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The Impact of Organizational Context and Information Technology on Employee Knowledge-Sharing Capabilities

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Sharing knowledge and information is an important factor in the discourses on electronic government, national security, and human capital management in public administration. This article analyzes the impact of organizational context and IT on employees' perceptions of knowledge-sharing capabilities in five public sector and five private sector organizations in South Korea. Social networks, centralization, performance-based reward systems, employee usage of IT applications, and user-friendly IT systems were found to significantly affect employee knowledge-sharing capabilities in the organizations studied. For public sector employees, social networks, performance-based reward systems, and employee usage of IT applications are all positively associated with high levels of employee knowledge-sharing capabilities. Lessons and implications for knowledge-sharing capabilities and management leadership in the public sector are presented.

There is an increasing emphasis on the importance of knowledge sharing for organizational performance and effectiveness in both the private and public sectors. Knowledge-sharing activities create opportunities for private organizations to maximize their ability to meet customers' changing needs and to generate solutions to gain competitive advantage (Argote, Beckman and Epple 1990; Baum and Ingram 1998; Beckman 1997). As a result of their focus on performance- and results-oriented government services, researchers in public administration have emphasized the necessity that government agencies coordinate and enable the integration, sharing, and transfer of information and knowledge within agencies and governmental networks (Fountain 2003; Hale 1996; Holzer and Callahan 1998; Linden 1994; Popovich 1998). Beckman (1997) specifically argues that knowledge sharing is one of the most important factors affecting organizational agility and performance. Argote, Beckman, and Epple (1990) and Baum and Ingram (1998) are among several research teams to observe that organizations with more effective knowledge-transfer channels are more productive. As knowledge is a central resource in government ser-

vice, effective knowledge sharing among employees is a significant public management challenge for providing high-quality government services to constituencies at all levels.¹

Sharing knowledge and information is also an important factor in discourses on electronic government (e-government), national security, and human capital management in public administration. The Internet, the World Wide Web, and other ongoing advancements in information technology (IT) are supporting the efforts of public sector agencies to generate, integrate, and transfer information and knowledge among agency networks (Council for Excellence in Government 2000; Stowers 2002; Strover and Straubhaar 2000). The 9/11 terrorist attacks spotlighted the need to share intelligence within the American security community with its international equivalents. The U.S. Departments of Homeland Security, State, and Justice are increasing their budgets for the purchase of knowledge-management products and services for gathering, analyzing, and distributing data among federal agencies (Santossus 2003). In terms of human capital management, Nonaka (1994) notes that knowledge is created and managed by individuals within organizations. Aging civil servants and staff turnover across countries have created new challenges for the preservation of institutional memory and the training of new staff (OECD 2003). To improve the quality of services to the public, government agencies need to share their most effective knowledge-sharing practices by collaborating, both internally, within agencies, and externally, with agencies of similar functions (Motsenigos and Young 2002; OECD 2003).

Knowledge sharing requires the dissemination of individual employees' work-related experiences and collaboration between and among individuals, subsystems, and organizations; collaboration with other agencies and stakeholders is also required for improved knowledge sharing (Dyer 1997; Inkpen and Beamish 1997). Knowledge sharing further entails the development of storage and retrieval mechanisms for quick and easy

access to information that is used for adjusting strategic direction, problem solving, and improving organizational efficiency (Almeida 1996; Appleyard 1996; Ipe 2003; Nonaka and Takeuchi 1995). Public and private organizations are finding it necessary to assess their internal knowledge-sharing capabilities for organizational success. Despite the growing literature on knowledge sharing, little attention has been paid to employee knowledge-sharing capabilities in organizations, and little empirical research has been conducted on how organizational context affects employee knowledge-sharing capabilities in public and private sector organizations. Although advanced IT applications and network systems facilitate employee knowledge sharing, employees are the main driver of knowledge and information sharing in organizations (Bartol and Srivastava 2002; Nonaka 1994). Therefore, an important challenge for public and private sector organizations is to establish an organizational culture that enhances employees' knowledge-sharing capabilities.

For this study, we define *employee knowledge-sharing capability* as the ability of employees to share their work-related experience, expertise, know-how, and contextual information with other employees through informal and formal interactions within or across teams or work units. The knowledge-sharing capability discussed in this article also refers to employees' ability to acquire knowledge that is held by other divisions within the organization. In this article, we analyze the influences of organizational culture, structure, and IT on employees' perceptions of knowledge-sharing capabilities in five public-sector and five private-sector organizations in South Korea. We discuss the results of a survey of 322 public and private employees that

explored their perceptions of organizational vision and goals, trust, social networks, centralization, formalization, reward systems, IT application usage, user-friendly IT systems, and knowledge-sharing capabilities.

In 2000, the South Korean government established a special committee to develop knowledge-management systems in the public sector and to initiate knowledge-management strategies. In addition, a bill on e-government development passed by the national legislature in 2001 promotes knowledge sharing in government agencies (MOGAHA 2002). Since 1997, major South Korean corporations have also been developing knowledge-sharing information systems to allow employees to quickly respond to complex and evolving domestic and international market environments. Some of the knowledge-sharing practices implemented in these corporations were selected as benchmark knowledge sharing for the development of the Government Knowledge Management System by the South Korean government.

In the next section, we review the current literature on variables associated with knowledge sharing for both private and public sector employees. The key organizational factors and information technologies related to employee knowledge-sharing capabilities that emerged from the literature were synthesized to form the conceptual framework presented in this article. Figure 1 summarizes our research model. After presenting results from a multiple regression analysis of the collected data, we discuss the major findings. Finally, lessons and implications of this study for knowledge-sharing capabilities and management leadership in the public sector are presented.

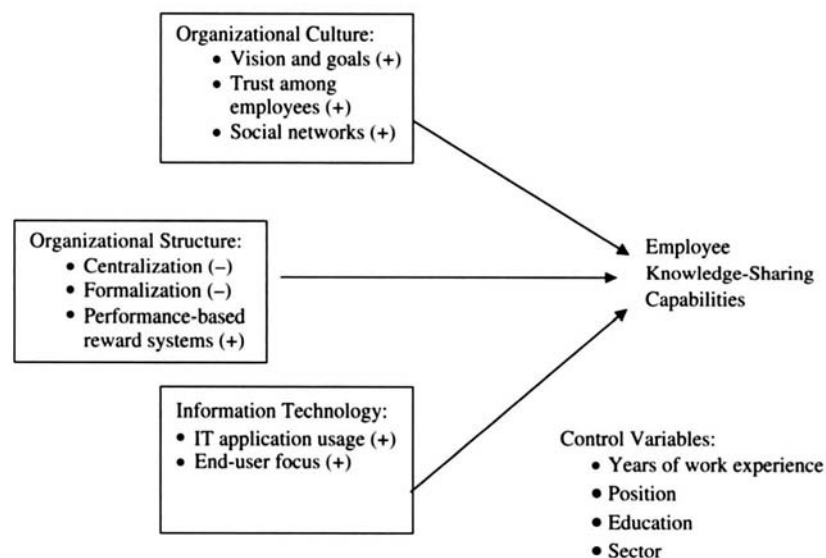


Figure 1 Research Model

Literature Review and Hypotheses

The current literature contains numerous definitions of the term *knowledge*. Davenport and Prusak (1998) define it as a fluid mix of framed experiences, values, contextual information, and expert insights that provide a framework for evaluating and incorporating new experiences and information. They note that in many organizations, knowledge is often embedded in routines, processes, practices, and norms, in addition to obvious sources such as documents. Nonaka and Takeuchi (1995) identify three characteristics that distinguish information from knowledge: (1) Knowledge is a function of a particular perspective, intention, or stance taken by an individual, and therefore, unlike information, it is about beliefs and commitment; (2) knowledge is always about some end, which means that knowledge is about action; and (3) knowledge is context specific and relational, and therefore it is about meaning. Grant (1996) notes that knowledge is "the most strategically important resource that organizations possess," whereas others refer to knowledge as a principal source of value creation (Spender and Grant 1996; Teece, Pisano, and Shuen 1997).

Knowledge can be categorized into explicit and implicit (tacit) categories (Polanyi 1966). It is much easier to use formal language to transmit explicit knowledge than to convey tacit knowledge, which is often viewed as being specific to an individual. Nonaka and Takeuchi (1995) note that explicit knowledge is available in the form of files, library collections, or databases, whereas some types of implicit knowledge (which also serve as an organization's knowledge capital) are either difficult or impossible to access—for example, the accumulated experiences, creativity, and skills that reside within individuals. Argote and Ingram (2000) observe that a significant component of organizational (especially tacit) knowledge is embedded in individual members, and that knowledge can be embedded in various social networks.

Sharing knowledge (explicit or tacit) requires effort on the part of the individual doing the sharing. Bartol and Srivastava (2002) identify four mechanisms for the sharing of individual knowledge within organizations: (1) contributing knowledge to organizational databases, (2) sharing knowledge in formal interactions within or across teams or work units, (3) sharing knowledge in informal interactions, and (4) sharing knowledge within practice communities (i.e., voluntary forums created around a particular topic of interest). According to Kim and Nelson (2000), knowledge sharing also occurs as a dynamic learning process involving organizational interactions with customers and suppliers, resulting in innovation or creative imitation. Because of advancements in information and computer technology, this process often entails increasingly differentiated knowledge that is shared

between units and with outside partners and clients (Bresman, Birkinshaw, and Nobel 1999).

Organizational characteristics that are unique to the public sector have brought attention to employee knowledge-sharing capabilities in public management. Compared to private organizations, government organizations are composed of multiple and competing interests (Quinn 1983; Rainey 2003; Ring and Perry 1985; Rohrbaugh 1981). Accordingly, a significant question in public organizations is how public administrators manage the diverse values that are simultaneously considered major objectives for government services. Discussing multiple perspectives and sharing the practices that most effectively enable integration of competing viewpoints in decision making would be very useful to public managers. These practices would allow public managers to better solve problems in policy implementation and more successfully adapt to changing organizational environments. Public organizations also face paramount challenges because of ambiguous measurement of organizational performance (Rainey 2003; Ring and Perry 1985). Accordingly, knowledge-sharing capabilities related to the success of programs, the criteria of performance, and actual assessments of accomplishment are all likely to enable public administrators to be accountable to all levels of government constituents.

Currently, public sector organizations are using state-of-the-art IT to form collaborative, knowledge-dedicated workgroups and communities for specific projects (Cooper 2001). For example, the U.S. General Services Administration, the U.S. Army Corps of Engineers, and the U.S. Navy and Transportation Department are implementing knowledge-sharing systems at all levels of their organizations by adopting various technologies, including the Internet, Web-based portals, databases, and teleconferencing (Barquin, Bennet, and Remez 2001; Bouthillier and Shearer 2002). The South Korean government has established the Government Knowledge Management Center, Government Knowledge Management Systems, and incentive systems to facilitate employee knowledge-sharing activities (MOGAHA 2002).

As this article examines the impact of organizational context and IT on employees' perceptions of knowledge-sharing capabilities within organizations, we identify and analyze three major mechanisms for employee knowledge sharing: (1) sharing knowledge in interactions among employees, (2) sharing knowledge with other employees in teams or groups, and (3) acquiring knowledge held by other divisions. In the next section, we will examine the theoretical background of organizational culture, structure, and IT, all of which affect employee knowledge-sharing capabilities.

Organizational Context, IT, and Employee Knowledge-Sharing Capabilities

Organizational Culture

Three components of organizational culture that are related to effective knowledge sharing are clear organizational vision and goals (Gold, Malhotra, and Segars 2001; Kanter, Stein, and Jock 1992; Leonard 1995), trust (Kanter, Stein, and Jock 1992; O'Dell and Grayson 1998; von Krogh 1998), and social networks (Leonard and Sensiper 1998; O'Dell and Grayson 1998; Tsai 2002). We will analyze these three cultural components to establish the degree to which they influence effective knowledge sharing. According to Kanter, Stein, and Jock (1992), organizational vision leads to the generation of a clear organizational purpose that assists in goal achievement. Others have suggested that clear organizational vision and goals engender a sense of involvement and contribution among employees (Davenport, Jarvenpaa, and Beers 1996; O'Dell and Grayson 1998; Popovich 1998). This study proposes that clear organizational vision and goals have a positive impact on employee knowledge-sharing capabilities.

Von Krogh (1998) argues that trust and openness in organizational culture promote active knowledge sharing among employees and that trustworthy behavior enhances communication speed by empowering coworkers to freely share personal knowledge and concerns. Nonaka (1990) observes that loyal and trusting relationships eliminate deception, cheating, and the tendency among employees to blame others for organizational failures. According to Cohen and Prusak (2001), high levels of employee trust can lead to better knowledge sharing, shared goals, and lower transaction costs. Andrews and Delahaye (2000) also found that in the absence of trust, formal knowledge-sharing practices were insufficient to encourage individuals to share knowledge with others in the same work environment. Roberts (2000) and Zand (1972) also found empirical support for the relationship between employee trust and knowledge sharing.

Another aspect of organizational culture that influences employee knowledge sharing is social networks or informal networks within the community. Modes of sharing within networks include communication, dialogue, and individual or group interactions that support and encourage knowledge-related employee activities (Leonard and Sensiper 1998; Levinthal and March 1993). Both formal and informal relationships and contacts between employees are considered important for sharing perspectives and knowledge within organizations (O'Dell and Grayson 1998). Although formal relationships or interactions, including training programs and structured work teams, play an important role in facilitating employee knowledge sharing, Truran (1998) found that

the greatest amount of knowledge is shared in informal interactions.

A study conducted by Stevenson and Gilly (1991) also found that even when clearly designated channels of communication exist in organizations, individuals tend to rely more on informal relationships for communication. In addition, Constant, Sproull, and Kiesler (1996) discuss the emerging role of practice communities (voluntary employee forums built around specific topics of interest) as knowledge-sharing networks. Social networks built into communities of practice may facilitate communication among employees, which, in turn, influences their knowledge-sharing capabilities.

The following hypotheses address the impact of organizational vision and goals, trust, and social networks on employee knowledge-sharing capabilities:

H1: Clear understanding of organizational vision and goals exerts a positive effect on employee knowledge-sharing capabilities.

H2: Increased trust among employees exerts a positive effect on employee knowledge-sharing capabilities.

H3: The level of social networking is positively associated with employee knowledge-sharing capabilities.

Organizational Structure

Three variables are used in the present study to consider the organizational structure dimension of knowledge sharing: centralization, formalization, and performance-based reward systems. Despite limited empirical research on the impact of organizational structure on employee knowledge-sharing activities, several scholars have addressed its importance. For example, Creed and Miles (1996) note that the hierarchical structure of many government organizations limits knowledge-sharing activity and communication between employees or between employees and supervisors. In addition, Tsai (2002) argues that centralization can reduce the initiatives that a unit might take in interunit exchange, thus reducing interest in knowledge-sharing activities with other units in the organization. O'Dell and Grayson (1998) also suggest that organizational structures should be designed to promote flexibility as a means of encouraging collaboration and sharing within and across organizational boundaries and stakeholders.² For example, participatory management practices balance the involvement of managers and their subordinates in information-processing, decision-making, or problem-solving endeavors (Wagner 1994).

This study examines how organizational centralization—that is, the degree to which power and authority are concentrated at the organization's higher levels (Hall 2002; Rainey 2003)—affects employee

knowledge-sharing capabilities. It further explores the impact of formalization—defined as the degree to which organizational activities are manifest in written documents regarding procedures, job descriptions, regulations, and policy manuals (Hall 2002; Rainey 2003)—on employee knowledge sharing. Scholars note that effective knowledge management requires flexibility and less emphasis on work rules (Holsapple and Joshi 2001; Rapert and Wren 1998). In particular, Damanpour (1991) found that low formalization permits openness and variation, which encourage new ideas and behaviors. Jarvenpaa and Staples (2000) also note that a lack of formal structure tends to enable organizational members to communicate and interact with one another to create knowledge. Organizational structure that emphasizes centralization, rules and regulations, and control systems may serve as a barrier to the creation of knowledge-sharing communities in organizations.

Performance-based rewards serve as another variable. According to Leonard (1995), organizational reward systems determine knowledge flow and access. Several researchers have noted the utility of incentive systems for motivating employees to generate new knowledge, share existing knowledge, and help employees in other divisions or departments (e.g., Argote and Epple 1990; O'Dell and Grayson 1998). Szulanski (1996) and Davenport (1997) also identify lack of motivation as an important impediment to transferring best practices within an organization. Neely (1998) argues that the main functions of performance-based reward systems are to (1) increase involvement and communication among all organizational units in a targeted setting, and (2) collect, process, and deliver information on the performance of organizational units, activities, processes, products, and services. Kogut and Zander (1992) researched the association between knowledge sharing and human resource management practices and found that knowledge sharing increases when employees understand that it helps them do their jobs more effectively, retain their jobs, develop personally and professionally, earn performance rewards, and earn personal recognition.

To further explore the impact of organizational structure on knowledge sharing, the following hypotheses are established and tested in this study:

H4: The degree of centralization is negatively associated with employee knowledge-sharing capabilities.

H5: The degree of formalization is negatively associated with employee knowledge-sharing capabilities.

H6: The level of performance-based rewards is positively associated with employee knowledge-sharing capabilities.

Information Technology

Researchers have emphasized the importance of IT infrastructure and application in linking organizational information with knowledge integration (Alavi and Leidner 2001; Davenport 1997; Grant 1996; Leonard 1995; Teece 1998). Alavi and Leidner (2001) note that IT increases knowledge transfer by extending an individual's reach beyond formal lines of communication. For example, computer networks, electronic bulletin boards, and discussion groups facilitate contact between those seeking knowledge and those who control access to knowledge. Davis and Riggs (1999) and Wiig (1999) extend the IT application list for knowledge sharing to include Internet-based network systems, groupware systems, intranets, databases, electronic data-management systems, and knowledge-management information systems. This study examines how employees' use of IT applications affects their knowledge-sharing capabilities.

Another important component of IT that is related to knowledge sharing is the degree to which end-user ease is a focus of information system development. Regardless of the technology, IT system and software developers must create user-friendly products that promote their acceptance and use (Branscomb and Thomas 1984; Davis 1989; King 1999). For example, Davis found that perceived ease of IT system use, defined as "the degree to which a person believes that using a particular system would be free of effort" (1989, 320), is significantly associated with current usage and future usage. King (1999) also indicates that designing and delivering a knowledge-management system that precisely addresses user needs is one of the most important factors affecting the success of the system. For this reason, this study also explores the impact of user-friendly information systems on employee knowledge-sharing capabilities.

Based on these findings, the final hypotheses are established as follows:

H7: The level of employees' utilization of IT application has a positive effect on employee knowledge-sharing capabilities.

H8: The degree of perceived ease of IT application use has a positive effect on employee knowledge-sharing capabilities.

Methodology

Sample Selection and Survey Administration

The study was conducted on a convenience sample of 322 employees in five public-sector and five private-sector organizations in South Korea. For the research project, we sought organizations that met two criteria: First, to see the impact of IT on employee knowledge-sharing capabilities, the organization must have

established knowledge-management systems, as well as IT infrastructure. Second, the size of the organizations was considered in order to select similar organizational contexts between the public and private sectors. The authors sent letters to each organization explaining the purpose of the study and requesting assistance in distributing the survey. Because this study focuses on employee knowledge sharing within the organization, we selected a division from each organization, where the division employee size was between 50 and 60.³

One of the authors visited the selected divisions and requested assistance for the sampling process. From the employee list of each division, the author and the contact person at the division selected 40 samples representing a diversity of age, gender, years of experience, profession, and position. The survey questionnaire was tested with 30 employees in public and private organizations to determine the face validity and clarity. A total of 400 surveys were hand-delivered to the 10 divisions during August 2003. For the public sector organizations, 165 questionnaires were returned; three of those were discarded because they were incomplete. Among the private sector organizations, 163 questionnaires were returned, three of which were discarded for the same reason. The final number of usable questionnaires was 322 (80 percent response rate).

To better understand the knowledge-management systems and knowledge-sharing policies of the selected organizations, phone interviews were conducted with knowledge-management administrators before the surveys were distributed. We found that the selected organizations had established their knowledge-management systems between 1998 and 2002. Several private sector organizations had initiated their knowledge-management systems three years earlier than the public sector organizations. All of the 10 organizations had appointed a chief knowledge officer. With the exception of one private firm, all of the organizations used incentives and rewards to encourage knowledge-management practices. Two public organizations and three private organizations emphasized their efforts to create communities of practice to improve knowledge sharing among employees. Several public sector organizations offered prizes based on knowledge application mileage systems as incentives for improving knowledge management. Furthermore, although two public sector organizations had cash-reward incentive systems related to knowledge management, four private organizations reported monetary incentives.

Several limitations of this study should be noted. First, the measures used here were perceptual rather than objective; a more complete analysis would require additional data from employee interviews and longitudinal data on knowledge-sharing dynamics and

patterns within certain types of organizations. Second, the survey response rate was high, but the sample size was relatively small. In addition, there is potential sampling bias because the study was based on neither a random nor a representative sample. As this study is based on a convenience sample, the findings are specific and can be generalized on only a very limited basis. Finally, the present study did not analyze specific organizational processes for putting shared knowledge into action in the organizations surveyed.

Survey Measures and Items

The items used in this survey were adapted from previous studies. Multiple-item measures were used for all of the variables in the interest of improving reliability and validity (see appendix 1). Responses were recorded along a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) or a seven-point Likert scale ranging from 1 (almost never) to 7 (almost always).

Vision and goals were assessed using a five-item scale adapted from research by Gold, Malhotra, and Segars (2001). Four items adapted from research by Cook and Wall (1980) were included to measure trust, and three items were developed to measure social networks. Cronbach's alpha reliability estimates for the trust and social network items were 0.81 and 0.85, respectively. Centralization was assessed using a five-item centralization scale described by Hage and Aiken (1967). The items measured the respondents' perceptions of the degree to which power and authority are concentrated in the higher levels of their organizations. Formalization was assessed using a five-item scale adapted from research by Hage and Aiken (1967). Cronbach's alpha reliability estimates for the centralization and formalization items were 0.85 and 0.75, respectively. Four items were developed to measure employee perceptions of the level of performance-based reward systems in the organization. The Cronbach's alpha reliability estimate for this section of the survey was 0.83.

Employee utilization of IT applications was measured in terms of (1) Internet, e-mail, and electronic bulletin boards; (2) intranets; (3) databases and electronic data-management systems; and (4) knowledge-management systems. Responses were measured along a seven-point frequency of usage scale ranging from 1 (almost never use) to 7 (almost always use). Cronbach's alpha for these items was 0.86. Perceived ease of IT system use was measured with two items (see appendix 1). The Cronbach's alpha for the end-user focus items was 0.82.

Three items were developed to measure employee knowledge-sharing capabilities: (1) "I voluntarily share my know-how, information, and knowledge with other employees"; (2) "I cooperate or communicate

with other employees in teams or groups for sharing information and knowledge"; and (3) "I can freely access documents, information, and knowledge held by other divisions within the organization." The Cronbach's alpha reliability estimate for these items was 0.89. Sector was included as a control variable. Three personal characteristics were also used as control variables: years working at the agency or corporation, current position, and level of education.

The exploratory factor analysis (principal components with varimax rotation) was conducted for the organizational culture, structure, and IT dimensions. For organizational culture, the results show three factors with eigenvalues greater than 1.0: vision and goals; trust among employees; and social network or interaction. Results of the factor analysis also reveal three factors for the organizational structure dimension: centralization, formalization, and reward systems. Regarding IT dimension, the analysis shows two factors: IT application usage and end-user focus. The three items of employee knowledge-sharing capabilities all loaded on a single factor; the factor loadings support the use of these items as indicators of the underlying constructs they were designed to measure.

Findings

Among the 322 respondents, only 44 (13.7 percent) were female. Respondent ages ranged from early 20s to over 50, with 36.4 percent over the age of 40. The distribution of work experience was as follows: fewer than 5 years, 29.5 percent; 5–10 years, 34.2 percent; 11–15 years, 19.6 percent; 16–20 years, 9.3 percent; 21 years or more, 7.4 percent. A brief demographic overview of the 322 survey respondents is provided in appendix 2.

Descriptive statistics, correlation coefficients, and reliability figures for the study variables are presented in table 1. The majority of zero-order correlations were statistically significant at $p < .01$. The prevalence of significant relationships may suggest some weaknesses in the study measures. To determine whether an ordinary least squares multiple regression analysis was the appropriate estimator, multicollinearity was tested by collinearity statistics. Eight independent variables' variation inflation factor values indicate there is no severe multicollinearity among the variables.

All of the survey respondents indicated their organizations used Internet-based services, intranets, electronic data-management systems, and knowledge-management systems. However, the data reflect significant differences in mean scores for each variable between public and private employees. Employees in corporations had higher mean scores than public employees for clear vision and goals (4.99 vs. 4.50) and performance-based reward systems (4.24 vs. 3.30). Public employees perceived slightly higher levels of centralization (3.94 vs. 3.53) and formalization (4.51 vs. 4.08) than employees in corporations. These findings are consistent with previous research on the distinction between public and private organizations in other countries (Rainey 2003).

Interestingly, the present study found that public employees perceived lower levels of trust among employees (4.95 vs. 5.33), social networks (3.93 vs. 4.96), IT application utilization (4.98 vs. 5.82), and end-user focus of IT systems (4.53 vs. 5.23) than employees in private industry. Regarding employees' perceptions of knowledge-sharing capabilities, employees in industry perceived higher levels of knowledge sharing than

Table 1 Descriptive Statistics, Reliabilities, and Correlations

	Mean (s.d.)	1	2	3	4	5	6	7	8	9
1. Vision and goals	4.74 (1.16)	1.0	(.93)							
2. Trust	5.13 (0.96)	.56**	1.0	(.81)						
3. Social networks	4.44 (1.17)	.54**	.48**	1.0	(.85)					
4. Centralization	3.73 (1.16)	-.38**	-.33**	-.33**	1.0	(.85)				
5. Formalization	4.30 (0.95)	-.01	-.08	-.02	.39**	1.0	(.75)			
6. Reward systems	3.77 (1.05)	.60**	.41**	.60**	-.28**	-.02	1.0	(.83)		
7. IT application usage	5.40 (1.46)	.29*	.29**	.36**	-.15	-.01	.30**	1.0	(.86)	
8. End-user focus	4.87 (1.17)	.52**	.48**	.55**	-.28**	.03	.49**	.50**	1.0	(.82)
9. Knowledge sharing	4.33 (1.23)	.47**	.37**	.57**	-.34**	-.07	.58**	.48**	.56**	1.0 (.89)

$N = 322$; * $p < .05$, ** $p < .01$; the coefficient alpha reliability estimate for all of variables are reported in the parentheses.

public employees (4.66 vs. 3.82). According to independent sample *t* tests, mean differences between the public and private sector employees were statistically significant for all variables.⁴

The findings indicate that the organizational context of employee knowledge sharing differs between public and private organizations. Although all managers in public and private organizations must deal with organizational context related to employee knowledge sharing, the sectoral differences found in this study suggest that public managers face more organizational constraints on their ability to improve employee knowledge-sharing capabilities. Therefore, the important questions for public managers to ask are how they can overcome these constraints, and how they can improve employee knowledge sharing in the public-sector environment.

Multivariate Analysis

Results from the ordinary least squares multiple-regression analysis appear in table 2. The adjusted R^2 for the model was .51, and the equation achieved statistical significance at the .001 level. Among the organizational culture variables, social network was positively associated with knowledge-sharing capabilities—that is, employees with strong perceptions of available social networks reported higher levels of knowledge sharing than employees who did not. Hypothesis 3, therefore, is supported. Statistical support was also found for hypotheses 4 and 6. The data show that employees who perceived a high level of centralization were less likely to express knowledge-sharing capabilities ($p < .10$). Employees with strong

. . . the sectoral differences found in this study suggest that public managers face more organizational constraints on their ability to improve employee knowledge-sharing capabilities.

perceptions of performance-based reward systems were more likely to express high levels of knowledge-sharing capabilities ($p < .001$). Furthermore, the regression analysis results show that employees who reported a high level of IT application utilization were more likely to

express their knowledge-sharing capabilities at a statistically significant level ($p < .001$). In addition, the data show that employees who perceived their information systems to be user-friendly were more likely to report a high level of knowledge sharing ($p < .01$). These findings support hypotheses 7 and 8.

On the other hand, no statistically significant associations were noted between either organizational vision or trust and employee knowledge sharing (hypotheses 1 and 2). Finally, no statistical support was found for formalization (hypothesis 5) or any of the control variables (table 2).

Results from separate ordinary least squares analyses for each sector are presented in table 3. Both equations achieved statistical significance at $p < .001$. The results for the public sector employees indicate that social networks ($p < .01$), performance-based reward systems ($p < .01$), and IT application utilization ($p < .001$) were all positively associated with high levels of employee knowledge sharing. IT application utilization had the strongest association with employee knowledge sharing in the public sector.

However, end-user focus was not significantly associated with employee knowledge sharing in public

Table 2 Results of Regression Analyses for Employee Knowledge-Sharing Capabilities

Organizational Dimension	Variable	Regression Coefficient (β)	Standard error	<i>t</i>
Culture	Vision and goals	.02	.06	.38
	Trust	-.04	.06	-.91
	Social network	.20***	.06	3.60
Structure	Centralization	-.08*	.05	-1.75
	Formalization	-.03	.06	-.77
	Performance-based reward systems	.28***	.06	5.02
Information technology	IT application usage	.22***	.04	4.82
	End-user focus	.18**	.06	3.36
Control variable	Years of work	.07	.04	1.51
	Position	.03	.04	.67
	Education	-.00	.08	-.11
	Sector	-.00	.12	-.14
	R^2	.532		
	Adjusted R^2	.513		
	<i>F</i>	29.220***		

$N = 322$; $^{\dagger}p < .10$, $*p < .05$, $**p < .01$, $***p < .001$.

Table 3 Results of Regression Analyses Comparing the Public and Private Sector Employees

Organizational Dimension	Variable	Public Employees Regression Coefficient (β)	Private Employees Regression Coefficient (β)
Culture	Vision and goals	-.03	.09
	Trust	-.08	-.04
	Social network	.23**	.17*
Structure	Centralization	-.07	-.11†
	Formalization	-.08	-.00
	Performance-based reward system	.24**	.24**
Information technology	IT application usage	.27***	.15*
	End-user focus	.12	.28**
Control variable	Years of work	.18**	-.16*
	Position	-.05	.22**
	Education	.01	-.00
	R^2	.415	.594
	Adjusted R^2	.374	.563
	F	9.745***	19.558***

Public employees, $N=162$; private employees, $N=160$. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

organizations, as it was for the private sector employees (table 3). The findings imply a need for greater effort and commitment on the part of public sector leaders and managers to build knowledge-sharing capabilities through the establishment of stronger informal and formal networks, performance-based reward systems, and improved IT applications. The results also indicate a positive correlation between years of work experience and knowledge sharing in public sector organizations ($p < .01$). This demonstrates that employees with many years of experience may have diverse social networks as well as work-related experiences within the organization. Accordingly, these social networks and experiences may positively influence knowledge sharing.

Results from our regression analysis for the private sector employees indicate that social networks ($p < .05$), performance-based reward systems ($p < .01$), IT application utilization ($p < .05$), and end-user focus ($p < .01$) were positively associated with high levels of knowledge sharing (table 3). Compared to the regression analysis for public sector employees, the degree of centralization was negatively associated with employee knowledge sharing in the private sector ($p < .10$). In addition, compared to public sector employees, years of work experience was negatively correlated with knowledge-sharing capabilities in the private sector organizations ($p < .05$). For the private sector employees, position was also positively associated with knowledge sharing ($p < .01$), though it was not for the public sector employees.

Based on this study's findings, future researchers may want to examine variances in employee knowledge-sharing capabilities in public organizations in terms of social networks and performance-based reward systems. In public organizations that have already established knowledge-management systems and updated

their IT infrastructures, researchers will have opportunities to use social networks and performance-based reward systems as independent variables for explaining employee knowledge sharing capability variances within and among agencies. A typology construction could be applied to analyze the current state of knowledge sharing across a larger sample of public organizations.

A summary of the intersection of the social network and performance-based reward system variables and how they affect employee knowledge-sharing capabilities is presented in table 4. According to this typology, employees of all organizations represented in the four cells are assumed to use upgraded IT applications. The organizations in cell B have a high number of active employee social networks and strong performance-based reward systems; those in cell C have neither. The organizations in cells A and D are strong in one area and weak in the other. According to our findings, organizations in cell B have the highest degree of employee knowledge-sharing capabilities and organizations in cell C the lowest—even if they have established IT infrastructures and IT applications. Confirming or refuting these relationships requires further empirical evidence.

Implications

According to the data, social networks, centralization, performance-based reward systems, employee usage of IT applications, and user-friendly IT systems significantly affected employee knowledge-sharing capabilities in the 10 public- and private-sector organizations that were the focus of this study. The results for the public sector employees indicate that social networks, performance-based reward systems, and IT application utilization were all positively associated with high levels of employee knowledge sharing. The data also show that IT application usage was the most significant

improve knowledge sharing through employee participation in the design process and training programs.

Conclusion

Social networks, centralization, performance-based reward systems, employee usage of IT applications, and user-friendly IT systems are significant variables that affect employee knowledge-sharing capabilities in public and private organizations. Efforts to improve the knowledge-sharing capabilities of employees in government require organizational leaders to commit to promoting informal and formal networks and knowledge-oriented management practices. To transform a government agency into a knowledge-sharing community, decision makers should assess the knowledge-sharing needs within the agency. Furthermore, the agency should define the knowledge that the agency needs and clarify its purpose in terms of measurable results. Especially in light of the emerging emphasis on e-government and human capital management, agency leaders, IT managers, and human resource managers must collaboratively respond to fundamental environmental changes by encouraging employees' commitment to knowledge-sharing activities and organizational performance.

The associations between organizational context, IT, and South Korean public employees' knowledge-sharing capabilities found in this study can serve as a starting point for research projects involving public sector employees in other countries. An assessment of the validity of our findings would be especially valuable. Future researchers may want to focus on (1) the nature of knowledge (i.e., explicit and tacit) and its impact on employee knowledge-sharing capabilities; (2) motivational factors (i.e., internal and external) and their impact on employee knowledge-sharing capabilities; (3) relationships with recipients and their impact on employee knowledge-sharing capabilities, and (4) knowledge sharing and its impact on organizational performance.

Acknowledgments

The authors wish to thank Rosemary O'Leary and Alasdair Roberts for their comments on an earlier draft of this article, as well as the comments of anonymous reviewers. An earlier draft of this article was presented at the 2005 Annual Meeting of the Hawaii International Conference on System Sciences.

Notes

1. Many industrialized countries have responded to the emerging demand for knowledge management in the public sector. A research survey of 132 central government agencies from 20 countries conducted by the OECD (2003) found that a majority of central government organizations in the OECD member countries had devised knowledge-management strategies and ranked knowledge

management as one of the top five future internal management priorities. Almost 80 percent of organizations surveyed (106 agencies) reported that the total budget allocated to knowledge-management practices had increased in the last five years. According to the survey, France, Sweden, Finland, Iceland, and Canada had higher scores on knowledge-management practices than the OECD average. Countries whose scores were significantly lower than the OECD average included Portugal, Belgium, and Poland. Countries whose scores were close to the average were South Korea, England, Norway, the United States, Denmark, Germany, Hungary, Ireland, Greece, and the Slovak Republic.

2. It is possible to increase flexibility while maintaining a formal hierarchical structure. Kogut and Zander (1992) argue that the vertical transfer of knowledge among organizational functions occurs according to higher-order organizing principles in both formal and informal structures. Examples of formal structures include rules, directives, and routines; informal structures include social networks and practice communities. Nonaka and Takeuchi (1995) indicate that a combination of formal and nonhierarchical or self-organizing organizational structures serves to improve knowledge creation and sharing.
3. The five agencies selected from the South Korean central government engaged in various activities, including general government affairs, information and telecommunications, justice, science and technology, and culture and tourism. The five public sector divisions whose employees were asked to complete surveys for this study were also diverse, including a local finance policy division, an internet policy division, an immigration division, an industrial innovation and support division, and a cultural industry policy division. The five corporations selected for this study were IT-related industry firms. However, the five divisions selected from private organizations were diverse, including a strategy consulting team, a public affairs team, a marketing unit, a public affairs team, and a sales team. All 10 divisions selected for this study were located in Seoul, South Korea.
4. The *t* tests were conducted for random samples of 30 survey respondents from both sectors. The results of the random samples showed that mean differences between the public and private sector employees were statistically significant for the variables of vision and goals, trust, social networking, reward systems, IT application usage, and end-user focus ($p < .001$). Mean differences of centralization and formalization between the public and private sector employees were also statistically significant at $p < .01$. We also conducted an analysis of variance on knowledge-sharing capabilities among the 10 divisions. There was significant difference

among the divisions ($F=6.602, p < .001$). According to the study, four divisions within the public sector had the lowest employee perceptions of knowledge-sharing capabilities. Three divisions from the private sector had the highest employee perceptions of knowledge-sharing capabilities. One division from the public sector and two divisions from the private sector were established as the second group, indicating a middle level of employee perceptions of knowledge-sharing capabilities. These results reveal that employees in the private sector perceived higher levels of knowledge-sharing capabilities than their counterparts in the public sector. Statistical comparisons between the five public-sector divisions reveal there was no significant difference between the organizational divisions in terms of employee perceptions of knowledge-sharing capabilities. However, statistical comparisons between the five private-sector divisions indicate there was a significant difference between divisions in terms of employee perceptions of knowledge-sharing capabilities ($F=2.557, p < .05$). These findings can be generalized on only a very limited basis because of the sampling bias.

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Appendix 1 Survey Items

Responses to items marked with an asterisk (*) were measured along a seven-point frequency of usage scale, where 1 = “almost never” and 7 = “almost always.” Responses to all other items were measured along a seven-point agreement scale, where 1 = “strongly disagree” and 7 = “strongly agree.”

Vision and Goals

1. My organization has an organizational vision.
2. Top management leaders present a clear organizational vision and communicate it to employees.
3. Overall, organizational vision and goals are clearly stated in this agency.
4. I understand my organization's goals.
5. I can explain my organization's vision and goals to others.

Trust

1. I have full confidence in the skills of my coworkers.
2. I trust the expertise of my coworkers.

3. If I face difficulties at work, I know my coworkers will try to help me out.
4. My coworkers do not try to deceive me for their own profit.

Social Networks

1. I communicate with other employees through informal meetings within the organization.
2. I interact and communicate with other people or groups outside the organization.
3. I actively participate in communities of practice.

Centralization

1. Little action can be taken until a supervisor approves a decision.
2. A person who wants to make his or her own decision without consulting his or her supervisor will be quickly discouraged.
3. Even small matters have to be referred to someone higher up for a final answer.
4. Any decision I make has to have my boss's approval.
5. I rarely participate in decisions on adopting new policies or programs.

Formalization

1. Each unit in this agency has well-established formal rules, task guidelines, and operational procedures.
2. There are many rules in this job.
3. The employees are constantly being checked on for rule violations.
4. I always carry out my tasks according to rules and formal organization documents.
5. I feel as though I am constantly being watched to see that I obey all the rules.

Performance-Based Reward Systems

1. I feel that employees are promoted to higher positions not for years of work but for competencies and performance.
2. Individual or team-based performance is measured with fairness.
3. This organization provides me with fair opportunities for advancement and rewards based on performance.
4. I am satisfied with the amount of pay and rewards I receive based on my job performance.

Information Technology Utilization*

1. I regularly use the Internet, e-mail, and electronic bulletin boards.
2. I regularly use our organization's intranet.
3. I regularly use our organization's DB (database) and/or EDMS (electronic data management system).
4. I regularly use our organization's KMS (knowledge management system).

End-User Focus (Perceived Ease of IT Application Use)

1. In this agency, information systems and software are designed to be user-friendly.
2. It is easy for me to use information systems without extra training.

Knowledge Sharing

1. I voluntarily share my know-how, information, and knowledge with other employees.
2. I cooperate or communicate with other employees in teams or groups for sharing information and knowledge.
3. I can freely access documents, information, and knowledge held by other divisions within the organization.

Appendix 2 Characteristics of Survey Respondents

Classification		Public Employees (N= 162)		Private Employees (N= 160)		Total (N= 322)	
		Number	Percent	Number	Percent	Number	Percent
Gender	Male	140	86.4	138	86.3	278	86.3
	Female	22	13.6	22	13.8	44	13.7
Age	20–29	13	8.0	27	16.9	40	12.4
	30–39	95	58.6	101	63.1	165	51.2
	40–49	46	28.4	32	20.0	102	31.7
	50–59	8	4.9	—	—	15	4.7
	Less than 5	36	22.2	59	36.9	95	29.5
Years of work experience	5–10	52	32.1	58	36.3	110	34.2
	11–15	32	19.8	31	19.4	63	19.6
	16–20	19	11.7	11	6.9	30	9.3
	21–25	18	11.1	1	0.6	19	5.9
	26–30	4	2.5	—	—	4	1.2
	More than 31	1	0.6	—	—	1	0.3
Education	High school	8	4.9	—	—	8	2.5
	Two yrs college	13	8.0	10	6.2	23	7.1
	Four yrs college	111	68.5	118	73.8	229	71.1
	Master's degree	27	16.7	29	18.1	56	17.4
	PhD candidate	2	1.2	3	1.9	5	1.6
	PhD	1	0.6	—	—	1	0.3
Position	Low level	22	13.6	40	25.0	62	19.2
	Mid level	84	51.8	84	52.5	168	52.1
	High level	56	34.6	36	22.5	92	28.5