

# Balancing cognition and emotion: Innovation implementation as a function of cognitive appraisal and emotional reactions toward innovation

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## Summary

Focusing on the role of emotions in understanding employee behavior, the present study identifies employees' emotional reactions toward innovation as a mediating process that explains the effects of institutional environment on collective innovation use in work units. We further employed the appraisal theory of emotion and affective events theory (AET) to conceptualize the relationships between cognitions and emotions involving innovation. This expanded conceptual model was tested using multi-source data from 1150 employees and managers of 81 branches of a Korean insurance company that were implementing a new practice called Life-Long Learning. Two contextual factors (management involvement and training for innovation) significantly predicted employees' collective cognitive appraisal of the innovation (perceived usefulness and perceived ease of use). Collective cognitive appraisal in turn predicted employees' positive and negative emotions toward the innovation, which completely mediated the effects of contextual factors and cognitive appraisal on implementation effectiveness (consistent and committed use of the innovation in the branch). This study highlights the critical role of emotions in the context of innovation implementation, and shows the need for greater attention to emotional processes in examining organizational innovations. Copyright © 2010 John Wiley & Sons, Ltd.

## Introduction

Both scholars and practicing managers have long recognized that innovation is critical to organizational survival and performance (Greenhalgh, Robert, Bate, Macfarlane, & Kyriakidou, 2005). Innovation progresses through stages that include awareness, adoption, implementation, and routinization (Rogers, 2003). Innovation adoption refers to the decision to use an innovation that leads to implementation, which constitutes an intermediate process between adoption and routinization of the innovation (Choi & Chang, 2009). Focusing on this key intermediate process, the present study focuses on *implementation effectiveness*, defined as “the pooled or aggregate consistency and quality

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of targeted organizational members' use of an innovative technology or practice'' (Klein, Conn, & Sorra, 2001: p. 812). Employing institutional theory of implementation (Scott, 1995), we propose that organizational contextual factors affect implementation effectiveness by shaping employee reactions to innovation. With regard to employee reactions, drawing on the cognitive appraisal theory of emotion (Roseman, Spindle, & Jose, 1990) and affective events theory (AET, Weiss & Cropanzano, 1996), we investigate the distinct roles of, and interplay between, cognitions and emotions in the context of innovation implementation.

Previous studies have identified user acceptance and use as a pivotal factor in the process of innovation implementation. For this reason, researchers have suggested various models to explain different user reactions to innovations. Technology acceptance model (TAM) emphasizes individuals' cognitive evaluations such as perceived usefulness and perceived ease of use (Davis, 1989; King & He, 2006). Similarly, social cognitive theory suggests that users' expectancy evaluations regarding a new system are the primary determinants in predicting innovation use (Bandura, 1986; Venkatesh, Morris, Davis, & Davis, 2003). The theory of planned behavior (TPB) is another widely employed framework that highlights the role of individuals' attitudes and efficacy beliefs with regard to innovation (Ajzen & Fishbein, 1980).

The existing literature has thus principally focused on a person's cognitions regarding the innovation. Although this approach offers meaningful insights, the prevailing orientation toward cognitive processes suffers from an inherent limitation owing to its unidimensional focus on the rational aspects of human behavior. Given that human behavior is affected not only by rational and cognitive processes, but also by emotional processes that can often be irrational (Brief & Weiss, 2002; Huy, 2002), it is necessary to examine both cognitive and emotional processes to provide a more comprehensive understanding of employees' innovation use. As emotion has become acknowledged as a critical predictor of human behavior, the innovation literature has witnessed the rapid emergence of emotion as an important issue, although most scholarly attention has remained theoretical, thus lacking empirical evidence (Liu & Perrewe, 2005; Smollan, 2006). Until recently, empirical attention to this issue has been limited and has focused on a single, often acute, emotional experience such as fear or anxiety regarding a new technology (Venkatesh, 2000), and thus failed to attend to the broader array of theoretically meaningful emotions identified in the emotions literature.

Addressing this issue, we consider both cognitive and emotional processes to predict implementation effectiveness. Specifically, adopting the *appraisal theory* of emotion, we propose that employees' cognitive appraisal of the organizational context and innovation leads to their emotional reactions, which explain their implementation behavior (Roseman et al., 1990; Weiner, 1986). In addition, unlike most prior studies on innovation acceptance and use which focused on individual-level dynamics (e.g., Compeau, Higgins, & Huff, 1999; Venkatesh et al., 2003), the present study examines users' *collective* cognitive appraisal of, and emotional reactions toward, the innovation shared among work unit members. Given that innovation is an organizational event, and organizational members' collective or overall engagement in the implementation process is more important than a single individual's committed use (Choi & Chang, 2009), it is necessary to treat it as a collective phenomenon and investigate it as such.

Below, we develop a conceptual model that integrates the cognitive and emotional processes related to collective innovation use in work units. In doing so, we consider the effects of contextual factors (or institutional environment, Scott, 1995) on those innovation-related cognitions and emotions. We tested our hypotheses using data collected from 1150 employees and managers in 81 branches of a large insurance company in Korea. In this study, the unit of analysis and inference is the branch that was geographically distributed and run by a branch manager. Although these branches were under the control of the corporate headquarters, their operation was relatively independent, and each was fully responsible for its performance within its region, thus forming a distinct performance unit.

## A Model of Collective User Reactions Toward Innovation Implementation

Figure 1 visually depicts our overall conceptual framework. Integrating macro and micro processes of innovation implementation (Choi & Chang, 2009; Klein et al., 2001), we propose that contextual factors influence employees' attitudes and behavior by shaping favorable institutional environment for implementation (Scott, 1995). Drawing on the implementation literature (Greenhalgh et al., 2005), we included manager involvement, reflective climate, and training for innovation as key contextual enablers that indirectly predict implementation effectiveness by shaping employees' cognitive and emotional reactions toward the innovation.

Cognitive appraisal refers to employees' cognitive evaluation of the innovation based on the assessment of the innovation and implementation situation. Drawing on TAM, which is the most widely applied model in user acceptance research, we examine two specific innovation-relevant cognitions: Perceived usefulness and perceived ease of use (Davis, 1989; King & He, 2006). Perceived usefulness is the extent to which a person believes that using a particular innovation would enhance his or her job performance. Perceived ease of use, on the other hand, indicates the degree to which a person believes that using a technology would be free of effort. In this study, we propose that these two cognitions are shared among members within the same work unit through various social learning processes, such as social information processing (Salancik & Pfeffer, 1978). Implementation studies conducted at the group or organization level of analysis have demonstrated that these innovation-related cognitions tend to be shared among members of the same unit (Choi & Chang, 2009; Klein et al., 2001).

Emotion reflects an organized response to a target that includes the psychological, motivational, and experiential systems (Salovey & Mayer, 1990). Therefore, to fully understand the impact of an innovation on employees' receptivity, it is necessary to understand their feelings (Bartunek, Rousseau, Rudolph, & DePalma, 2006). Unlike prior studies mostly focusing on negative emotions of fear and anxiety related to innovation and change, we examined both positive and negative emotions regarding the innovation. Studies have indicated that positive and negative emotions tend to comprise independent (although correlated) dimensions and exhibit distinct functions with regard to human behavior (Larsen & Diner, 1992; Posner, Russel, & Peterson, 2005, see also studies of PANAS, *cf.* Watson, Clark, & Tellegen, 1988). Similar to cognitive appraisal, we treat positive and negative emotions as collective constructs shared among work unit members. Kelly and Barsade (2001) proposed that group members tend to experience similar emotions through various processes such as emotional contagion, vicarious affect, interaction synchrony, and emotion norms. Drawing on the social constructionist view, Antonacopoulou and Gabriel (2001) also maintained that emotions are social phenomena that can be driven by the rules, scripts, and norms within the situation.

Numerous studies have examined the relationship between cognition and emotion in explaining human behavior. However, determining the direction of influence between cognition and emotion is a

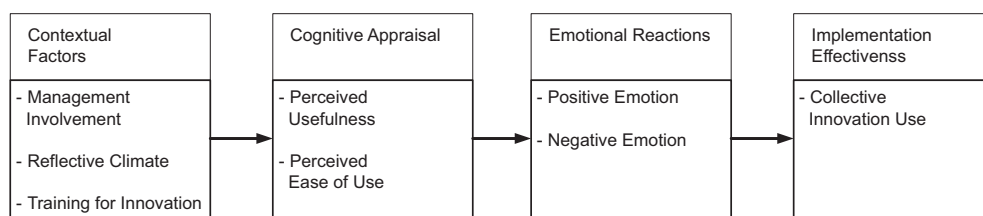


Figure 1. Theoretical framework predicting implementation effectiveness

daunting task because in many cases, they shape each other in a reciprocal manner (Lazarus, 1991). According to the cognitive appraisal or attribution theory of emotion, it has been argued that “evaluations and interpretations of events, rather than events *per se*, determine whether an emotion will be felt and which emotion it will be” (Roseman et al., 1990: p. 899). Thus, appraisal theorists suggest that discrete emotions are elicited by cognitive evaluations of valence, motivation, probability, and legitimacy of the situation or the agency involved in the emotion-causing events (Weiner, 1986). Adopting the cognitive appraisal theory, we propose that employees cognitively assess the implementation situation first and then develop emotional reactions toward the innovation based on their assessments, which is also consistent with previous studies on innovation (Bhattacharjee, 2001; Compeau et al., 1999). In contrast, AET suggests that organizational events trigger emotional reactions among employees, which in turn elicit workplace cognitions and behavior (Ashoton-James and Ashkanasy, 2008). Given the plausibility of AET-based arguments (e.g., “Somehow we feel good about this innovation, thus we generate favorable cognitive evaluations around it.”), we will also consider this alternative theoretical possibility later in the discussion section. Below, we present specific hypotheses based on the framework.

### *Contextual Factors and Collective Cognitive Appraisal*

Drawing on institutional theory (Scott, 1995), we propose that contextual factors indirectly predict implementation effectiveness by shaping employees’ cognitive appraisal of the innovation. Specifically, institutional factors (or organizational context) shape members’ beliefs and actions by providing meaning to, and understanding of, the situation (structures of signification), by offering normative templates to validate a specific behavior (structures of legitimization), and by regulating individual actions by means of sanctions (structures of domination). The implementation literature has identified various institutional enablers that facilitate implementation processes, such as fluid organizational structure, resource availability, climate or culture of the work unit, and various support systems for the innovation (Chatterjee, Grewal, & Sambamurthy, 2002; Choi & Chang, 2009; Clayton, 1997; Klein et al., 2001). Drawing on previous studies, we examined three contextual characteristics: Management involvement, reflective climate, and training for the innovation. These contextual factors capture the respective roles of managers, climate, and organizational support with regard to the innovation.

#### **Management involvement**

Managers’ commitment to innovation has been acknowledged as a predominant predictor of innovation success (Holahan, Aronson, Jurkat, & Schoorman, 2004; Klein et al., 2001). Given managers’ role as institutional elites, their active engagement in implementation legitimizes the innovation (Baer & Frese, 2003; Scott, 1995), which may reduce feelings of uncertainty associated with the innovation. Through personal engagement, managers convince employees that the innovation is consequential, will increase productivity, and will lead to positive changes in their job (signification). Managers’ direct involvement also promotes employees’ motivation to explore ways to effectively leverage the innovation’s functionality in their task setting (Chatterjee et al., 2002). In exploring more effective ways to collectively implement the innovation, employees may share their positive expectations regarding the favorable consequences of the innovation. In addition, when managers actively support a new practice or tool, personally use it, and monitor its progress, employees will clearly understand the goal of the innovation and feel comfortable in adopting and using it in their work (Agars, Kaufman, & Locke, 2008; Sharma & Yetton, 2003). Thus, we hypothesize the following:

*Hypothesis 1:* Management involvement is positively related to collective cognitive appraisal (perceived usefulness and perceived ease of use) regarding the innovation.

### **Reflective climate**

Team reflexivity refers to “the extent to which team members collectively reflect upon the team’s objectives, strategies, and processes as well as their wider organizations and environments and adapt them accordingly” (West & Richter, 2007: p. 224). Reflective climate encourages members to discuss new ways to work effectively together and regularly modify goals and procedures in light of changing circumstances (Patterson et al., 2005). Therefore, a reflective climate tends to reshape employees’ cognitive orientation toward the innovation (West, 2000). For example, in a work unit that spends a great deal of time reviewing goals and periodically modifies work processes, employees may believe that innovation is a normal part of their work and that it is highly valued in their organization (legitimization); thus they are likely to perceive the benefits of an innovation. A reflective climate also tends to increase intermember interactions related to the innovation, which should provide more opportunities to share cognitions regarding the innovation, resulting in increased collective effort toward implementing it (Patterson et al., 2005; West, 2000). This reflective process around the innovation may boost employees’ collective confidence in achieving the implementation goal. A reflective climate, therefore, may create a favorable institutional environment for the innovation and beget efficacy beliefs regarding implementation.

*Hypothesis 2:* Reflective climate is positively related to collective cognitive appraisal (perceived usefulness and perceived ease of use) regarding the innovation.

### **Training for innovation**

Training for innovation provides information, knowledge, and skills relevant to the innovation, and thereby enhances employees’ understanding and technical readiness (Choi & Chang, 2009). Training for innovation thus effectively conveys the message that the innovation is a significant and legitimate agenda within the organization (Scott, 1995). Through training, employees also find the innovation easy to use and learn various ways to apply it to their job, creating psychological intimacy toward the innovation, as well as the sense of efficacy in using it (Venkatesh et al., 2003). In addition, training enhances employees’ awareness of the potential benefits that can be accrued from the innovation (Clayton, 1997). Finally, training for innovation may also offer employees ample opportunities to share positive cognitive appraisals among themselves (Sharma & Yetton, 2003).

*Hypothesis 3:* Training for innovation is positively related to collective cognitive appraisal (perceived usefulness and perceived ease of use) regarding the innovation.

### *Cognitive appraisal and emotional reactions toward the innovation*

In line with the appraisal theory of emotion, studies have shown that emotional reactions tend to emerge from the cognitive appraisal of the situation or causal attribution of events (Butt & Choi, 2006; Roseman et al., 1990). Encountering an innovation, employees may evaluate the situation using personal importance and the degree of control as the two primary appraisal criteria (Beaudry & Pinsonneault, 2005). This initial cognitive appraisal results in employees’ evaluation of the potential consequences (perceived usefulness) and accessibility of the innovation (perceived ease of use), which should be the bases of their emotional inclinations toward it (Bartunek et al., 2006; Bhattacharjee, 2001). For instance, if employees appraise an innovation as potentially beneficial and easy to apply to their job, they will develop positive emotions (e.g., happiness or delight) regarding the innovation (Lazarus, 1991). In contrast, “if the employee has no previous experience in using technology and is not convinced of the need for it, he/she is more likely to feel anxious about its introduction”

(Antonacopoulou & Gabriel, 2001: p. 441). Although prior studies regarding the effects of cognitions on emotions have been mostly conducted at the individual level, we propose the same process at the group level based on mechanisms such as social information processing and emotion contagion among group members (Barsade, 2002; Salancik & Pfeffer, 1978).

*Hypothesis 4:* Collective cognitive appraisal (perceived usefulness and perceived ease of use) is positively related to collective positive emotion regarding the innovation.

*Hypothesis 5:* Collective cognitive appraisal (perceived usefulness and perceived ease of use) is negatively related to collective negative emotion regarding the innovation.

### *Emotional reactions toward the innovation and implementation effectiveness*

Research has shown that emotional valence is closely aligned with *action tendency* (e.g., felt anger and aggressive tendency) and thus has substantial implications for individuals' motivation and subsequent behavior (Frijda, 1986; Lazarus, 1991). Accordingly, we identify collective emotions toward the innovation as a direct predictor of innovation use and the ultimate success of innovation in the work unit. If employees share positive emotions regarding the innovation, they are likely to develop a favorable motivational orientation toward it and behavioral readiness for implementing it (Butt & Choi, 2006). In contrast, employees with negative emotional reactions may not be willing to exert significant effort or exhibit coordination among themselves to implement the innovation. Thus, we expect that collective emotional reactions to the innovation may bear significant direct implications for collective, committed use of the innovation.

*Hypothesis 6:* Collective positive emotion toward the innovation is positively related to the implementation effectiveness of a work unit.

*Hypothesis 7:* Collective negative emotion toward the innovation is negatively related to the implementation effectiveness of a work unit.

### *Cognition and emotion as mediating collective processes*

Thus far, we proposed seven hypotheses that establish a series of bivariate relationships among the components in our conceptual model presented in Figure 1. When combined, these hypotheses altogether suggest a double-mediated causal sequence, in which employees' collective cognition and emotional reactions mediate the effects of contextual factors on implementation effectiveness. This overall causal flow is consistent with the argument of the institutional theory of innovation implementation that institutional factors indirectly affect implementation effectiveness by generating intermediate processes involving employees (Choi & Chang, 2009; Klein et al., 2001). Specifically, institutional enablers shape employees' collective efficacy beliefs regarding implementation, resulting in positive cognition and confidence of the benefits and accessibility of the innovation. Based on their cognitive assessment, employees develop shared emotional reactions toward the innovation (Bartunek et al., 2006; Bhattacharjee, 2001), which increase motivations and readiness for implementing the innovation. We thus advance the following mediation hypothesis.

*Hypothesis 8:* The relationship between contextual factors and implementation effectiveness will be mediated by collective cognitive appraisal and collective emotions regarding the innovation.

## Method

### *Research setting and target innovation*

To empirically test the present hypotheses, we conducted a field study in a large Korean insurance company with 3300 employees. The company was organized into nine regional headquarters and 105 sales branches, each of which was led by a branch manager. The 105 branches were staffed by 208 sales managers (thus, two sales managers per branch on average) and 1868 financial planners (approximately 17.8 planners per branch). Over the course of several meetings with the executives of the company, we identified a target innovation for this study, which was regarded as a key management agenda item within the company at the time of data collection. To improve organizational capabilities, the company initiated an innovation campaign called “Life-Long Learning” at the beginning of 2007 and subsequently expanded this practice to every corner of the company. As part of its implementation effort, the company introduced a series of learning-oriented programs such as “Community of Learning,” “Cyber-Learning School,” “Financial Planner College,” “Community of Practice,” and “Facilitator Academy.”

This company initiated the Life-Long Learning program partly because of the Korean Government’s encouragement and subsidy for such practices to improve employees’ quality of life. More importantly, however, the insurance industry in Korea has experienced substantial changes with increasing competition for market share among giant domestic financial institutions and multinational insurance firms. This competitive and changing business environment imposed a severe burden to financial-sector employees. With regard to the core skills needed in the financial sector, scholars have reported the shift from technical skills to management skills, particularly sales and marketing competences (Donnelly, Gibson, & Skinner, 1988; Morgan & Sturdy, 2000). Encountering these challenges, many Korean firms in the financial sector initiated innovative business strategies focusing on HRM practices such as management education and training.

Similarly, the insurance company examined in this study also introduced HRM practices that emphasized team-level capability building and encouraged knowledge sharing among financial planners of each branch particularly related to the sales and marketing aspect of the insurance business. Specifically, it implemented the “Four Teams Learning System,” in which the financial planners of each sales branch were assigned to four different learning teams. Each learning team and its members took a day off (called the “Learning Day”) once a week and participated in various learning programs. Under the guidance of each team’s sales manager, the team members were provided with job-related training, and shared job experiences, knowledge, and sales know-how. This well-organized initiative around Life-Long Learning increased organizational members’ voluntary participation in various learning activities. Within the first year of the implementation of the Life-Long Learning practices, the company witnessed 21.5 per cent growth in high-revenue insurance sales, and the number of high-earning financial planners increased by 12 per cent.

### *Data collection procedure*

To assess various aspects of the implementation processes, we developed five different survey instruments for five respondent groups within the branch: The branch manager, sales managers, and three separate groups of financial planners within the branch. Each group of respondents was asked to rate different aspects of the implementation, as described below. The survey instruments were designed in collaboration with the innovation management team at the corporate headquarters that was

responsible for implementing and monitoring the progress of the Life-Long Learning practices. Before the main data collection, we pre-tested the five survey instruments by administering them in three randomly selected branches. Fifty individuals (including two branch managers and five sales managers) participated in the pilot test. Based on the comments provided by these participants, we modified the scale items to increase their clarity and their relevance to the current research setting.

In the main survey, we asked the innovation management team to randomly allocate financial planners of each branch into three subgroups of comparable sizes. The initial sample for this study included 2139 participants, which represented about 98 per cent ( $N=2181$ ) of all sales branch employees and managers. Over a period of two weeks, data were collected from 1150 participants of 81 branches (response rate = 53.8 per cent). The average number of participants per sales branch was 14.20 ( $SD=6.49$ ) ranging between 10 and 21. The participants were 45 per cent male with an average age of 40.0 years ( $SD=7.75$ ) and an average organizational tenure of 4.9 years ( $SD=5.15$ ). The sample included 75 branch managers (6.5 per cent), 162 sales managers (14.1 per cent) and 913 financial planners (79.4 per cent). Thus, on average, the data for a single branch consisted of a branch manager, two sales managers, and eleven financial planners divided into three separate subgroups (Subgroups A, B, and C). Each of the three subgroups included multiple financial planners (ranging between two and eight, mean = 3.76 members per subgroup) that allowed the calculation of within-group agreement indexes. The HR managers of the company confirmed that the demographic profile of the present sample is comparable to that of the entire target sample. The demographic composition of the three subgroups (i.e., gender, average age, and average tenure) did not show any significant differences ( $F=1.60, p>0.20$ ;  $F=55, p>0.50$ ;  $F=97, p>0.30$ , respectively), further indicating that they comprise comparable subgroups randomly generated from branch employees. In comparison with the overall response rate of 53.8 per cent, the response rates for branch managers and sales managers were 71.4 and 77.9 per cent, respectively, showing that managers were more responsive.

### Measures

We tested the present hypotheses using data from five different sources. All constructs were assessed by multi-item measures using a six-point Likert-type scale (1 = *strongly disagree*, 6 = *strongly agree*). Individual responses were aggregated to the branch level for analysis. All scales exhibited acceptable interrater agreement ( $r_{wg(j)}$ ) and intraclass correlations (ICC(1), ICC(2)), suggesting that employees and managers of the same branch possessed shared perceptions regarding the present constructs (Chen, Mathieu, & Bliese, 2004).

#### Management involvement (Branch Manager)

Adapting items used by Douglas and Judge (2001), we constructed a four-item scale ( $\alpha=0.90$ ) to measure the level of management involvement: (a) "I have a clear understanding of the innovation" (i.e., Life-Long Learning), (b) "I am strongly committed to the training programs related to the innovation," (c) "To improve organizational capability, I actively utilize what I learned through the innovation," and (d) "I take the initiative in implementing the innovation." These items were rated by branch managers.

#### Reflective climate (Employees in Subgroup A)

Modifying existing measurement items (Scott & Bruce, 1994; Patterson et al., 2005), we used three items ( $\alpha=0.87, r_{wg(3)}=0.74, ICC(1)=0.12, ICC(2)=0.38, F=1.60, p<0.01$ ) to measure reflective climate: (a) "Our company always searches for new ways to improve organizational performance," (b) "People in our company often discuss about the ways we perform our tasks," and (c) "People in our



company have regular meetings to pursue new approaches and new ways of doing things to improve effectiveness.”

### **Training for innovation (Employees in Subgroup B)**

The extent to which a company provided training for innovation was measured by four items ( $\alpha = 0.85$ ,  $r_{wg(4)} = 0.77$ ,  $ICC(1) = 0.10$ ,  $ICC(2) = 0.34$ ,  $F = 1.52$ ,  $p < 0.05$ ) that were used in prior studies (Patterson et al., 2005): (a) “Employees were given enough information during the training for the innovation,” (b) “The training for the innovation was given to employees throughout the organization,” (c) “Training was readily available to employees who want to learn more about the innovation,” and (d) “The training employees received related to the innovation was adequate.”

### **Cognitive appraisal (Employees in Subgroup C)**

Employees’ cognitive appraisal of the innovation was assessed with regard to two widely accepted evaluative dimensions: Perceived usefulness and perceived ease of use (Venkatesh et al., 2003). The perceived-usefulness scale included the following three items ( $\alpha = 0.95$ ): (a) “The innovation would enable me to accomplish my tasks more effectively,” (b) “The innovation would increase productivity in my job,” and (c) “The innovation would lead to positive changes in my job.” The level of perceived ease of use was evaluated using the following three items ( $\alpha = 0.91$ ): (a) “It is easy to understand the processes involved in the innovation program,” (b) “I find it easy to use the innovation in my job,” and (c) “I find the innovation easy to apply to my job.”

Prior studies on TAM have reported moderate to high correlations between perceived usefulness and perceived ease of use. King and He’s (2006) meta-analysis of 88 studies on TAM showed that the average correlation between perceived usefulness and perceived ease of use was 0.49, ranging between 0.07 and 0.84. In the present study, the correlation between the two scales was quite high ( $r = 0.82$ ,  $p < 0.001$ ), and they were not empirically distinguishable. This pattern suggests that individuals may not differentiate between perceived usefulness and perceived ease of use when the target innovation is relatively easy to use, which might have been the case in the present research context (*cf.* moderator analysis of King & He, 2006). We therefore merged these two scales into a single scale of *cognitive appraisal* that included six items ( $\alpha = 0.95$ ,  $r_{wg(6)} = 0.89$ ,  $ICC(1) = 0.17$ ,  $ICC(2) = 0.47$ ,  $F = 1.89$ ,  $p < 0.001$ ).

### **Positive and negative emotions (Employees in Subgroup C)**

Drawing on the circumplex model of emotion (Larsen & Diner, 1992; Posner et al., 2005), we identified emotion items that reflect employees’ positive and negative emotions toward an innovation. The positive emotion scale included the following four items ( $\alpha = 0.96$ ,  $r_{wg(4)} = 0.74$ ,  $ICC(1) = 0.08$ ,  $ICC(2) = 0.29$ ,  $F = 1.41$ ,  $p < 0.05$ ): “When I think of the innovation, I feel (a) delighted, (b) pleased, (c) happy, and (d) comfortable.” Employees’ negative emotional reaction was assessed by the following four items ( $\alpha = 0.93$ ,  $r_{wg(4)} = 0.80$ ,  $ICC(1) = 0.14$ ,  $ICC(2) = 0.43$ ,  $F = 1.75$ ,  $p < 0.01$ ): “When I think of the innovation, I feel (a) disappointed, (b) distressed, (c) sad, and (d) depressed.”

### **Implementation effectiveness (Sales Managers)**

To measure the overall level of innovation implementation in the branch, we used two items ( $\alpha = 0.93$ ,  $r_{wg(2)} = 0.69$ ,  $ICC(1) = 0.10$ ,  $ICC(2) = 0.33$ ,  $F = 1.50$ ,  $p < 0.05$ ): (a) “Most employees in our branch actively participate in the innovation,” and (b) “Most employees voluntarily make efforts for successful implementation of the innovation.” These items were rated by sales managers who were familiar with financial planners’ daily operations and activities related to Life-Long Learning in each branch.

## Results

The descriptive statistics and correlations among all study variables are reported in Table 1. To empirically validate our theoretical framework, we conducted a series of structural equation modeling (SEM) analyses as described below.

### *Measurement model and structural model*

Adopting Anderson and Gerbing's (1988) recommendation for a two-step approach to SEM, we first tested the measurement model that includes covariances among all study variables. Considering the relatively small sample size at the branch level ( $N = 81$ ), we created two item parcels per latent construct by randomly assigning scale items into two subscales of the construct (*cf.* Hagtvet & Nasser, 2004). Thus, in the measurement model and the structural models described below, all latent variables were indicated by two subscales. The measurement model showed a very good fit to the data ( $\chi^2$  ( $df = 56$ ) = 58.23,  $p = 0.393$ ; CFI = 0.99; RMSEA = 0.022; RMR = 0.044). All indicators significantly loaded on their corresponding latent factors ( $p < 0.001$ ), and the covariances among them remained low to moderate (all below 0.28), showing the convergent and discriminant validity of the measures used. We thus proceeded to the second step, which is testing structural relations among the latent constructs.

Using the measurement model tested above, we tested the hypothesized model as shown in Figure 1. The hypothesized structural model showed a good fit to the observed relations among variables:  $\chi^2$  ( $df = 70$ ) = 88.95,  $p = 0.063$ ; CFI = 0.98; RMSEA = 0.058; RMR = 0.061. Seemingly, the present data support the overall theoretical framework based on the double-mediation causal sequence (Hypothesis 8). Nevertheless, it is possible that the mediating roles of employee cognition and emotional reactions were only partial rather than complete. Thus, we tested the possibility of partial mediation by adding the following direct effect paths: (a) Direct effects of contextual factors on positive and negative emotions, (b) direct effects of contextual factors on implementation effectiveness, and (c) direct effects of cognitive appraisal on implementation effectiveness. In all three cases, the partial mediation model

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

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Management involvement (branch manager)	4.97	0.82	—						
2. Reflective climate (subgroup A)	4.15	1.15	0.12	—					
3. Training for innovation (subgroup B)	4.23	1.07	0.10	0.38**	—				
4. Cognitive appraisal (subgroup C)	4.39	1.06	0.31**	0.27*	0.28*	—			
5. Positive emotion (subgroup C)	3.44	1.23	0.09	0.05	0.25*	0.59**	—		
6. Negative emotion (subgroup C)	2.08	1.10	-0.19	-0.04	-0.14	-0.44**	-0.26*	—	
7. Implementation effectiveness (sales managers)	3.94	1.17	0.16	0.18	0.15	0.29*	0.32**	-0.28*	—

Note: Unit of analysis is sales branch ( $N = 81$ ).

\* $p < 0.05$ ; \*\* $p < 0.01$ .

with additional direct effects failed to improve the model fit significantly ( $\Delta\chi^2$  difference test, all  $p > 0.20$ ). Therefore, the present data supported the overall double-mediation relationships as depicted in Figure 1, supporting Hypothesis 8.

### Hypothesis testing

The results of the best-fitting, hypothesized model are graphically depicted in Figure 2 with standardized path coefficients. Among the three contextual factors, management involvement and training for innovation were statistically meaningful predictors of employees' cognitive appraisal of the innovation ( $\beta = 0.26$  and  $0.23$ , both  $p < 0.05$ , respectively). Thus, Hypotheses 1 and 3 were supported. The effect of reflective climate was not significant in the present data.

Our analysis supported Hypotheses 4 and 5 in that cognitive appraisal was a significant predictor of positive and negative emotions toward the innovation ( $\beta = 0.60$  and  $\beta = -0.45$ , both  $p < 0.001$ , respectively). Positive and negative emotions, in turn, were direct predictors of implementation effectiveness ( $\beta = 0.23$  and  $\beta = -0.24$ , both  $p < 0.05$ , respectively), confirming Hypotheses 6 and 7.

All in all, the present analyses supported most hypotheses with regard to the role of contextual variables that shape collective processes involving employees, which were directly responsible for collective innovation use. In addition, as reported above, each of the mediated relationships was complete, rather than partial. To test the significance of these mediated relationships, we employed the product-of-coefficients approach and tested their significance by computing the Sobel-test statistics for each indirect effect (MacKinnon, Fairchild, & Fritz, 2007).

As shown in Table 2, management involvement had significant indirect effects on both positive and negative emotions via cognitive appraisal ( $\alpha\beta = 0.16$  and  $-0.12$ ,  $z = 2.04$  and  $-1.97$ , both  $p < 0.05$ , respectively). Training for innovation showed a significant indirect effect on positive emotion ( $\alpha\beta = 0.14$ ,  $z = 1.96$ ,  $p < 0.05$ ). Cognitive appraisal exerted significant indirect effects on implementation effectiveness via both positive and negative emotions ( $\alpha\beta = 0.14$  and  $0.11$ ,  $z = 2.06$  and  $1.97$ , both  $p < 0.05$ , respectively).

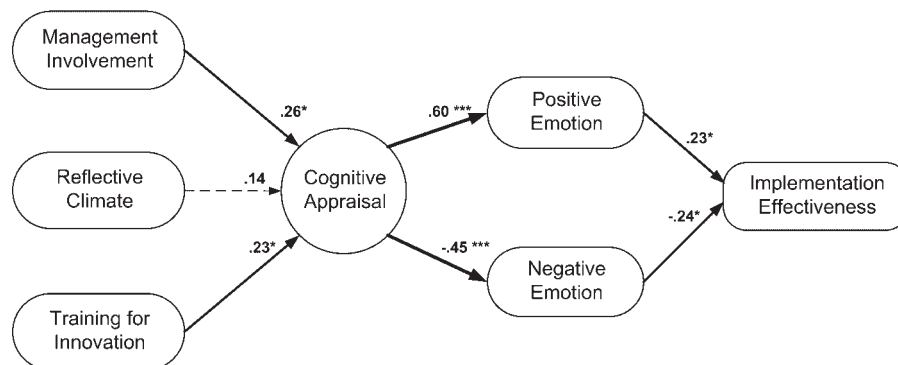


Figure 2. Collective user reaction model in the implementation process. *Note:* Solid lines represent statistically significant results. Insignificant paths are depicted as dotted lines in the diagram. \*  $p < 0.05$ ; \*\*\*  $p < 0.001$

Table 2. Indirect effects

Dependent variable	Independent variable	Indirect effect	Sobel-test statistic
Positive emotion	Management involvement	0.16*	2.04
	Reflective climate	0.09	0.81
	Training for innovation	0.14*	1.96
Negative emotion	Management involvement	-0.12*	-1.97
	Reflective climate	-0.07	-0.81
	Training for innovation	-0.10	-1.84
Implementation effectiveness <sup>a</sup>	Cognitive appraisal through positive emotion	0.14*	2.06
	Cognitive appraisal through negative emotion	0.11*	1.97

<sup>a</sup>None of the indirect effects of contextual factors on implementation effectiveness was statistically significant and was not included in this table. \* $p < 0.05$ .

### *Robustness of the present results*

The results presented in Figure 2 were based on partially missing data. Specifically, of the 81 branches included in our analysis, only 75 branch managers reported their level of participation in the innovation (management involvement). To check the potential bias introduced by these missing observations, we conducted the same SEM analysis using 75 branches with full branch manager data. This analysis produced the same results as reported in Figure 2.

Scholars pointed out that SEM might provide less reliable estimates in the case of small samples, in which the data often fail to fulfill typical statistical assumptions such as multivariable normality (Cassel, Hackl, & Westlund, 1999). As an alternative, researchers have increasingly employed partial least square (PLS) modeling (Chin, 1998), which tends to produce robust results facing various inadequacies such as missing values, model misspecification, and small samples (Cassel et al., 1999). Given that our sample included a small number of observations from 81 branches, it is necessary to check if the present findings can be replicated using alternative statistical procedures such as PLS. To this end, we tested our conceptual model using SmartPLS 2.0, a PLS-based path modeling program (Ringle, Wende, & Will, 2005). This PLS analysis produced almost identical path coefficients along with comparable statistical significance as reported in Figure 2, except that the path between training for innovation and cognitive appraisal became less significant ( $\beta = 0.17$ ,  $p < 0.07$ ). All in all, the present results based on SEM seemed robust and were not substantially affected by missing data and the analytic procedure applied.

## **Discussion**

In the innovation literature, user receptivity of an innovation has been regarded as crucial for successful implementation (Davis, 1989; Klein et al., 2001; Venkatesh et al., 2003). Research suggests that organizational practices and systems cannot substitute for employees' committed effort and participation in inducing the successful implementation of an innovation (Choi & Chang, 2009). Our analysis demonstrated the predominant role of employees' emotions in collective innovation use. Nevertheless, this critical role of human emotion has been somewhat lost in general management literature (Brief & Weiss, 2002), as well as in the innovation literature (Venkatesh, 2000), which has

concentrated on cognitive assessment or economic analysis in explaining human behavior in organizations. The present approach thus complements the existing literature and provides a balanced view of the innovation process by considering both cognitive and emotional processes. Before we highlight the meaningful findings of the study along with its limitations, we consider alternative theoretical accounts of the dynamics involving cognition and emotion in the present research context, although the present sample is not sufficient to conduct a rigorous test of such alternative theoretical propositions.

### *Alternative theoretical possibilities*

In the present conceptual framework, drawing on the appraisal and attribution theory of emotion (Weiner, 1986), we propose that cognitive appraisal precedes emotional reactions toward innovation. Nevertheless, emotion researchers have acknowledged the complex, reciprocal relations between emotion and cognition (Huy, 2002; Lewis, Sullivan, & Michalson, 1984). Taking this controversy into account, we acknowledge an alternative possibility in which employees' collective emotions lead to their cognitive appraisal of the innovation. AET (Weiss & Cropanzano, 1996) and the affect infusion model (Forgas, 1995) suggest the possibility that emotional reactions induce innovation-related cognitions that directly predict implementation effectiveness (Davis, 1989; Liu & Perrewe, 2005).

There is yet another possibility in which employees' shared cognitive appraisal and their emotions comprise *parallel processes* that are affected by contextual factors and that simultaneously predict collective innovation use. Given that cognition and emotion are conceived as a continuous and inseparable stream of behavior (Izard, 1984; Lewis et al., 1984), employees' cognition and emotion may play interchangeable roles in the current research framework, comprising parallel and simultaneous processes.

In an effort to incorporate various theoretical possibilities, we compared the empirical validity of these two alternative models against the hypothesized model. In the present data, both alternative models exhibited worse fit than the hypothesized model by both having smaller degrees of freedom but greater  $\chi^2$  values than the hypothesized model. The present data thus provided support for the appraisal theory of emotion suggesting that cognitive appraisals of the innovation are the basis of emotional reactions toward it. Nevertheless, given the small sample size at the branch level and the complexity of the model in the present study, these model comparisons should be regarded as only preliminary, waiting for further empirical investigation of causal directions using a larger sample and/or longitudinal panel data.

### *Implications for research and practice*

Departing from previous studies on user acceptance conducted predominantly at the individual level, our focal level of analysis was the work unit. Supporting institutional theory (Scott, 1995), our branch-level analysis demonstrated that employees' cognitions and emotions are pivotal mechanisms that mediate the effects of organizational contexts on the actual implementation of the innovation. Focusing on collective rather than individual processes is particularly meaningful in the present research framework because contextual influence refers to something beyond any single individual within the particular context (Rousseau, 1985). This study thus provides a more ecologically valid explanation of how organizational context or the institutional environment affects collective cognitions and emotions of organizational members, who are usually the ultimate users of organizational innovations and thus determine the fate of new practices or systems.

Among the three contextual factors examined, management involvement and training for innovation showed significant positive effects on cognitive appraisal regarding the innovation. In line with prior studies (Baer & Frese, 2003; Holahan et al., 2004), organizational members seemed to positively evaluate the innovation when management showed persistent support, which tends to establish a favorable institutional environment that legitimizes and rewards innovation use behavior (Chatterjee et al., 2002). Practical support (such as training for innovation) also increased the positive assessment of the innovation's benefit and its applicability to work, perhaps by creating an implementation climate that endorses the use of the innovation (Klein et al., 2001; Sharma & Yetton, 2003). However, reflective climate was not significantly related to employees' positive innovation evaluation. This is perhaps due to the fact that reflective climate is a rather general organizational climate that was not specifically targeted at the innovation in question (Life-Long Learning) and thus its implications for implementing the innovation were relatively ambiguous.

Comparisons of alternative structural models suggest that employees' shared cognitive appraisal is an anchoring enabler that incites their emotional reactions toward the innovation. This pattern seems to support a more rational perspective of emotional processes as suggested by the appraisal and attribution theories of emotion (Roseman et al., 1990; Weiner, 1986) than theories posing emotion as a driver of subsequent cognitive processes such as AET. However, given that AET is largely focused on within-individual phenomena involving specific affect-inducing events (Weiss & Cropanzano, 1996), the present analysis of unit-level phenomena as reported by five different sources might not render an adequate empirical test of AET. Nevertheless, considering the recent trend to expand AET to the strategic management level and to apply AET to various collective organizational phenomena (e.g., Ashoton-James and Ashkanasy, 2008; Härtel & Ganegoda, 2008), further conceptual and empirical efforts should be directed to establish the validity of AET at levels other than individuals and as a model involving interpersonal (in addition to intrapersonal) dynamics.

The present results are consistent with Bhattacharjee's (2001) argument that cognitive assessment precedes users' emotions regarding a new system. Therefore, to encourage positive emotions and reduce negative emotions regarding implementation, innovation champions may need to ensure that employees are sufficiently informed of the fact that the innovation promotes their interest (e.g., task performance, better impressions), and it can easily be implemented in their work (e.g., high congruence with their skill configuration, low technical complexity). The present study showed that organizational efforts such as management involvement and training for innovation could result in such favorable appraisals toward the innovation. Future studies may further identify institutional and work unit characteristics that lead to such positive cognitions among employees. In this regard, the implementation literature suggests several promising constructs including organizational flexibility (Patterson et al., 2005), financial resources for innovation (Klein et al., 2001), and social capital and support built around the innovation, particularly among peers (Clayton, 1997).

### *Study limitations*

This study expands the implementation literature by making both conceptual and empirical contributions, and also offers critical managerial implications. The present findings, however, should be interpreted with caution owing to several limitations. First, the present data were cross-sectional, and the causal directions of the relationships could not be clearly identified. Second, because the current level of analysis was the branch, the sample size was relatively small, particularly when the complexity of the model was taken into account. Although the PLS results provided the same pattern as we obtained from the SEM analysis, it is important to validate our findings using larger samples.

Third, although the present data were collected from five different sources (branch manager, sales managers, and employees in three subgroups within a branch), all measures were based on psychometric scales rated by branch members and managers. Moderately high correlations among the three scales reported by employee Subgroup C (cognitive appraisal, positive emotion, negative emotion) indicate the possibility of same method bias, although the measurement model demonstrated their empirical distinctiveness. Future studies could integrate these internal perspectives with external views of the phenomenon (e.g., other teams, executives, customers) as well as objective measures (e.g., actual number of training sessions offered, amount of financial investment for the innovation, actual frequency of innovation use).

Fourth, the present measures of cognitive appraisal and emotions regarding the innovation may confound individual- and group-level effects. In this study, we assessed cognitive appraisal and emotions by aggregating each branch employee's own cognitive and emotional reactions to the innovation, thus relying on the *direct consensus model* of aggregation (Chan, 1998). This approach has been used to assess collective constructs such as group efficacy, cohesion, and group-level OCB, and our data showed that branch employees held shared cognitions and emotions regarding the innovation. Notwithstanding, it is necessary to examine whether collective cognitions and emotions can be better assessed by alternative approaches such as the *referent-shift consensus model* or through a global assessment reported by the manager or an external evaluator (Chen et al., 2004).

Finally, the present research context could affect our findings because organizational learning and change processes are shaped by specific cultural, national, political, and industrial contexts (Antonacopoulou & Gabriel, 2001). Asian countries such as Korea may provide a distinct context of innovation implementation (Choi & Chang, 2009). In addition, although the financial sector has encountered increasing demand for the renewal of its workforce and business practices, employees in this sector tend to be conservative and less willing to take risks compared with those in other industries such as the pharmaceutical or electronics industries (Donnelly et al., 1988; Morgan & Sturdy, 2000). Future studies may further investigate the distinct roles of innovation-related cognitions and emotions in other cultural and industrial contexts.

### *Directions for future research*

This study identified a much needed issue for research in the domain of innovation implementation, and its findings suggest fruitful directions for future research efforts. First, as mentioned earlier, it is necessary to identify and examine various types of organizational or work unit characteristics that could encourage learning, which shift organizational members' cognitive evaluations and collective emotions regarding the innovation (Antonacopoulou & Gabriel, 2001). In so doing, future studies may investigate the relevance and significance of various types of discrete emotions beyond the present focus on the valence of emotion, further expanding the scope of emotions activated in the context of innovation (Larsen & Diner, 1992; Posner et al., 2005).

Second, although the present data supported the paths from cognitive appraisal to emotions, there have been debates regarding the causal direction between cognition and emotion. Emotion researchers have emphasized that cognition and emotion should be considered as reciprocal processes that comprise interwoven and inseparable strands of human behavior (Lazarus, 1991; Lewis et al., 1984). Future studies could further examine this issue using longitudinal panel data that track changes in innovation-related cognitions and emotions over time.

Finally, the present study demonstrated that employees who shared the same work environment tend to share cognitive appraisals and emotions regarding the innovation. Although this finding seems quite obvious, it would be an intriguing research issue to theorize and explore the mechanisms through which

organizational members develop similar patterns of perceptions, evaluations, emotions, and even behavior related to innovation implementation. In this regard, interpersonal processes including social information processing (Salancik & Pfeffer, 1978), social learning (Bandura, 1986), and emotion contagion or interaction synchrony (Kelly & Barsade, 2001) can be a good starting point. In summary, our findings clearly present a need for greater attention to the emotional processes involved in the implementation of organizational innovations. This shift in research attention and the resulting balanced consideration of cognitive and emotional processes would offer theoretical explanations of innovation implementation that are more ecologically valid than those currently available.

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