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USER MOTIVATION TO EXPLORE ENTERPRISE SYSTEM FEATURES: AN EXPLORATORY STUDY OF ITS ORGANIZATIONAL ANTECEDENTS AND CONSEQUENCES

*La motivation des utilisateurs pour explorer les caractéristiques d'un système
d'entreprise: une étude exploratoire de ses déterminants et ses conséquences
organisationnels*

Completed Research Paper

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Abstract

To attain the strategic goal of deriving competitive advantage from Enterprise System (ES) adoption, organizations rely on users' exploration of the system features and eventually integrating the system application tightly with job tasks. Research on how to align users' interest with the organization's strategic goal and enhance user motivation to explore ES features is of great significance but lacking. Drawing upon organizational psychology and information systems theories, this paper investigates the organizational mechanisms (i.e., reward system, autonomy job design, and socialization tactics) enhancing user motivation (i.e., extrinsic, intrinsic and normative motivation) to explore ES features, the moderating effect of individual motivational system (prevention focus in particular) on the association between organizational mechanisms and motivation, and how different types of motivation affect cognitive and affective exploration outcomes. Our research model is tested by data collected from individual users through a longitudinal two-wave survey. Theoretical contributions and managerial implication of this study are discussed.

Résumé

En se basant sur les théories de la psychologie organisationnelle et des systèmes d'informations, ce papier enquête sur les déterminants et les conséquences de la motivation des utilisateurs pour explorer les caractéristiques d'un système d'entreprise. Notre modèle de recherche est confronté aux données collectées auprès d'utilisateurs individuels dans le cadre d'une étude longitudinale. Les contributions théoriques et les implications managériales de cette étude sont discutées.

Keywords: feature exploration, motivation, organizational mechanisms, satisfaction, task performance

Introduction

In the increasingly hypercompetitive business arena, Enterprise Systems (ES) are regarded as a lever for organizations to derive competitive advantage. The investment on ES implementation was an estimated \$300 billion worldwide during the 1990s (James and Wolf 2000). Unfortunately, about one-half of ES implementations fail to meet the adopting organization's expectations (Adam and O'Doherty 2003). Empirical studies suggest that the driver of IT impact is not the investment in the technology, but the actual usage of the technology (Devaraj and Kohli 2003). Also, the failure in materializing the system's potential return on investment lies in the fact that the organization does not adequately explore ES features and truly integrate the system with its core business processes, create firm-specific tacit knowledge and make its application distinct from others (Nambisan et al. 1999; Karahanna and Agarwal 2006).

According to innovation and creativity theories, innovative ideas of technology application are generated by the users, rather than the management or IT staff (Ciborra 1991; Urban and von Hippel 1988; Swanson 1994). Therefore, the potential benefits of ES adoption translated into actual advantage depend on the extent to which individual users are motivated to behave in line with organizational goals, proactively explore system features, and eventually apply system functionalities best supporting job tasks (Jasperson et al. 2005). However, a majority of technology acceptance research focused on simple dichotomous adoption decision or amount of usage (Chin and Marcolin 2001). Such a limited theoretical attention may impede us from understanding the reasons for system underutilization (Hsieh and Wang 2007). Especially, the complexity and malleability of ES allow user to explore various features and utilize functionalities at different levels of sophistication (Moore 2002; Hsieh and Wang 2007). Hence many researchers have called for research on *how* and *why* users explore ES at the feature level (e.g., DeLone and McLean 2003; Jasperson et al. 2005; Berton-Jones and Straub 2006).

In response to this call, we conduct this research to explore the antecedents and consequences of a user's motivation to explore ES features. We focus on studying organizational mechanisms that motivate users to explore ES features and how motivations affect user performance in and satisfaction with ES feature exploration. It is established that, beyond technology and individual factors, organizational, managerial and social factors can influence system usage (e.g., Gallivan 2001; Hieh and Wang 2007; Li and Hieh 2007). ES, as packaged software, provides the adopting organizations limited room for customization and thus it limits the organization's ability to influence users by technical factors. Similarly, management cannot easily change user characteristics such as IT innovativeness and it is difficult for the organization to use personality traits as a lever for ES exploration. In contrast, the organization can institutionalize mechanisms that mobilize user's incentive to explore ES features. Therefore, a study on how organizational mechanisms affect user motivation may provide more insights into how the organization can manage ES exploration and eventually materialize ES benefits. We derive a research model by drawing upon organizational psychology and information systems theories. Specifically, we posit that perceived reward system, job autonomy and socialization tactics have positive effect on extrinsic, intrinsic and normative motivation, respectively. Given that individuals have various motivational systems. Specifically, an individual with a prevention focus motivation system fulfills the needs for safety through the pursuit of responsibilities. We submit that prevention focus moderates the relationships between organizational mechanisms and motivations. In addition, we contend that user motivation has a positive effect on their task performance in and satisfaction with feature exploration. The research model is tested with survey data collected from 600 users in three manufacturing organizations.

This study is distinct from previous research in mainly two ways. First, the extant literature has been largely focused on investigating salient factors that lead users to accept the system (e.g., Davis et al. 1989; Venkatesh et al. 2003). In other words, the emphasis has been on users' readiness to adopt a new technology or application (e.g., Agarwal and Prasad 1998), in which the user has a relatively passive role to play. In contrast, this research investigates how to motivate users to *proactively* explore features and appropriate the value of the already installed system. Second, the existing studies on system value appropriation have been conducted at the organizational level (e.g., Liang et al.

2007; Chatterjee et al. 2002) or examined factors that enhance individual capability to use a broad range/spectrum of system features (e.g., Nambisan et al. 1999). This study assesses the effect of organizational mechanisms on user *motivation* to explore system features. The literature suggests that outcomes of a behavior are determined by an individual's motivation and capability. Thus, management can either provide incentives for user ES feature exploration or facilitate the exploration by providing training. We have very limited understanding of motivation for system exploration (Li and Hsieh 2007), while there exist a plethora of studies on improving users' cognitive abilities for system learning (e.g., Kang and Santhanam 2003; Sein and Santhanam 1999; Lim and Benbasat 1997; Ahrens and Sankar 1993; Nambisan et al. 1999). More importantly, when motivation is low, an individual demonstrates low performance regardless of his or her cognitive abilities (Vroom 1964). Therefore, we choose to focus on user motivation in the current paper. Different from the one and only other quantitative research on user motivation for system exploration by Li and Hsieh (2007), we investigate all three types of motivation and examine the effect of organizational mechanisms.

The rest of the paper is organized as the following. We describe the theoretical underpinnings of our research model, followed by our articulation of proposed hypotheses. Then we provide information on our research methodology and present data analysis results. We end this paper with discussions and implications for theory and practice.

Theoretical Underpinnings and Research Model

Technology features are defined as the building blocks or components of the technology (Griffith 1999). Features result from choices during the technology design process and users' decisions about use. Design and user decisions serve to both filter features out of the system and to make new features available over time. The process of feature interpretation and possible adaptation by users constitute a technology-in-use (Griffith 1999; DeSanctis and Poole 1994; Orlikowski and Gash 1994). In the extant literature, there are many studies on the significant impact of technology feature exploration on innovation implementation success (e.g., Griffith 1999; Louis and Sutton 1991; Tyre and Orlikowski 1994; DeSanctis and Poole 1994). A common theme of this stream of research is that competitive advantage is most likely to be derived when users recognize the match between the requirements of job tasks and an application's features, and subsequently change their post-adoptive behaviors by selectively applying features to leverage the synergy offered by this fit between the task and the technology (Goodhue 1995; Todd and Benbasat 2000). To find the fit between the requirements of job tasks and technology features, users are required to actively learn about the technology, be aware of the existence, nature and potential usefulness of features embedded in the technology (Jasperson et al. 2005). That is, users must deliberately learn technology features and discover ways to apply features that go beyond the uses delineated by the technology designers or implementers (Nambisan et al. 1999; Agarwal 2000; Cooper and Zmud 1990; Morris et al. 2000; Saga and Zmud 1994; Goodhue and Thompson 1995).

In the context of ES, the importance of feature exploration has recently attracted researchers' attention (e.g., Jasperson et al. 2005; Burton-Jones and Straub 2006). As a third generation innovation (Swanson 1994), ES adoption has two stages (Jasperson et al. 2005; Robey et al. 2002). While the organization makes decision to adopt the system at stage one, users make individual decisions to adopt the system and the extent to which to apply the system at stage two (Leonard-Barton and Deschamps 1988). When the organization decides to adopt ES, the management expects to derive competitive advantage from such adoption. However, management's strategic goals cannot directly translate to users' appropriate usage (Attewell 1992; Bhattacharjee 1998; Venketesh et al. 2006; Keen 1981). Since feature exploration requires additional cognitive effort to consciously engage in exploratory activities, users tend to symbolically adopt the system and routinely apply the system through a subconscious mechanism (Jasperson et al. 2005; Robey et al. 2002) and thereby impede the organization from realizing benefits of the system. Indeed, Karahanna and Agrawal (2006) regard system exploration as an innovative, extra-role behavior that is beyond routine organizational requirements (Katz and Kahn 1978; van Dyne et al. 1995; Li and Hsieh 2007). It is established that organizational interventions are effective in motivating individuals to conduct innovative and extra-role behaviors (Shi and Zhou 2003; Piccolo and Colquitt 2006; Li and Hsieh 2007). Therefore, it is of great significant to investigate how the management can align user interest with the organization's strategic

goals (Wright et al. 1994) and harness user motivation to proactively explore system features, which is required for appropriating the value of the already installed system (Venkatesh 2006).

The concept of motivation plays a central role in research concerned with understanding the determinants of individual behavior in organizations and its impact on firm performance (Deci and Ryan 1985). According to organizational psychology theories, motivation is the psychological force within an individual that determines the direction of the individual's behavior, level of effort, and persistence in the face of obstacles (Kanfer 1990). Building on Vroom's (1964) expectancy-valence theory of motivation, Porter and Lawler (1968) proposed a model of intrinsic and extrinsic motivation. Intrinsic motivation involves an individual doing an activity for his or her immediate need satisfaction and it "is valued for its own sake and appears to be self sustained (Deci 1975, p. 105)." In contrast, extrinsic motivation requires an instrumentality between the activity and some separable consequences. Therefore, extrinsic motivation involves an individual's undertaking an activity to satisfy his or her needs indirectly. According to motivation theories, intrinsic motivation mobilizes an individual's effort in performing relevant tasks that are enjoyable and cognitively challenging, and satisfy the individual's need for competence and self-determination (Deci and Ryan 2000). Therefore, intrinsic motivation is correlated with both creativity and level of effort devoted to relevant tasks (Amabile, et al., 1994). Similarly, extrinsic motivation is found to drive individuals to work harder (Amabile et al. 1994).

In addition to this dichotomy of extrinsic and intrinsic motivation, researchers have proposed different classifications of motivation, with varying degrees of granularity (e.g., Deci and Ryan 1985). In particular, normative motivation is of great interest for studies conducted in the organizational settings. Normative motivation involves an individual doing an activity that is compatible with norms and values. As members of the social community of their firm, individuals are normatively motivated to engage in, or refrain from, a given behavior, depending on whether this behavior is congruent with organizational norms and values (Allen and Myer 1990; Kreps 1997). Therefore, normative motivation is another type of motivation that energizes individuals to conduct behaviors that have impact on the organization's performance.

Previous IS studies conducted in other contexts have endorsed the importance of motivation (e.g., Klein et al. 1997; Hunton and Price 1997; Venkatesh and Davis 2000). In addition, there are several studies investigating the role of motivation in user technology acceptance (Davis et al. 1992; Webster and Martocchio 1992; Venkatesh and Speier 1999; Venkatesh 2000; Gill 1996). Venkatesh (2000) found the significant effect of intrinsic motivation (i.e., computer playfulness and perceived enjoyment) on users' perceived ease of use, an important antecedent of users' technology acceptance. Venkatesh and Speier (1999) examine the impact of different types of mood on users' intrinsic and extrinsic motivation to use the system. Davis et al. (1992) relates extrinsic motivation to use a technology to performing job-related activities more productively (i.e., perceived usefulness) and conceptualizes intrinsic motivation as the extent to which a computer is perceived to be enjoyable. All these studies provide empirical support for motivation's effect on technology adoption. However, the research findings may not be directly applicable to the ES context since ES is much more complex (e.g., involving interdependence among users and coming with business process change) than the systems examined by these studies (Venkatesh 2006). Also, passive acceptance of the system is not enough to achieve the organizational goal of deriving competitive advantage from ES adoption. Instead, it requires users' proactive actions in exploring ES features and applying the system in an innovative way (Nambisan et al. 1999). Furthermore, these studies have primarily been focused on the effect of technology centric perceptions and individual characteristics while neglecting various aspects of the organizational context (Orlikowski and Iacono 2001) in general and organizational mechanisms' effect on user motivation in particular. Given that ES is a complex integrated system and learning how to use ES is a challenging task (Sharma and Yetton 2003; Robey et al. 2002; Shang and Seddon 2002), how the management intervene and mobilize user motivation to explore ES features is even more important for the organization and research on this issue is of great significance. Indeed, there emerges a trend of such research (e.g., Venkatesh 2006; Jaspersen et al. 2005). For example, the work by Hsieh and his colleagues (Li and Hsieh 2007) investigates how transformational leadership affects user intention to explore system features through intrinsic motivation.

Research in organizational psychology has documented that motivation varies as a function of several factors in the work environment, such as reward, autonomy, the nature of the work itself and socialization schemes (Venkatesh 2006; Amabile 1994). In the view that organizational leaders and managers play an important role in determining these factors, investigating how managerial actions, i.e., organizational mechanisms, influence user motivation to explore system features can shed new light on our understanding of how adopting organizations can materialize the potential benefits of information systems (Venkatesh 2006). In IS literature, there are many studies examining the important effect of managerial influence on users' technology usage (e.g., Leonard-Barton and Deschamps 1988; Bhattacharjee 1998; Charterjee et al. 2002; Liang 2007). In particular, this stream of research has treated top management participation or top management support as a black box and do not examine what specific mechanisms can be applied by the management (e.g., Jarvenpaa and Ives 1991; Liang 2007; Chatterjee et al. 2002). Although Sharma and Yetton (2003) is an arguably exception as it articulates the "metastructuring actions" that can be taken by the management to influence system implementation success, it employs a meta-analysis methodology to test hypotheses, rather than testing these actions' direct effect and its focus is on users' acceptance of the system in general, rather than system feature exploration. In addition, these studies are largely conducted at an organizational level and do not examine how organizational interventions affect individual motivation to proactively explore system features.

Antecedents of Motivation to Explore ES Features

Our research model is depicted in Figure 1. The model posits that there are three types of motivation, i.e., extrinsic, intrinsic and normative motivation. Extrinsic motivation is driven by the goal of obtaining extrinsic work rewards or outcomes (Deci and Ryan 1985), intrinsic motivation is driven by the goal of being engaged in self-determined and competence-enhancing behavior (Lindenberg 2001; Deci and Ryan 1985), and normative motivation is driven by the goal of engaging in behaviors that are compliant with norms and values (Bagozzi et al. 2002). Individual user motivation to explore ES features can be influenced by organizational mechanisms. Specifically, the three organizational levers, i.e., reward system, autonomy job design, and socialization tactics, affect users' extrinsic, intrinsic and normative motivation respectively. Also, the relationships between organizational mechanisms and motivation are moderated by a user's motivational system. We focus on examining the moderating effects of prevention focus on the relationships between users' perceived organizational mechanisms and their motivation to explore ES features.

Organizational psychology theories suggest that managers have several levers at their disposal to actively influence employee motivation and interest alignment (e.g., Hackman and Oldham 1980; Hackman and Gersick 1990; Gagne and Deci 2005). Specifically, intrinsic motivation can be influenced through changes in the design of tasks (Hackman and Gersick 1990; Hackman and Oldham 1980). Hackman and Oldham's model of job enrichment suggest that organizations can make tasks more intrinsically motivating by increasing each of the following: skill variety, task identity, task significance, autonomy and feedback. Taking the view that individuals' intrinsic motivation in organizational settings clusters along the dimensions of autonomy (Amabile et al. 1994), we focus on the effect of perceived autonomy job design's effect. In IS literature, it is established that user participation and involvement help the user sense his or her control of the implementation outcomes, formulate commitment toward of the project, and volitionally accept the system (e.g., Barki and Hartwick, 1994; James and Kenneth, 1997; McKeen, et al., 1994). Similarly, when a user perceives a high level of autonomy in ES feature exploration, he or she can decide what features to explore and how to explore these features. Thus, the user would sense more control over the expected outcomes and therefore have an active, rather than passive, orientation toward this specific behavior. In addition, new feature application may require changes in how the user gets jobs done. With a perceived high level of job autonomy, a user would have positive expectancy and valence about the consequences of feature exploration and therefore derive enjoyment from such behavior, which in turn enhances intrinsic motivation (Davis et al. 1992; Venkatesh 2000). Therefore, we submit that a user's perceived autonomy to explore ES has a positive effect on the user's intrinsic motivation to explore system features.

Hypothesis 1a A user's intrinsic motivation to explore ES features is positively related to his or her perceived job autonomy.

Organizational performance control systems reward specific behaviors and the achievement of specific outcomes (Eisenhardt 1985). Specifically, such control systems provide monetary reward and/or recognition for behaviors that generate benefits for the organization, and sanction behaviors that may harm the organization. Given that extrinsic motivation relies on an instrumentality between the behavior and some separate desirable consequences, it is most directly influenced by a reward and recognition system that specifies rewards or sanctions, for a specific behavior (Holmstrom and Milgrom 1994; Kirsch 1997; Eisenhardt 1985). In the context of information system diffusion, there is empirical support for the effect of a control system in aligning end user motivation with the benefits accruing to the organization from system adoption (e.g., Ba et al. 2001; Purvis et al. 2001; Sharma and Yetton 2003). We expect that the relationship remains valid in the current research context. That is, when the organization rewards ES feature exploration, users would perceive a positive outcome of such behavior, perceive a high level of “usefulness” of newly explored features and thus have a high level of extrinsic motivation (Davis et al. 1992; Venkatesh and Speier 1999). Therefore, we propose that a user’s perceived control system, in the form of reward and recognition, has a positive influence on individuals’ extrinsic motivation to explore system features.

Hypothesis 1b A user’s extrinsic motivation to explore ES features is positively related to his or her perceived organizational reward and recognition for ES exploration.

Organizations can enhance employees’ normative motivation by leveraging socialization tactics (Kerr and Jackofsky 1989). For example, company-wide events, formal or informal, can be used to enhance employees’ identification with the organization and desire to internalize and comply with organizational norms and values (Allen and Myer 1990). Several important contributions have highlighted the role of this type of mechanisms in motivating employees (e.g., Ouchi 1980; Kirsch 1997; Kirsch et al. 2002). Specifically, socialization processes allow employees to learn about a particular set of values within the organization. These values often stress loyalty and obligation (Ashforth et al. 1998), and may over time become internalized by an individual and adopted as his or her own values, which in turn, arouse the individual’s normative motivation to conduct behaviors that benefit the organization. In IS literature, it is established that user technology acceptance is affected by social influence, both normative and informational. In particular, an individual tends to accept a system if he or she senses the expectation from important others in the social network (Venkatesh et al. 2003). Also, an individual may formulate positive attitude toward the system due to the favorable information circulating in the network (Venkatesh 2006; Ke et al. 2006). These notions can be extended to the ES exploration context. That is, socialization tactics applied by the management allow users to be exposed to norms and information conducive to the positive attitude toward ES feature exploration and thus enhance their normative motivation. Hence we hypothesize the following:

Hypothesis 1c A user’s normative motivation to explore ES features is positively related to his or her perceived organizational socialization tactics.

Moderating Effect of Prevention Focus

The effect of these organizational mechanisms is contingent on an individual’s characteristics (Hackman and Oldman 1980). In particular, it is affected by the individual’s motivational system. According to regulatory focus theory (Higgins 1997, 1998), there are two distinct motivational systems, labeled promotion and prevention, which are distinguished by their focus on differing underlying needs, namely nurturance and gain vs. safety and security, and on the pursuit of differing types of goals, i.e., ideals vs. oughts. Specifically, individuals with a promotion focus strive to fulfill general needs for nurturance, achievement, and gain through the pursuit of ideals mainly using approach strategies. Individuals with this focus are primarily concerned with the absence and presence of positive outcomes, and success and failure result in cheerfulness- and dejection-related emotions, respectively. In contrast, individuals with a prevention focus strive to fulfill general needs for safety and security through the pursuit of oughts (duties, obligations, and responsibilities) mainly by using avoidance strategies. Individuals with this focus are primarily concerned with the absence and presence of negative outcomes, and success and failure result in quiescence- and agitation-related emotions, respectively. In this study, we focus on examining the effect of prevention focus because ES feature exploration, as an extra-role behavior, is performed by employees that have

greater sense of responsibility toward the organization and responsibility is the focus of a prevention motivation system.

We expect that an individual's prevention focus affects the effectiveness of organizational mechanisms in enhancing motivation. Specifically, with a higher level of prevention focus, the individual will be more sensitive to the reward system, which clearly signals what the organization expects from the employees. That is, prevention focus makes the individual construe feature exploration as responsibilities whose attainment brings job security. Therefore, the individual will have a higher level of extrinsic motivation, whose underlying expectation is to get promoted and recognition. In contrast, prevention focus weakens the effect of perceived job autonomy on intrinsic motivation. The underlying psychological needs of intrinsic motivation are autonomy and competence (Deci and Ryan 2000), while a prevention focus makes the individual strive to fulfill needs for safety and security rather than accomplishment. As such, with a high level of prevention focus, the individual will be less sensitive to perceived job autonomy and has lower intrinsic motivation to explore ES features. In addition, a higher level of prevention focus makes the individual more sensitive to socialization tactics, which leads to a higher level of normative motivation. Prevention focus makes the individual pay more attention to the norms and values communicated in the social networks. It also makes the individual more compliant with responsibilities and thus interacts with socialization tactics to enhance normative motivation. Indeed, empirical studies provide support for the moderating effect of regulatory focus in the relationship between expectancy of goal attainment and motivation (Shah and Higgins 1997). Therefore, we hypothesize the following:

Hypothesis 2a The prevention focus of a user's motivational system strengthens the relationship between perceived reward system and the user's extrinsic motivation.

Hypothesis 2b The prevention focus of a user's motivational system weakens the relationship between perceived job autonomy and the user's intrinsic motivation.

Hypothesis 2c The prevention focus of a user's motivational system strengthens the relationship between perceived socialization tactics and the user's normative motivation.

Consequences of Motivation to Explore ES Features

According to motivation theories, motivation mobilizes and energizes an individual's effort and persistence in conducting relevant tasks and therefore has a positive impact on the individual's task performance (Kanfer 1990; Deci and Ryan 2000; Amabile et al. 1994). Indeed, the relationship between motivation and performance has gained strong and consistent empirical support in psychology and information system literature (e.g., Amabile et al. 1994; Kankanhalli et al. 2005; Bock et al. 2005; Venkatesh and Speier 1999). As such, we expect that a user's motivation has a positive effect on his or her performance in exploring ES features. In particular, a high level of motivation allows the user to exert more intensive and persistent effort on the task of ES feature exploration, which in turn leads to better exploration outcomes. We hypothesize the following:

Hypothesis 3a A user's motivation (extrinsic, intrinsic and normative) is positively related to user performance in system feature exploration.

In addition to the cognitive outcomes, a user's motivation can also affect the affective outcomes of conducting ES feature exploration. According to Cherrington (1980), there are two fundamental perspectives on the psychological value of work, i.e., work as an instrumental value and work as a terminal value. The instrumental value view regards work primarily as a means to an end. In contrast, the terminal perspective views work as a positive activity and thus work produces a feeling of dignity and self-respect (Cherrington, 1980). This latter perspective of work implies that motivation leads to effortful engagement in work and thus has affective consequences, such as satisfaction. Indeed, empirical research supports that motivation arouses energized and persistent effort, which in turn, affects individuals' satisfaction with the work process (e.g., Brown and Peterson 1994). Extending this notion to the context

of ES feature exploration, we expect that when a user is highly motivated, he or she conducts exploration at their own discretion and thus derive psychological value from such work. Therefore, we hypothesize the following:

Hypothesis 3b A user's motivation (extrinsic, intrinsic and normative) is positively related to the user's satisfaction with ES feature exploration.

Furthermore, performance affects satisfaction and mediates the effects of antecedent variables on satisfaction (Brown and Peterson, 1994; Walker, et al., 1977). For individuals mobilized by motivations, good performance enables them get their psychological needs satisfied, get the reward they expect and reciprocate the favor received from the organization. Thus, performance may affect the user's satisfaction, the affective feeling about ES feature exploration.

Hypothesis 4 A user's performance in exploring system features is positively related to the user satisfaction with ES feature exploration.

Control Variables

To account for the differences among individual users, we also consider four control variables pertinent to individual characteristics. These variables include user's ability to explore ES features, age, work experience with the organization and experience with the system. We select these variables because they may have an impact on users' performance in and satisfaction with ES feature exploration. For example, with a higher level of ability, a user may be more optimistic about his or her exploration of ES features and therefore more proactively explore the target system's features. Thus, ability has positive effect on the user performance.

Research Methodology

To test our research model, we conducted a longitudinal two-wave survey to collect data from enterprise system users in three manufacturing companies that had implemented SAP for about one and a half years. We randomly selected 600 respondents from the employee lists of these organizations. While the survey respondents were anonymous, we required the respondents to generate their own participation code through a coding system so that we could link their responses for two waves of survey.

In the first wave of the survey, we sent each of these respondents the questionnaire, together with a cover letter to explain our research objectives. Respondents were assured that their responses would be used for research purpose only and only aggregated statistical data would be reported. In this wave of survey, respondents were required to provide information on their demographics, perceived reward system in their companies, autonomy job design, socialization tactics applied by their firms, and their motivation to explore ES features. We received a total of 228 returned questionnaires, with a response rate of 38%.

Three months later, we sent them the second-wave of survey to collect data on their performance of exploration and satisfaction with the exploration process, together with a thank-you letter for their participation and an explanation for this wave of survey. We received a total of 196 returned questionnaires in the second-wave of survey, with a response rate of 32.7%. Among the returned questionnaires from these two rounds of survey, we got 181 pairs of matched questionnaires. Five pairs of matched questionnaires were incomplete and were discarded. We tested the non-response bias by the method suggested by Armstrong and Overton (1977). That is, we compared the chi-squares of the responses from the first 25% of the respondents to that of the final 25%. The significant difference would indicate the presence of non-response bias. Our results showed that there was no non-response bias.

The measurement items in our questionnaire were adapted from existing validated and well-tested scales in the extant literature. These scales had been proved to have good validity and reliability. In the questionnaire, all items were measured with 5-point Likert scales, ranging from “strongly disagree” to “strongly agree”. The instrument for reward system (a second-order formative construct with the dimensions of performance-based and behavior-based reward), autonomy job design and socialization tactics (a second-order construct with the dimensions of collective and serial tactics) were adapted from Ahuja and Thatcher (2005) and Van Maanen and Schein (1979), respectively. The measurement scales for intrinsic motivation (with cognitive and affective components) and extrinsic motivation (with cognitive and affective components) were adapted from Amabile et al. (1994), while the items for normative motivation (with the components of identification and compatible values) were adapted from Karahanna et al. (2006). All three types of motivation were measured as formative constructs. Also, we adapted items for performance of exploration and satisfaction with the exploration process from Tsai et al. (1997) and Brown and Peterson (1994), respectively. IT support was measured with instrument adapted from Nambisan et al. (1999). Prevention focus items were adapted from Shah and Higgins (1997).

Data Analysis

4.1 Common Method bias and Multicollinearity Test

Since we collected data with a single-source, common-method bias might be a concern for data validity. We adopted the Harman’s one-factor test to examine the possible common method bias in this research. The resulting principal component factor analysis yielded ten factors with eigenvalues greater than 1.0 and accounted for 74% variance. The first factor of these ten factors did not account for the majority of the variance (only 27%). All of these results indicated that common method bias was unlikely to be a serious concern in our study. Also, we conducted multicollinearity test. Our results showed that the highest VIF was 3.54, which was lower the benchmark value of 10, and the lowest tolerance value was 0.283, which was higher than the benchmark value of 0.1. As such, multicollinearity did not appear to be a significant problem in our dataset.

4.2 Reliability and Validity of the Scales

To validate our measurement model, all scales were examined for the reliability and validity. The results were shown in Table 1 and Table 2. We examined construct validity by factor analysis. All items’ loading were over the benchmark level of 0.60. The values of composite reliability ranged from 0.757 to 0.931. All the results shown in Table 1 indicated that measurement items had good convergent validity. In addition, we assessed discriminant validity by average variance extracted (AVE) values and correlation matrix. As shown in Table 1, the AVE scores ranged from 0.509 to 0.859. According to Fornell and Larcker (1981), discriminant validity could be established when the square root of AVE for each construct was greater than the correlations with other constructs. As shown in Table 2, this condition was met in all cases.

Constructs	Items	Loading	Composite Reliability	AVE
Reward (P-based)	RePe1	0.927	0.924	0.859
	RePe2	0.927		
Reward (B-based)	ReBe1	0.921	0.918	0.849
	ReBe2	0.921		
Autonomy	Auto1	0.848	0.918	0.738
	Auto2	0.901		
	Auto3	0.829		

	Auto4	0.857		
Collective Tactics	CoTa1	0.762	0.868	0.688
	CoTa2	0.869		
	CoTa3	0.854		
Serial Tactics	DiTa1	0.68	0.83	0.622
	DiTa2	0.876		
	DiTa3	0.798		
Cognitive E.M.	TaRe1	0.891	0.886	0.795
	TaRe2	0.891		
Affective E.M.	Reco1	0.909	0.904	0.825
	Reco2	0.909		
Cognitive I.M.	CoMo1	0.887	0.881	0.787
	CoMo2	0.887		
Affective I.M.	AfMo1	0.9	0.895	0.81
	AfMo2	0.9		
Value N.M.	Valu1	0.789	0.767	0.622
	Valu2	0.789		
Identification N.M.	Iden1	0.86	0.85	0.739
	Iden2	0.86		
Performance	Perf1	0.914	0.918	0.79
	Perf2	0.912		
	Perf3	0.837		
Satisfaction	Sati1	0.88	0.931	0.818
	Sati2	0.91		
	Sati3	0.922		
Prevention Focus	PrLo1	0.732	0.757	0.509
	PrLo2	0.724		
	PrLo3	0.684		
Ability	Abil1	0.863	0.903	0.756
	Abil2	0.889		
	Abil3	0.856		

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Collective T.	0.83																	
Serial T.	0.02	0.79																
Reward P.	0.46	0.01	0.93															
Reward B.	0.32	0.1	0.64	0.92														

Autonomy	0.46	0.11	0.36	0.41	0.86													
Cognitive IM	0.08	0.08	0.22	0.49	0.17	0.89												
Affective IM	0.43	-0.17	0.35	0.38	0.4	0.29	0.9											
Cognitive EM	-0.01	-0.1	0.13	0.24	0.21	0.24	0.32	0.89										
Affective EM	0.23	0.13	0.09	0.37	0.28	0.41	0.43	0.28	0.91									
Value NM	0.02	0.35	0.17	0.03	0.16	-0.08	0.13	-0.06	-0.07	0.79								
Ident. NM	0.41	0.15	0.36	0.41	0.33	0.27	0.44	0.11	0.42	0.15	0.86							
Performance	0.39	-0.1	0.32	0.18	0.33	0.09	0.57	0.26	0.12	0.28	0.23	0.89						
Satisfaction	0.51	-0.08	0.52	0.42	0.38	0.34	0.56	0.18	0.35	0.13	0.44	0.69	0.9					
Prevention F.	0.18	-0.11	0.3	0.14	0.17	0.28	0.33	0.08	0.15	0.08	0.25	0.37	0.54	0.71				
Ability	0.47	-0.09	0.3	0.35	0.46	0.27	0.55	0.22	0.34	-0.02	0.38	0.41	0.46	0.2	0.87			
Age	0.04	0.15	0.06	0.15	0.24	-0.01	0.23	-0.05	0.05	0.13	0.16	0.09	0.11	0.06	0.13	NA		
Systems Exp.	0.03	0.15	0.14	0.09	0.07	-0.06	0.21	0.08	0.01	0.18	0.12	0.08	0.07	0.16	0.02	0.17	NA	
Work Exp.	0.26	0.28	0.24	0.33	0.39	0.23	0.45	0.06	0.22	0.26	0.3	0.31	0.31	0.09	0.41	0.33	0.19	NA

Table 2. Correlations and Discriminant Validity of Constructs

(Note: The diagonal elements are the square root of AVEs.)

4.3 Hypotheses Testing

To test the hypotheses, we applied PLS to analyze the structural model. The four control variables, ability, age, work experience with the organization and experience with the system, are considered in the analysis of the structural model. The result of the structural model is shown in Figure 1. Among the four control variables, only Ability has a significant positive effect on feature exploration performance. In general, the research model is largely supported. Specifically, the positive effects of organizational mechanism on motivation are significant. Thus, H1a, H1b and H1c are all supported. The positive effect of intrinsic motivation on performance and that of normative motivation on satisfaction are found significant, while other relationships between types of motivation and performance and between types of motivation and satisfaction are not significant. Therefore, H3a and H3b are both partially supported. In addition, H4 on the positive relationship between performance and satisfaction is supported. Overall, the model explains 35.8% and 57.1% of variances in Performance and Satisfaction, respectively.

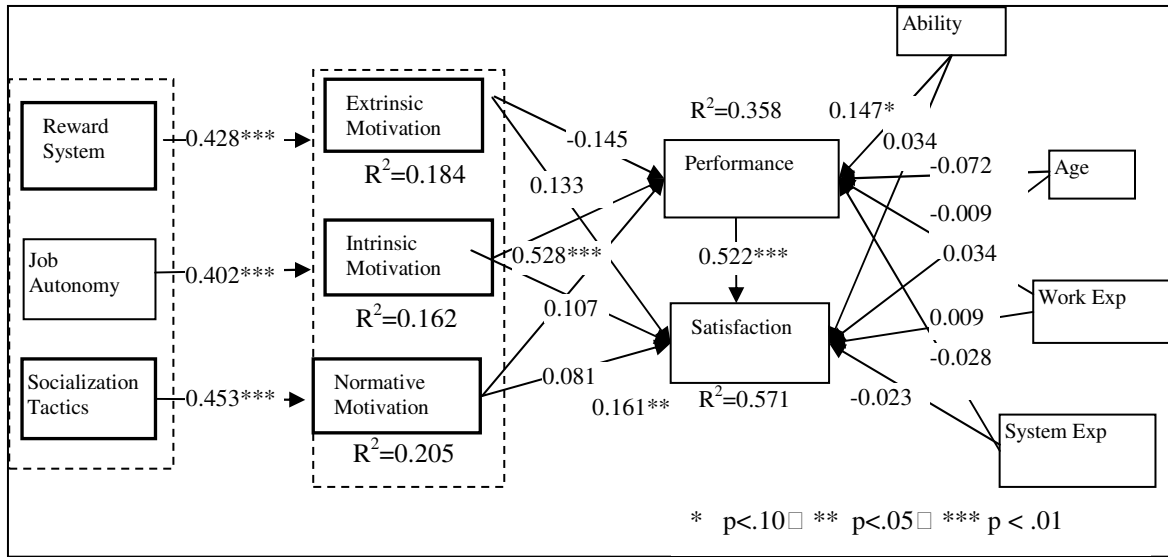


Figure 1. Structural Model

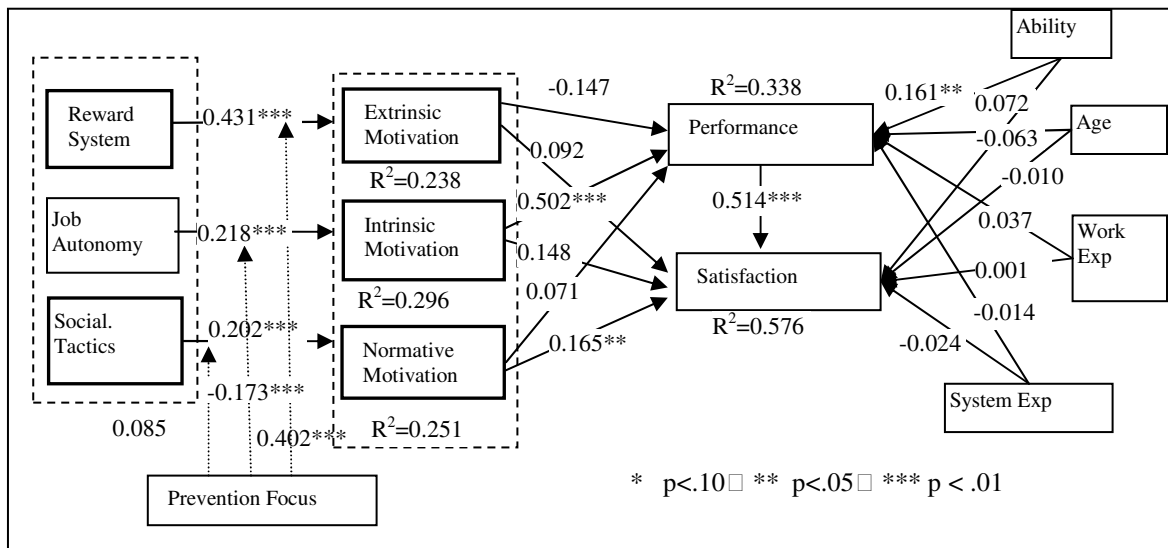


Figure 2. Structural Model (With Moderator)

Also, we tested the moderating effect of prevention focus on the relationships between organizational mechanisms and motivation. H2a on the strengthening effect of prevention focus on the relationship between reward and extrinsic motivation is supported ($b=0.218, p<0.01$). Similarly, H2b on the mitigating effect of prevention focus on the relationship between perceived job autonomy and intrinsic motivation is supported ($b=-0.173, p<0.01$). In contrast, H2c on the moderating effect of prevention focus on the relationship between perceived socialization tactics and normative motivation is not supported. Compared with the basic model without the moderating effects of prevention focus, the R squares of extrinsic and intrinsic motivation are greatly increased, which indicated the significant moderating effects of prevention focus on the relationship between organizational mechanisms and these two types of motivation.

Discussions and Conclusion

Our interest to investigate the antecedents and consequences of user motivation to explore ES features is triggered by the importance of truly integrating ES feature applications with business processes and the dearth of research studying how to energize users to make such integration possible. We examine the possible organizational mechanisms that arouse users' intrinsic, extrinsic and normative motivation to explore ES features. Our data analysis indicates that reward system, job autonomy and socialization tactics have positive effect on extrinsic, intrinsic and normative motivation, respectively. Also, we found that individuals' motivational system, prevention focus in particular, moderates the relationships between organizational mechanisms and motivation, except the relationship between socialization tactics and normative motivation. A post hoc data analysis reveals that prevention focus has a direct impact on normative motivation ($b=0.44$, $p<0.01$), which is consistent with the regulatory focus theory. That is, a prevention focus makes an individual more inclined to perform tasks that are called for by duties, obligations and responsibilities. As such, prevention focus directly influences normative motivation, rather than interacting with socialization tactics. Of course, this finding is subject to future research that further investigates the effect of prevention focus on normative motivation.

In addition, our data analysis results reveal that intrinsic motivation, among the three types of motivation, is the only factor that has positive effect on users' performance in ES feature exploration. Such finding is consistent with the creativity theory's notion that the generation of innovative ideas requires the presence of intrinsic motivation (Amabile et al. 1994). It is also in accord with Li and Hsieh (2007) finding that intrinsic motivation is positively related to user intention to explore complex systems. Different from what is hypothesized, the linkages between extrinsic and normative motivation and performance are found insignificant. An explanation is that ES feature exploration is an innovative task and requires genuine interest to come up with high quality, creative outcomes. Also, normative motivation is the only type of motivation that has positive effect on user satisfaction with the ES feature exploration process. One possible explanation is that users may encounter difficulties in the process of ES feature exploration. Given that ES is a complex, highly interdependent system, feature exploration may require a lot of coordination, communication and collaboration among users within and across functional units. Normative motivation, reflecting users' identification with the organization's norms and values and thus affective commitment to the organization, enables individuals to bear with the ordeals and conflicts that may occur. The special characteristics of ES feature exploration may also explain why intrinsic and extrinsic motivations are found insignificant in directly affecting user satisfaction.

Furthermore, we found that performance has a great positive impact on satisfaction ($b=0.514$, $p<0.01$). This finding is consistent with prior research that explores the relationship between task performance and satisfaction (e.g., Brown et al. 1997; Brown and Peterson, 1994; Walker, et al., 1977). It implies that motivation such as intrinsic motivation may indirectly affect satisfaction through performance although it does not have a direct effect on satisfaction.

It is important to evaluate the current study's results and contributions in light of its limitations. First of all, there are other organizational mechanisms that may affect user motivation to explore ES exploration. Due to the concern about parsimonious model, we do not intend to include an exhaustive list of organizational mechanisms. However, future research exploring other mechanisms' effects on motivation to explore ES features will shed new light on the possible ways the organization can leverage to enhance user motivation. Second, although we collected data at two points in time, which helps us explain the causal relationships between different types of motivation and exploration outcomes, we collected data with a single source and all major constructs were measured by respondents' perceptions, which are subjective. Data analysis shows that common method bias is not a serious concern for the current study. Yet, we urge that future research collects data with multiple sources. Third, we do not include exploration activity as a mediator for the relationships between motivation and behavior outcome. Since motivation requires effort to lead to positive outcomes, future research should be conducted to explore this effect. We expect that the presence of exploration effort in the model may help explain the insignificant relationships between motivation and exploration outcomes as found by the current study.

Our study makes five major theoretical contributions. First, this is one of the few quantitative studies that investigate user motivation to explore ES features. Given the importance of user feature exploration for achieving the

organization's strategic goal of ES adoption (e.g., Jaspersen et al. 2005; Nambisan et al. 1999), this study compliments existing studies on user capability to apply the system. Without motivation, capability cannot be transferred into performance. Indeed, the longitudinal data shows that motivation is causally related to ES exploration outcomes. Second, this research extends our understanding of possible organizational interventions that can enhance user motivation to proactively explore ES features. Previous studies on technology acceptance and diffusion have mainly focused on effects of technology-centric perceptions (e.g., Venkatesh et al. 2003; Davis et al. 1992). Their research findings provide limited guidelines since ES are packaged, complex, large-scale software and require that the organization mobilizes users to proactively explore systems features, regardless of the technology's usefulness and ease of use. This study investigates possible organizational mechanisms that the management can leverage to enhance user motivation to explore ES features and therefore shed new lights on the research issue on hand. Third, different from other studies on user motivation to explore large-scale system features such as the work by Hsieh and his colleagues (Li and Hsieh 2007; Hsieh and Wang 2007), we incorporate all three types of motivation in the study, which allows us to compare the significance of different motivations in affecting the outcomes of ES feature exploration. Fourth, this study introduces the concept of regulatory focus to IS research. It shows that individual differences in motivational system may lead to variations in the effectiveness of organizational mechanisms in motivating individuals. Incorporating the effect of individual motivational system in motivation related research provides us a more precise and complete view of the scenario. Fifth, this study explores how motivations cause ES exploration outcomes, both cognitively and affectively. ES feature exploration is a long-lasting process, especially for organizations responding to constant changes. Thus, it is critical that users achieve positive affective outcomes so that they will remain engaged and continuously explore the system. Yet, there is a dearth of research investigating the affective consequences of system adoption and assimilation in general and large-scale system feature exploration in particular. Thus, this study contributes to our understanding of how motivation and cognitive system exploration outcome are related to user satisfaction in the process of system assimilation.

In addition, our study has two practical implications. First, ES adopting organizations can motivate users to explore system features by organizational interventions. In particular, the organization should focus on effective ways (i.e., autonomy-enhancing job design and socialization tactics) to enhance users' intrinsic and normative motivation that can lead to higher performance and satisfaction, respectively. Second, when applying organizational mechanisms, the organization should provide different "treatments" to users based on their motivational systems. Specifically, for those that are higher level of prevention focus, autonomy-enhancing job design may not be effective to enhance their intrinsic motivation.

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