Decision Sciences
Volume 37 Number 4
November 2006

Where To Go From Here? Thoughts on Future Directions for Research on Individual-Level Technology Adoption with a Focus on Decision Making*

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ABSTRACT

This article recognizes the maturity of individual-level technology-adoption research and suggests three broad future research directions. They are: (i) business process change and process standards, (ii) supply-chain technologies, and (iii) services. Each of these areas is identified based on the topics likely of interest to the readers of the *Decision Sciences* by closely examining *Decision Sciences'* editorial mission and the recent research published in it. Within each of these three different broad topic areas, a few different specific directions are identified. The directions outlined here are not meant to be exhaustive but rather potential directions that can result in a theoretical contribution to individual-level technology-adoption research and the specific topic area.

Subject Areas: Business Process Change, Future Research, Process Standards, Technology Acceptance, Technology Adoption, Services, and Supply Chain.

INTRODUCTION

Technology adoption is one of the most widely researched topics in information systems research. It has been studied at the individual (Venkatesh, Morris, Davis, & Davis, 2003), group (e.g., Sambamurthy & Chin, 1994), and organizational (e.g., Fichman & Kemerer, 1997) levels. This article focuses on individual-level technology-adoption research and provides suggestions for how research in this area could be furthered, with a particular focus on work that would be appropriate for *Decision Sciences.* Stating that research on individual-level technology adoption is mature is an understatement (see Venkatesh et al., 2003, for a review and synthesis). Much of this work was sparked by the seminal articles by Fred Davis on

*My thanks to Dr. Vicki Smith-Daniels for her comments and suggestions on various versions of this article. I would also like to thank Dr. Arun Rai for his extensive help and guidance in helping me think about various future research directions on services. I appreciate Hillol Bala's help and support in the literature review and Sandeep Goyal and Miyuki Maruping for helping with organizing the extensive reference list.

the technology acceptance model (TAM; Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). The impact of Davis' original work on the TAM and follow-up research has been substantial, as evidenced by well over 1,000 cites to Davis' original two articles. In the context of *Decision Sciences,* Davis' article in 1996 (Venkatesh & Davis, 1996) was the eighth most-cited article among all articles published in *Decision Sciences* from 1970 to 2005 (https://wpcarey.asu.edu/dsjOnline/editorcorner.cfm).

In terms of the reach, TAM has been applied in a variety of domains, extending well beyond the initial scope of computer software studied by Davis—for example, it has been applied from marketing contexts (e.g., Dabholkar & Bagozzi, 2002; Gentry & Calantone, 2002; Yang & Peterson, 2004) to green electricity use (Arkesteijn & Oerlemans, 2005) to dairy farming (Flett, Alpass, Humphries, Massey, Morriss, & Long, 2004). Some of the systems studied related to decision making include: decision support system (Bhattacherjee, 1998), group decision support system (Sambamurthy & Chin, 1994), scheduling system (Venkatesh & Davis, 2000), and executive information system for collaboration and decision making (Rai & Bajwa, 1997). The maturity and extensive research in this area suggest a need to pause, take stock, and ask the question of "where to go from here?"

Research on individual adoption of technology has been characterized by applications, replications, competing models, model refinement, and extensions, a pattern that has also characterized the work on individual-level technology adoption published in *Decision Sciences*. Recent work has reviewed and synthesized eight of the models from prior research into a unified theoretical model, namely unified theory of acceptance and use of technology (UTAUT; Venkatesh et al., 2003). Perhaps, one of the greatest strengths of models, such as TAM, has been their generalizability across a wide range of technologies and settings over several years. A particular characteristic of prior research is the type of technologies that have been examined. The complexity of technologies studied grew from simple standalone software, such as a word processor, in early individual-level technology-adoption studies (e.g., Davis, 1989; Davis et al., 1989) to simple collaboration tools like e-mail (e.g., Adams, Nelson, & Todd, 1992) to broader technology resources such as a computer center (e.g., Taylor & Todd, 1995) to a complex multi-user system such as a portfolio management system (e.g., Venkatesh et al., 2003). Such increasing complexity of technologies notwithstanding, the types of constructs employed in individual-level adoption research have primarily been technology-centric perceptions and, while there has been a call for richer theorizing (e.g., Venkatesh et al., 2003; Jasperson, Carter, & Zmud, 2005) by giving deeper consideration to various aspects of the technology and the context (Orlikowski & Iacono, 2001), little research has actually done so at the individual level. There is some evidence from qualitative research about the potential far-reaching nature of the determinants and impacts of complex technology introductions, especially those including new business processes (e.g., Orlikowski, 1992; Boudreau & Robey, 2005).

As I reflected on the question of where to go from here and reviewed the literature on individual-level technology adoption, I felt there were many potential directions to pursue. One meaningful way to scope this article was to focus on research that would lead to articles that would be appropriate for consideration by

Decision Sciences. In order to do this, I draw on the editorial mission and focus of the journal. This means that there will certainly be other fruitful avenues to pursue even though I do not discuss them here. One underlying theme that will be evident throughout my various suggestions is the call for research to integrate established work in individual-level technology adoption with knowledge and theory bases in other domains. The three specific avenues for future research that I identify and discuss at length are: (i) business process change and process standards, (ii) supply-chain technologies, and (iii) services.

BEING GUIDED BY THE EDITORIAL MISSION OF *DECISION SCIENCES*

Before delving into the editorial mission of the journal, I would like to discuss two reasons for rejection, both rooted in the lack of theoretical contribution, of a vast number of articles on this topic at the premier journals. Based on my involvement as a reviewer or associate editor of several, perhaps hundreds, of articles in this area submitted to various journals, including *Decision Sciences, Information Systems Research, MIS Quarterly, Management Science,* among others, I make the following rather obvious observation: the articles that are unsuccessful are most frequently rejected due to insufficient theoretical contribution. The first reason for many articles to miss the mark in terms of contribution is that they are simply empirical tweaks. Many of these articles apply a technology-adoption model (e.g., TAM) to a technology that has not been previously studied. Seldom do they theorize richly about the specific technology that is being studied or how/why relationships previously observed would be different in the particular target technology. Such articles are not usually appropriate for premier journals. The empirical examination may be interesting to second- and third-tier journals. The value and contribution of such work is in establishing the robustness and generalizability of existing models and, unless there are major surprises, reinforcing prior research findings lends itself well to a solid empirical contribution but does not create any new knowledge, which is a necessary condition for publication in premier journals. The second reason for some articles to miss the mark in terms of contribution is that, although some theory is developed (e.g., a new construct is added to an existing model), the advances are not interesting enough. Clearly, this reason for rejection applies a far more subjective criterion than the first reason. In particular, at *Decision Sciences,* the addition of a construct *without* substantial implications for and/or ties to decision making (e.g., sharing information), certain types of systems (e.g., collaborative forecasting systems), and/or managerial relevance (e.g., offshoring) renders an article uninteresting to the journal, even if such an article may be of interest to a different journal, premier or otherwise.

The first sentence of the editorial mission of *Decision Sciences* states that the journal publishes "research about decision making within the boundaries of an organization, as well as decisions involving interfirm coordination." The mission further notes that the journal distinguishes itself by its focus on decision making. The mission statement goes on to describe interest in work on contemporary business problems and work that is multidisciplinary. With this editorial mission

Table 1: Suggested directions for future research.

Business Process Change and Process Standards	Supply-Chain Technologies	Services
1. Understanding individual adoption of business processes	1. Multiple stakeholder research	1. Channel choice
2. Understanding the impact on employees' jobs and job outcomes	2. Broadening the base of constructs	2. Service context
3. Modeling process characteristics and their impacts on employees' adoption	3. Outcomes beyond technology use	3. Role of technology
4. Understanding and isolating change related to technology vs. process characteristics	4. Interventions	
5. Interventions to foster success		

statement in mind, as noted earlier, I suggest three important avenues for future research: (i) business process change and process standards, (ii) supply-chain technologies, and (iii) services. Each of these three avenues is a critical, contemporary issue related to coordination within firms, across firms, and firms' interactions with its customers. While each of these areas has received attention in the literature, it should be noted that the individual-level focus, such as decision-making issues related to the individual employee (e.g., adoption decision) and consequences of organizational actions on individual employees (e.g., job satisfaction implications of process change), have been almost completely overlooked. Like with much social science research in general, these three suggestions are meant to be illustrative of important avenues for future inquiry; they are not meant to be exhaustive. Table 1 lists the three areas and the various ideas for future research in each of those areas, which I discuss in detail next.

BUSINESS PROCESS CHANGE AND PROCESS STANDARDS

There has been a fair bit of research on business process change. Research on business processes dates back to about a decade ago when the focus was on business process reengineering (e.g., Grover, Jeong, Kettinger, & Wang, 1995; Kettinger, Teng, & Guha, 1997) and how information technology (IT) infrastructure helped successfully reengineer business processes (e.g., Broadbent, Weill, & St. Clair, 1997). This research has evolved quite a bit with a focus on issues such as process integration (e.g., Basu & Blanning, 2000, 2003) and IT investment and process performance (e.g., Ray, Muhanna, & Barney, 2005) but the emphasis has still been on macro issues with little or no focus on individual-level issues. In terms of articles published in *Decision Sciences,* the focus has been on process design and process performance, including impacts on customer satisfaction (e.g., Hoogeweegen, Teunissen, Vervest, & Wagenaar,1999; Tsikriktsis & Heineke, 2004; Saeed, Malhotra, & Grover, 2005; Van der Zee & Van der Vorst, 2005).

With regard to business process standards, researchers have similarly focused on how to configure processes within and across firm boundaries (e.g., Gosain,

Malhotra, El Sawy, & Chehade, 2003; Davenport, 2005; Malhotra, Gosain, & El Sawy, 2005), including total quality management (TQM) and Six Sigma (e.g., Hackman & Wageman, 1995; Ahire, Goldhar, & Waller, 1996), and how firms can benefit from standardizing their business processes (e.g., Davenport, 2005). More broadly, there has been a substantial body of work on standards that has focused primarily on technology standards, including adoption (e.g., Zhu, Kraemer, Gurbaxani, & Xu, 2006) and impacts (e.g., Weitzel, Beimborn, & Konig, 2006). In recent years, there has been one article published in *Decision Sciences* that included process standards as part of a model on customization capability in manufacturing processes (see Tu, Vonderembse, Ragu-Nathan, & Ragu-Nathan, 2004).

Business process change and the introduction of process standards can occur in intra- and interorganizational settings. As technologies have increased in complexity, many of today's technology implementations, both intra- and interorganizational systems such as Enterprise Resource Planning (ERP) systems, are accompanied by substantial business process changes. The introduction of process standards (e.g., RosettaNet, 2006) typically comes with the introduction of software compliant with the particular standard and changes to the business processes as designed and articulated in the particular standard. While research has examined various aspects of business process change, little research has focused on the individual employee and studied the drivers of process adoption by employees, the factors influencing resistance, the impacts of process change on employees, and potential interventions to ease the transition. I call for research that aims to understand employee adoption and impacts of these more complex technology solutions by theorizing richly not only about technology characteristics and technology-centric predictors but also about business process characteristics and relevant outcomes. I will elaborate on these ideas next.

Understanding Individual Adoption of Business Processes

While adoption of technologies has a rich history, the study of individual adoption of business processes is quite limited. Complex technologies of today, as noted earlier, frequently come with business process change. Unlike technologies, where it may indeed be possible for there to be freedom associated with their use, the same freedom may not be formally afforded to employees with regard to business processes. Yet, adoption of business processes could vary in the extent of faithfulness and avoidance. Adoption could be gauged on the basis of the extent to which employees faithfully appropriate and use business processes as designed and intended by the designers and by management, the extent and frequency with which employees seek and execute workarounds, and the extent and frequency with which employees revert to old business processes. This requires rethinking the dependent variable, relative to much technology-adoption research that has examined intention to adopt technology and/or self-reported frequency, intensity, and duration of use of a technology (see Venkatesh et al., 2003). Research along these lines can leverage individual-level technology-centric determinants that have been identified in prior research and go beyond these by identifying relevant process-centric constructs that could predict adoption. Such work would help organizations better predict success of new business processes

and create an environment that would foster faithful adoption of new business processes.

Understanding the Impact on Employees' Jobs and Job Outcomes

While technology introductions, especially those coupled with business process change, have been studied and understood at the individual level with the ultimate dependent variable of interest typically being use, research on individual impacts, particularly job-related impacts, is limited (see DeLone & McLean, 2003; Venkatesh et al., 2003). The popular press is rich with discussions of the impact of technologies on employees' jobs (e.g., Davenport, 2000). Yet there has been almost no systematic investigation of the impact of technology on employee job characteristics. One important and fruitful direction would be to richly conceptualize characteristics of the technology and understand the impacts of the various characteristics on employee job characteristics—for example, task variety, task significance, task identity, autonomy, and feedback (see Hackman & Oldham, 1980). A related direction would be to examine the impact of new technology introduction, conceptualized as characteristics, on important job outcomes such as job satisfaction, organizational commitment, and job performance. Work along these lines will be important in helping organizations create a better environment in times of IT-initiated change.

Modeling Process Characteristics and Their Impacts on Employees' Adoption

Related to the first two directions above, research should focus on conceptualizing relevant business process characteristics (see Malone et al., 1999) that can influence employee adoption of business processes. Understanding process adoption by tying them to specific characteristics as perceived by employees will provide an important complement to current work that tends to blackbox employee reactions and feelings and treat process performance as a macro-level problem related to constructs such as IT investment. Research at the individual level will help isolate the conditions (process characteristics' combinations) under which favorable employee and process performance benefits will accrue. Research that considers personality characteristics, process characteristics, and potential interactions may reveal specific scenarios and organizational environments where process changes are more likely to be well received and successful in terms of performance improvements. For instance, an organizational or business unit environment that boasts of employees who are innovative and adaptable is more likely to lead to greater openness to change and potentially, better process performance. Thus, work along these lines will help predict and foster success of new business processes.

Understanding and Isolating Change Related to Technology Versus Process Characteristics

As noted at the outset, many complex technology solutions today introduce both new technology and new business processes. Any understanding of relevant dependent variables will be well served to consider both technology characteristics and process characteristics and their separate direct, joint direct, and interactive

influences on key dependent variables, ranging from adoption to performance. While in the case of the technology introduction there has been some research on the impact on performance at the individual level (DeLone & McLean, 2003), as already noted, such work at the individual level in the context of business processes is lacking. There are two possible reasons why technology characteristics and business process characteristics have not been considered separately, particularly in individual-level technology-adoption research. In the late 1980s and early 1990s, much of that body of research was conducted among fairly simple software systems that were geared to support existing business processes, thus rendering business process change to be somewhat moot. Even in cases where there was business process change, researchers typically treated the entire technology solution as a single entity and did not model any technology or process characteristics (e.g., Venkatesh & Davis, 2000; Venkatesh et al., 2003). I call for work that essentially integrates the various ideas presented in the first three subsections above and can yield similar benefits as outlined earlier with an added benefit of providing a more holistic understanding of the underlying phenomenon.

Interventions to Foster Success

Interventions represent a focus on the major managerial levers that can foster adoption and provide the opportunity to gain from the implementation of supply-chain technologies. In general, technology-adoption research, be it at the individual, group, or organizational levels, has not focused much on interventions. One of the most important aspects of being managerially relevant that go beyond aiding prediction and understanding is helping managers and organizations overcome problems and challenges to foster success. By focusing on technologies and technology-related constructs, prior research has proposed (Jasperson et al., 2005) and even tested interventions (e.g., Venkatesh, 1999), including work published in *Decision Sciences* (e.g., Venkatesh, Speier, & Morris, 2002). For example, Venkatesh et al. (2002) examined how different training types—for example, game-based training versus traditional training—influenced system-related perceptions and concluded that system-related perceptions and intentions were more favorable when game-based training was used. Researchers should investigate the impact of various types of interventions—for example, change management support, type and extent of change management support, business process education including simulation games—by studying their effects on employee adoption, job outcomes, and process success. For example, a study could investigate if, rather than using traditional process charts and training associated with new processes, a simulation game that introduced employees to the new processes were used, would it lead to a better understanding of the new process and/or more favorable employee reactions to the new processes? Related to this, research that examines the impacts of interventions in longitudinal studies will deepen our understanding of issues related to business processes. It is quite reasonable to expect that most interventions will have a time lag before benefits start to accrue. Understanding what the time lag is and what trajectory of impact on outcomes different interventions will have is important to help organizations manage their own expectations and the expectations of employees—for example, steady improvement in performance to a reasonable level of total improvement versus very slow increase over

the first several months and then a sudden ascent to an extremely high level of improvement.

SUPPLY-CHAIN TECHNOLOGIES

Many technologies today are being designed to support intra- and interorganizational activities, with intraorganizational systems frequently aiming to create integration and sharing of information across business units. There has been prior research on interorganizational relationships, including electronic data interchange (EDI) and various aspects related to the supply chain. There has been research on the adoption, use, and value of interorganizational systems, such as EDI (Premkumar, Ramamurthy, & Nilakanta, 1994; Riggins, Kriebel, & Mukhopadhyay, 1994; Srinivasan, Kekre, & Mukhopadhyay, 1994; Iacovou, Benbasat, & Dexter, 1995; Mukhopadhyay, Kekre, & Kalathur, 1995; Wang & Seidmann, 1995; Hart & Saunders, 1997, 1998; Chwelos, Benbasat, & Dexter, 2001; Teo, Wei, & Benbasat, 2003; Premkumar, Ramamurthy, & Saunders, 2005; Saed, Malhotra, & Grover, 2005). Insofar as research on supply chain is concerned, particularly from the perspective of work with a decision-sciences focus, there are several vibrant streams of research. Supply-chain optimization (e.g., Krajewski & Wei, 2001; Arcelus, Pakkala, & Srinivasan, 2002; Mahajan, Radas, & Vakharia, 2002; Van der Zee & Van der Vorst, 2005), effectiveness or success of supply chain and their determinants (Lee, Padmanabhan, & Whang, 1997; Zhao, Xhie, & Wei, 2002; Rabinovich, Bailey, & Carter, 2003; Robinson, Sahin, & Gao, 2005), supply-chain relationships (Huang, Li, & Mahajan, 2002; Sahin & Robinson, 2002), and technologies in supply chain with a particular emphasis on Internet-based technologies (Frohlich, 2002; Vakharia, 2002; Subramani, 2004; Nissen & Sengupta, 2006; Rai, Patnayakuni, & Seth, 2006).

From an individual technology-adoption perspective, there has been little research that has considered the context of study or the type of technology and the unique aspects related to it. A typical technology-adoption study would typically blackbox the technology, such as the scheduling system studied in Venkatesh and Davis (2000), rather than consider the unique elements and challenges associated with the particular type of system. Building on the strong base of research in individual-level adoption, I call for research to help us deepen our understanding of the use of the inherently multi-user and multi-stakeholder supply-chain technologies and the phenomenon of supply-chain technology-enabled collaboration. While individual-level adoption research has studied more complex technologies, as discussed earlier, the emphasis has almost always been on treating people in different business units as similar with almost no agendas. I call for research that will address this general gap by examining multiple stakeholders and the interplay of reactions across individuals in different stakeholder groups (e.g., dominant or powerful supplier vs. small manufacturer; dominant or powerful manufacturer vs. small supplier or suppliers). Such research will focus on understanding the reactions of multiple stakeholders and seek to reconcile them on different bases, examine strategies used by different partners, understand the role of differential power across partners, examine outcomes beyond the technology-centric outcomes of use, and study interventions that could foster success.

Multiple Stakeholder Research

Individual-level adoption research has focused on understanding reactions and relating them to individual intentions or use. In technologies that are implemented with the objective of facilitating interactions across the supply chain, whether intra- or interorganizational, an individual user's behavior may be influenced by a confluence of factors that relate not only to environmental factors, which are typically captured by individual-level models using constructs such as facilitating conditions (see Venkatesh et al., 2003), but also by perceptions and behaviors of others. For example, if employee A in firm X is to use a particular system to place orders with a supplier firm Y, A's use may be constrained by the actions of supplier liaison B in firm Y. While B's use of the system may be directly determined by his or her own actions, A's ultimate intentions to use the technology and/or use of the technology may be determined by a combination of A's and B's perceptions regarding the technology. This situation is not only a boundary condition of the individual-level models but also begins to create the need to model constructs at a dyadic level. Dyads are not the only higher level at which constructs could be modeled—future work could also consider incorporating factors at the business-unit level or other levels that might alter relationships known to exist at the individual level. For example, while individual-level technology-adoption research has studied training perceptions at the individual level, training may be more of a function of the business unit. Thus, using a measure at the business-unit level (e.g., training expenses incurred per employee) will present us with a different theoretical perspective and potentially deeper understanding of underlying phenomenon of individual-level technology adoption. Specifically, such multilevel models will further our understanding of the deployment and use of supply-chain technologies. Also, such work will provide potential leverage points for managers. In the previous example, if training expenses incurred were a cross-level main effect or cross-level moderator in a model of technology use, managers can channel their resources accordingly. Analytical techniques, such as hierarchical linear modeling, facilitate the empirical test of such multi-level models.

Broadening the Base of Constructs

As suggested in the section on business processes, there are many potential avenues for broadening the base of constructs being studied in the context of supply-chain technologies. To some extent, there is overlap between suggestions made earlier and constructs that are relevant here—that is, constructs regarding job-related constructs and process-related constructs as supply-chain technologies do tend to be frequently associated with process changes, process standards, and job changes. Other pertinent constructs that would shed light on the phenomenon of individual use include, but are not limited to, technology-related constructs that are unique to supply-chain technologies (e.g., the extent of collaboration supported by a supply-chain technology), relationship-related constructs (e.g., the nature and extent of relationship with individuals from other members in the supply chain), and task characteristics that are unique to the supply-chain contexts and supported by supply-chain technologies (e.g., the nature and extent of collaboration needed in a supply chain).

Outcomes Beyond Technology Use

Much prior individual-level technology-adoption research has been focused on technology use as the ultimate variable of interest (see Venkatesh et al., 2003). Other recent research has studied how use predicts other relevant outcomes depending on the context of study. One example is the study of the use-purchase relationship in the context of Web site use by consumers (Venkatesh & Agarwal, 2006). Another example is the context of decision support systems (DSS) where the outcome variable is decisional conflict from using multicriteria DSS (Aloysius, Davis, Wilson, Taylor, & Kotteman, 2006). Similar work in the context of the adoption and use of supply-chain technologies by relating it to job performance is important. Further, some research has noted that process performance is one of the important metrics that can be used to predict organizational performance or be more accurate than firm-level measures of organizational performance because a firm can achieve high process performance on certain processes but can have overall low firm performance due to other poorly performed processes (Ray, Barney, & Muhanna, 2004; Ray, Muhanna, & Barney, 2005). Thus, relating technology use at the individual level to outcomes at higher levels of aggregation are important—important outcomes include customer satisfaction, process performance, service time, and partner satisfaction. In addition, the focus should expand to include outcomes that focus on the extent to which individuals use the information from the system and have confidence and trust the information from the system such that they base their decisions on input from the system. There has been some prior research that has focused on individuals' reliance on such DSS even when it provides them information that makes them worse off (Davis, Lohse, & Kotteman, 1994; Kottemann, Davis, & Remus, 1994) or individuals failing to use information from DSS even when it would have improved their performance (e.g., Davis & Kotteman, 1994; Todd & Benbasat, 1999). Such research has not focused on the characteristics of the system or individuals that lead to favorable adoption of information from the system and the conditions under which the use of such information leads to positive or negative outcomes. There has also been research on knowledge management that has examined the adoption and use of knowledge management systems (Alavi & Leidner, 2001; Poston & Speier, 2005). Such work has the potential to help individual-level adoption research link to meaningful business outcomes—the work of Bock, Zmud, Kim, and Lee (2005) in the context of knowledge sharing is a step in that direction. Still other individual-level adoption and outcomes will become relevant as technologies such as radio frequency identification (RFID), which are now primarily used for intraorganizational applications, become more widely used in consumer applications such as customer loyalty cards. For example, modeling characteristics (e.g., privacy concerns) relevant to the particular technology (e.g., RFID) and their impact on traditional outcomes, such as adoption and use, and other outcomes not typically studied in individual-level technology-adoption research, such as customer satisfaction.

Interventions

As I suggested in the context of business processes earlier, research on interventions provides a great opportunity to relate research to business practice. This is

particularly true in decision-making contexts where individual decision makers can be meaningfully influenced to work collaboratively with partners, be it within the firm or outside the firm. The extent of collaboration and alliances transcending organizational boundaries is at unprecedented heights, supported primarily by supply-chain technologies. Educating individual employees will play a key role in using technologies as designed to create successful outcomes beyond just use. Such interventions could focus on specific types of training interventions, specific design characteristics of the systems, and socialization tactics across employees in different partner organizations that would lead to positive outcomes. While training and design have been suggested and even examined as potential avenues for creating favorable adoption, use, and other outcomes related to technology implementations, organizational socialization tactics have been studied primarily with a focus on helping employees succeed in their jobs/organizations (e.g., Van Maanen & Schein, 1979; Cable & Parsons, 2001) but the effects of socialization tactics on technology use or leveraging technology for improved performance has not been studied. Future research on socialization tactics in the context of supply-chain technologies could focus on increasing trust across partners. Relationships hinge on trust, and recent work has established its importance in a variety of contexts, particularly those related to technology (e.g., McKnight, Choudhury, & Kacmar, 2002). While it is clear that trust will play a role in fostering use of technologies by both partners, more work is needed to determine how such trust can be created to avoid potential stand-offs or a firm simply waiting and watching the partner's actions before doing anything. Also, researchers could study interventions that can reduce goal incongruence and information asymmetry between partners that in turn could result in more effective use of supply-chain technologies for mutual gain. Goal incongruence and information asymmetry are common in any interorganizational relationship where partners have different goals and access to different information. These can often serve as significant impediments to the growth of the relationship. One way to grow the relationship is the effective use of supply-chain technologies for mutual gain. In order to achieve this, like in the case of building trust, future research should investigate approaches that would foster identification and alignment of some goals (i.e., thus reducing goal incongruence) and information sharing (i.e., thus reducing information asymmetry).

SERVICES

Driven by the business significance and interest (e.g., Karmakar, 2004), services have also been of recent interest to the academic community, including researchers interested in decision making. Prior decision-making services research can be organized into a few interrelated themes. There has been a focus on the classification of services (Schmenner, 2004) and service design (e.g., Easton & Pullman, 2001) and a substantial focus on service quality (e.g., Carr, 2002; Sum, Lee, Hays, & Hill, 2002). Further, there has been work that has examined various service attributes (e.g., service quality, service failure, service recovery, recovery strategy) on customer outcomes (Ostrom & Iacobucci, 1995; Krishnan, Ramaswamy, Meyer, & Damien, 1999; Easton & Pullman, 2001; Babakus, Bienstock, & Van Scotter, 2004; De Jong & De Ruyter, 2004; Zhu, Sivakumar,

& Parasuraman, 2004; Baker & Collier, 2005). With the emergence of a vast array of service technologies (e.g., customer relationship management), there has been an interest in technologies (e.g., Krishnan et al., 1999; Rayport & Jaworski, 2004) and, in particular, self-service technologies (Meuter, Ostrom, Roundtree, & Bitner, 2000; Dabholkar & Bagozzi, 2002; Piccoli, Brohman, Watson, & Parasuraman, 2004; Schultze & Orlikowski, 2004; Zahay & Griffin, 2004). There is even emerging interest on the impact of the service personnel and technology interaction on customer satisfaction (Froehle, 2006).

Roth and Menor (2003) present a rich set of directions for further inquiry into services. The discussion here is meant to complement their suggestions by focusing on ties between services and individual-level technology-adoption research. The prior research on services presents a rich literature base that individual-level technology-adoption research could draw from to move in a meaningful direction. Likewise in the services space, although there have been isolated investigations regarding individual attitudes and perceptions toward the self-service technology (e.g., Dabholkar & Bagozzi, 2002), a rich and deep integration of insights from individual-level technology-adoption literature would help deepen our understanding of the services space.

From an individual-adoption perspective, no special consideration has been given to the service environment on consumer use of specific channels over others. As already noted, the context of study is typically blackboxed in pursuit of invariance across contexts or technologies (Venkatesh et al., 2003). I call for research on three key areas related to services that are somewhat understudied. The first area is the choice of the service-delivery channel by the end consumer and the attributes that drive that decision and the potential characteristics of the type of service and the service-delivery channel, including technology-channel characteristics for various levels of the role of technology in the customer interaction (e.g., Froehle & Roth, 2004). A second area is related to the service context by richly theorizing about the specific context—Schmenner's (2004) service matrix and Froehle and Roth's (2004) archetypes provide an excellent starting point for such research. For example, differences are important to understand across contexts: healthcare versus production line (McDonald's®) versus personalized service (The Ritz-Carlton®). A third area worthy of study is related to the context where the customer makes an important choice of a service delivery channel. This suggestion builds directly on Froehle and Roth's (2004) archetypes related to the role of technology in the customer interaction. For instance, there can frequently be a disconnect when a consumer specifies his or her needs in layperson terms that the service personnel have to translate into terms that the technology-mediated system can understand.

Channel Choice

Individual technology-adoption research has not examined how or why consumers may choose across different technology channels. As in the previous two major avenues of research, I suggest the need to draw from relevant other theoretical domains to help us better understand consumer choice of service channels. Given the overlap in general ideas with what has been discussed in the earlier two avenues—that is, investigating constructs from other related domains, the need to study outcomes, and design interventions—I present them in an integrated manner here.

Individual technology-adoption research has not considered service characteristics or channel characteristics beyond what may be specified in models like TAM and UTAUT and can be augmented by a focus on service design and constructs, such as service characteristics, to determine how and why consumers choose a particular service channel. An excellent example of recent work along these lines is Meuter et al. (2005). Work along these lines has the potential to proceed in two intertwined directions—first, the addition of new constructs that will enhance individual technology-adoption models and tailor them to the particular context of services and, second, individual technology-adoption models tend to focus on a particular technology and study the intention and use of that technology, but the work I call for will focus on the choice an individual may make across different competing alternatives. There is a rich body of work on choice models and there are also different analytical approaches (e.g., conjoint analysis) that could be used to design the right mix of attributes to drive consumer choice. The choice decisions are complex: first, a consumer is faced with a self-serve option (e.g., a Web site) or a face-to-face option or a telephone option; second, once a choice has been made, what set of attributes (channel and service) and in what mix will result in the optimal outcome for the consumer (e.g., customer satisfaction) and for the organization (e.g., profit); and, finally, the interplay of the service channel options and the various characteristics as determinants of consumer choice and consumer and organizational outcomes. Research investigating channel choice along these lines will be complemented well by work examining actual interventions and areas for potential interventions that can aid consumer choice of low-cost service options (e.g., self-serve), with an obvious candidate for an intervention being training and how to deliver the training effectively and efficiently, and an area for exploration that could lead to the identification of interventions is personality (e.g., individuals with certain personality traits may need to be supported differently or they would avoid self-serve channels and instead choose the phone service option, experience long hold times and, in turn, be dissatisfied).

Service Context

Building on what was suggested in the "Channel Choice" subsection above, I call for theorizing richly about specific service contexts. Schmenner's (1986, 2004) service matrixes provide a useful way of classifying various services. Each service context is important in its own right and presents important theory bases that could serve as springboards for further development of technology-adoption research. As mentioned earlier, examples of very different service contexts with rich streams of work include healthcare, production line (e.g., McDonald's®) and highly personalized (e.g., The Ritz-Carlton®). For instance, the implications of self-serve options with the vast body of information—for example, WebMD®—for health care providers should be understood. Here, it is not merely a matter of how and why people use WebMD® but rather what the broader implications of such use are, ranging from how does this change the patient–physician dialogue to the ramifications of partial, incorrect, or complex information and the interplay across ailments that may not be comprehensible to the layperson. Similarly, while The Ritz-Carlton® strives to provide highly personalized services to its consumers and there is a rich body of work on hospitality that should be leveraged, consumers' many early interactions with

The Ritz-Carlton® may be using self-serve technologies, thus effectively changing the service. Theorizing richly about the context by drawing on relevant research, both from individual-level technology adoption (technology characteristics and contingencies) and the relevant domain of the service context will yield insights that will further our understanding of core underlying service contexts.

Role of Technology

Service contexts have evolved such that the role of technology can vary greatly in a service context (Froehle & Roth, 2004). For example, even nontechnology service situations (e.g., interactions by phone, interactions with service personnel face to face) are technology based in that service personnel are most likely using some technology/software to provide the service. The nontechnology-yet-technology-based service situation is readily illustrated by considering a consumer who calls an airline call center to purchase a ticket—although the consumer is talking to a human being, the individual providing the service is, in turn, using a technology. A second example could be used to draw the contrast between a nontechnology service situation and a nontechnology-yet-technology-based service situation: when a consumer orders food at a restaurant, the waiter may write down the order (including all the preferences within any dish—e.g., no lettuce) and relay it to the cooking staff verbally or in writing, which would represent a nontechnology service situation; or, when a consumer orders food at a restaurant, the waiter may write down the order and enter it into a technology interface that is then retrieved in the kitchen (e.g., the situation at McDonald's®), which would represent a nontechnology-yet-technology-based service situation. In some of these cases, self-service options will be available to provide the consumer with greater control over the outcomes (e.g., buying an airline ticket on a Web site) and, in some cases, such an option may simply not be available yet, so sometimes the consumer will have to live with the errors introduced by another's use of technology. Researchers should consider the different service contexts that vary in how the technology plays a role (Froehle & Roth, 2004) and theorize about how consumers can be protected against the consequences of others' technology use. Essentially, by choosing the channel (e.g., phone service), the consumer is indirectly adopting and using a technology. Individual-level technology-adoption research in such situations would typically focus on the employee who uses the technology rather than the consumer who is indirectly using the technology. Questions related to consumers' trust in such indirect use of technology, risks involved, expected consequences (good and bad), design characteristics and features (e.g., poka-yokes) that could prevent errors, and communication gaps between expression of consumer needs and their translation by service personnel into information that can be entered via a software system are a few of the potential important and fruitful areas that can deepen our understanding of individual-level technology adoption and use with a specific focus on services.

CONCLUSIONS

Research in individual-level technology adoption is undoubtedly mature. It has also seen the development of several models that can be applied to a wide variety of

technology-related contexts. In this article, I sought to identify three broad areas that build upon the prior research on individual-level technology adoption and leverage the robust models available. In identifying these areas, I was mindful in this article of suggesting directions that will likely be of interest to *Decision Sciences* and other journals focused on similar topics. Further, the suggested directions aim to focus on topics not only of importance to practice but also that will help make a theoretical contribution to individual-level technology-adoption research and the topics identified. [Invited.]

REFERENCES

Adams, D. A., Nelson, R. R., & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: A replication. *MIS Quarterly, 16*, 227–247.

Ahire, S. L., Golhar, D. Y., & Waller, M. A. (1996). Development and validation of TQM implementation constructs. *Decision Sciences, 27*, 23–56.

Alavi, M., & Leidner, D. (2001). Knowledge management and knowledge management systems: Conceptual foundation and an agenda for research. *MIS Quarterly, 25*, 107–136.

Aloysius, J. A., Davis, F. D., Wilson, D. D., Taylor, A. R., & Kotteman, J. E. (2006). User acceptance of decision support systems: The impact of preference elicitation techniques. *European Journal of Operational Research, 169*(1), 273–285.

Arcelus, F. J., Pakkala, T. P. M., & Srinivasan, G. (2002). A purchasing framework for B2B pricing decisions and risk-sharing in supply chains. *Decision Sciences, 33*, 645–666.

Arkesteijn, K., & Oerlemans, L. (2005). The early adoption of green power by Dutch households: An empirical exploration of factors influencing the early adoption of green electricity for domestic purposes. *Energy Policy, 33*(2), 183–196.

Babakus, E., Bienstock, C. C., & Van Scotter, J. R. (2004). Linking perceived quality and customer satisfaction to store traffic and revenue growth. *Decision Sciences, 35*, 713–737.

Baker, T., & Collier, D. A. (2005). The economic payout model for service guarantees. *Decision Sciences, 36*, 197–220.

Basu, A., & Blanning, R. W. (2000). A formal approach to workflow analysis. *Information Systems Research, 11*, 17–36.

Basu, A., & Blanning, R. W. (2003). Synthesis and decomposition of processes in organizations. *Information Systems Research, 14*, 337–355.

Bhattacherjee, A. (1998). Intraorganizational use of information technology: A principal-agent model. *Decision Sciences, 29*, 139–162.

Bock, G. W., Zmud, R. W., Kim, Y. G., & Lee, J. N. (2005). Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators,

social psychological forces, and organizational climate. *MIS Quarterly, 29*, 87–111.

Boudreau, M. C., & Robey, D. (2005). Enacting integrated information technology: Human agency perspective. *Organization Science, 16*(1), 3–18.

Broadbent, M., Weill, P., & St. Clair, D. (1997). The implications of information technology infrastructure for business process redesign. *MIS Quarterly, 23*, 159–182.

Cable, D. M., & Parsons, C. K. (2001). Socialization tactics and person-organization fit. *Personnel Psychology, 54*(1), 1–23.

Carr, C. L. (2002). A psychometric evaluation of the expectations, perceptions, and difference scores generated by the IS-adapted SERVQUAL instrument. *Decision Sciences, 33*, 281–296.

Chwelos, P., Benbasat, I., & Dexter, A. S. (2001). Research report: Empirical test of an EDI adoption model. *Information Systems Research, 12*, 304–321.

Dabholkar, P. A., & Bagozzi, R. P. (2002). An attitudinal model of technology-based self service: Moderating effects of consumer traits and situational factors. *Journal of the Academy of Marketing Science, 30*(3), 184–201.

Davenport, T. H. (2000). *Mission critical*. Boston: Harvard Business School Press.

Davenport, T. H. (2005). The benefits of business process. *Harvard Business Review, 83*(6), 100–108.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*, 319–340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*, 982–1003.

Davis, F. D., & Kottemann, J. E. (1994). User perceptions of decision support effectiveness: Two production planning experiments. *Decision Sciences, 25*, 57–78.

Davis, F. D., Lohse, G. L., & Kottemann, J. E. (1994). Harmful effects of seemingly helpful information on forecasts of stock earnings. *Journal of Economic Psychology, 15*, 253–267.

De Jong, A., & De Ruyter, K. (2004). Adaptive versus proactive behavior in service recovery: The role of self-managing teams. *Decision Sciences, 35*, 457–491.

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean Model of information systems success: A ten-year update. *Journal of Management Information Systems, 19*(4), 9–30.

Easton, F. F., & Pullman, M. E. (2001). Optimizing service attributes: The seller's utility problem. *Decision Sciences, 32*, 251–275.

Fichman, R. G., & Kemerer, C. F. (1997). The assimilation of software process innovations: An organizational learning perspective. *Management Science, 43*, 1345–1363.

Flett, R., Alpass, F., Humphries, S., Massey, C., Morriss, S., & Long, N. (2004). The technology acceptance model and use of technology in New Zealand dairy farming. *Agricultural Systems, 80*(2), 199–211.

Froehle, C. M. (2006). Service personnel, technology, and their interaction in influencing customer satisfaction. *Decision Sciences, 37*, 5–38.

Froehle, C. M., & Roth, A. V. (2004). New measurement scales for evaluating perceptions of the technology-mediated customer service experience. *Journal of Operations Management, 22*(1), 1–22.

Frohlich, M. T. (2002). E-integration in the supply chain: Barriers and performance. *Decision Sciences, 33*, 537–556.

Gentry, L., & Calantone, R. (2002). A comparison of three models to explain shop-bot use on the Web. *Psychology and Marketing, 19*, 945–956.

Gosain, S., Malhotra, A., El Sawy, O., & Chehade, F. (2003). The impact of common e-business interfaces. *Communications of the ACM, 46*(12), 186–195.

Grover, V., Jeong, S. R., Kettinger, W. J., & Wang, S. (1995). The implementation of business process reengineering. *Journal of Management Information Systems, 12*(1), 109–144.

Hackman, J. R., & Oldham, G. R. (1980). *Work redesign*. Reading, MA: Addison-Wesley.

Hackman, J. R., & Wageman, R. (1995). Total quality management: Empirical, conceptual, and practical issues. *Administrative Science Quarterly, 40*, 309–342.

Hart, P., & Saunders, C. (1997). Power and trust: Critical factors in the adoption and use of electronic data interchange. *Organization Science, 8*(1), 23–42.

Hart, P. J., & Saunders, C. S. (1998). Emerging electronic partnerships: Antecedents and dimensions of EDI use from the supplier's perspective. *Journal of Management Information Systems, 14*(4), 87–111.

Hoogeweegen, M. R., Teunissen, W. J. M., Vervest, P. H. M., & Wagenaar, R. W. (1999). Modular network design: Using information and communication technology to allocate production tasks in a virtual organization. *Decision Sciences, 30*, 1073–1103.

Huang, Z., Li, S. X., & Mahajan, V. (2002). An analysis of manufacturer-retailer supply chain coordination in cooperative advertising. *Decision Sciences, 33*, 469–594.

Iacovou, C. L., Benbasat, I., & Dexter, A. S. (1995). Electronic data interchange and small organizations: Adoption and impact of technology. *MIS Quarterly, 19*, 465–485.

Jasperson, J., Carter, P. E., & Zmud, R. W. (2005). A comprehensive conceptualization of the post-adoptive behaviors associated with IT-enabled work systems. *MIS Quarterly, 29*, 525–557.

Karmakar, U. (2004). Will you survive the services revolution? *Harvard Business Review, 82*(6), 100–107.

Kettinger, W. J., Teng, J. T. C., & Guha, S. (1997). Business process change: A study of methodologies, techniques, and tools. *MIS Quarterly, 21*, 55–80.

Kottemann, J. E., Davis, F. D., & Remus, W. R. (1994). Computer-assisted decision making: Performance, beliefs, and the illusion of control. *Organizational Behavior and Human Decision Processes, 57*(1), 26–37.

Krajewski, L., & Wei, J. C. (2001). The value of production schedule integration in supply chains. *Decision Sciences, 32*, 601–634.

Krishnan, M. S., Ramaswamy, V., Meyer, M. C., & Damien, P. (1999). Customer satisfaction for financial services: The role of products, services, and information technology. *Management Science, 45*, 1194–1209.

Lee, H. L., Padmanabhan, V., & Whang, S. J. (1997). Information distortion in a supply chain: The bullwhip effect. *Management Science, 43*, 546–558.

Mahajan, J., Radas, S., & Vakharia, A. J. (2002). Channel strategies and stocking policies in uncapacitated and capacitated supply chains. *Decision Sciences, 33*, 191–222.

Malhotra, A., Gosain, S., & El Sawy, O. A. (2005). Absorptive capacity configurations in supply chains: Gearing for partner-enabled market knowledge creation. *MIS Quarterly, 29*, 145–187.

Malone, T. W., Crowston, K. G., Lee, J., Pentland, B., Dellarocas, C., Wyner, G., Quimby, J., et al. (1999). Tools for inventing organizations: Toward a handbook of organizational processes. *Management Science, 45*, 425–443.

McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: An integrative typology. *Information Systems Research, 13*, 334–359.

Meuter, M. L., Bitner, M. J., Ostrom, A. L., & Brown, S. W. (2005). Choosing among alternative service delivery modes: An investigation of customer trial of self-service technologies. *Journal of Marketing, 69*(2), 61–83.

Meuter, M. L., Ostrom, A. L., Roundtree, R. I., & Bitner, M. J. (2000). Self-service technologies: Understanding customer satisfaction with technology-based service encounters. *Journal of Marketing, 64*(3), 50–64.

Mukhopadhyay, T., Kekre, S., & Kalathur, S. (1995). Business value of information technology: A study of electronic data interchange. *MIS Quarterly, 19*, 137–156.

Nissen, M. E., & Sengupta, K. (2006). Incorporating software agents into supply chains: Experimental investigation with a procurement task. *MIS Quarterly, 30*, 145–166.

Orlikowski, W. J. (1992). The duality of technology: Rethinking the concept of technology in organizations. *Organization Science, 3*, 398–427.

Orlikowski, W. J., & Iacono, C. S. (2001). Desperately seeking the 'IT' in IT research: A call to theorizing the IT artifact. *Information Systems Research, 12*, 121–134.

Ostrom, A., & Iacobucci, D. (1995). Consumer trade-offs and the evaluation of services. *Journal of Marketing, 59*(1), 17–28.

Piccoli, G., Brohman, M. K., Watson, R. T., & Parasuraman, A. (2004). Net-based customer service systems: Evolution and revolution in web site functionalities. *Decision Sciences, 35*, 423–455.

Poston, R., & Speier, C. (2005). Effective use of knowledge management systems: A process model of content ratings and credibility indicators. *MIS Quarterly, 29*, 221–244.

Premkumar, G., Ramamurthy, K., & Nilakanta, S. (1994). Implementation of electronic data interchange: An innovation diffusion perspective. *Journal of Management Information Systems, 11*(2), 157–186.

Premkumar, G., Ramamurthy, K., & Saunders, C. S. (2005). Information processing view of organizations: An exploratory examination of fit in the context of interorganizational relationships. *Journal of Management Information Systems, 22*(1), 257–294.

Rabinovich, E., Bailey, J. P., & Carter, C. R. (2003). A transaction-efficiency analysis of an Internet retailing supply chain in the music CD industry. *Decision Sciences, 34*, 131–172.

Rai, A., & Bajwa, D. S. (1997). An empirical investigation into factors relating to the adoption of executive information systems: An analysis for collaboration and decision support. *Decision Sciences, 24*, 939–974.

Rai, A., Patnayakuni, R., & Seth, N. (2006). Firm performance impacts of digitally enabled supply chain integration capabilities. *MIS Quarterly, 30*, 225–246.

Ray, G., Barney, J. B., & Muhanna, W. A. (2004). Capabilities, business processes, and competitive advantage: Choosing the dependent variable in empirical tests of the resource-based view. *Strategic Management Journal, 25*(1), 23–37.

Ray, G., Muhanna, W. A., & Barney, J. B. (2005). Information technology and the performance of the customer service process: A resource-based analysis. *MIS Quarterly, 29*, 625–652.

Rayport, J. F., & Jaworski, B. J. (2004). *Introduction to e-commerce*. New York: McGraw-Hill.

Riggins, F. J., Kriebel, C. H., & Mukhopadhyay, T. (1994). The growth of interorganizational systems in the presence of network externalities. *Management Science, 40*, 984–998.

Robinson, E. P., Jr., Sahin, F., & Gao, L. (2005). The impact of e-replenishment strategy on make-to-order supply chain performance. *Decision Sciences, 36*, 33–64.

RosettaNet®. (2006). www.rosettanet.org. Accessed: September 15, 2006.

Roth, A. V., & Menor, L. J. (2003). Insights into service operations management: A research agenda. *Production and Operations Management, 12*(2), 145–163.

Saeed, K. A., Malhotra, M. K., & Grover, V. (2005). Examining the impact of interorganizational systems on process efficiency and sourcing leverage in buyer-supplier dyads. *Decision Sciences, 36*, 365–396.

Sahin, F., & Robinson, E. P. (2002). Flow coordination and information sharing in supply chains: Review, implications, and directions for future research. *Decision Sciences, 33*, 505–536.

Sambamurthy, V., & Chin, W. (1994). The effects of group attitudes toward GDSS designs on the decision-making performance of computer-supported groups. *Decision Sciences, 25*, 215–242.

Schmenner, R. W. (1986). How can service businesses survive and prosper? *Sloan Management Review, 28*(3), 21–32.

Schmenner, R. W. (2004). Service businesses and productivity. *Decision Sciences, 35*, 333–347.

Schultze, U., & Orlikowski, W. J. (2004). A practice perspective on technology-mediated network relations: The use of Internet-based self-serve technologies. *Information Systems Research, 15*, 87–106.

Srinivasan, K., Kekre, K., & Mukhopadhyay, T. (1994). Impact of electronic data interchange technology on JIT shipments. *Management Science, 40*, 1291–1304.

Subramani, M. (2004). How do suppliers benefit from information technology use in supply chain relationships? *MIS Quarterly, 28*, 45–73.

Sum, C., Lee, Y., Hays, J. M., & Hill, A. V. (2002). Modeling the effects of a service guarantee on perceived service quality using alternating conditional expectations (ACE). *Decision Sciences, 33*, 347–383.

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research, 6*, 144–176.

Teo, H. H., Wei, K. K., & Benbasat, I. (2003). Predicting intention to adopt interorganizational linkages: An institutional perspective. *MIS Quarterly, 27*, 19–49.

Todd, P., & Benbasat, I. (1999). Evaluating the impact of DSS, cognitive effort, and incentives on strategy selection. *Information Systems Research, 10*, 356–374.

Tsikriktsis, N., & Heineke, J. (2004). The impact of process variation on customer dissatisfaction: Evidence from the U.S. domestic airline industry. *Decision Sciences, 35*, 129–141.

Tu, Q., Vonderembse, M. A., Ragu-Nathan, T. S., & Ragu-Nathan, B. (2004). Measuring modularity-based manufacturing practices and their impact on mass customization capability: A customer-driven perspective. *Decision Sciences, 35*, 147–168.

Vakharia, A. J. (2002). E-business and supply chain management. *Decision Sciences, 33*, 495–504.

Van der Zee, D. J., Van der Vorst, J. G. A. J. (2005). A modeling framework for supply chain simulation: Opportunities for improved decision making. *Decision Sciences, 36*, 65–95.

Van Maanen, J., & Schein, E. H. (1979). Toward a theory of organizational socialization. In B. M. Staw (Ed.), *Research in organizational behavior (1)*. Greenwich, CT: JAI Press, 209–264.

Venkatesh, V. (1999). Creation of favorable user perceptions: Exploring the role of intrinsic motivation. *MIS Quarterly, 23*, 239–260.

Venkatesh, V., & Agarwal, R. (2006). From visitors to customers: A usability-centric perspective on purchase behavior in electronic channels. *Management Science, 52*, 367–382.

Venkatesh, V., & Davis, F. D. (1996). A model of the antecedents of perceived ease of use: Development and test. *Decision Sciences, 27*, 451–481.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*, 186–204.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*, 425–478.

Venkatesh, V., Speier, C., & Morris, M. G. (2002). User acceptance enablers in individual decision-making about technology: Toward an integrated model. *Decision Sciences, 33*, 297–316.

Wang, E. T. G., & Seidmann, A. (1995). Electronic data interchange: Competitive externalities and strategic implementation policies. *Management Science, 41*, 401–418.

Weitzel, T., Beimborn, D., & Konig, W. (2006). A unified economic model of standard diffusion: The impact of standardization cost, network effects, and network topology. *MIS Quarterly, 30*, 489–514.

Yang, Z. L., & Peterson, R. T. (2004). Customer perceived value, satisfaction, and loyalty: The role of switching costs. *Psychology and Marketing, 21*, 799–822.

Zahay, D., & Griffin, A. (2004). Customer learning processes, strategy selection, and performance in business-to-business service firms. *Decision Sciences, 35*, 169–203.

Zhao, X., Xhie, J., & Wei, J. C. (2002). The impact of forecast errors on early order commitment in a supply chain. *Decision Sciences, 30*, 251–280.

Zhu, K., Kraemer, K. L., Gurbaxani, V., & Xu, S. X. (2006). Migration to open-standard interior organizational systems: Network effects, switching costs, and path dependency. *MIS Quarterly, 30*, 515–539.

Zhu, Z., Sivakumar, K., & Parasuraman, A. (2004). A mathematical model of service failure and recovery strategies. *Decision Sciences, 35*, 493–525.

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