

Running Head: Management Capacity and Government Innovation

**The Quality of Management and Government Innovation:
An Empirical Study**

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ABSTRACT

A common assertion within public management is that management capacity drives policy outcomes. This study tests that argument, focusing on an important policy outcome—innovation. Data were drawn from the Korean government to examine the impact of governments' management capacity for adoption, implementation, and diffusion of government innovation. Our findings confirm that both managerial behavior and structures are drivers of government innovation. Innovative leadership, in combination with effective strategic planning and strong commitment to innovation, appears to be the most important factor throughout the innovation process and especially at the innovation adoption stage. However, the implementation of innovative projects requires full-scale management capacity, encompassing leadership, a quality workforce, appropriate structures/systems, and the ability to managing external influences. The diffusion of innovation is heavily influenced by effective network management, presumably because consistent interaction with multiple stakeholders reduces the uncertainty about new initiatives. Some words of caution about the Korean government innovation were addressed in the conclusion.

Government performance is a long-standing issue in public administration. Not surprisingly, productivity, excellence, and innovation in government have been major areas of study in public administration as plausible venues for performance improvement (Holzer and Callahan 1998; Osborne and Gaebler 1992; Peters and Waterman 1982). Especially, government innovation research has gained in popularity since 1960s as the pressure for performance under conditions of limited resources require new and more effective ways of service delivery (Borins 1998; Deutsch 1985; Dimock 1986; Light 1998; Mohr 1969; Moon and DeLeon 2001; Rainey and Ryu 2004; Rogers and Kim 1985; Simon 1967; Stone 1981; Thompson 1965; Wilson 1966; 1989). Research grants, award programs, and recognitions of innovative practices have accelerated innovation research in public administration.¹

Even though considerable research on innovation has been conducted, critical questions remain unexamined. Under what conditions do organizations innovate, adopt and implementing implement new practices? In what ways can innovation within an organization be put forward to achieve intended outcomes? Recently, a link between public management capacity and government performance has been recognized (Coggburn and Schneider 2003; Donahue, Selden, and Ingraham 2000; Ingraham, Joyce, and Donahue 2003; Ingraham and Donahue 2000; Lynn, Heinrich, and Hill 2000; Riccio, Bloom, and Hill 2000). In keeping with this line of thinking, we assert that greater management capacity would increase the chance for successful government innovation, which is arguably a crucial venue for improving performance.

This study seeks to test the assertion using a rich set of quantitative data from the Korean government. Despite its popularity, innovation—its adoption, implementation, and diffusion—has been taken for granted and little empirical research has been conducted to

examine the contribution of management capacity to understanding government innovation. Quantitative data at different levels of government could advance the present stream of innovation research, which has relied heavily on case studies and thus raised the questions of generalizability and validation of the research findings (Heinrich and Lynn 2000; Rainey and Ryu 2004). With the analysis of a large quantitative dataset, this study contributes to a durable knowledge of government innovation that can be applicable to different times, places, and contexts (Lynn, Heinrich, and Hill 2000).

In the data analysis, we address following two specific research questions: (1) Is there empirical evidence that management capacity—the ability to manage people and administrative structure and translate them into public services—indeed contributes to the adoption, implementation, and diffusion of government innovation? (2) If so, which elements of management capacity would be influential in the adoption, implementation, and diffusion of government innovation? The empirical findings presented here are exploratory in nature since little research has been conducted to assess the impact of the management capacity on the innovative practices in government with a quantitative dataset. Thus, hypotheses testing and findings are preliminary.

We first propose a model of management capacity and government innovation, followed by research hypotheses. Our theoretical and analytical examinations are based on large-scale government innovation in Korea, which provided a rich research context. Next, we introduce the sample data and the measures of both independent and dependent variables. Then, we describe the methods of data analysis and present our results. Finally, the paper concludes with a discussion of the findings and implications of the data analysis.

MODEL OF MANAGEMENT CAPACITY AND GOVERNMENT INNOVATION

Although government innovation and ongoing productive change are perennial issues, accumulated knowledge on government innovation is still lacking. This paucity of knowledge in government innovation is no help to public managers who need to learn how to change management practices within their agency to keep it more competitive (Linden 1990; Riccio, Bloom, and Hill 2000). Building models and testing them with representative samples would provide useful knowledge for public managers about what drives government innovation. Exhibit 1 proposes a model of management capacity and government innovation. The model suggests that public management capacity matters in the adoption, implementation, and diffusion of innovation and improving capacity would lead to better government performance.

----- Insert Exhibit1 about here -----

Dependent Variable: Government Innovation

Although public organizations are increasingly required to run programs innovatively, public employees often attempt to avoid innovation due to the pressure for accountability from external authorities. Bureaucrats know that accountability is most pressing when things go wrong. In such situations, non-adherence to rules is punished and innovation is not rewarded. Thus, even when agencies are encouraged to be innovative, bureaucrats have incentives to be cautious, rigid, and resistant to change (Romzek and Ingraham 2000, 250). Thus, innovation deficiency seems to be a major feature in public organizations (Golembiewski and Vigoda 2000)

Innovation in government may be harder than the private sector, but an increasing body of research indicates that innovations are no longer found exclusively in the private sector. Public agencies have become a key player in creating and implementing novel

practices of management (e.g., Borins 1998; Goodsell 2004; Holzer and Callahan 1998; Linden 1990; Osborne and Gaebler 1992; Rainey and Thompson 2006). The Innovation Series by the IBM Center for the Business of Government, for example, documents many fruitful efforts by government agencies at all levels and provides useful insights to practitioners and researchers. Success stories reported from outside of the US bring more optimism about change and innovation efforts by public organizations. A recent report by the United Nations (UN) provides a list of public sector innovations from different countries within different continents. More promising is that the scope of these innovations is far-reaching, ranging from service provision, e-government, and internal management process to regulatory activities and citizen participation, just to name a few.

Government-wide innovation efforts by the Korean government are extraordinary in this regard. The Roh Moo-Hyun Administration, which came into office in 2003, set government innovation as one of the top national agendas and focused its resources to create a new and improved administrative system. The momentum for this drive was the president's firm belief and his leadership in innovation. Government innovation is a popular agenda in many countries, but it is not common for a presidential administration to make such a strong commitment to the issue. In addition, some urgency was created by a critical external event. The social and economic shocks caused by the currency crisis in the late 1990s made government innovation inevitable, opening a wide window of opportunity for the proponents of large-scale government innovation and change.

The results of its innovation endeavors are impressive and deserving of special attention. Innovation in the Korean government has been seen as comprehensive, systematic, and successful in institutionalizing a culture of constant change. In 2004, the Korean

government was ranked 5th out of 191 countries in the e-Government Readiness Index developed by the UN. Seoul, the capital city of Korea, retained the number one position in the world in its e-government performance, according to a joint survey conducted by the US and Korea in 2006. The Ministry of Government Administration and Home Affairs (MOGAHA) announced that a total of 686 best practices have been identified and pertinent information disseminated to both central and local governments over the last four years.²

In this article, adoption, implementation, and diffusion of innovation in the Korean government serve as our dependent variables primarily for two reasons. First, innovation is typically measured by the number of innovations adopted within a given period (e.g., Mohr 1969; Daft and Becker 1978; Schneider 2007). Innovation does not simply mean the adoption of new ideas, processes, products or services to an adopting organization, however; it also implies bringing them into use for a new way of organizational management (Wilson 1989). As a consequence, innovation is fundamentally biased for action (Drucker 1985; Thompson 1965). Accordingly, this study includes not only adoption but also implementation as critical features of innovation.

Second, innovation is intended to improve organizational performance by disseminating new management practices to other relevant organizational units (Mone, Mckinley, and Barker 1998; Rogers and Kim 1985). Kanter (1988) argues that diffusion is the culmination of innovation production, but diffusion research is not common in the innovation literature. He claims that “it [diffusion] demands more attention, particularly with respect to innovations that themselves have organizational consequences. Unfortunately, much of the literature is shortsighted as it is still looking for determinants of adoption of innovations in

individual attitudes or intraorganizational structures” (203). Thus, diffusion is considered an important dimension of government innovation in the current analysis.

Independent Variable: Management Capacity for Innovation

Many factors account for the Korean government’s successful innovation experiences. Strong presidential commitment to innovation is often referred to as an important success factor. However, the leadership approach may underestimate the importance of the management capacity and related variables in the adoption and successful implementation of new initiatives (Perrow 1970). Exploring management variables would not only improve the understanding of leadership effects on innovation but also pave the way to building a stable condition for ongoing innovation (Light 1998; Wilson 1989). Light (1998) acknowledged that one-shot dramatic successes may or may not be sustainable. Repeated and sustainable innovation is important for effectiveness. Dissecting “the black box” would help to explain how the capacity of public management influences government programs that depart from the traditional routines or patterned practices of getting things done.

Management capacity here is defined as “government’s ability to develop, direct, and control its resources to support the discharge of its policy and program responsibilities (Donahue, Selden, and Ingraham 2000, 384). Management practices and systems have an important influence on government performance (Cogburn and Schneider 2003; Donahue, Selden, and Ingraham 2000; Ingraham, Joyce, and Donahue 2003; Ingraham and Donahue 2000; Lynn, Heinrich, and Hill 2000). Consistent with the literature, we hypothesize that management capacity would matter for innovation, which in turn affects performance.³ Our hypothesis, however, is set within the daunting methodological challenge of identifying what constitutes management capacity in terms of innovation and how to measure that with

representative samples and reasonable methodological sophistications (Donahue, Selden, and Ingraham 2000; Holzer and Callahan 1998; Rainey and Steinbauer 1999). Unfortunately, no direct measures of management capacity are available and the criteria for what constitutes important management capacity vary among organizations (Ingraham and Donahue 2000, 306).

In the model, we propose that public management capacity for innovation depends on: 1) innovative leadership, 2) quality of workforce, 3) systems and structures that are amenable to innovation, and 4) capacity of managing external influences. These dimensions of management capacity were extracted from the existing dataset designed and collected by the Korean government. Consequently, we cannot claim that our model is comprehensive, but it is generally consistent with Light's (1998) four factors that influence sustained innovation: 1) the external environment, 2) the internal structure, 3) leadership, and 4) internal management systems.

Innovative Leadership The literature has found that effective leadership consistently proves to be an important independent variable in innovation (Damanpour 1991; Holzer and Callahan 1998; Ingraham and Donahue 2000; Mohr 1969; Moynihan and Ingraham 2004). Mohr (1969), for example, provides empirical evidence that leadership in local public health departments has a significant impact on the number of nontraditional programs adopted and the increase in resources devoted to those programs. Rainey and Steinbauer (1999) characterize effective leadership as the one with “more stability, multiplicity, commitment to mission, effective goal setting, and effective administrative and political coping” (18). Consistent with the authors and given the existing dataset, we selected effective strategic

planning, commitment to innovation, and leadership stability as major features of innovative leadership that would affect government innovation.

We expect that effective strategic planning would have a positive influence on government innovation. Strategic planning as a leadership-intensive management process can provide an arrangement in which leaders communicate the importance of innovation and develop action plans to promote innovation throughout the organization. Strategic plans for relieving change resistance, analyzing potential barriers of innovation implementation, and establishing specific performance indicators would contribute to the adoption and successful implementation of innovation. However, too much specificity within the plans might stifle management creativity (David 1989).

Innovative leadership is action-oriented and makes a strong commitment to change established routines and practices (Moon 1999). Innovative leaders are actively engaged in management systems and encourage employees to propose and implement new ideas and practices without fear (Moynihan and Ingraham 2004). On-going communication with employees is particularly important to reduce uneasiness as innovation tends to face highly uncertain future returns (Greve and Taylor 2000, 55). Innovative leaders are also entrepreneurs; they are willing to take risk and consistently undermine obstacles their innovations face (Sanger and Levin 1992). This entrepreneurship, however, may be extravagant in government because political environments do not tolerate failure from public managers (Linden 1990, 27-8).

Leadership stability is a controversial variable in innovation research. Rainey and Steinbauer (1999) found a clear linkage between stable/long-term leadership and the effectiveness of public agencies. When it comes to innovation, however, outsiders may be

better able to bring new ideas and management practices from different angles with less exposure to bureaucratic inertia (Kanter 1988). Kimberly and Evanisko (1981) also claim that “new leaders with fresh perspectives and unfettered by obligations to particular organizational constituencies might be more likely to advocate and support innovations” (696).

Hypothesis 1: Adoption, implementation, and diffusion of government innovation are positively influenced by innovative leadership with effective strategic planning capabilities, strong commitments to innovation, and shorter terms of office.

Quality of Work Force No innovation can be successful without strong employee commitment to change because employees are the source of information about administrative reality. Viewing them as the driving force for innovation, many well-performing organizations encourage employee participation and support small learning groups to encourage novel practices for improving performance. However, bringing employee commitment to innovation is a daunting task in government because bureaucratic accountability discourages departure from traditional routines and bureaucrats are often rewarded if they are cautious about innovation (Golembiewski and Vigoda 2000; Romzek and Ingraham 2000). It may be true that simply “feeling valued and secure helps people relax enough to be creative” (Kanter 1988, 183).

Innovation involves the production of proposals and the development of new technologies that often require professional knowledge and skills. Not surprisingly, innovative organizations tend to be more professional than non-innovative ones (Damanpour 1991; Mohr 1969; Thompson 1965). Damanpour (1991), for example, reported that the degree of professionalism of employees appears to be an important determinant across 23 empirical studies on innovation. We also expect that organizational leaders and employees who are

equipped with state of the art technologies or problem solving techniques tend to be innovative.

Hypothesis 2: Adoption, implementation, and diffusion of government innovation are positively influenced by a high quality workforce with strong commitment to innovation and a high degree of professionalism.

Systems and Structure The quality of management systems and structures determine agency innovativeness along with innovative managerial behavior. Team structures and team-based management have swept through many public agencies, emphasizing the importance of communication with autonomy in decision making (Rainey 2003, 333). Within the team, top managers often directly work with their employees and share their substantial authority to make important decisions. The sharing power and autonomy eliminates bureaucracy and encourages employees to develop and propose new ideas with no intervening organizational barriers (Kanter 1988, 191).

Consistent sharing and communication of information and knowledge within a loosened organizational structure increases the chance for successful innovation because a dynamic learning process within and between organizational units promotes novel ideas and creative imitation (Van De Ven 1986; Thompson 1965). The tremendous growth of e-government has multiplied the capacity of knowledge sharing in public agencies by increasing online communication. In addition, traditional offline sharing systems using work teams or learning groups can also have profound impacts on knowledge sharing for innovation.

Sustained innovation requires appropriate and timely rewards for the development of creative ideas and new behaviors that can bring new products and services. Extrinsic rewards—such as special promotions, bonuses, and fair performance appraisals—can certainly encourage creative achievements (Quinn 1985). However, extrinsic rewards alone

may simulate conformity rather than innovation (Thompson 1965). Intrinsic rewards—such as memberships on teams, task forces, and committees, and participative management—are also equally important to stimulating productive proposals and implementing them (Kanters and Summers 1987; Wilson 1966).

Finally, comprehensive evaluations of innovative ideas and implementation and timely feedback about the results of the evaluations are crucial for sustained innovation. The evaluation must be comprehensive, including both processes (e.g., managing personnel, allocating budget, and marshalling structures) and outcomes (e.g., organizational efficiency and citizen satisfaction).

Hypothesis 3: Adoption, implementation, and diffusion of government innovation are positively influenced by the use of team structures, knowledge sharing systems, rewards for innovation and timely evaluation/feedback systems.

Managing External Influences Government agencies cannot be run in a vacuum; they are heavily influenced by politics and political process. In their analysis of the IRS transformation, Rainey and Thompson (2006) share the lesson from Charles Rossotti, the former IRS Commissioner, that “change in any large organization has limits set by constraints in its broader context. The leaders and employees of the IRS cannot fix the tax code or the tax system by themselves; political leaders must support the necessary reforms” (602). The capacity of the agency to marshal resources to accomplish its goals and objectives directly depends on how it manages external environments effectively in order to obtain political supports for innovation.

Because political support heavily influences government to perform effectively, it can be a source of agency power to initiate and implement new programs (Meier 1993). We expect that political support for financing new programs, and effective network management

for obtaining consensus among multiple stakeholders, would facilitate the innovation process as frequent interactions decrease potential conflicts and generate agreed-upon innovations. Since an innovation may be treated as good or bad depending on how multiple stakeholders view it, the innovation process requires a sophisticated ability to manage network interactions and draw innovative outcomes that are mutually beneficial (Rahim and Wolfe 2000).⁴

Hypothesis 4: Adoption, implementation, and diffusion of government innovation are positively influenced by effective management of external influences.

DATA AND METHODS

Data

Data were drawn from the Government Innovation Index (GII), a web-based innovation diagnostic tool developed and implemented by the Headquarters for Government Innovation (HGI) in the Korean Ministry of Government Administration and Home Affairs (MOGAHA) in 2005.⁵ The GII diagnosed the innovation level of government agencies, focusing on major innovation management components, including 1) innovation vision and strategy; 2) innovation leadership; 3) innovation capability; 4) systemization of innovation; and 5) innovation execution. The entire diagnostic process was completed online between July 18 and 23 in 2005.

The GII data were collected as follows: A designated innovation official and two other public officials from each agency, randomly selected by the HGI, went on the website, called up the GII System, and simultaneously answered a set of questions that assess various innovation management components. The HGI took the median answers of the three surveys. If there was a significant difference among the three answers, the HGI required the agency to provide supporting documents to check for possible discrepancies. Significant outliers

detected among agencies were also cleared by the HGI with supporting documents and interviews with the innovation officials in the agency. Answers from each respondent relied more heavily on factual data than on normal Likert Scale questions in order to avoid the social desirability problem (Yoonb 2006). This rigorous data filtering process reduced perceptual biases and eliminated inflation of correlations that can arise when the same respondents are the sources of information for both independent and dependent variables (Daft and Becker 1978, 28).

All 51 central government agencies and 250 local government agencies (a total of 301 government agencies in Korea) provided factual information on the adoption, implementation, and diffusion aspects of their innovative programs. The mandatory requirement of the GII data entry from the HGI resulted in a 100 percent response rate. Samples in the central government include 18 departments, 25 agencies, and eight commissions. Samples in the local government agencies encompass eight provinces, seven special metropolitan cities and 69 districts within them, 88 counties and 77 cities.

Measures

Dependent Variable: Adoption, Implementation, and Diffusion of Innovation

The number of innovations adopted in each agency was calculated by the response to the following question in the GII: “During the year of 2004, how many new programs or practices were adopted in your agency?”

Measuring the performance of innovation implementation is a daunting task in part because ambiguous goals in government agencies create considerable difficulty in determining actual accomplishments (Rainey 2003), and also in part because program implementations occur continuously and none of the programs are undertaken independently.

The performance of innovation implementation was measured by index scores assessing the extent to which an agency implements its new programs or practices as planned. A group of scholars and practitioners appointed by the HGI generated the implementation index scores of each agency in December 2004, based on the review of the agency performance reports and on-site visits to collect further information using interview, additional document reviews, and the agency briefing. The evaluation group specifically focused on the following four criteria: (1) the agency efforts to identify innovative ideas and the potential value of them, (2) goal clarity to accomplish the identified innovative tasks, (3) effective marshalling resources and obtaining cooperation from other agencies to accomplish its goals, and (4) measurable results of the innovation implementations. Each of these four criteria received maximum 20 points, totaling 80 scores.

Diffusion of innovation was dummy coded (0=no, 1=yes) from this question in the GII: “Have your agency innovative programs been disseminated or adopted by the outside agencies through benchmarking, media, official agreements, innovation award competitions, and other mechanisms?”

Independent Variable: Management Capacity

In this study, management capacity was composed of the following four latent variables: innovative leadership, quality of workforce, systems and structures, and managing external influences.

Innovative leadership was measured by the quality of strategic planning, commitment to innovation, and leadership stability in the agency. The quality of strategic planning was measured by the following eight items in the GII: Whether the agency strategic planning includes: (1) a set of annual goals to be accomplished; (2) regular analysis of citizen needs;

(3) monthly plans for the implementation of innovative tasks; (4) itemized budgets to implement innovative tasks; (5) implementation plans consistent with annual goals; (6) specific performance indicators to measure goals; (7) a set of change management strategies such as conflict management; (8) systematic analyses of innovation barriers. These eight items were standardized, combined and averaged to generate the quality of strategic planning variable (*Cronbach's* $\alpha=.76$).

Leadership commitment was measured by the following six items in the GII. The first four items are: How many times does your agency leader (1) hold a meeting for the agency innovation?; (2) participate in the meeting for the agency innovation?; (3) contact the innovation official in the agency?; (4) communicate with agency employees to discuss about innovation? In addition, (5) has your agency leader proposed any innovative ideas? (0=no, 1=yes); (6) how many proposed ideas have been actually implemented? (*Cronbach's* $\alpha=.76$). We standardized, combined and averaged these six items to generate the leadership commitment variable. Finally, leadership stability was calculated by the number of months that have passed since the agency leader took his or her current position.

The quality of workforce was composed of the following two variables: employee commitment and their level of professionalism. Employee commitment was measured by the following three items in the GII: (1) the number of official learning groups in the agency for identifying areas for innovation; (2) the number of taskforces in the agency specifically designed for solving problems that may occur during the implementation process; and (3) the number of voluntary groups for innovation within the agency. We standardized, combined and averaged the three items to generate the employee commitment variable (*Cronbach's* $\alpha=.77$). Professionalism was measured by the number of training programs in the agency—

such program as problem-solving, 6sigma, and process reengineering—specifically designed for increasing capacity for innovation.

Systems and structures in the agency were measured by the following four variables: team structures, knowledge sharing systems, reward systems, and evaluation/feedback systems. The team structures in the agency were dummy coded (0=no, 1=yes) by the response to the question “Is your agency structured by team for continuous innovation?” Knowledge sharing systems were also dummy coded (0=no, 1=yes) by the response to the following two questions, “Does your agency have (1) online and (2) offline information systems for sharing innovative knowledge, ideas, and practices?” Reward systems were dummy coded (0=no, 1=yes) by the following four items in the GII: Does your agency offer (1) cash rewards; (2) favorable ratings in performance appraisals; (3) special promotions; and (4) other benefits for innovative accomplishments? (*Cronbach’s* $\alpha=.73$). We combined these four items into a composite measure of reward system. Evaluation/feedback systems were dummy coded (0=no, 1=yes) by the response to the question, “Does your agency set up evaluation and feedback systems for assessing the results of innovation implementation?”

Managing external influences was composed of the following two variables: political support for financing new programs and effective network management to obtain wide-ranging support for innovation from multiple stakeholders. The first variable was calculated by a natural log transformation of the size of the agency budget specifically allocated for implementing new programs in 2004. Effective network management was dummy coded (0=no, 1=yes) by the response to the question, “Has your agency made known innovation activities and accomplishments to within and outside the agency using such tools as newsletters, media, publications, and internet?”

Finally, we controlled the following three variables, assuming that the agency innovation tends to differ depending upon organizational characteristics: (1) organizational size measured by a natural log transformation of the number of full-time agency employees in 2004; (2) task complexity measured by the number of rank 4th and higher levels of public officials;⁶ and (3) task nature, which was dummy coded as 0=policy making agency, 1=policy implementation agency.

ANALYSIS AND RESULTS

Differing features of the three dependent measures (adoption, implementation, and diffusion of government innovation) require different analytical approaches to test the aforementioned four hypotheses.⁷ Exhibit 2 shows the descriptive statistics for management capacity and government innovation. Exhibit 3, 4, and 5 illustrate the results of the data analysis using three different analytical approaches (negative binomial regression, OLS regression, and logit regression, respectively). A listwise deletion of the Stata program reduced the number of observations from 301 to 274 agencies.

----- Insert Exhibit 2 about here -----

Negative binomial regression was used to explain the number of innovation adoptions in each agency. Negative binomial regression is a proper fit for the model because the dependent measure (innovation adoption) is a count holding discrete variable with a preponderance of zeros and small values (Greene 1993).⁸ As Figure 1 shows, the number of innovation adoption is overdispersed with a predominance of zero and small number of adoptions in many agencies. While the mean number of innovation adoption per agency is 5.16 with a range of 0 to 54, the standard deviation is 7.9. The frequency distribution shows

that about half of the 301 total sample government agencies reported either zero (148 agencies) or just one innovation adoption (41 agencies), whereas each of the top four agencies adopted more than 35 innovative programs in 2004.

----- Insert Figure 1 about here -----

Exhibit 3 shows that effective strategic planning has the greatest impact on the number of innovation adoptions in the agency. For a standard deviation increase in the leaders' ability to make an effective strategic planning, the expected mean number of innovation adoption increases by 51 percent, holding all other variables constant. In addition, for a standard deviation increase in leadership commitment to innovation, the expected mean number of innovation adoption increases by 28 percent, holding all other variables constant. Although not significant at .05 level, online knowledge sharing system has a modest but not trivial impact on the innovation adoption ($p < .10$). Among control variables, organizational size shows a significant influence ($p < .05$), indicating that a large variation in innovation adoption may occur in part because of the different sizes of organization that can bring different amounts of resources to spend for innovation.

----- Insert Exhibit 3 about here -----

Exhibit 4 clearly shows that the performance of innovation implementation derives from both managerial behaviors and systems/structures (Ingraham and Donahue 2000, 296). OLS was used for this model because of the normal distribution of the interval dependent measure. The results in Exhibit 4 are highly significant, $F(15, 258) = 13.08$, $p < .0000$, and the independent variables explain about 40 percent of the variance in the performance of innovation implementation. Both effective strategic planning ($p < .01$) and leadership commitment ($p < .01$) present significant impacts on innovation implementation. As we

expected, leadership stability shows a negative impact on implementation ($p < .05$), which indicates that someone whose term of office is shorter than others is likely to bring fresh ideas and perspectives with less degree of bureaucratic inertia (Kanter 1988). The quality of workforce does also have significant impact on implementation performance, as evidenced by significant contributions from both employee commitment ($p < .05$) and their levels of professionalism ($p < .05$).

Systems and structures also contribute to the performance of innovation implementation. Those agencies with team-based structures ($p < .05$) and appropriate reward systems ($p < .01$) tend to implement their innovative programs successfully as planned. In addition, the significant impact of effective network management ($p < .05$) shows that the success of innovation implementation requires substantial political support from multiple stakeholders. The performance of innovation implementation differs from agency to agency. Large agencies tend to be successful ($p < .01$) in part because of their ability to generate greater resources. Also, those agencies whose tasks are primarily geared toward policy implementation tend to be successful ($p < .01$) presumably because implementation processes and outcomes are likely to be visible and measurable.

----- Insert Exhibit 4 about here -----

Exhibit 5 shows the results of logit regression that tests the individual impact of the management capacity variables on innovation diffusion. Logit regression was used for this model because of a dichotomous dependent variable. The descriptive analysis (see Exhibit 2) indicates that while a majority of agencies (84 percent of 301 agencies) have successfully disseminated their innovative programs through various tools (e.g., official agreements with

other agencies, newspaper publications, and innovation award competitions), 48 agencies (16 percent) failed to disseminate their achievements to other agencies.

----- Insert Exhibit 5 about here -----

The model is highly significant ($p < .0000$), but our hypotheses are partially supported. Consistent with the Exhibit 3 and 4, leadership commitment significantly increases the probability of disseminating agency innovations ($p < .05$), but effective strategic planning and leadership stability have no noticeable impact on innovation diffusion. In the structure variables, evaluation and feedback systems alone increase the probability of innovation diffusion ($p < .05$). Conceivably, evaluation and feedback systems filter a set of innovative programs in order to improve their quality and sustainability, which in turn attracts outsiders to benchmark the programs that have proven quality. Notably, effective network management has the greatest impact on innovation diffusion ($p < .001$). Presumably, efforts to share innovation activities of an agency would reduce the uncertainty among major stakeholders about the newly developed programs or practices and, accordingly, would increase the probability of adopting their innovations.

DISCUSSION AND CONCLUSION

Although there is a growing consensus that management matters for program performance, an ambiguous link between management systems and government innovation gives little guidance for government managers who are increasingly required to learn how to create management capacity amenable to innovation. The results of the data analysis in this article confirm the arguments of public management scholars that management capacity does

matter in government innovation, which is arguably a crucial variable for government performance (Ingraham, Joyce, and Donahue 2003).

Innovative leadership seems to be the most important variable that can explain the dynamics of government innovation. The data advised that the adoption and implementation of innovative programs requires effective strategic planning that not only clarifies goals and performance indicators for innovation to be measured but also predicts citizen needs, innovation barriers, and potential change resistance. Strong leadership commitment to innovation also presented consistently significant effects on innovation. In all likelihood, innovations would not even begin in government without strong leadership commitments that can protect employees from accountability pressures (Carnevale 2001). Contrary to the performance literature that claims a strong tie between stable leadership and performance, new leaders' willingness to take risks for new projects with fresh perspectives, rather than their years of experience, decided the success of innovation implementation. This raises a perplexing question of how to create a culture of risk taking behavior within public managers whose environment simply would not tolerate even one failure (Linden 1990, 27).

Employee commitment and their professionalism were found to be important in the implementation of innovative programs. Innovation through active employee participation is a key strategy of the Korean government innovation. Official learning groups and voluntary small groups within the agency have identified areas for innovation with support from taskforces, which are temporary problem-solving teams established to deal with challenges and barriers of innovation. In addition, emphasis on innovation education programs, such as problem-solving, 6sigma, and process reengineering, accelerated employee participation by

increasing employee motivation and confidence in how to work out new programs (Yoona 2006).

Transforming managerial behaviors to those that are well suited to innovation requires appropriate systems and structures that can encourage creativity and expedite the innovation process. Our finding indicates that team structures played a significant role in the implementation of agency innovative programs. Presumably, at the organizational level, teams can provide flexibility in dealing with complex policy problems by breaking them down into manageable pieces and assigning them to separate teams.⁹ At the individual level, teams “help to maintain a high quality of workforce by satisfying needs of their members” (Schermerhorn, Hunt, and Osborn 2005). The significance of team suggests that policy outcomes are not only behaviorally driven but also structurally driven by empowering employees with a proper responsibility for a specific segment of finished work (Ingraham and Donahue 2000, 296).

Timely rewards for creativity and novel approaches also increased the chance for successful innovation implementation. Although Thompson (1965) warned that extrinsic rewards, for the most part, stimulate conformity rather than innovation, our finding suggests that creativity is promoted by both intrinsic (e.g., teamwork, innovation awards) and extrinsic rewards (e.g., special promotion, favorite ratings in performance appraisal, and special bonus). These rewards do not necessarily need to be based on “after the fact” achievements but can be investments in people before they start a project. “Investment-centered” rewards may work better than traditional “payoff-centered” rewards when it comes to innovation, which focuses on what organizations seem to require in the future (Kanter 1983, 154; Linden 1990, 33).

Evaluation and feedback systems increased the quality of program implementation by assessing the utility of new programs and refurbishing them into the new innovation cycle. Unexpectedly, our finding did not confirm the value of evaluation and feedback systems in the implementation of innovative programs. Instead, they significantly increased the probability of innovation diffusion. Conceivably, systematic assessments for the utility of new programs could reduce the uncertainty about the quality of innovations and increase a chance to be adopted by other agencies because of their proven quality.

In public organizations where political environment determines performance, quality of network relationships may account for the fate of innovation (Kanter 1988, 185). Our finding also made it clear that effective network management does increase the chance for the successful implementation and diffusion of innovations. Consistent communications with multiple stakeholders using such tools as media, publications, and internets would increase understanding about new behaviors and bring political supports for the change. This finding clearly provides empirical evidence rejecting the politics-administration dichotomy and confirms the importance of securing political support from external factors for successful implementation and diffusion of government innovation (Cogburn and Schneider 2000, 211; Breul 2007, 21). However, political responsiveness does not often get along with innovation, which requires risk taking, unprogrammed tasks, and autonomy (Lynn 1997, 99). Reconciling political responsiveness and innovation requires continued attention.

Although large-scale innovation is particularly difficult to implement in government due to the distinctive characteristics of political environment, more and more evidence is being accumulated about successful change and innovation initiatives by government agencies. The success of innovation in Korean government is a prime example.¹⁰ However,

some words of caution should be made before making such a conclusion. First, although government innovation received substantial support from the president in that he set innovation as one of the top components of the national agenda, such strong commitment may bring unproductive competition among agency leaders. Negligible impacts of online and off-line knowledge sharing systems on innovation as reported in the analysis may imply uneasiness in sharing their novel approaches due to concern that their agency will lose its competitive position. Consequently, agency leaders have tried to make innovation results look good by focusing on short-term projects in order to receive positive evaluations (Yoon 2006a, 7).

Second, the descriptive statistics of innovation adoption (see Figure 1) showed that the mean number of innovation adoption per agency is slightly more than five innovations ranging from 0 to 54. This finding indicates that government innovation is in evidence at all levels of the Korea government but “has not yet led to a rapid paradigm shift” (Schneider 2007, 615).

Finally, the significant overdispersion in the number of innovation adoptions advises that there may be systematic differences between agencies with exceptional records and those with no such records. This result suggests a closer investigation of the impact of organizational characteristics (OC) on innovation. Our findings showed that OC matters in the adoption and implementation of innovation in part because large agencies are able to bring greater resources to spend on innovation (Kimberly and Evanisko 1981), and in part because agencies whose functions are primarily service delivery tend to have routine tasks that are amenable to innovation. As a result, government innovations are dense in the implementation agencies such as IRS, SSA, and GSA in the US and National Tax Service, Public

Procurement Service, and Korea Customs Service in Korea. The density of government innovation in the implementation agencies may drive government managers away from sophisticated policy making and analysis in favor of designing measurable work process for effective service delivery.

In a political environment that punishes errors rather than rewarding excellence, government innovation is not an amenable task. Our findings, however, clearly demonstrate that government can innovate, and that public management capacity derives innovation in government by changing managerial behaviors and structures. The quality of management capacity makes a difference because it provides stable conditions for continued innovation (Light 1998). Of course, management matters. However, we argue that understanding the relative strengths of individual variables in the management capacity would provide better lessons for government managers about how to build a strong management capacity for sustained innovation.

ENDNOTES

1. Since 1986, for example, the Kennedy School at Harvard has run an Innovations in American Government Award program sponsored by the Ford Foundation. Also, the IBM Center for the Business of Government has given research stipends for innovative research that promotes excellence and creativity among the U.S. public agencies. Since 2001 the United Nations Committee of Experts on Public Administration has offered the UN Special Public Service Award for any country in the world in the innovation and excellence for revitalizing public administration and service delivery.
2. For example, the Korean government established a Senior Civil Service in 2006 by eliminating rank classifications of the highest civil servants in grade one, two, and three. The senior civil servants are freely assigned to any ministry according to their competency and performance. Another example shows that the Prosecutor's office adopted 6 Sigma's scientific and systematic analysis in order to reduce significant backlogs of non-incarceration cases. Previously, it took about 3 days for a case to be assigned to the Prosecutor's office from the police station. The newly formed 6 Sigma team categorized cases according to the phases of the case and radically reduced the allotment time to 7 hours. Also, the Ministry of Culture and Tourism created an Information Disclosure Forum on the ministry website as part of the Disclosure of Information by the Public Agencies Act in 2004. The Forum provides real-time disclosure of all original policy-related documents.
3. It should be cautious, however, that not all innovations attain intended performance improvement. Managerial risk-aversion and organizational inertia, especially prominent in public organizations, may slow down or prevent change (Kanter 1983; Rahim and Wolfe 2000). Greve and Taylor (2000) argue that "high performance causes managers to be risk-averse, making the organization less likely to change. Old or large organizations tend to be inert and unlikely to change" (58). Furthermore, any innovation may be good for one adopter in a particular situation but can be undesirable for another in a different situation and could even be harmful and ineffective (Golembiewski and Vigoda 2000; Rogers and Kim 1985).
4. However, the mode of effective networking still remains uncertain. For example, in a comparative study of mental health networks in four U.S. cities, Provan and Milward (1995) found that the most effective of the four mental health service networks is centralized around a core agency under direct external control within a stable system environment.
5. The GII is widely recognized as one of the most critical elements in successful innovation management by the Korean Government. As evidence, the Korean Ministry of Government Administration and Home Affairs was awarded the 2006 UN Special Public Service Award for the development and application of this online innovation management tool.
6. Korea has one to nine rank systems, in which rank decrease with GS numbers. GS 5th and less ranks are considered high levels of public officials whose works tend to require sophisticated body of professional knowledge to generate effective policy solutions.
7. Collinearity statistics of independent variables indicate that all variance inflation factors (VIF) and tolerance levels are within acceptable ranges (VIF is less than 4, Tolerance is greater than .20). Thus, multicollinearity is not an issue in the data analysis.
8. Significant evidence of overdispersion (loglikelihood-ratio test of $\alpha G^2=1118.65$, $p<.000$) suggests that the negative binomial regression is preferred to the Poisson regression model. The traditional poisson model underpredicts zeros with biased standard errors that result in spuriously large z-values and spuriously small p-values (Long 1997, 266). OLS regression can also result in biased estimates because of non-normality of the dependent measure.
9. Kettl and Fesler (2005) made it clear that "it is impossible to manage complex work without breaking it down into its component parts and then building strong competence in bureaus to carry it out" (135).
10. We argue that innovation is particularly challenging in the Confucian culture of Korea, in which seniority often receives a higher priority than new initiatives and ideas derived from subordinators. Worse yet, frequent political turmoil in Korea discourages public employees from departing their existing routines.

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Exhibit 1. A Model of Management Capacity and Government Innovation

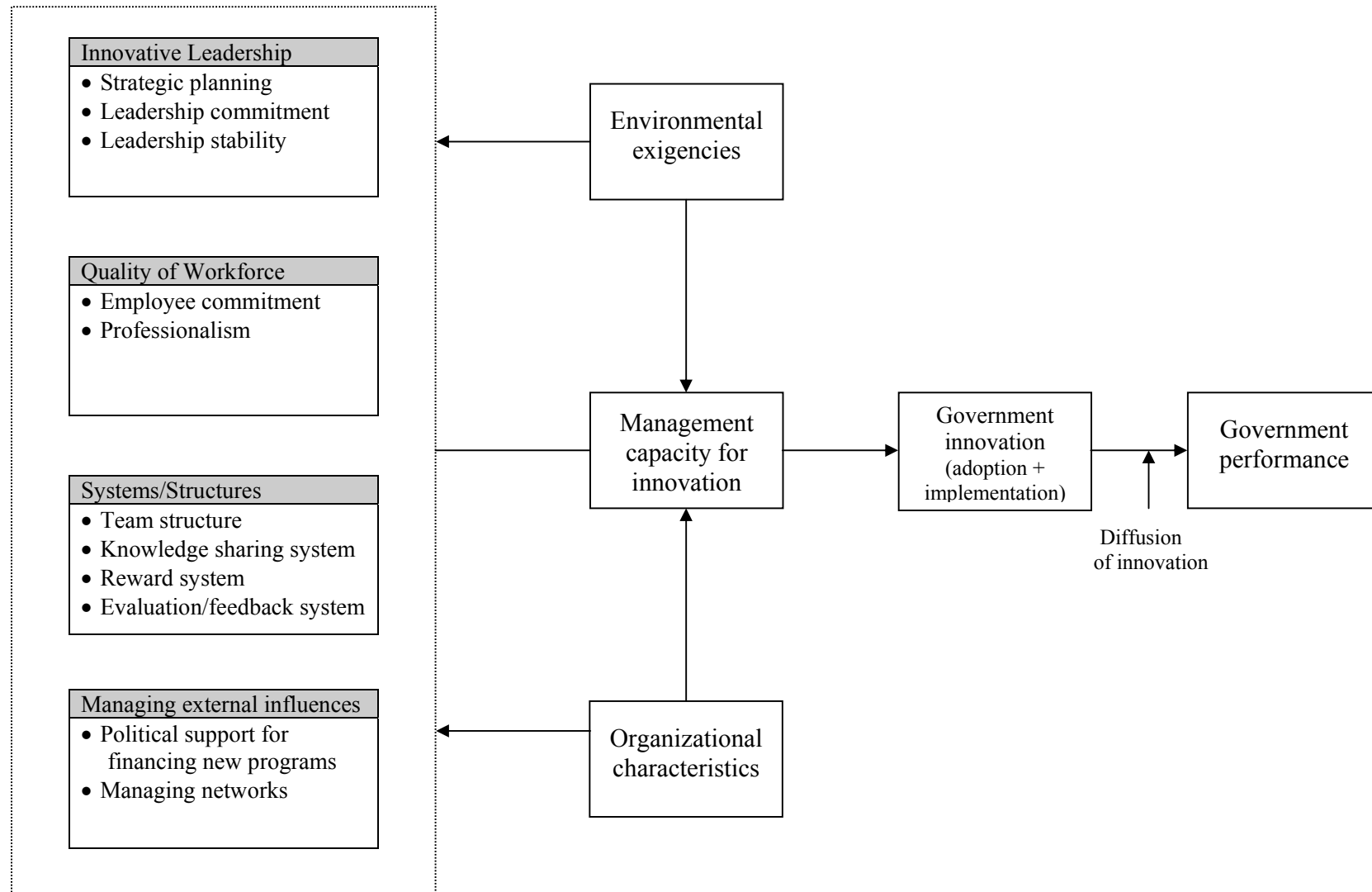


Exhibit 2. Descriptive Statistics

	Unit	Mean	Std. Dev.	Min.	Max.
Government Innovation					
Adoption	Number	5.16	7.9	0	54
Implementation	Index score	41.76	10.96	6	70
Diffusion	0=No; 1=Yes	.84	.37	0	1
Management Capacity					
Strategic planning	Z-score	0.0	.61	-1.5	.90
Leadership commitment	Z-score	0.0	.70	-1.96	2.3
Leadership stability	Months of tenure	42.4	33.4	1	148
Employee commitment	Z-score	0.0	.81	-1.04	3.55
Professionalism	Number of special training program	2.07	1.84	0	5
Team structure	0=No; 1=Yes	.95	.22	0	1
Knowledge Sharing(online)	0=No; 1=Yes	.87	.33	0	1
Knowledge Sharing(offline)	0=No; 1=Yes	.63	.48	0	1
Reward system	Index score	1.63	1.35	0	4
Financial support (log)	Won ^a	23.41	3.76	0	28.72
Managing networks	0=No; 1=Yes	.85	.35	0	1
Controls					
Organizational size (log)	Number of employee	6.69	.91	0	11.48
Task complexity	Number ^b	64.6	114.4	0	1681
Task nature	0=policy making 1=implementation	.83	.38	0	1

Note: ^a \$1 U.S. dollar is approximately equal to 950 won.

^b the number of rank 4th and higher levels of public officials. In Korea, rank decrease with GS numbers.

Figure 1. The Number of Innovation Adoptions in Each Agency

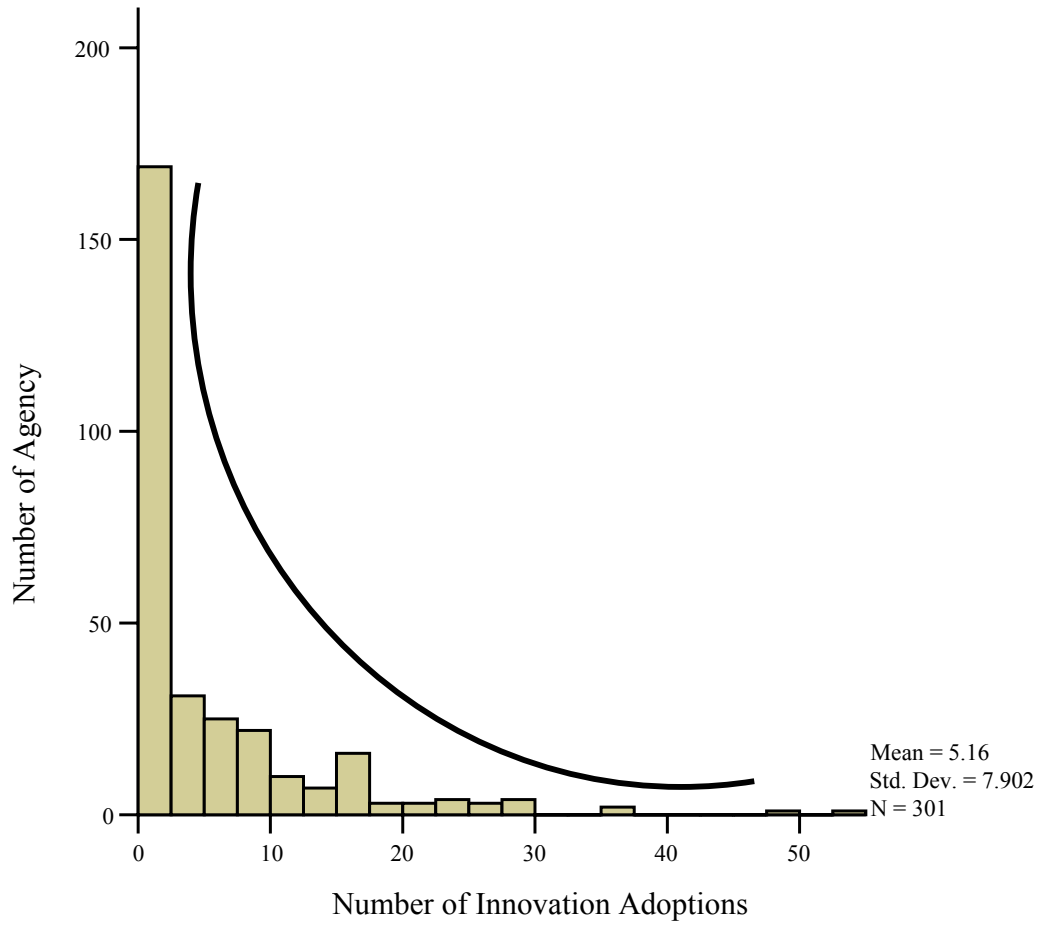


Exhibit 3. Negative Binomial Coefficients for the Number of Innovation Adoption by Agency

Variables	Coefficient	S.E.	Z-score
Innovative Leadership			
Strategic planning	.698	.207	3.36***
Leadership commitment	.374	.185	2.02*
Leadership stability	.005	.003	1.54
Quality of Workforce			
Employee commitment	.034	.199	.17
Professionalism	.033	.062	.53
Systems/structures			
Team structure	.097	.441	.22
Knowledge sharing (on-line)	.428	.294	1.46
Knowledge sharing (off-line)	.060	.228	.26
Reward systems	-.036	.094	-.39
Evaluation/feedback	-.000	.004	-.05
Managing external influences			
Political support for financing new programs (log)	-.018	.029	-.61
Managing networks	-.426	.288	-1.48
Controls			
Organizational size (log)	.408	.194	2.10*
Task complexity	-.003	.002	-1.62
Task nature	-.461	.426	-1.08

Number of observations = 274

Log likelihood function = -673.501

$\chi^2 = 57.86$, $df = 15$

Pseudo $R^2 = .041$

Significance level = .0000

* $p < .05$ ** $p < .01$ *** $p < .001$ (Significant values are from a one-tail t -test)

Exhibit 4. OLS Regression Coefficients for the Innovation Implementation Scores by Agency

Variables	Coefficient	S.E.	T-score
Innovative Leadership			
Strategic planning	3.26	1.15	2.84**
Leadership commitment	2.26	.972	2.33**
Leadership stability	-.029	.017	-1.76*
Quality of Workforce			
Employee commitment	2.02	1.01	2.00*
Professionalism	.826	.358	2.31*
Systems/structures			
Team structure	4.17	2.38	1.75*
Knowledge sharing (on-line)	-.135	1.56	-.09
Knowledge sharing (off-line)	-.890	1.20	-.74
Reward systems	1.19	.492	2.41**
Evaluation/feedback	.021	.022	.99
Managing external influences			
Political support for financing new programs (log)	-.025	.145	-.17
Managing networks	2.76	1.53	1.81*
Controls			
Organizational size (log)	2.54	.877	2.90**
Task complexity	-.007	.011	-.67
Task nature	5.54	2.30	2.41**

Number of observations = 274

F(15, 258) = 13.08

Adjusted R² = .40

Significance level = .0000

*p<.05 **p<.01 ***p<.001 (Significant values are from a one-tail t-test)

Exhibit 5. Logit Regression Coefficients for the Innovation Diffusion by Agency

Variables	Coefficient	S.E.	Z-score
Innovative Leadership			
Strategic planning	.232	.548	.42
Leadership commitment	1.22	.556	2.19*
Leadership stability	.012	.010	1.25
Quality of Workforce			
Employee commitment	.984	.704	1.40
Professionalism	-.046	.189	-.24
Systems/structures			
Team structure	.839	.843	1.00
Knowledge sharing (on-line)	.538	.656	.82
Knowledge sharing (off-line)	.152	.578	.26
Reward systems	-.296	.248	-1.19
Evaluation/feedback	.032	.016	2.03*
Managing external influences			
Political support for financing new programs (log)	.027	.029	-.61
Managing networks	3.73	.562	6.64***
Controls			
Organizational size (log)	.189	.444	.43
Task complexity	.006	.015	.44
Task nature	2.01	1.37	1.47

Number of observations = 274

Log likelihood function = -60.624

$\chi^2 = 120.22$, $df = 15$

Pseudo $R^2 = .50$

Significance level = .0000

* $p < .05$ ** $p < .01$ *** $p < .001$ (Significant values are from a one-tail t -test)