaudry and Pinsonneault's (2005) study who adapted the Benefit Maximization approach were quoted as spending hours trying new items on the system, finding new uses for the system, utilizing support services to learn the system, discovering other capabilities by trial and error, and exploring new methods of conducting their business functions. In this research, we are interested in identifying and understanding intrinsic factors of end-users that influence their ability to realize maximum benefits from IS. In other words, our research question is: "What attributes and skills of end-users influence their ability to attain the greatest benefits from IS?"

THEORETICAL BACKGROUND

We are interested in identifying user attributes and skills that enhance one's ability to "correctly exploit the appropriate capabilities of software in the most relevant circumstances" (Boudreau, 2003, p.236) and to successfully deploy the Benefit Maximization approach (Beaudry and Pinsonneault, 2005). In reviewing the literature, we found the literature on creativity and innovativeness to be most relevant (Amabile, 1996; Hurt, Joseph and Cook, 1977). Creative innovativeness, as utilized in this research, refers to a user's abilities and willingness to explore and utilize IS in a novel manner to generate beneficial uses of the technology. It refers to discovering technology in a way that invokes new value and approaches (rather than simply discovering ways to make the technology functional or operational to accomplish tasks similar to before). In so doing, the user has a greater potential to discover ways of maximizing the value of the technology. Creative innovativeness not only incorporates the definition of personal innovativeness – "willingness of an individual to try out any new information technology" (Agarwal and Prasad, 1998, p.206) – but also incorporates the aspects of creativity highlighted by Amabile (1983) to bring novelty and value from an IS. As Rank, Pace and Frese (2004) noted, "creativity refers to idea generation, whereas innovation refers to idea implementation… Creativity is truly novel, whereas innovation can be based on ideas that are adopted from previous experience or different organizations" (p.520). West and Farr (1990) summarized "creativity as the ideation component of innovation and innovation as encompassing both the proposal and applications of the new ideas" (p.10). Previous research that has examined the construct of personal innovativeness or investigativeness has focused the influence on perceptions and usage intentions (Agarwal and Prasad, 1998; Nah and Tan, 2005). The research posited in this study looks at personal innovation as an element that contributes to the strategic, novel, and effective use of technology.

Components of Creative Performance

Amabile's (1983, 1996) Components of Creative Performance are adopted to assess the creativity components of creative innovativeness. These components are: domain-relevant skills, creativity-relevant skills (cognitive style & creativity traits), and task motivation.

Domain-Relevant Skills

Domain-relevant skills represent the resources utilized in the problem-solving or task accomplishment process, the alternatives that will be available, and the criteria to evaluate potential solutions. The component, domain-relevant skills, entails the cognitive pathways for performing a task or solving a problem. It contains factual knowledge within the domain of study, which may include facts, principles, or knowledge frameworks, as well as technical skills and talents relevant to the specific domain. The manner in which domain-relevant information is stored also impacts creativity, with a more generalized approach being preferable.

Creativity-Relevant Skills

Creativity-relevant skills influence the process whereby solutions are sought or a task is completed. Creativity-relevant skills comprise two parts: (1) cognitive style, which emphasizes individuals' approach to rationalizing tasks or problems and breaking pre-established methods for solving problems or accomplishing tasks, and (2) personality traits as characteristics of creative individuals. Amabile notes these skills may be learned through training.

Task Motivation

Task motivation entails the initiation and continuation of a process. Two elements compose task motivation: baseline attitude toward the task ("trait") and the perception of purpose of the task ("state"). Intrinsic motivation can be analyzed as both a trait and a state because individuals may hold a persistent interest in a task but this interest can also be impacted by social and environmental factors. The baseline attitude develops through an individual's own analysis of the task itself and its compatibility with the individual's interests. If the individual perceives the task as an end in itself, they are more likely to be intrinsically motivated. Task motivation is noted as "the most important determinant of the difference between what a person can do and what s/he will do. The former is determined by the level of domain-relevant and creativity-relevant skills; the latter is determined by these two in conjunction with an intrinsically motivated state."

Predictors of Innovativeness

Hurt, Joseph and Cook (1977) developed a measure for innovativeness based on their view that innovativeness is a personality construct and their definition of innovativeness as a willingness to change. They categorize personal innovativeness into nine components – openness to experience, ambiguity tolerance, rationality, intelligence, optimism, motivation toward achievement, extraversion, opinion leadership, and resourcefulness.

RESEARCH METHOD AND PROCEDURES

We use the Repertory Grid (RepGrid) Technique (Kelly, 1955) to understand intrinsic factors of end-users that influence their ability to realize maximum benefits from IS. The RepGrid technique is very appropriate because of its ability to capture an individual's personal constructs that bring meaning and understanding to various phenomena (Stewart, 1981) such as maximizing benefits of IS usage. In this research, we need to understand what attributes, skills, characteristics, etc. a potential expert user utilizes and experiences that allows him/her to exploit the system to its fullest potential. RepGrid is an excellent technique for identifying such constructs and hence, is an excellent fit for our research purpose.

The RepGrid technique consists of three major components: elements, constructs, and links (Easterby-Smith, 1980; Tan and Hunter, 2002). A detailed description of the RepGrid technique will not be included here. Readers may refer to Stewart's (1981) Business Applications of Repertory Grid for details. The research procedure involves interviewing working professionals who utilize IS on a regular basis as end-users to accomplish their job requirements and responsibilities. The research procedure consists of five main steps:

Step 1: Participant Selection

The research participants will be selected at random from a variety of industries. The sample size for the study will be determined at the point of saturation where no new constructs emerge from interviews with additional subjects. Tan and Hunter (2002) indicated that a sample size of 15 to 25 is generally adequate to reach the saturation point. At the beginning of each interview, the participant will be asked to identify the number of elite users (or those considered as close as possible to an elite user) within their organization.

Step 2: Select Elements

The *elements* are defined as the focal point of the study (Tan and Hunter, 2002). In this research, the elements will be system users that the participant works with or has worked with. The participant will be asked to identify the elite users they counted in step 1 (with choices of using Aliases to protect identities). The participant will then be asked to identify an equivalent number of other users of information systems within their organization, with the option of including himself/herself. Two additional elements that represent an Elite (Ideal) User and an Unskilled (Incompetent) User will also be included. The set of elements generated in step 2 forms the element pool for step 3.

Step 3: Identify Constructs

The *construct* identifies the interpretation of the elements (Tan and Hunter, 2002). In so doing, bipolar labels can be used to divulge a deeper understanding through the development of contrasts. For example, one set of the bipolar constructs developed by Hunter (1997) in researching the qualities of an excellent system analyst was "good user rapport-no user rapport." The research participant will first be asked to identify constructs using the triadic approach (explained next). More specifically, three elements (users of information systems) will be randomly selected from the element pool and the participant will identify how two of them are similar and then different from the third in the context of ability to utilize an IS to realize its full potential and benefits. Questions such as how and why will also be asked to gain further insight into the meanings of the participant's labels, also known as laddering (Tan and Hunter, 2002). The number of triads in each session will be determined by the point of redundancy, where no new constructs emerge. Reger (1990) indicates that previous research identifies seven to ten triads to be sufficient. The identified bipolar labels will be listed and given to the participant for review and confirmation.

Step 4: Develop Links

Links illustrate the relationship between elements and constructs from the research participant's perspective and interpretations of similarities and differences (Tan and Hunter, 2002). In this research, a five-point rating scale (with 1-Most Important to 5-Least Important) will be utilized to ascertain the importance of the constructs as a contributing factor to the elements' ability to fully utilize an IS and experience the maximum benefits that the system can provide. In addition, to further verify the reliability of the constructs elicited, during the final stage of the interview, the participant will be asked to focus on the elite users that they identified earlier and asked probing questions such as "How would you describe this person in terms of what makes him/her elite?", "Why do you think they are elite (or close to an elite) user?", etc. The constructs identified from the responses will be compared to the existing list. If any new constructs emerge, they will be included in the existing list with bipolar labels identified, and a rating given by the participant.

Step 5: Analysis of RepGrids

To conduct a qualitative analysis of the RepGrids generated from the data, the frequency that the constructs are mentioned will be tabulated. Also, the mean average of the ratings will be developed and reviewed. As suggested by Tan and Hunter (2002), "linguistic analysis can be used to classify groups of common constructs" (p.49). Higher level constructs/categories will be developed using open coding (Strauss & Corbin, 1998).

DATA ANALYSIS AND RESULTS

To date, we have completed data collection of six subjects. These six subjects represented a variety of industry experience from healthcare and insurance to retail and aviation. The constructs that were generated were categorized following Stewart's (1981) approach of content analysis and Strauss and Corbin's (1998) open coding methodology. Stewart suggests that, "to perform a content analysis you select a series of categories into which the elements or constructs fall, and then assign the elements or constructs to categories." We examined the data collected and grouped them into categories using the open coding methodology. During open coding, we referenced those categories identified in the literature review and followed their definitions as closely as possible in order to capitalize on the strong theoretical foundation in the literature and to develop high cumulative tradition.

Frequency counts were calculated. Constructs that were not specifically identifying abilities or characteristics of individuals were not included (e.g., young…old, senior level management…operations support). Major groupings/classifications that resulted in the greatest frequency counts of constructs are creativity-relevant skills (64 counts, where 42 counts relate to cognitive/work style attributes and 22 counts relate to creativity traits) followed closely by personal innovativeness characteristics (56 counts). Therefore, the presence of both creativity and innovativeness is essential for realizing maximum benefits from IS. The other two categories identified are domain-relevant skills (35 counts) and task motivation (14 counts).

CONTRIBUTIONS AND FUTURE RESEARCH

The results indicate that domain-relevant skills, cognitive/work style attributes, task motivation, individual characteristics (identified as creativity traits) and personal characteristics (identified as innovativeness traits) are important antecedents of benefit maximization from IS usage. Domain-relevant skills, cognitive/work style attributes, task motivation, and creativity traits are components of creative performance (Amabile, 1983, 1996). Therefore, support for the importance of creative innovativeness to achieve benefit maximization of IS usage is observed. If users are encouraged to utilize creative innovativeness, then they may move beyond the basic training to application in novel ways. Further, organizations can identify approaches and methods that foster these components to attain the greatest benefits from their IS.

In future research, we are interested to develop and test specific interventions (e.g., training programs, creativity exercises) fostering benefit maximization of IS usage. These interventions can then be implemented in organizations if they are found to be effective.

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