 Journal of Management & Organization (2011) 17: 344–363.

Who initiates and who implements? A multi-stage, multi-agent model of organizational innovation

Sun Young Sung and Dong-Sung Cho
Department of Strategy and International Business, College of Business Administration, Seoul National University, Seoul, South Korea

Jin Nam Choi
Department of Organizational Behavior and Human Resource Management, College of Business Administration, Seoul National University, Seoul, South Korea

ABSTRACT

Innovation researchers have typically focused on either the adoption or the implementation phase of organizational innovation. In the present study, we propose that four agents of innovation (i.e., top management, external environment, innovation, and employees) play distinct roles in the adoption and implementation stages, and that, together, they predict innovation outcomes. We test the phase-dependent process of organizational innovation using data drawn from intensive interviews with 40 executives of a consumer product company. A path analysis of 94 innovations introduced to the organization over the past 20 years indicates that there is a significant level of stability in innovation-driving dynamics. Particularly, top management and employees tend to remain heavily involved in the implementation of an innovation if they played an important role in adopting it. The four agents of innovation play different roles in accruing benefits from the innovation. The results also suggest that employees tend to produce positive innovation outcomes when they have been involved in the innovation from the very beginning and are thus responsible for its adoption. The present study makes a distinct contribution to the literature by exploring the multi-stage, unfolding processes of organizational innovation.

Keywords: innovation adoption, innovation implementation, innovation effectiveness, top management, external environment, efficacy of innovation, employee involvement

Innovation has been widely acknowledged as a core source of competitive advantage for organizations; thus, scholars have investigated various organizational processes and factors related to innovation (Klein & Knight, 2005; Myers, Sivakumar, & Nakata, 1999; Rogers, 1995; Wejnert, 2002; Yetton, Sharma, & Southon, 1999). The existing literature on innovation can be divided into two streams: the variance approach (Jarvenpaa & Staples, 2000; King & Anderson, 1995) and the process approach (Damanpour & Schneider, 2006; Greenhalgh, Robert, Bate,

Macfarlane, & Kyriakidou, 2005; Song, Song, & Benedetto, 2009). Studies based on the variance approach have examined a variety of predictors that promote organizational innovation, including organizational factors such as culture and climate (Baer & Frese, 2003; Choi & Chang, 2009), environmental factors (King & Anderson, 1995; Pierce & Delbecq, 1977), properties of the innovation (Klein & Knight, 2005; Sharma & Yetton, 2003), and individual characteristics and innovation receptivity (Jones, Jimmieson, & Griffiths, 2005; Klein & Sorra, 1996). The process perspective, in contrast, attempts to provide a detailed account of the complex developmental processes underlying an innovation (Holl & Hord, 1987; Kwon & Zmud, 1987; Myer & Goes, 1988; Rogers, 1995; Van de Ven, Polley, Garud, & Venkataraman, 1999).

Scholars of the variance approach rely mostly on quantitative data collected from a number of innovations involving multiple organizations (e.g., Dougherty & Hardy, 1996; Higgs & Rowland, 2005), whereas those taking the process approach largely depend on qualitative case studies around a small number of innovations (or even a single innovation; e.g., Denis, Hebert, Langley, Lozeau, & Trottier, 2002; Fitzgerald, Ferlie, Wood, & Hawkins, 1997). These different research orientations may be the reason the existing literature provides only a limited understanding of the developmental process involving multiple innovations. Given that innovation is a complex, multi-phase phenomenon (Damanpour & Schneider, 2006; Myer & Goes, 1988), the stage-dependent processes of innovation must be considered using quantitative data based on multiple innovations.

In this study, taking the view that innovation is a multi-event phenomenon (Greenhalgh et al., 2005), we examine organizational innovation at two different stages: adoption and implementation. We propose that these two innovation stages are shaped by four agents or actors: top management, external environment, innovation, and employees. These agents may play distinct roles at each of the two stages, and may have different implications for innovation outcomes. For example, the role of top management may be critical at the adoption stage; however, once the innovation has been adopted, acceptance of and active engagement of employees in the use of the innovation may emerge as the critical conditions at the implementation stage. Therefore, the primary antecedent of innovation success may vary according to the innovation phase (King, 1990; Wolfe, 1994). The existing literature, however, does not provide consistent evidence regarding the stage-dependent dynamics of organizational innovation (Greenhalgh et al., 2005; Tornatsky & Klein, 1982).

By testing the roles of diverse actors related to innovation at multiple stages, this study complements existing innovation studies based on the variance approach, which have generally focused on a particular stage of innovation, leaving the question of stage-dependent dynamics unanswered (for an exception, see Damanpour & Schneider, 2006). The present study also addresses a shortcoming of studies endorsing the process approach, which have typically resorted to qualitative case analyses of a small number of innovations (Greenhalgh et al., 2005). To this end, we propose a conceptual framework that isolates key actors operating at both the adoption and implementation stages of innovation. We also present hypotheses regarding the ways in which these actors are connected to one another during the adoption and implementation stages, as well as the ways in which they predict innovation outcomes.

Multi-stage, multi-agent model of organizational innovation

Scholars have divided the innovation process into various phase frameworks, such as knowledge–persuasion–adoption–implementation–confirmation (Rogers, 1995); initiation–adoption–adaptation–acceptance–routinization–infusion (Kwon & Zmud, 1987);

and initiation–adoption–implementation (Damanpour & Schneider, 2006). In this study, we examine two widely recognized and clearly distinguished stages of innovation: adoption and implementation. *Adoption* refers to the decision to use an innovation as the best course of action to derive anticipated benefits from changes that the innovation may bring to the organization (Klein & Sorra, 1996; West & Anderson, 1996). *Implementation* refers to the transition stage between the decision to adopt the innovation and the consistent use or routinization of the innovation (Holahan, Aronson, Jurkat, & Schoorman, 2004; Klein & Sorra, 1996).

To account for varying patterns of innovation adoption and implementation in organizations, researchers have focused on numerous factors, both internal and external to the organization (Greenhalgh et al., 2005). Among these, we consider four critical factors that may cover a wide variety of domains related to the innovation process: top management (Dong, 2001; Grover, Jeong, Kettinger, & Teng, 1995), external environment (Freel, 2005; Nohria & Gulati, 1996), the efficacy of an innovation (Agarwal & Prasad, 1997; King & He, 2006; Yetton et al., 1999), and employees (Jones et al., 2005; Zmud, 1984). These four agents of innovation have been consistently emphasized in relation to both adoption and implementation (Ferman & Levin, 1987; Glynn, 1996). On one hand, the leadership of top managers with regard to innovation and the receptivity of employees to innovation represent critical *internal dynamics* needed for successful innovation (Fidler & Johnson, 1984; Zmud, 1984), whereas environmental pressure or uncertainty and the efficacy or technical advantage of the innovation represent core *external conditions* to be considered (Klein & Knight, 2005; Pierce & Delbecq, 1977; Sharma & Yetton, 2003). On the other hand, top management and external environment may be reflective of *macro* or *strategic dynamics* involved in organizational innovation (Castle, 2001; Nystrom, Ramamurthy, & Wilson, 2002; Pawar & Eastman, 1997), whereas innovation and employee characteristics represent more *micro issues* that may be closer to the field of actual innovation-related operations (Aubert & Hamel, 2001; Klein & Sorra, 1996; Venkatesh & Davis, 2000).

Implementation as a mediator between adoption and innovation effectiveness

As shown in Figure 1, what happens during the adoption and implementation stages may determine *innovation effectiveness*, which refers to the benefits or positive outcomes accrued from a given innovation (Klein & Sorra, 1996). In the present conceptual framework, we consider two such outcomes: increased innovative capability and organizational performance gain caused by the innovation (Holahan et al., 2004). Organizations adopt and implement innovations to improve

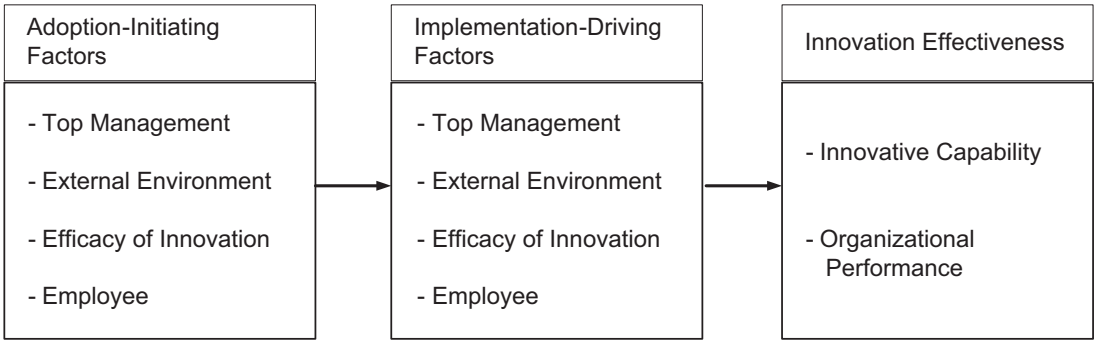

Figure 1: Theoretical framework predicting innovation effectiveness.

their performance in the short term, as well as to increase their capacity to innovate in order to enhance long-term output (Caldwell, Herold, & Fedor, 2004).

Although both adoption and implementation are necessary elements of organizational innovation, we propose that implementation is a more proximal process in the production of innovation effectiveness, and thereby mediating the effect of adoption on the outcomes. Many innovation scholars have assumed that innovation implementation is a mechanical, routine process that follows the adoption decision (Moore, 1991; Wejnert, 2002). However, as Klein and Knight (2005) have pointed out, the key reason that most organizations fail to benefit from a given innovation is not innovation failure, but implementation failure. Simply adopting an innovation, therefore, may not guarantee desired outcomes from the innovation. Instead, organizational gains, in terms of both innovative capability and increased performance, may rely more on if and how the innovation is implemented, rather than on whether it is adopted (Jones et al., 2005; Klein & Sorra, 1996). We thus advance the following mediation hypothesis:

> Hypothesis 1: The relationship between adoption-related processes and innovation effectiveness is mediated by implementation-related processes.

Effects of implementation-driving factors on innovation effectiveness

As the immediate process responsible for innovation effectiveness, we propose that all four implementation-driving forces have meaningful implications for innovation effectiveness.

Top management

The commitment of top managers to innovation has been recognized as one of the most crucial conditions for innovation success (Holahan et al., 2004; Sharma & Yetton, 2003; Van de Ven, 1986). The direct engagement of top managers in innovation implementation tends to increase the legitimacy of the innovation within the organization, thereby enhancing employee acceptance of the innovation and facilitating its routinization (Baer & Frese, 2003; Dong, 2001). In addition, top managers develop a supportive organizational context for implementation by allocating sufficient financial resources for innovation-related activities, such as training and technical support, and by installing organizational practices, such as HR policies and the rearrangement of task processes needed for the successful assimilation of the innovation (Champy, 1995; Choi & Chang, 2009; Davidson, 1993; Grover et al., 1995). Innovation implementation driven by top management, therefore, may increase innovation effectiveness in terms of both innovative capability and performance gains caused by the innovation.

> Hypothesis 2: Top management-driven implementation is positively related to innovation effectiveness.

External environment

As a member of a larger system, an organization may not survive without persistently engaging in exchanges of information and resources with its external environment (Cohen & Levin, 1989; Nohria & Gulati, 1996). For this reason, adequately dealing with market and technological demands imposed by various external actors (e.g., customers, competitors) constitutes a critical condition for organizational effectiveness (Castle, 2001; Kimberly & Evanisko, 1981). Therefore, when an organization implements an innovation to meet or exploit external opportunities and challenges, such as emerging market demands or technological changes, its effort is likely to result in increased organizational performance (Pierce & Delbecq, 1977; Rai & Bajwa, 1997; Wejnert,

2002). This type of innovation implementation may also invigorate the capability of the organization to cope with future environmental changes by enhancing the sensitivity and knowledge of environmental events and trends of its members (Damanpour & Schneider, 2006). Environment-driven implementation thus provides an organization with learning experiences that should improve its innovative capability with regard to managing external opportunities and threats.

> Hypothesis 3: Environment-driven implementation is positively related to innovation effectiveness.

Efficacy of innovation

An efficacious innovation with technical advantages and convincing rationale can be another driver of implementation efforts that may also result in desirable outcomes for the organization (Agarwal & Prasad, 1997; King & He, 2006). The well-known innovation diffusion model of Rogers (1995) identifies various innovation characteristics that promote adoption decisions, such as relative advantage, trialability, and compatibility with existing organizational arrangements. These characteristics seem to provide momentum for implementation once an innovation has been adopted (Clayton, 1997). Some other properties of an innovation, such as a low impact on social relations, communicability, reversibility, divisibility, and modifiability, are also directly related to the level of innovation use in organizations (cf. implementation characteristics, Leonard-Barton, 1988; Oldenburg, Hardcastle, & Kok, 1997). In the information systems literature, researchers have found that innovations with desirable attributes, such as task relevance, perceived usefulness, and perceived ease of use, tend to be more widely accepted and actually used, resulting in a greater benefit accrued from the innovation (Agarwal & Prasad, 1997; Venkatesh & Davis, 2000). In addition, when employees have been exposed to innovations with desirable characteristics, they may develop positive attitudes toward innovations and become more receptive to innovative ideas, which should increase organizational capability (Jarvenpaa & Staples, 2000; Yetton et al., 1999). Formally stated, our fourth hypothesis is as follows:

> Hypothesis 4: Innovation-driven implementation is positively related to innovation effectiveness.

Employees

The indifference or resistance of organizational members has been identified as an onerous barrier to successful implementation because they are the ultimate target users of most organizational innovations (Choi & Chang, 2009; Zmud, 1984). Therefore, when employees actively engage in implementation, the innovation is likely to be readily assimilated into existing work processes and routines. In addition, when employees find themselves to be the main force driving the implementation of an innovation, they may feel responsible for its success and develop a sense of ownership and strong motivation to prove that the innovation is of benefit to the organization (Armenakis, Harris, & Mossholder, 1993; Holt, 2002; Jones et al., 2005; Miller, Johnson, & Grau, 1994). If they are enthusiastically engaged in implementing an innovation, employees may encounter various situations that require their creative contribution to make the innovation work or to adapt it to the specific organizational context (cf. structuration perspective, Pozzebon, 2000; Staber, 2006), which should increase the innovative capacity of the organization. We thus posit that employee-driven implementation may enhance both innovative capability and organizational performance.

> Hypothesis 5: Employee-driven implementation is positively related to innovation effectiveness.

Relationships among adoption-initiating factors and implementation-driving factors: Stability and agentic shift

In Hypothesis 1, we propose that implementation factors, as direct predictors of innovation outcomes, mediate the relationship between adoption factors and innovation effectiveness. Below, we complete our theoretical framework by articulating how the adoption-initiating factors are related to implementation-driving factors.

When the same agent operates in both organizational decisions to adopt an innovation and its implementation, we can reasonably assume that there will be a certain level of stability (or inertia) over the two phases of innovation. For example, if top managers were heavily involved in the adoption decision, they would be likely to continue their commitment at the implementation stage by providing more resources and legitimizing the use of the innovation, perhaps due to their feelings of ownership and responsibility for the innovation (Chatterjee, Grewal, & Sambamurthy, 2002; Dong, 2001; Sharma & Yetton, 2003). Top-initiated adoption, therefore, may increase the likelihood of top-driven implementation.

In a similar vein, if environmental uncertainty caused by competition and market dynamics was the main factor influencing the organization to adopt an innovation, its implementation would also be fueled by environmental forces because the environment would be likely to remain unchanged in the short run. Likewise, once the organization has decided to adopt an innovation because of its technical advantages or potential benefits in work performance (innovation-initiated adoption), this superiority would continue to be the main force in the implementation phase. Finally, given that people tend to stick to their positions (even when these decisions turn out to be wrong), employees exert greater effort to implement an innovation when they have initiated (or influenced) its adoption. Thus, we advance the following stability hypothesis:

> Hypothesis 6: A factor that is important in the innovation adoption phase will remain important in the innovation implementation phase.

In addition to this agentic stability over the two phases, we recognize the possibility that the main driving force can change over time. This agentic shift in the innovation process may take several different forms. First, to legitimize their adoption decision, top managers may make an intensive effort to convince organizational members of the merits of the innovation by developing a clear vision and a rationale for the innovation (Chatterjee et al., 2002; Higgs & Rowland, 2005) and providing sufficient resources and encouragement for innovation use. These conditions will increase employees' commitment to the innovation (Aparna, Mila, & Hui, 2009; Igbaria & Guimaraes, 1994; Klein, Conn, & Sorra, 2001), possibly placing them in the central role with regard to implementation. Thus, when top management adopts an innovation, organizational members may be drawn to the center stage of implementation through persuasion and resource allocation.

> Hypothesis 7: Top-initiated adoption is positively related to employee-driven implementation.

If the innovation were adopted due to environmental forces, such as technological or market changes, top management may soon recognize the significance of those changes and actively support the innovation in order to exploit opportunities or to minimize damage to the organization (Paswan, D'Souza, & Zolfagharian, 2009). Considering the strategic role played by top management and the strategic implications of the external environment (Ferman & Levin, 1987; Freel, 2005), environment-initiated adoption should eventually attract the attention of top managers to the external condition that necessitates the implementation of the innovation.

Hypothesis 8: Environment-initiated adoption is positively related to top management-driven implementation.

Previous studies have indicated that the superior characteristics of an innovation, such as relevance, usefulness, and ease of use, are critical factors in its adoption (Sharma & Yetton, 2003). When an innovation is adopted due to its efficacy or superiority over existing courses of action, organizational members, as ultimate users of the innovation, are likely to perceive its merits and be convinced of its value to their work. Thus, when the innovation is readily applicable to the organization and efficacious in producing positive results, employees will become enthusiastic about actively implementing the innovation (Venkatesh & Davis, 2000). Thus, we hypothesize the following:

Hypothesis 9: Innovation-initiated adoption is positively related to employee-driven implementation.

The innovation adoption literature has focused principally on top management and environmental elements such as institutional forces (Ferman & Levin, 1987; Paswan et al., 2009), thereby effectively ignoring employees as a potential agent of adoption. However, employees are best equipped to select the most compatible and useful innovations to improve organizational performance because of their familiarity with actual task operations and demands and/or the specifications to be fulfilled for the successful completion of the task. For this reason, employees are able to render a realistic assessment of the fit of an innovation with the task, as well as its technical potential in the workplace, and will thereby initiate the adoption of an innovation with superior characteristics. Thus, if an innovation is adopted in accordance with the desires of employees, the innovation is likely to be highly efficacious and produce desirable consequences. In such a case, the quality of an innovation may play a critical role in its implementation.

Hypothesis 10: Employee-initiated adoption is positively related to innovation-driven implementation.

Methods

To test the multi-phase, multi-agent model of the innovation process, we conducted a field study in a Korean company that operates in the consumer product industry with approximately 2000 employees. This company is well recognized as an innovative and learning-oriented company, and has been successful in introducing various innovations internally, as well as to the market and to society. Adapting the guidelines of Huber and Power (1985) for improving the accuracy and representativeness of interview data, we carefully selected key informants for this study. Specifically, with the assistance of the HR director, we identified 40 executives, including most of the top management team members and key senior managers, who comprised the upper echelon of the company. They were knowledgeable in the history, context, and business operations of the company, including its innovation efforts.

The sampled group of 40 executives equally represented the eight functional areas of the company (i.e., five executives per function): strategy development, public relations, human resource management, marketing, production, R&D, sales, and logistics. In terms of organizational positions, these informants included 6 vice-presidents, 5 senior executives, 10 directors, and 19 general managers. This sample included 36 males (90%) and 4 females (10%). Their average tenure was 19 years (SD = 5.48), ranging between 5 and 34 years, with the company. On average, they were 46 years old (SD = 5.40).

The present research design provided a comprehensive picture of the company's innovation-related activities by covering all eight functions represented on the company's organization chart. The presence of multiple informants representing the same functional area allowed us to

cross-validate these executive managers' reports. With this research design, we avoided potential biases that often plague the single-informant design.

Structured interviews with key informants

Over a period of four weeks, we conducted semi-structured interviews with the 40 executives. We employed the critical incident technique (CIT, Flanagan, 1951) to structure the interview. Specifically, at the beginning of every interview, we guaranteed anonymity and confidentiality, and obtained approval for documenting the process via audio recording. All 40 executives allowed us to record the interview. Then, we asked the interviewees to identify a major innovation that had significant influences on the company and with which they had direct experiences. Once the executives identified such an innovation, we asked them to chronologically describe the way the innovation unfolded and became embedded in the company. Specifically, we probed for explanations of *how* and *why* the innovation was adopted, as well as *what* factors influenced its implementation. Finally, we asked for descriptions of the consequences of the innovation, either positive or negative. Once the interviewees had finished their descriptions of the process of adoption and implementation, and had identified the outcomes of the innovation, we asked them to identify another innovation, following the same interview procedure. To obtain a quantitative assessment of each innovation that can be compared across executives, we asked them to offer numerical ratings regarding the unfolding processes of the innovation at the end of each innovation case (see below for a more detailed description). We employed this procedure to avoid any subjective biases that could be introduced when we numerically code our informants' innovation stories.

The average duration of the interviews was 90 min (ranging between 70 and 180 min). On average, each executive identified and described approximately 4.7 innovations (ranging between 3 and 7). Thus, the informants spent an average of 20 min describing the adoption, implementation, and outcomes for the organization of each implementation. In total, the 40 executives described 186 innovations over the past 20 years, most of which were introduced to the organization within the past 10 years. Executives from the same functional area, however, often described the same innovation events. Thus, some cases were reported by over 10 informants. We, therefore, collapsed multiple interview data regarding the same innovation into a single incident. When this procedure was applied, the final sample included 94 separate cases of innovation. In this initial interview data, each innovation was described by approximately two informants (ranging between 1 and 10).

To calculate the inter-rater agreement of interview responses, however, we needed at least three informants for each innovation case. Among the 94 innovation cases, only 27 cases (28.7%) were reported by three or more informants. Of the other cases, 15 innovation cases (16%) were reported by two participants and 52 cases (55.3%) were reported by only one informant. To reduce the potential subjectivity of interview responses due to the small number of informants, we conducted follow-up telephone interviews with 22 of the 40 executives who participated in the initial interviews. Telephone interviews have been used widely and have demonstrated their validity as a procedure for data collection (Holbrook, Green, & Krosnick, 2003; Sudman, 1966). Before we conducted these follow-up interviews, we first categorized the 67 target innovations reported by less than three informants according to pertinent functional areas and assigned them to executives in the same or related functional area. Second, at the beginning of the phone interview, we determined if the informants were familiar with those innovations and their unfolding processes. Once we confirmed that the informants were knowledgeable about the innovation, we briefly described the target innovation, and then

asked them to rate the innovation process questions (described below). In the follow-up telephone interviews, participants rated an average 5.41 innovations (ranging between 3 and 7). In so doing, we ensured that each innovation was reported by at least three informants.

Interview questions

During the initial interviews and the follow-up telephone interviews, we asked the same set of questions verbatim to apply the same protocol to every interview. To quantify the responses, we instructed the informants to respond using a 10-point scale (1 = *strongly disagree*, 10 = *strongly agree*). With regard to the innovation adoption process, the following four questions (adapted from Fidler & Johnson, 1984; Oldham & Cummings, 1996; Venkatesh, Morris, Davis, & Davis, 2003; Waldman, Ramirez, House, & Puranam, 2001) were used to assess the role of the four key agents of adoption: (a) 'Top managers strongly believed that this innovation would fit quite well with the company and initiated its adoption' (top-initiated adoption), (b) 'The introduction of this innovation was inevitable because of external environmental factors such as market and technological changes' (environment-initiated adoption), (c) 'This innovation was adopted largely because of its expected value in terms of increased job effectiveness and organizational performance' (innovation-initiated adoption), and (d) 'Employees' eagerness and persistent suggestions played a critical role in adopting this innovation' (employee-initiated adoption).

To examine the implementation process, we asked the following four questions (adapted from Douglas & Judge, 2001; Lampikoski & Emden, 1996; Patterson et al., 2005; Yetton et al., 1999): (a) 'This innovation was implemented mostly due to top managers' wholehearted support' (top-driven implementation), (b) 'We implemented this innovation mostly because of external environmental demands such as market or technological changes' (environment-driven implementation), (c) 'We implemented this innovation mostly because of its positive outcomes such as increased quality and productivity' (innovation-driven implementation), and (d) 'This innovation was implemented in our organization mostly due to employees' enthusiastic effort' (employee-driven implementation).

Finally, we asked two questions (adapted from Caldwell et al., 2004; Fedor, Caldwell, & Herold, 2006) to assess innovation effectiveness: (a) 'This innovation significantly improved the innovativeness and creativity of our company' (innovative capability), and (b) 'This innovation significantly improved job effectiveness and productivity in our company' (organizational performance).

Each innovation in the sample was evaluated using these 10 questions with three or four participating executives. The inter-rater reliability of these 10 items was calculated using the Spearman–Brown formula for effective reliability of judges (see Rosenthal & Rosnow, 1991, p. 53). As reported in Table 1, all items showed acceptable levels of inter-rater reliability, indicating that the informants had shared understandings of the innovation events they described. Thus, we averaged the responses of the executives regarding the same innovation, resulting in 94 innovation cases. This innovation-level aggregated data comprised the final analysis sample used in our hypothesis testing.

Results

The basic characteristics of the 94 innovations adopted by and implemented in the sampled company are summarized in Table 2. The initial categorization of the sampled innovations was based on the descriptions of the innovations provided by the interviewed executives. We then invited the company's HR managers and the senior vice-presidents of the eight functions to validate the categorization results, after which we corrected our initial categorization as needed. Most innovations in the current sample (73 innovations, 77.7%) were introduced to the organization within the past 10 years. In terms

Table 1: Means, standard deviations, and correlations among study variables

Variables	*M*	SD	1	2	3	4	5	6	7	8	9	10
1. Top-initiated adoption	8.37	1.49	**.72**									
2. Environment-initiated adoption	6.34	1.87	–.07	**.66**								
3. Innovation-initiated adoption	6.92	1.69	.31**	.25**	**.69**							
4. Employee-initiated adoption	6.26	2.08	–.04	.27**	.50**	**.69**						
5. Top-driven implementation	8.46	1.06	.52**	–.13	.32**	.15	**.73**					
6. Environment-driven implementation	8.06	1.16	.32**	.18	.24**	.12	.33**	**.73**				
7. Innovation-driven implementation	7.78	1.28	.23*	.31**	.47**	.43**	.26*	.67**	**.63**			
8. Employee-driven implementation	7.50	1.36	.09	.19	.31**	.47**	.11	.52**	.53**	**.69**		
9. Innovative capability	7.97	.90	.29**	.08	.41**	.27**	.35**	.49**	.58**	.50**	**.63**	
10. Organizational performance	7.83	1.06	.26*	.30**	.47**	.50**	.24*	.57**	.70**	.53**	.65**	**.76**

The unit of analysis is innovation (N = 94). The numbers on the diagonal indicate the level of inter-rater reliability.
*p < .05; ** p < .01.

of the functional area, strategy development most frequently initiated innovation projects (22.3%), whereas the R&D function initiated only a small portion of the innovations (5.3%). This is perhaps due to the fact that the majority of the sampled innovations (90.4%) were related to organizational practices and processes (process innovations), such as culture changes toward ethical and transparent management, socially oriented initiatives (e.g., CSR moves) and changes in work processes including Six Sigma, BPR, ERP, new information systems, and the reorganization of distribution channels, rather than innovations in actual products (product innovations). In addition, most of the innovations in our sample involved radical changes (73.4%) and were targeted at individual- and team-level processes (58.6%).

Table 1 reports descriptive statistics and correlation coefficients for all study variables. The mean scores of the variables indicate that top management was the most active agent of innovation adoption (mean = 8.37). Although top management continued to be the main force at the implementation phase (mean = 8.46), the other three agents, particularly employees (mean = 8.06), increased their significance as a driver of innovation implementation. To test our research framework, we conducted a path analysis using structural equation modeling (SEM), which allows an omnibus test of the predictive relationships involving multiple outcomes that take place in multiple stages. We used the innovation-level aggregated scores of the 10 variables as single indicators of the latent constructs in our theoretical model.

Hypothesized model and alternative structural models

We first developed a structural model that incorporated all paths suggested in Hypotheses 1 through 10. This model produced a good

Table 2: Classification of 94 cases of innovations

Types	Categories	Frequency	Valid (%)
Functional area	Strategy development	21	22.3
	Public relations	9	9.6
	Human resource management	14	14.9
	Marketing	8	8.5
	Production	14	14.9
	R&D	5	5.3
	Sales	13	13.8
	Logistics	10	10.6
Process vs. product innovation	Process	85	90.4
	Product	9	9.6
Incremental vs. radical innovation	Incremental	25	26.6
	Radical	69	73.4
Target level of innovation activities	Individual	15	16.0
	Team	40	42.6
	Cross-function	8	8.5
	Organization	19	20.2
	Society	12	12.8

fit (χ^2 (df = 13) = 20.63, p = .081; CFI = .98; RMSEA = .079; AIC = 104.63; Hu & Bentler, 1999). Following the common SEM practice (Anderson & Gerbing, 1988), we tested several alternative models that might provide theoretically plausible alternative explanations of the data. In our theoretical framework, we proposed eight paths that connect adoption factors to specific implementation factors. However, all four adoption-initiating factors may affect all four implementation-driving factors. For example, as hypothesized, the efficacy of an innovation may promote positive cognition of employees toward it, thereby placing them in a central position in the implementation phase (Choi et al., 2011). The merit of innovation, however, may also attract top managers and instigate their active support for its implementation. Efficacious innovation is also likely to meet environmental demands because technically superior and timely innovations are likely to fulfill external demands from competitors and consumers. Therefore, the efficacy of an innovation not only promotes employees as the drivers of implementation, but may also invite top management and the external environment as core players at the implementation stage. Similarly, employee-initiated adoption can beget top management-driven and environment-driven implementation, as well as implementation driven by the innovation's efficacy and the organization's employees. To address this possibility, in the first alternative model, we estimated those eight remaining paths between adoption and implementation factors that were constrained to be 0 in the hypothesized model. This model produced a worse model fit (χ^2 (df = 5) = 11.41, p = .044; CFI = .98; RMSEA = .117; AIC = 111.44) than the hypothesized model, indicating that the hypothesized links between adoption and implementation factors were adequate to explain the observed pattern in the data.

We also tested the possibility that adoption-initiating factors directly contribute to innovation effectiveness. Although we proposed that implementation mediates the effect of adoption on the innovation outcomes, scholars have assumed and shown that the processes involved in innovation adoption have significant implications for innovation outcomes (King & Anderson, 1995; Sharma & Yetton, 2003). Considering that innovative capability and actual organizational performance may comprise separate dimensions of innovation effectiveness, we separately tested the possibility that adoption-initiating factors have direct effects on these two outcomes. We created our second alternative model by allowing direct paths from the four adoption factors to innovative capability. This model produced a good model fit (χ^2 (df = 9) = 16.26, p = .062; CFI = .98; RMSEA = .093; AIC = 108.25), but was not significantly different from our hypothesized model ($\Delta\chi^2$ (Δdf = 4) = 4.36, $p > .50$). Finally, the third alternative model allowed for the direct effects of adoption-initiating factors on organizational performance. This model exhibited an excellent fit to the observed data (χ^2 (df = 9) = 9.92, p = .357; CFI = .99; RMSEA = .033; AIC = 101.92), along with a statistically significant improvement of model fit from the hypothesized model ($\Delta\chi^2$ (Δdf = 4) = 10.71, $p < .05$). Figure 2 presents this final alternative model with standardized path coefficients.

Testing the multi-stage, multi-agent model of innovation

We proposed that the four implementation-driving agents would be positively related to the two innovation outcomes. As shown in Figure 2, the results indicate that only implementation driven by an innovation's efficacy has positive effects on both innovative capability and organizational performance (β = .36, $p < .05$ and β = .34, $p < .01$, respectively), confirming Hypothesis 4. Implementation driven by top management and employees is significantly related only to innovative capability (β = .21 and .26, respectively,

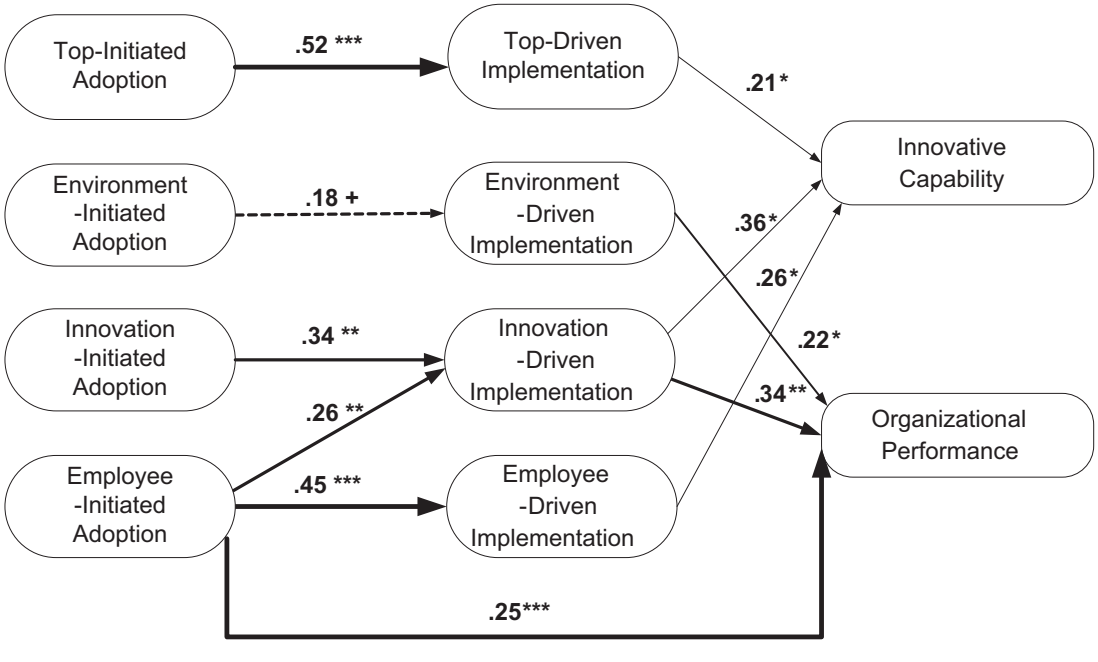

Figure 2: Multi-stage, multi-agent model of organizational innovation. Thicker lines represent statistically more significant results. Insignificant paths are not depicted in the diagram. †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$.

both $p < .05$). Environment-driven implementation predicts only organizational performance ($\beta = .22$, $p < .05$). Thus, Hypotheses 2, 3, and 5 are only partially supported.

With regard to the connections between the agents of adoption and those of implementation, the present data support our stability hypothesis that the same agency may play a key role in both the adoption and implementation phases of innovation (Hypothesis 6). Three of the four stability paths were significant, with top management and employees showing particularly strong stability effects ($\beta = .52$ and .45, respectively, both $p < .001$). As predicted by Hypothesis 10, employee-initiated adoption is positively associated with implementation driven by the efficacy of an innovation ($\beta = .26$, $p < .01$).

Disconfirming our expectation, implementation-related factors do not completely mediate the effects of adoption-related factors on innovation effectiveness (Hypothesis 1 not supported). Even after controlling for its indirect effects through implementation factors, employee-initiated adoption remains a highly significant direct predictor of organizational performance ($\beta = .25$ $p < .001$). Therefore, the results suggest that implementation processes only partially mediate the relations between adoption processes and innovation outcomes.

Discussion

Departing from previous studies that focused on either innovation adoption (Baer & Frese, 2003; Sharma & Yetton, 2003) or implementation (Dong, 2001; Klein & Sorra, 1996), the present study examines the relationships among key factors that operate at both the adoption and implementation phases of innovation, as well as the way they work together to influence innovation effectiveness. The present findings offer quantitative evidence of the close connections between the adoption and implementation processes that have been hinted at in qualitative case studies of innovation. Along with the recent study of Damanpour and Schneider (2006) on the differential predictors of innovation adoption and implementation in municipal governments, this study makes a distinct contribution to the innovation literature by theorizing and empirically testing the way adoption-initiating and implementation-driving agents are related to one another, and how they work together to predict innovation effectiveness. Below, we highlight the significance and implications of the present findings and discuss the limitations of the study.

Implications for theory and research

As shown in Figure 2, the present data clearly show that there is a meaningful stability or inertia in the underlying forces that make innovation possible in organizations. This tendency is particularly strong for top management and employees. Consistent with existing studies (Choi & Chang, 2009; Dong, 2001), top managers appear to actively engage in innovation implementation when they adopted the innovation. A similar continued engagement across the adoption and implementation phases was reported for employees, perhaps due to their ownership of the innovation in question. Apparently, top management and employees, the two 'willful' agents of innovation in our model, tend to maintain their commitment to an innovation throughout the innovation process when they were heavily involved in its initiation. Although this continued commitment from top management or employees could be beneficial for the successful introduction and routinization of an innovation, it may also have several drawbacks. Top management and employees may ignore negative feedback if they are overly committed to their initial decision and feel responsible for the success of the innovation, and may fail to abort the innovation process before substantial damage to the organization has been incurred (cf. sunk cost and escalated commitment, Staw, 1981). For this reason, support for innovation by active and willful agents should be carefully managed to ensure that actors do not fall prey to face-saving motivations.

Contrary to our expectation, the efficacy of an innovation does not stimulate employees

to implement it. However, employee-initiated adoption does appear to lead to implementation driven by the efficacy of an innovation. This indicates that, as end users of the innovation, employees are capable of recognizing an innovation with high compatibility and usefulness, which should enhance their job performance. If employees are able to identify innovations that actually work, managers may need to engage these innovations from the very beginning in the search for new solutions to organizational challenges (Hartwirk & Barki, 1994). Nevertheless, the present data indicate that, of the four factors, top management has the most impact on adoption decisions, with employees being the weakest agent of adoption (mean = 8.37 versus 6.26, respectively, $t = 7.80$, $p < .001$, see Table 1). Unfortunately, our data indicate that this difference between top management and employees in terms of impact on innovation adoption persists at the implementation stage, although the difference does become smaller over the two stages (mean = 8.46 versus 7.50, respectively, $t = 5.74$, $p < .001$).

With regard to innovation effectiveness, our analysis indicates that the innovative capability of an organization can be improved when the implementation process is driven by organizational constituents, including top management and employees. In addition, the organization's record of implementing efficacious innovations that clearly result in performance enhancement is also beneficial to innovative capability (Klein & Knight, 2005). In contrast, the organization accrues greater actual performance gains when innovation implementation is driven by both environmental demands and the innovation's efficacy. This is consistent with existing findings revealing that, in order to be successful, organizations must continually engage in environmental analysis and properly respond to external demands (Freel, 2005; Rai & Bajwa, 1997).

Our analysis also shows that implementation-driving factors mediate the effects of adoption-initiating factors on innovative capability, supporting Hypothesis 1. However, employee-initiated adoption exhibits a significant direct effect on organizational performance ($\beta = .25$, $p < .001$) after controlling for its indirect effects via the implementation-driving factors. In addition, employee-initiated adoption is the only significant predictor of the engagement of employees in innovation implementation, which is in turn a significant predictor of enhanced innovative capability. Indeed, there is no doubt that top management plays a critical role as the 'institutional enabler' throughout the innovation process (Chatterjee et al., 2002). Nevertheless, employees are the ultimate determinant of success for most innovations (Choi & Price, 2005). Our analysis bolsters the finding of Hartwirk and Barki (1994) that only early involvement of employees in the innovation decision process boosts their active engagement at the implementation stage, perhaps due to their sense of ownership toward and commitment to the innovation. Considering this critical role of employees in organizational innovation, innovation scholars need to revise the prevailing assumption that employees are 'passive executors' of managerial decisions (Klein & Sorra, 1996), and to pay greater attention to employee-related dynamics in the innovation process.

Implications for practice

Organizations adopt and implement innovations with two benefits to be accrued in mind: (a) improved organizational performance, such as operational efficiency, employee productivity and satisfaction, and financial performance; and (b) increased innovative capability, such as employees' learning ability, adaptability, and creativity beneficial for future adaptation of the organization (Holahan et al., 2004; Klein & Sorra, 1996). Our analysis reveals that organizational performance and innovative capability are predicted by different actors playing distinct roles at each of the two stages. These results offer practical implications for organizations and managers, as described below.

First, the role of top management in the innovation process has been acknowledged as a predominant determinant for innovation success

(Dong, 2001; Klein et al., 2001). To legitimize their adoption decisions and to effectively implement the innovation, top management supports innovation implementation by allocating resources and by developing policies (Chatterjee et al., 2002). Unfortunately, our results show that the active engagement of top management in the implementation stage may not result in benefits for the organization. This is perhaps because top-down innovation could be seen as a coercive force to employees, which in turn results in resistance toward innovation among them. Thus, to increase organizational performance through innovations, top managers need to step back and encourage proactive and voluntary engagement of employees by providing ownership with regard to implementation. Our analysis also indicates that environment-driven implementation facilitates organizational performance. This signifies that organizations should leverage their environmental scanning ability to respond to environmental uncertainties, which maximizes opportunities and minimizes threats from external environments (Damanpour & Schneider, 2006).

Second, the efficacy of an innovation has been identified as a critical factor that affects the frequency of innovation use and the implementation process (Sharma & Yetton, 2003). Our analysis also indicates that the efficacy of an innovation is the sole determinant that increases both innovative capability and organizational performance. When the innovation is useful and relevant to task performance, employees develop a positive attitude and receptivity toward the innovation (Choi et al., 2011). Therefore, to increase innovation effectiveness, organizations should adopt useful and task-relevant innovations that offer superiority over existing practices.

Third, our analysis reveals that the early engagement of employees directly contributes to organizational performance due to innovation. The active involvement of employees in the entire innovation process and their sense of ownership may be the most important factors for an innovation's success. Therefore, managers need to create an innovative climate that encourages employees' personal initiatives (Baer & Frese, 2003). The early involvement of employees and their personal initiative for innovation are promoted when the organization provides an environment where they feel safe to speak up without fear of rejection or reprisal, and where they have sufficient task autonomy and trusting relationships with peers and supervisors (Jones et al., 2005; Victor, Boynton, & Stephens-Jahng, 2000).

Study limitations and conclusion

Although intriguing, the present findings should be interpreted with caution because of several limitations of this study. First, the present data were drawn from interviews with 40 executives of a single organization in Korea. This research design provided maximum control of various potentially confounding sources, such as industry characteristics, an organization-specific context, and a distinct business environment. However, the present design also limits the generalizability of the findings because of the possibility that the research site had an idiosyncratic way of dealing with innovations. Future studies need to validate the present multi-stage, multi-agent model in more diverse settings involving multiple organizations.

Second, although this study was intended to reveal distinct roles of multiple agents at different stages of innovation, the data were based on retrospective explanations of the innovation process that may be subject to post hoc rationalizations, oversimplifications, and biased attributions, leading to unclear causal directions. Future studies need to use longitudinal and real-time accounts of the unfolding innovation process over time.

Third, we conducted telephone interviews in the follow-up data collection, which could result in different response patterns among the interviewees. Indeed, face-to-face interviews may present richer information and offer greater opportunities for probing. Although prior studies suggest that telephone interviews and face-to-face interviews are comparable means for data collection (Holbrook et al., 2003; Sudman, 1966), we

acknowledge that maintaining consistency in collecting data methods is desirable.

Finally, the present study used executives' accounts of the innovation process, as well as of outcomes of the innovation. Although we collected multiple views from different executives, and although the measurement model has exhibited empirical distinctiveness among variables, relatively high correlations among adoption-initiating factors and implementation-driving factors suggest the possibility of same-source bias. Future studies need to employ multi-source data from diverse informants with different perspectives. In addition, to obtain a more reliable assessment of innovation outcomes, future studies may utilize third-party ratings of innovation effectiveness and/or objective measures based on archival data (e.g., financial performance, the number of patents). Nevertheless, our finding that employees play critical roles in the innovation process, as reported by executives, increases our confidence that the present results are not driven by self-serving biases of these executives. Further studies could incorporate diverse viewpoints, revealing potentially different sense-making processes regarding the emergent, unfolding processes of organizational innovation.

All in all, the present study makes a distinct contribution to the innovation literature by quantitatively exploring how a variety of actors are related to one another over the two phases of innovation, and how these actors in adoption and implementation affect innovation effectiveness. Our analysis indicates the strong stability of willful actors, such as top management and employees, in their levels of engagement over the two stages of innovation. A critical finding that merits further mention is the key role of employees in ensuring organizational performance gains from the innovation, particularly the importance of their active involvement from the early stages of innovation initiation or adoption. Innovation is crucial to the sustainability and viability of contemporary organizations. Further conceptual elaboration of the multi-phase dynamics of innovation and an empirical exploration of the phase-dependent processes involving innovation initiation, adoption, implementation, and routinization would enrich our understanding and the management of innovation in organizations.

Acknowledgement

This research was financially supported by a Korea Research Foundation Grant funded by the Korean Government (KRF-2009-32A-B00064) and a research grant from the Management Research Center of the College of Business Administration at Seoul National University.

References

Agarwal, R., & Prasad, J. (1997). The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies. *Decision Sciences, 28*, 557–582.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411–423.

Aparna, J. B., Mila, L., & Hui, L. (2009). Getting everyone on board: The role of inspirational leadership in geographically dispersed teams. *Organization Science, 20*, 240–252.

Armenakis, A. A., Harris, S. G., & Mossholder, K. W. (1993). Creating readiness for change. *Human Relations, 46*, 681–703.

Aubert, B. A., & Hamel, G. (2001). Adoption of smart cards in the medical sector: The Canadian experience. *Social Science and Medicine, 53*, 879–894.

Baer, M., & Frese, M. (2003). Innovation is not enough: Climates for initiative and psychological safety process innovations and firm performance. *Journal of Organizational Behavior, 24*, 45–68.

Caldwell, S., Herold, D. M., & Fedor, D. B. (2004). Toward an understanding of the relationships among organizational change individual differences and changes in person-environment fit. *Journal of Applied Psychology, 89*, 868–882.

Castle, N. G. (2001). Innovation in nursing homes: Which facilitates are the early adopters? *Georontologist, 41*, 161–172.

Champy, J. A. (1995). *Reengineering management: The mandate for new leadership.* New York: Harper Business.

Chatterjee, D., Grewal, R., & Sambamurthy, V. (2002). Shaping up for e-commerce: Institutional enablers of the organizational assimilation of web technologies. *MIS Quarterly, 26*, 65–89.

Choi, J. N., & Price, R. H. (2005). The effects of person-innovation fit on individual responses to innovation. *Journal of Occupational and Organizational Psychology, 78*, 83–96.

Choi, J. N., & Chang, J. Y. (2009). Innovation implementation in the public sector: An integration of institutional and collective dynamics. *Journal of Applied Psychology, 94*, 245–253.

Choi, J. N., Sung, S. Y., Lee, K. M., & Cho, D. S. (2011). Balancing cognition and emotion: Innovation implementation as a function of cognitive appraisal and emotional reactions toward innovation. *Journal of Organizational Behavior,* 32, 107–124.

Clayton, P. (1997). *Implementation of organizational innovation.* San Diego: Academic Press.

Cohen, W. M., & Levin, R. C. (1989). Empirical studies of innovation and market structure. In R. Schmalansee & R. D. Willing (Eds.), *Handbook of industrial organization* (pp. 1059–1107). Oxford: Elsevier.

Damanpour, F., & Schneider, M. (2006). Phases of the adoption of innovation in organizations: Effects of environment organization and top managers. *British Journal of Management, 17*, 215–236.

Davidson, W. H. (1993). Beyond reengineering: The three phases of business transformation. *IBM Systems Journal, 32*, 65–79.

Denis, J. L., Hebert, Y., Langley, A., Lozeau, D., & Trottier, L. H. (2002). Explaining diffusion patterns for complex healthcare innovations. *Health Care Management Review, 27*, 60–73.

Dong, L. Y. (2001). Modeling top management influence in ES implementation. *Business Process Management Journal, 73*, 243–250.

Dougherty, D., & Hardy, C. (1996). Sustained product innovation in large mature organizations: Overcoming innovation-to-organization problems. *Academy of Management Journal, 39*, 1120–1153.

Douglas, T. J., & Judge, W. Q. Jr. (2001). Total quality management implementation and competitive advantage: The role of structural control and exploration. *Academy of Management Journal, 44*, 158–169.

Fedor, D. B., Caldwell, S., & Herold, D. M. (2006). The effects of organizational changes on employee commitment: A multilevel investigation. *Personnel Psychology, 59*, 1–29.

Ferman, B., & Levin, M. A. (1987). Dilemmas of innovation and accountability: Entrepreneurs and chief executives. *Policy Studies Review, 7*, 187–199.

Fidler, L. A., & Johnson, D. (1984). Communication and innovation implementation. *Academy of Management Review, 94*, 704–711.

Fitzgerald, L., Ferlie, E., Wood, M., & Hawkins, C. (1997). Interlocking interactions: The diffusion of innovations. *Journal of Communication, 47*, 112–131.

Flanagan, J. C. (1951). Defining the requirements of an executive's job. *Personnel, 28*, 28–35.

Freel, M. S. (2005). Perceived environmental uncertainty and innovation in small firms. *Small Business Economics, 25*, 49–64.

Glynn, M. A. (1996). Innovative genius: A framework for relating individual and organizational intelligences to innovation. *Academy of Management Review, 21*, 1081–1111.

Greenhalgh, T., Robert, G., Bate, P., Macfarlane, F., & Kyriakidou, O. (2005). *Diffusion of innovations in health service organisations: A systemic review.* Malden, MA: BMJ Books Blackwell.

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

Hartwirk, J., & Barki, H. (1994). Explaining the role of user participation in information system use. *Management Science, 40,* 440–465.

Higgs, M., & Rowland, D. (2005). All changes great and small: Exploring approaches to change and its leadership. *Journal of Change Management, 52*, 121–151.

Holahan, P. J., Aronson, Z. H., Jurkat, M. P., & Schoorman, F. D. (2004). Implementing computer technology: A multiorganizational test of

Klein and Sorra's model. *Journal of Engineering and Technology Management, 21*(1), 31–50.

Holbrook, A. L., Green, M. C., & Krosnick, J. A. (2003). Telephone versus face-to-face interviewing of national probability samples with long questionnaire. *Public Opinion Quarterly, 67*, 79–125.

Holl, G. E., & Hord, S. M. (1987). *Change in schools.* Albany, NY: State University of New York Press.

Holt, D. T. (2002). *Readiness for change: The development of a scale.* 62nd Annual meeting of the Academy of Management. Denver, CO, 9–14 August.

Hu, L. T., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.

Huber, G. P., & Power, D. J. (1985). Research notes and communications retrospective reports of strategic-level managers: Guidelines for increasing their accuracy. *Strategic Management Journal, 6*, 171–180.

Igbaria, M., & Guimaraes, T. (1994). Empirical testing the impact of user involvement on DSS success. *Omega, 22*, 157–172.

Jarvenpaa, S. L., & Staples, D. S. (2000). The use of collaborative electronic media for information sharing: An exploratory study of determinants. *Journal of Strategic Information Systems, 9*, 129–154.

Jones, R. A., Jimmieson, N. L., & Griffiths, A. (2005). The impact of organizational culture and reshaping capabilities on change implementation success: The mediating role of readiness for change. *Journal of Management Studies, 42*, 361–386.

Kimberly, J. R., & Evanisko, J. M. (1981). Organizational innovation: The influence of individual organizational and contextual factors on hospital adoption of technological and administrative innovation. *Academy of Management Journal, 24*, 689–713.

King, N., & Anderson, N. (1995). *Innovation and change in organization.* London/New York: Essential Business Psychology Clive Fletcher.

King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information and Management, 43*, 740–755.

King, N. (1990). Innovation at work: The research literature. In M. A. West & J. L. Farr (Eds.), *Innovation and creativity at work* (pp. 15–59). New York: John Wiley.

Klein, K. J., & Knight, A. P. (2005). Innovation implementation. *American Psychological Society, 14*, 243–246.

Klein, K. J., & Sorra, J. S. (1996). The challenge of innovation implementation. *Academy of Management Review, 21*, 1055–1080.

Klein, K. J., Conn, A. B., & Sorra, J. S. (2001). Implementing computerized technology: An organizational analysis. *Journal of Applied Psychology, 86*, 811–824.

Kwon, T. H., & Zmud, R. W. (1987). Unifying the fragmented models of information systems implementation. In R. J. Boland & R. Hirschheim (Eds.), *Critical issues in information systems research* (pp. 227–251). New York: John Wiley.

Lampikoski, K., & Emden, J. B. (1996). *Igniting innovation: Inspiring organizations by managing creativity.* New York: John Wiley.

Leonard-Barton, D. (1988). Implementation characteristics of organizational innovations: Limits and opportunities for management strategies. *Communication Research, 15*, 603–631.

Miller, V. D., Johnson, J. R., & Grau, J. (1994). Antecedents to willingness to participate in a planned organizational change. *Journal of Applied Communication Research, 22*, 59–80.

Moore, G. (1991). *Crossing the chasm: Marketing and selling high-tech products to mainstream consumers.* New York: Harper Business.

Myer, A. D., & Goes, J. B. (1988). Organizational assimilation of innovations: A multi-level contextual analysis. *Academy of Management Review, 31*, 897–923.

Myers, P. W., Sivakumar, K., & Nakata, C. (1999). Implementation of industrial process innovations: Factors effects and marketing implications. *Journal of Product Innovation Management, 13*, 220–286.

Nohria, N., & Gulati, R. (1996). Is slack good or bad for innovation? *Academy of Management Review, 39*, 1245–1264.

Nystrom, P. C., Ramamurthy, K., & Wilson, A. L. (2002). Organizational context climate and innovativeness: Adoption of

imaging technology. *Journal of Engineering and Technology Management, 19,* 221–247.

Oldenburg, B., Hardcastle, D. M., & Kok, G. (1997). Diffusion of innovations. In K. Glanz, F. M. Lewis, & B. K. Rimer (Eds.), *Health behavior and health education: Theory, research and practice* (pp. 270–286). San Francisco: Jossey-Bass.

Oldham, G. R., & Cummings, A. (1996). Employee creativity: Personal and contextual factors at work. *Academy of Management Journal, 39*, 607–634.

Paswan, A., D'Souza, D., & Zolfagharian, M. (2009). Toward a contextually anchored service innovation typology. *Decision Sciences, 40*, 513–540.

Patterson, M. G., West, M. A., Shackleton, V. J., Dawson, J. F., Lawthom, R., Maitlis, S., Robonson, D. L., & Wallace, A. M. (2005). Validating the organizational climate measure: Links to managerial practices productivity and innovation. *Journal of Organizational Behavior, 26,* 379–408.

Pawar, B. S., & Eastman, K. K. (1997). The nature and implications of contextual influences on transformational leadership: A conceptual examination. *Academy of Management Review, 22*, 80–109.

Pierce, J. L., & Delbecq, A. L. (1977). Organization structure individual attitudes and innovation. *Academy of Management Review, 2,* 27–37.

Pozzebon, M. (2000). *Combining a structuration approach with a behavioral-based model to investigate ERP usage.* Proceedings of 6th Americas Conference on Information. Long Beach, CA.

Rai, A., & Bajwa, D. S. (1997). An empirical investigation into factors relating to the adoption of executive information systems: An analysis of EIS for collaboration and decision support. *Decision Sciences, 28*, 939–974.

Rogers, E. M. (1995). *Diffusion of innovations.* New York: Free Press.

Rosenthal, R., & Rosnow, R. L. (1991). *Essentials of behavioral research: Methods and data analysis* (2 ed.). New York: McGraw-Hill.

Sharma, R., & Yetton, P. (2003). The contingent effects of management support and task interdependence on successful information systems implementation. *MIS Quarterly, 27,* 533–555.

Song, L. Z., Song, M., & Benedetto, C. A. (2009). A staged service model. *Decision Sciences, 40*, 571–599.

Staber, U. (2006). Social capital processes in cross cultural management. *International Journal of Cross Cultural Management, 6,* 189–203.

Staw, B. M. (1981). The escalation of commitment to a course of action. *Academy of Management Review, 6*, 577–587.

Sudman, S. (1966). New uses of telephone methods in survey research. *Journal of Marketing Research, 3*, 163–167.

Tornatsky, L. G., & Klein, K. J. (1982). Innovation characteristics and innovation-adoption-implementation: A meta-analysis of findings. *Transactions on Engineering Management, 29*, 28–45.

Van de Van, A. H. (1986). Central problems in the management of innovation. *Management Science, 32*, 590–607.

Van de Ven, A. H., Polley, D. E., Garud, R., & Venkataraman, S. (1999). *The innovation journey.* Oxford: Oxford University Press.

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.

Victor, B., Boynton, A., & Stephens-Jahng, T. (2000). The effective design of work under total quality management. *Organization Science, 11*, 102–117.

Waldman, D. A., Ramirez, G. G., House, R. J., & Puranam, P. (2001). Does leadership matter? CEO leadership attributes and profitability under conditions of perceived environmental uncertainty. *Academy of Management Journal, 44,* 134–143.

Wejnert, B. (2002). *Integrating models of diffusion of innovations.* Boston: HBS Press.

West, M. A., & Anderson, N. R. (1996). Innovation in top management teams. *Journal of Applied Psychology, 81,* 680–693.

Wolfe, R. A. (1994). Organizational innovation: Review critique and suggested research directions. *Journal of Management Studies, 31*, 405–431.

Yetton, P., Sharma, R., & Southon, G. (1999). Successful IS innovation: The contingent contributions of innovation characteristics and implementation. *Journal of Information Technology, 14*, 53–68.

Zmud, R. W. (1984). An examination of push–pull theory applied to process innovation in knowledge work. *Management Science, 30*, 727–738.

Received 08 September 2010 Accepted 21 December 2010