IS Continuance, Team Ambidexterity and Team Performance: A Multilevel Approach

Research-in-Progress

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Abstract

Information systems and teams are essential for organizations achieve competitive advantages. In fact, the team's ability to adapt to continuous changes in the organizational environment may depend on IS and consequently in their usage. In the post-adoption stage, user behavior can assume a routine or an innovative nature. In routine usage, IS is used in a standardized way with small variations whereas in innovative usage, the user search for novel ways to perform work tasks. These distinctive usage behaviors may have different effects on task and team performance. Also, may affect the ability of a team to be aligned and be adaptable to organizational context. This paper proposes a multilevel conceptual model for IS usage behavior and the role of team ambidexterity in the usage-performance relationship. This multilevel perspective opens new research areas and guides organizations to focus on different approaches to deal with IS use, team ambidexterity and performance.

Keywords: IS continuance use, innovative, routine, team ambidexterity, team performance, multilevel research

Introduction

Organizations strongly depend on information systems (IS) to be competitive. Research in value creation in IS has identified system use as having an important role in such value creation. The DeLone and McLean IS Success Model proposes a positive impact of system use on net benefits (Petter and McLean 2009). Net benefits represent "the effect that an IS has on an individual, group, organization, industry, society, etc., which is often measured in terms of organizational performance, and effect on work practices" (Petter et al. 2008, p. 161). Therefore, IS usage is a key variable in explaining the impact of technology on organizational performance and the omission of this variable may be a missing link in IT payoff analyses (Devaraj and Kohli 2003). With relatively low investments, organizations may achieve considerable economic benefits by enhancing the appropriate use of their IT-enabled work systems

(Jasperson et al. 2005). As such, in the post-adoption stage of IS, when the system is fully implemented and is part of regular work practices, widespread use should be established. However, research suggests that most users underutilize IS in an organizational context (Tennant et al. 2014).

As individuals acquire experience using the IS, their system usage increases (Jasperson et al. 2005) and changes their initial perceptions of their interaction patterns regarding the system (Orlikowski and Gash 1994; Saeed and Abdinnour-Helm 2008). Continued usage can be characterized by dynamic interactions between individual cognitions towards the system (experience, knowledge, meanings and habits) and other organizational drivers (power relations and norms) that induce these individual cognitions (Jasperson et al. 2005; Orlikowski 2000). The interaction effects between individual and organizational drivers, and the emergence of IS usage to higher level structures such as teams, suggest IS continued usage is a multilevel construct. A group of users with similar work practices typically enacts similar IS usage (Orlikowski 2000). Since teams are groups of people working together, performing work tasks with shared and common goals (Salas et al. 2008), it can be expected that within teams a similar IS usage occurs.

Different users and groups within organizations can use IS in distinct ways, exhibiting different behaviors. As such, two post-adoption IS usage behaviors may coexist in organizations:(i) a routine behavior, aligned with exploitation, is an usage type with small variations and perceived as normal by users (Saga and Zmud 1993) and (ii) an innovative, explorative usage, where users take novel approaches to work tasks resolution (Li et al. 2013). These distinct individual behaviors produce different team usage. According to March (1991), an excessive explorative IS usage without accounting for exploitative usage may lead organizations to not achieve the benefits of that exploration. On the other hand, if organizations do not invest in explorative usage they may never achieve an optimal equilibrium state. Ambidexterity, the successful management of exploration and exploitation (Anderson et al. 2014), plays an important role in organizational performance. Similarly, ambidextrous teams, which achieve their overall objectives managing correctly the work effort, at the same time challenge standard practices, respond quickly to changes in tasks, and evolve rapidly in response to changes should perform better. The way teams use IS may allow them to become more ambidextrous and therefore, achieve better performance.

The main contributions of this work are to advance multilevel research on system usage and the development of the team ambidexterity concept. Teams are important structures in organizations and increasingly rely on collaborative information systems to support teamwork. Team behavior is the result of a collection of individual actions of a team's members (Morgeson and Hofmann 1999). A better understanding on which behavior individuals perform and how each type of IS usage behavior leads to the team usage behaviors is fundamental to leverage IS usage for achieving better team outcomes. Additionally, the study explores the role of team ambidexterity. Further, we study a multilevel phenomenon. Despite the importance of cross-level effects in multilevel research, this research focuses on the bottom-up emergence structure, where dynamic interaction processes among individuals, over time, cause the manifestation of the phenomena at higher collective levels (Kozlowski and Chao 2012).

In summary, it is important to understand how IS continued usage impact team ambidexterity and performance. It is also important to understand what drives individual behaviors towards IS, do behaviors arise from some individual characteristics or cognitive style (innovative or adaptor individuals)? Or, are individuals motivated by other external factors, such as the perceived fit between the task to be performed or the IS user's satisfaction with the IS? To explore these issues, the following research questions guide this research: (1) How do the antecedents of IS continued usage affects different types of usage behavior? (2) How does a team's IS continued usage emerges from individual usage behaviors? And, (3) What is the role of ambidexterity in affecting team IS usage and team performance?

In order to answer these research questions, we draw from Burton-Jones and Gallivan (2007)'s multilevel model of system usage as our theoretical foundation to develop the multilevel construct of IS usage behavior. Furthermore, as this study focuses on the continued use of IS, the post-acceptance model of IS continuance (Bhattacherjee 2001) is applied. This work will contribute to the existing IS literature by advancing our knowledge of continued IS usage, multilevel IS usage, and the role of team ambidexterity in the usage-performance relationship.

Theoretical Background

IS Continued Usage

In the post-acceptance stage, it is expected that the IS is used to its fullest potential in order to support users in performing their work tasks (Cooper and Zmud 1990). IS usage transcends conscious behavior and becomes part or normal routine activity (Bhattacherjee 2001). The continued user interaction with the IS can reinforce or change the users' initial perceptions towards the system by developing new cognitions and acquiring new knowledge about it (Bhattacherjee and Premkumar 2004; Orlikowski 2000; Orlikowski and Gash 1994; Saeed and Abdinnour-Helm 2008). Additionally, social organizational practices may influence the ongoing usage and change of technology in the workplace. The range of alternative usage types is conditioned by the relative integration of features in larger systems, networks or technological configurations (Orlikowski 2000).

A theoretical model to explain post-acceptance IS continued usage was developed by Bhattacherjee (Bhattacherjee 2001) based on the Expectation-Confirmation Theory (ECT) (Oliver 1980). The ECT suggests that after the adoption stages, users confirm their pre-adoption expectations. Confirmation "is the degree to which the users' original expectation is confirmed" (Bhattacherjee 2001, p. 359). Perceived usefulness of the IS is the perception of the user regarding the benefits of the IS, which is a post expectation belief. These constructs affect the user's satisfaction with the IS. Satisfaction is defined as "the individual's feelings of pleasure or disappointment resulting from comparing their perceptions of IS to their expectation level" (Bhattacherjee 2001, p. 359). Finally, the continuance intention to use the IS may be influenced by post-adoption perceived usefulness and user satisfaction.

Bhattacherjee's (2001) model has been extended with other relevant variables to explain continued IS usage. For example, Limayem et al. (2007) found that habit, "the extent to which people tend to perform behaviors (use IS) automatically because of learning" (p. 709), acts as a moderator between intention and IS continuance usage, and that satisfaction is an antecedent of habit. The stronger the habit the lesser intention to use the IS affects continued usage. Also, when users perceive that the IS coincides with their work tasks needs (i.e. there is a task-technology fit) they explore and utilize more functionalities in the system which increases the intention of continuing using the IS (Larsen et al. 2009).

IS Usage Behaviors

March (1991) introduces the concepts of exploitation, "the refinement and extension of existing competences, technologies and paradigms" (p.85) centered on efficiency and reduced change, and exploration as "experimentation with new alternatives" (p.85) focusing on experimentation, change and risk-taking. Exploitive IS usage happens when the user implements and executes their personal knowledge of the system and the task, whereas exploration is the search for novel or innovative ways of performing the task (Burton-Jones and Straub 2006).

In routinization and infusion post-acceptance stages of the IS implementation model, the system is used within the organization to its absolute potential. In the routinization stage, there is a routinized or habitual usage behavior and IS continuance. In the infusion stage, two types of behaviors may exist: an extended and deep usage of the IS and after this, user behavior evolves to an emergent use, feature extension, intention to explore or attempt to innovate with IT (Hsieh and Robert 2006). Aligned with exploitation, routine use is the standardized way of IS usage to support work tasks (Li et al. 2013). Thus, IS usage becomes a part of work routines (Schwarz 2003) with reduced variations in usage standards. This is perceived as normal use. On the other hand, aligned with exploration, innovative usage occurs when users find new ways to use IS to perform their work tasks (Li et al. 2013). Users that explore more features of the systems are more likely find novel ways of using the systems (Qin and Jiang 2013) and several factors drive these distinct behaviors. Using the motivation theory, Li et al. (2013) found that perceived usefulness has a stronger impact on routine usage than other motivation constructs. Conversely, the intrinsic motivation to know, intrinsic motivation to experience simulation and personal innovativeness with IT have a stronger impact on innovative usage behavior.

According to March (1991) a well-balanced trade-off between exploitation and exploration is necessary to improved performance. If there is an investment in exploration not regarding for exploitation, one may

"suffers the costs of experimentation without gaining many of the benefits" (p.71), while the consequences of exploitation without exploration are "to find themselves trapped in suboptimal stable equilibria" (p.71). Therefore, a variation of usage is required to further leverage an IS and several factors may cause this variation of usage behavior, such as intrinsic motivation, domain-related knowledge and feedback quality (Tennant et al. 2014).

Kirton's adaption-innovation theory (KAI) (Kirton 1976) "is founded on the assumption that all people solve problems and are creative"(p.4). Individuals find different solutions when facing similar problems but the individual's problem-solving style does not change over time (Buttner and Gryskiewicz 1993). The theory places individuals on a continuum ranging from extremely adaptive to extremely innovative. Adaptors are individuals who prefer to "do things better" and innovators prefer to "do things differently." We argue that this cognitive style may have an effect on individual IS usage levels.

Team Ambidexterity and Performance

Ambidexterity is the successful management of exploration (e.g., creation of new products, generation of new ideas, or new ways to resolve tasks) and exploitation (e.g., production and implementation of new ideas and product innovation) (Anderson et al. 2014). Contextual ambidexterity may be defined as "the behavioral capacity to simultaneously demonstrate alignment and adaptability across an entire business unit" (Gibson and Birkinshaw 2004, p. 209) that is originated in the organizational context. Alignment is achieved when business unit activities exhibit consistent patterns, working toward the same goals. Adaptability is the capacity of business units to quickly address changing demands of the environment. Contextual ambidexterity is a behavioral capacity that emerges from the environment context and does not imply separated business units. Individuals embedded in organizational contexts are induced to consider both exploitative and explorative aspects of their work, when trying to be effective (doing the right things) while simultaneous being efficient (doing the things right) (Simsek 2009).

The research that examines exploration and exploitation at individual and team levels is relatively scarce despite several calls for such research (Gupta et al. 2006). Jansen et al. (2016) define a team level construct for ambidexterity based on team learning theory. In this context, team ambidexterity is defined as "the extent to which teams engage in exploratory and exploitative learning simultaneously, as their members search for, experiment with and develop new knowledge and skills while they concurrently refine, recombine and implement existing ones" (p.4). Nemanich and Vera (2009) in the context of an acquisition integration, based on the processes of learning (intuiting, interpreting, integrating and institutionalizing) of the 4I framework of organizational learning, define team exploration as "the active search by team members for ideas that are new to the combined organization; these ideas are shared and institutionalized into their teams and the newly formed organization" (p.20) and team exploitation as "the use by team members of knowledge available within the integrated organization on an "as is" basis or with incremental revision, through methods such as the adoption of best practices and standard procedures" (p.20). Based on the previous definitions and the theoretical background supporting contextual and team ambidexterity, we define team ambidexterity as the teams' ability to achieve their goals by managing correctly internal work effort while challenging standard work practices to quickly respond to external challenges.

The existing research at group level ambidexterity focuses on the factors that cause group ambidexterity. Social context and team interactions; reward systems that encourage the support of both exploitation and exploration; long-term view and support for risk-taking; processes for creating dense social relations; and informal coordination mechanisms, are important at the team level, such that both exploitation and exploration can be supported (Turner et al. 2013). Nemanich and Vera (2009) found that transformational leadership behaviors and the development of a learning culture positively affect ambidexterity at the team level. Liu and Leitner (2012) studied ambidexterity at the project team level and found it to be an important contributor to project performance.

The balance of complementary resources of group exploitative and explorative usage of IS improves the group satisfaction by the promotion of in-depth routinized work processes and by leveraging the potential value of IS (Luo et al. 2015). Following these results, we propose that routine and innovative usage behaviors will increase team ambidexterity.

Multilevel Frameworks

System usage in organizations happens at the organizational, team and/or individual levels. Multilevel research on system usage in organizations is justified by the need to understand usage at each level of analysis (individual, team, organization) and the relations between the different levels involved in the phenomenon.

Post-adoptive individual system usage behavior is influenced by organizational work practices such as common training sessions, shared socialization, comparable on-the-job experiences, etc. Over time, system usage occurring in organizational groups of interdependent and goal-directed users such as teams, becomes similar and institutionalized (Burton-Jones and Gallivan 2007, p. 661). These stabilized individual cognitions or behaviors regarding IS usage in organizational context may be stimulated to change. The drivers of change could be organizational interventions, user-initiated interventions or both (Jasperson et al. 2005). The emergence of individual system usage into a collective usage may occur when users have preexisting relationships with each other, or in complex tasks that require multiple units or individuals to coordinate the work or when the IS features facilitate this emergence (communication facilities, data storage facilities, maintenance of interaction history, and common responsibility for data) (Burton-Jones and Gallivan 2007).

Jasperson et al. (2005) propose a multilevel conceptual model of post-adoptive behavior. Individual cognition and organizational action are modeled separately but interdependently. This separation simplifies the conceptual complexity of the multiple threads of behavior that involve adjustment. The individual cognition model describes how individual cognitions affect post-adoptive intentions, which in turn influence post-adoptive behaviors and subsequently technology sense making. The model includes other variables like user initiated learning interventions, use history, individual attention, and individual differences. The organizational action model establishes that work system outcomes influence work system sense making and then work system interventions (Alter 2015).

Individuals and organizations should use IS to reliably perform their work with a determined minimum quality and repeatedly. Butler and Gray (2006) used the mindfulness concept to address this issue using a multilevel approach. Mindfulness is the ability of individuals to process information using a wider variety of perspectives with the ability to apply them in new ways and in alternative contexts. In organizations, mindfulness is centered on the ability to perceive cues, interpret them, and respond appropriately. Organizational mindfulness is more than the outcomes of the mindful individual; it involves the capacity to detect the context and take the proper actions in a timely manner (Butler and Gray 2006). This is the theoretical foundation for explaining efforts to achieve both individual and organizational reliability dealing with complex technologies and dynamic environments. The framework states that individuals should approach IS usage by focusing on the ability of continued creation, applying a novel approach and exploring new forms of IS use. In turn, this individual mindfulness along with how systems are designed, affect organizational mindfulness (Butler and Gray 2006).

Burton-Jones and Gallivan (2007) develop an illustrative conceptual multilevel model to demonstrate that system usage can be studied as a multilevel construct. System usage positively affects task performance through higher levels of task-technology fit at individual level (Goodhue and Thompson 1995), group level (Dennis et al. 2001) and firm level (Devaraj and Kohli 2003). Reciprocally, task performance also affects system usage because users reflect about the results of their usage and adjust their actions over time (Goodhue and Thompson 1995). In order to achieve performance goals, some work tasks demand interaction between users. In this case, work tasks require an interdependence-in-use pattern. This can occur either by the collective assigning usage tasks to the individual users or by the individual users developing norms for how they interact with other users. It is possible to say that if individual users use IS in a determined way, it is expected that this behavior emerges to a collective one (e.g., teams) (Burton-Jones and Gallivan 2007). In addition, if teams control individual usage behaviors by taking specific actions in order to change the behaviors or by the occurrence of unexpected events, the team affects individual behaviors.

Research Model

Following Bhattacherjee's (2001) IS continuance model and Burton-Jones and Gallivan (2007)'s multilevel model of system usage as our theoretical foundation, a research model was developed (Figure 1). The model main goals are to analyze the impact of antecedents of IS continued usage intention on each of the usage behaviors, the structure of team IS continued usage behaviors, and how each behavior, at individual and team level, affect team ambidexterity and performance.

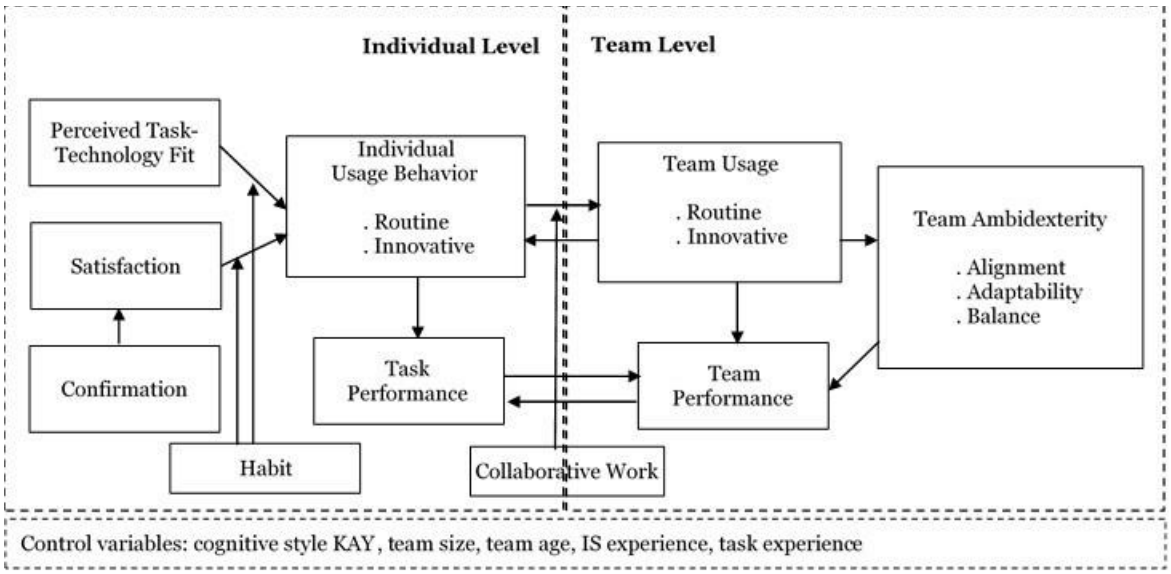

Figure 1. Research Model

In continued usage, user satisfaction, perceived usefulness and perceived task-technology fit are the main variables affecting intention to continuing using the IS (Bhattacherjee 2001; Larsen et al. 2009). There is also a positive association between satisfaction and both, innovative and routine, usage behaviors (Wang et al. 2014). Other contextual factors like habit and the user cognitive style should affect the nature of the association between satisfaction and perceived task-technology fit, "the degree to which individuals perceive a match between the features of a technology and the requirements of the task and the needs of the individuals involved with the task" (Fuller and Dennis 2004, p. 5), with each usage behavior. The effect of satisfaction on IS continuance usage behaviors will be moderated by habit, such that the effect will be stronger on innovative usage behavior with lesser habit than on routine usage behavior. In addition, perceived task-technology fit has a positive association with perceived usefulness which in turn has a facilitating role along with user satisfaction on routine use (Wang et al. 2014). As users get more routinized using the IS, acting with a subconscious (automatic) behavior, conscious behaviors (intentions) to use as less effect on IS continuance. Habit may have a stronger effect on the relation between task-technology fit and routine usage behavior than on innovative usage behavior.

Usage behavior (innovative/routine) is a team level construct but the same functional relationships occur at both levels (individual and team) (Burton-Jones and Gallivan 2007). There is a well-known positive association between system usage and performance impacts or net benefits (Goodhue 1995; Petter and McLean 2009). "Performance" can be defined as an evaluation of the output of an individual's or collective's task implying improved efficiency, effectiveness, or quality in the accomplishment of the task (Cane and McCarthy 2009). At individual level, we will study the impact of IS usage behaviors on task performance and on the team level, looking at the association between team usage on team performance. According to Burton-Jones and Gallivan (2007), individuals in the team must interact with each other to generate a collective usage behavior. This interdependency-in-use is represented by collaborative work occurring during IS usage in the team. Collaborative work encompasses "the interplay of situation-

appropriate uses of four interrelated processes: teamwork communication, synchronicity, explicit coordination, and implicit coordination" (Chiocchio et al. 2012, p. 12). We will also study the emergence structure of team usage behaviors. Individual usage behaviors may emerge to the team level in the form of homogeneity among the team members or as a distinct pattern (Burton-Jones and Gallivan 2007).

At the team level, the research explores the relationships between team IS usage and team performance, and the mediating role of ambidexterity in this relationship. Applying organizational findings to teams, employees' system usage behavior could be an important contribution to the ability of the team to exploit and explore products or ideas. It is expected that the effect of each system usage behavior in team ambidexterity will have a different impact depending on the dimension of the team's ambidexterity.

Additionally, other context variables like the team size and age, how long the team has worked together, task and IS experience, how long the user performs that task and uses the system, may also have an effect on the collaboration between team members and system usage (Burton-Jones and Gallivan 2007). Also, adaptation-innovation cognitive style has a direct effect on IS usage intention (Löbler et al. 2011). Accordingly, we will control for these variables.

Methods

In order to test and validate the research model proposed in Figure 1, a cross-sectional research design with multilevel units of analysis (individuals as employees and teams), and tasks performed using an IS tool common to all teams, will be developed.

The measures of the constructs will be adapted from prior literature. At the individual level, scales for routine usage will be adapted from Schwarz (2003) and for innovative usage from Li et al. (2013). Confirmation and satisfaction will be measured using Bhattacherjee (2001)'s scales. Perceived task-technology fit will be adapted from Goodhue 1995 and Vessey (1991). Habit will be adapted from Limayem and Hirt (2003) and the Kirton Adaption-Innovation Inventory for the KAY cognitive style comes from Kirton (Kirton 1976). For task performance, we will use the scale developed by Torkzadeh and Doll (1999), specifically the task productivity and task innovation sub-constructs scales. Collaborative work will be measured using Chiocchio et al. (2012) scale. In multilevel research constructs must be measured on at least two levels (Bélanger et al. 2014). To analyze team usage behavior as a multilevel construct, the frame of reference will contain both direct-consensus data, by surveying individuals about their usage behavior, and referent-shift items by asking individuals about their overall team usage behavior. Additionally, team managers or coordinators will be surveyed about their team's usage behaviors. The scale to measure team routine usage will be adapted from the individual level (direct-consensus) scale to the team level (reference-shift). Team innovative usage will be adapted from the team innovation scale from Anderson and West (1998), which yields similar items to the adapted version of the reference-shift scale for team innovative usage. At the team level, team ambidexterity will be an adaptation of the scale from contextual ambidexterity scale for organizations (Gibson and Birkinshaw 2004) and the team performance scale will be from Lewis (2003).

Once the scales have been developed and tested, the questionnaire will be developed and translated from its original English version to the native language where the survey will be conducted (in a European Country). The back translation technique will be applied to validate that the translated questionnaire (Sekaran 2003).

The survey will take place in a European organization rendering shared services of finance and human resources that also develops and implements other types of information systems. The respondents will be employees (individual level) and team managers/coordinators (team level) across the organization. In this organization, an IT service management tool has been used for over five years to manage requests between business units and service teams. The use of the tool is mandatory to all employees and teams use this system also as a collaborative tool. Although several upgrades have been made, users always get reacquainted with the tool and their behavior type towards usage has been long established. The organization has about 300 employees grouped in 60 teams approximately. This is greater than the smallest acceptable number of groups in organizational research, which is 30, although the most frequently used sample size is 50 groups (Kreft et al. 1998). Employees and team managers will be invited to answer an online survey about their usage when performing the specific task of creating a request work

order to another business unit using the IT service management tool. This research setting offers the necessary components to study continued system usage in a multilevel approach.

Data will be analyzed using PLS as implemented in SmartPLS3.0 (Ringle et al. 2015).

Final Remarks

This study proposes a conceptual model to fill a well-known gap in the literature: a multilevel research approach to post-adoptive system usage and the impacts that post-adoptive usage behaviors may have on team performance. More specifically, the study introduces and develops the concept of team ambidexterity and explores IS usage at the individual and team levels. Multilevel approach brings a more complete, natural and integrated view of how IS are actually used in practice. The research model also advances the research stream on team performance and team ambidexterity.

The proposed exploratory study will operationalize the research model so that the resulting findings will increase knowledge in these research areas. Ultimately, the study will give the necessary support to a possible generalization of the model to be used in other researches and with varied teams. Based on the results of this study, organizations may be able to influence their employees' IS usage behaviors in each of several ambidexterity states to leverage team performance. By implementing appropriate actions, such as advanced training or other programs to users, organizations can stimulate the most suitable usage behavior at the different business units.

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