Contingent Effects of Information Technology Governance Styles on Decision Areas

Taekyung Kim
Department of Business
The University of Suwon
South Korea

Junghoon Moon
Regional Information
Seoul National University
South Korea

Abstract:- **Information technology governance has been regarded as one of the top managerial issues. Nevertheless, there is a lack of in-depth studies that investigate the contingent effects of the centralized and the decentralized governance styles on different decision areas with different strategic and managerial purposes. This study tries to fill this gap by conducting in-depth interviewees with 24 successful Korean companies. Based on information processing perspectives, our quantitative and qualitative findings show that top managers tend to form different perceptions on different decision areas. This study contributes to understanding heterogeneity in information technology management across firms.**

Keywords — IT Governance, Korean Business, Contingent Effect

I. INTRODUCTION

There is no conclusive evidence that investing in information technology assets has decreased significantly in developing Asian countries [21]. Traditionally, Asian companies have widely accepted the idea that information technologies should be helpful in fortifying competitive advantages and competencies to sustain their businesses [2], [6], [11], [15]. As a matter of fact, supplying tools that are timely for solving problems and overcoming constraints has been acknowledged as a key managerial success factor [6].

We confirm that information technology (IT) investment should increase strategic power for a company. However, in many cases, top managers in Korean companies confess serious confusion on the proper way to make a decision on IT management. Negative perceptions and the lack of a mechanism for controlling IT assets can reduce chances to compete effectively and efficiently in global markets [26], [27].

Korean companies have been known to be fast IT investment initiators. We rationally suspect that IT governance works properly to promote this characteristic since the Korean IT infrastructure and education system are regarded as some of the best in the world. To our knowledge, empirical evidences to support this assertion have not been suggested nor discussed with a supporting academic lens. Misconceptions about Korean companies' IT capabilities seem to be linked with a general lack of academic attention about IT governance.

IT governance has been a top-ranked issue for most companies. Previous studies on IT governance have commonly indicated that organization characteristics influence how IT investment results in a positive or negative impact [4], [20], [24]. Moreover, the theory of IT governance contingency effects supports that IT governance performance is affected by how well organization characteristic and IT governance styles correspond [12], [27].

In this study, we focus on how Korean top managers perceive the contingent effects of the different IT governance styles. This exploratory study contains insightful findings from interviews with 24 top managers. Especially, we focus on the contingent effects of IT governance styles in internal and external information processing contexts. What is the relationship between an IT governance style and a heavy workload of routine tasks? What is the impact of IT governance style on knowledge assimilation from an external partnership in each decision area? Including these questions, we set up hypotheses and tested them using a non-parametric statistical method and by supplementing interview data.

II. BACKGROUND

A. IT Governance

IT governance is a relatively broad concept. As shown in Table 1, there are several definitions of IT governance.

IT governance relates to an internal mechanism that includes a decision-making process to supply IT assets in a timely manner. Usually, this process of managing IT assets and investments is viewed as a top manager's task; however, it should be carefully noted that, in reality, it is harder to achieve the expected results with one core person or group through IT investment. In our experience, it is evident that IT investment cannot be exclusively subjected to the IT department or a few key persons. According to Weill and Ross [27], managing IT requires cooperation from all members in an organization. The well-designed IT governance program is transparent to all the stakeholders. In this way, supplying IT is results of both pull and push activities from top to bottom [20].

TABLE I.   DEFINITIONS OF IT GOVERNANCE

Definition	Reference
Specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT.	[27]
IT governance as the set of processes that ensure the effective and efficient use of IT in helping an organization achieve its goals.	[10]
IT governance is the responsibility of the board of directors and executive management. It is an integral part of enterprise governance and consists of the leadership and organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategies and objectives.	[13]

Special Issue - 2016

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
ICIDB - 2015 Conference Proceedings

Xue et al. [29] discovered seven IT governance styles by analyzing data collected from hospitals. They argue that IT governance can be identified by two major communication and decision archetypes: monarchy and cooperative duopoly. The framework suggested by Xue et al. [29] significantly enhances our understanding of IT governance; however, connecting each IT governance style to organizational capability has not been sufficiently tried. Wilkin and Chenhall [28] try to clarify our perception on IT governance. Based on the literature survey methodology, their findings show that IT governance is strongly related to developing competitive capabilities by timely refreshing IT assets. The seminal study by Prasad et al. [22] examines the relationship between the effectiveness of IT committee initiatives and IT-related capabilities for obtaining competitive advantages. Pang [19] indicates that giving legitimacy and power to an IT decision maker is beneficial for the improving productivity of IT investment. The research on IT governance shows that IT governance is more closely related with a firm strategy. Not only should IT governance be aligned with mission critical tasks, it should also be flexibly adjusted as available technical options change [29].

B. IT Governance Style

The early IT governance studies usually adopted a bi-polarized view: a centralized and decentralized style. When a decision-making process counts on a few core personnel or a group, we can conclude that the organization follows the centralized style. On the contrary, each individual, for instance, may have an independent right to purchase IT assets for their own sake under the decentralized style of IT governance [3]. Most cases of the centralized style are followed by standardized rules and top-down communication, whereas the decentralized style tends to be more flexible and to support bottom-up communication [20].

Brown and Grant [3] indicate that an organization can combine the centralized and the decentralized style together. This third style is called the federal style.

In line with the dichotomous perspective on IT governance, Weill and Ross [27] suggest a comprehensive framework that integrates IT governance styles with decision areas, as shown in Table 2.

TABLE II.   DECISION AREAS

Decision Area	Description
Principle	High level statements about how IT is used in the business
Architecture	An integrated set of technical choices to guide the organization in satisfying business needs
Infrastructure	Foundational hardware to support IT applications throughout a firm
Business applications	Functional applications or software products for supporting tasks
Investment prioritization	Decisions about how much and where to invest in IT, including project approvals and justification techniques

The principle area is related to defining missions and roles. The architecture area is associated with system design regarding integrating data and information processing procedures for core business activities. The infrastructure area involves decisions for constructing a shared service platform for internal and external stakeholders. The fourth area, business applications, covers IT application development or purchase for satisfying individual needs to complete tasks. The final area is the investment prioritization area, where decisions about optimal schedules of IT allocation and replacement are made.

Weill and Ross [27] specify three IT governance styles into six: business monarchy, IT monarchy, feudal, federal, IT duopoly and anarchy. Based on the theory of information ecology proposed by Davenport and Prusak [8], the classification scheme not only covers the centralized, decentralized and federal styles but also covers chemical and decision areas.

Although Weill and Ross' [27] work is comprehensive and systematic, there is a lack of empirical evidence on practical values of specifying the centralized and decentralized scheme. We believe that Weill and Ross' [27] key contribution can be found in the idea of IT governance contingency analysis rather than the precise descriptions of IT governance style.

Research efforts to identify the IT governance style have focused on contingency variables relating to a proper organization structure for maximizing performance [4], [20], [24]. For example, when a firm needs to manage costs for production, IT governance may be the centralized style [1].

Traditional research on the contingent variables and IT governance styles is mainly interested in financial performance. For example, Brown and Magill [4] interviewed top managers from six large companies. They investigated various kinds of antecedents to explain contingent relationships with the IT governance styles reported by interviewees. Another qualified paper on the contingent variables to IT governance was written by Sambamurthy and Zmud [24]. In the study, they observed the suitability between a corporate strategy and a selected IT governance style. This research stream has been developed continuously [2], [6], [11], [15]; however, difficulties to obtain data with honest manners from top managers have hindered theory development.

III.   HYPOTHESIS

A. Internal Information Processing

An organization is a body of information processing procedures. Transactions with customers require large data processing. Another simple example can be found in internal communication between employees when solving business problems. To get new insight, people share knowledge through information systems on a daily basis. We admit that one of the key reasons for adopting information systems is to enhance and maximize information processing power.

The intensity of information processing is generally dependent on the number of tasks for an individual worker, and may differ between organization levels [18]. For example, a top manager position requires a low volume of data, but should include a summarized and refined report. Usually, this kind of information processing task is non-routine, unique and case by case. On the contrary, low level positions may deal with a large quantity of data and many repeating tasks.

Based on the contingent theory of IT governance, we posit that the decentralized style of IT governance is more rooted in repeated and routine tasks with intensified information processing. In addition, we anticipate that this effect may differ in each decision area of IT governance. It should be noted that

Special Issue - 2016

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
ICIDB - 2015 Conference Proceedings

a repeated task is mainly charged to an employee in a low-level position. To increase learning performance, a corporate organization has strong motivation to sustain standardized manners to maintain information systems and courses of education. As a result, governance areas such as architecture, infrastructure and business application demand are not affected by IT governance style.

H1: Internal information processing due to repeated tasks is more likely to be contingent upon the decentralized IT governance style.

B. External Information Processing

As information technology becomes a core element in business strategies, companies are seeking to increase performance based on IT by assigning more authority to subunit employees [23]. It should be noted that the level of IT-related capabilities possessed by employees can significantly influence the choice of IT governance and its contingent relationships with decision areas [24]. Based on the conceptual notation of absorptive capability [7], we posit that the extent to which external partners interact with a firm may influence contingent relationships under different IT governance styles. The idea of absorptive capacity refers to the ability to develop relevant knowledge bases, recognize valuable external information, find appropriate solutions and implement them effectively and efficiently.

According to Hurley and Hult [12], an information processing culture interacting with different external sources influences managerial choice for innovation. In line with the notion of absorptive capability, information processing experiences with external partners can be reflected in how a firm sets up IT infrastructure, develops policies, constructs system architecture, utilizes applications and adjusts future investment plans.

The frequent and significant interaction with external partners may increase the chance of getting proper information on better IT alternatives. Such effective cases may be built over time with support from top managers. If the partners share similar characteristics in terms of tasks and workplace culture, we may anticipate that the understandability of better IT alternatives for end-user applications is enhanced in low-level positions; thus, the contingent suitability of IT governance style could be more skewed to the decentralized one. In addition, the case involving partners with a high level of communication capability can more easily bring new insight to a decision area on an architectural level. In this situation, a firm can have more benefits by allocating decision-making legitimacy to decentralized units. From the abovementioned arguments, the following hypothesis is derived:

H2: External information processing with partners is more likely to be contingent upon the decentralized IT governance style.

C. Environmental Conditions

The influence of environment conditions surrounding a firm has been widely acknowledged (e.g., [18], [30]). Previous literatures on innovation performance insist that the impact of fast environmental change can significantly affect innovation efforts [16], [17].

Environmental dynamism refers to the speed of change [9]. Studies on the innovativeness of a firm have shown that a dynamic environment may bring unpredictability so that central decision authority is replaced by local decision-making procedures [9], [14], [25].

According to Zahra et al. [30], more competitive strategies to deal with environmental instability can be proposed under the decentralized IT governance style. To deal with threats from environmental instability, organizational decision-making processes on IT management may require fast feedback from subunit employees [14]. Accordingly:

H3: The decentralized IT governance style is more likely to be contingent upon the instable and dynamic environmental conditions.

IV. DATA

A. Data Collection Sites

Using standardized inquires to collect data, we interviewed chief managers. One of the authors took a primary role for contacting the mangers and explained the primary objectives of this study. We carefully chose 24 firms that are all known as leaders in each field, including information technology services, broadcasting, manufacturing high-tech components, financial services and medical services. Before we started collecting the data, protection agreements for company security were individually set down. In accordance with these agreements, we need to cover performance-related profiles in this paper; therefore, collective descriptions on the studied firms are presented in Table 3, and all private information on the interviewees is hidden.

TABLE III. OVERALL SIZES OF COMPANIES

	N	Min	Max	Mean
Service	15			
Employee		15	8K	6405
Revenue ($)		0.7M	1200M	443.8
Manufacture	9			
Employee		8	30K	1181
Revenue ($)		1M	7500M	2336.9

As shown in Fig. 1, the most matured firm was established in the 1940s. More than half of the firms were formed later than the 1980s. All 24 companies developed their own IT governance policies and protocols in the 2000s. After initial meetings, we acknowledged that the firms had carried out regular meetings for IT management, and each firm regarded IT as a primary strategic asset.
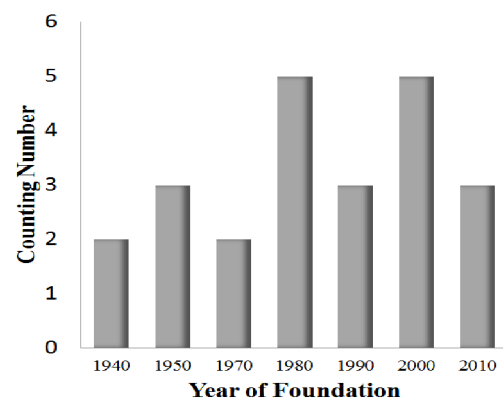

Fig. 1. Foundation year of companies

Special Issue - 2016

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
ICIDB - 2015 Conference Proceedings

B. Interview Procedure and Instruments

Interviewees were asked to answer overview questions on IT governance styles. Then, we distributed interview questions for collecting data about contingent situations. Although we mainly used an open-question interview, we tried to interpret firm-specific situations in order to identify boundary conditions for data analysis. For example, one of the interviewees was from a large hospital. He reported unique partnerships, relationships and investment traditions in new diagnostic information systems. His process of supplying IT assets was quite different from the rest. In addition, his perception on the dynamic change of environmental conditions needed to be carefully understood since the competition between hospitals in Korea was partially restricted by government policies.

We adopted instruments developed by Burton et al. [5] to measure the degree of business governance decentralization. Based on suitability theories for information coordination and control systems, the measurement system is easy and convenient for reviewing a corporate governance style. While we were repeatedly explaining the mechanism of analyzing a governance style, all the interviewees had no difficulties choosing one of the IT governance styles: centralized- and decentralized styles.

To measure task complexity for testing H1, we mixed survey instruments, as suggested by Huley and Hult [12]. After the interviews, we discovered that task complexity measures could be simplified and asked more directly. As a result, we dropped items except two: (1) "Are most of the organization's work tasks unique, or are the tasks repeated in a large volume?" and (2) "To what extent are there common types of data that can be captured from many transactions and tasks recursively?"

Information processing with external partnerships was captured by a set of instruments based on [15] and [21]. The environmental instability was measured by adopting instruments from Jansen et al. [14]. All items were rated on a 5-Likert Scale from 1 (low) to 5 (high). We also collected open-ended statements and contextual information by administering additional questionnaires that were not included in this study.

C. Analysis Procedure

We recorded the IT governance style item as follows:

$$\omega_{ij} \equiv decentralized_j - centralized_j \qquad (1)$$

The equation simply shows the difference of dichotomous IT governance style: 0 is equal; 1 is skewed to the decentralized style; and -1 is skewed to the centralized style. For each individual interviewee (i), five decision-making areas (for each j) were assigned to be answered.

To obtain statistical results, we adopted a Mann-Whitney U Test. This non-parametric test is efficient and as nearly reliable as a t-test in validating the differences of two data sets in terms of stochastic distribution identification.

V. RESULTS

The summary of statistical results is presented in Table 4. We verified that H1, H2 and H3 were all supported. In addition, we also observed interesting findings about the contingent influence of the IT governance style. We will explain them in turn.

The first hypothesis of our study aims to understand how internal information processing is associated with different styles and decision areas. As we anticipated, internal information processing due to repeated tasks is likely to be more coupled with the decentralized IT governance style. In addition, this result is salient in the policy area and the IT investment decision area; however, the result is not stable in the areas of architecture, infrastructure and business application. One of the interviewees commented:

Workforce applications should be efficient. I don't agree that managing how to make things done should be a part of a top manager's work. By cooperating with the IT department, I believe our employees can deal with daily tasks more successfully.

TABLE IV.   RESULTS OF MANN-WHITNEY TEST FOR EACH CONTINGENT POINT

Measurement Item	IT Governance Style (Decentralized–Centralized)				
	Principle	*Architecture*	*Infrastructure*	*Business application demand*	*IT investment decision*
Hypothesis 1					
Are most of the organization's work tasks unique (mark at low), or are the tasks repeated in a large volume (mark at high)?	**1.03*** (0.03)	-0.47 (0.25)	0.15 (0.82)	-0.19 (0.76)	**1.08*** (0.02)
To what extent are there common types of data that can be captured from many transactions and tasks recursively?	**0.69*** (0.05)	0.39 (0.30)	0.15 (0.65)	**1.13***** (0.00)	0.58 (0.09)
Hypothesis 2					
To what extent do you trust external partnerships to develop and execute strategies?	**0.83*** (0.02)	0.27 (0.58)	0.01 (0.95)	0.44 (0.23)	-0.25 (0.72)
To what extent do you feel that your organization is different from external partners in terms of culture?	-0.12 (0.64)	-0.53 (0.10)	-0.22 (0.36)	**-0.81*** (0.02)	-0.25 (0.35)
To what extent do you feel that your organization has flexibility in decision making with external partners?	0.27 (0.61)	**1.17*** (0.02)	0.41 (0.47)	0.44 (0.47)	-0.50 (0.30)

Special Issue - 2016

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
ICIDB - 2015 Conference Proceedings

|					
To what extent do you feel that your organization is willing to accept ideas from external partners?	0.38 (0.24)	**0.94*** (0.02)	0.29 (0.46)	0.00 (0.82)	-0.33 (0.41)
Hypothesis 3					
How fast does your industry grow?	-0.17 (0.67)	**1.13**** (0.01)	0.34 (0.41)	-0.13 (0.80)	-0.75 (0.09)
To what extent do you feel your organization is able to increase production/service capacity?	0.54 (0.34)	0.19 (0.83)	0.47 (0.42)	**1.38**** (0.01)	0.42 (0.42)
To what extent do you feel that your competitors have unique strategies to take competitive advantage?	-0.31 (0.27)	0.29 (0.42)	-0.20 (0.83)	-0.06 (0.75)	**-1.00*** (0.02)
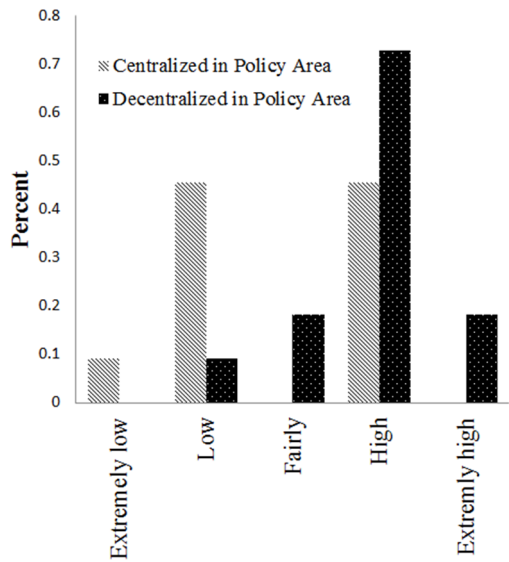
Fig. 2. Level of task routineness and policy decision area of IT governance

We asked the interviewees to report personal experiences on IT management issues relating to H1. Figure 2 summarizes the frequencies of those responses. As we notice, managers who reported more cases relating to IT management for handling routine tasks also indicated that their companies were inclined to the decentralized IT governance style.
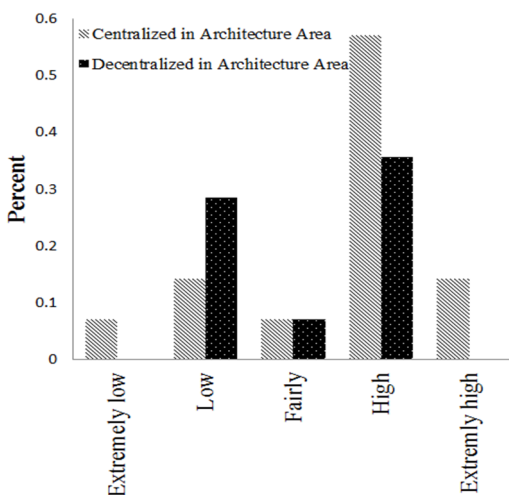

Fig. 3. Level of task routines and architecture decision area of IT governance

When we asked the managers to explain the contexts of their stories, we found that most routine tasks and the contingent IT governance styles were related to setting up policies, enforcing regulations and security concerns. Different answers were obtained when we asked them about decision-making events for managing IT architecture. As shown in Fig. 3, we were told that a majority of cases were associated with routine tasks and the centralized style. The managers commonly stated that systems for large information processing should be managed by top management boards. The most frequent keywords they suggested involved databases, mobile computing and security. In addition, the managers gave us negative responses about the capability of line managers to use cloud-based resources for satisfying peak time needs.

Most managers thought that their primary role in supporting heavily repeated tasks was to set up policies; however, they argued that specific guidelines given by the top manager were not necessary. Some of the interviewees insisted that micro-management could be more harmful than letting low-level employees or IT-related departments do their job autonomously.
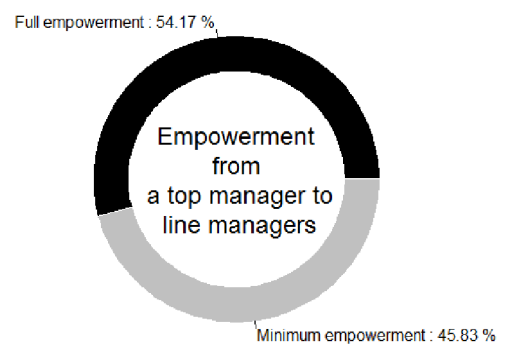

Fig. 4. Empowerment decision

The managers who were inclined to the centralized style had mixed opinions about empowerment. We suggested a specific case about dealing with peak-time needs for computing power. This short case described a small game company that failed to forecast demand and thus faced service problems due to uneven traffic. As is shown in Fig. 4, 54% of respondents answered that they would willingly give power to make a contract with a cloud service provider. This decision was contradictory with the other managers, who were against empowerment.

Special Issue - 2016

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
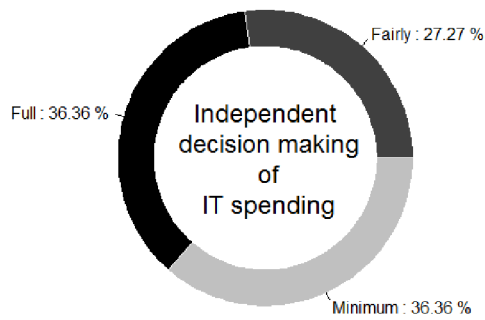**ICIDB - 2015 Conference Proceedings**

Fig. 5.   IT budget independence level with the centralized governance style

We asked the group of managers to decide how much money was needed to solve the problem. Of the top managers who preferred centralized IT governance style, 36.36% wanted to give line managers minimum rights for deciding IT budget, whereas, 15.38% of the managers who advocated for the decentralized style agreed to the same decision scheme. As shown in Fig. 5 and Fig. 6, the decentralized style managers were more willing to allow line managers to spend money for dealing with the peak-time issue.
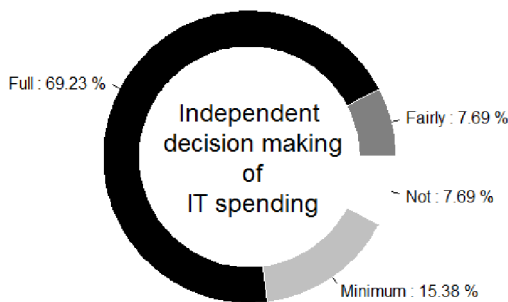

Fig. 6.   IT budget independence level with the decentralized governance style

Many times, we have discovered new and emerging software in the market from our close partners. Since we have shared many things, IT department people think that a new program or an emerging IT tool is worth discussing with me. This is especially true if such new programs or tools are discussed first with my business partners, who I know well.

The second hypothesis, H2, shows that a high level of external information processing with business partners increases the likelihood of being contingent on the decentralized IT governance style in different decision areas. As the results show, H2 is supported. In line with H1, the more managers show trust with external partnerships, the more they show favor to the decentralized style. The interesting finding regarding H2 is that an idiosyncratic culture with partners may decrease the chance of adopting the decentralized style in the area of business application.

The last hypothesis, H3, is about the influence of environmental instability to the contingent on the IT governance style. As we predicted, managers' perceptions on the fast-changing environment are associated with the decentralized IT governance style. In line with the study by Jansen et al. [14], we found that managers tend to count on subunit managers or employees who have more knowledge on tentative situations. One of the interviewees commented:

If we need something, the best way to get it is to hire someone who has the necessary knowledge. The real question is how to find him. I usually ask developers to recommend someone. As you know, my job is rather far away from solving problems in codes; but customers turn over because of them. Who can best deal with this situation?

It should be carefully noted that top managers from the other areas, including manufacturing, finance services and medical services, had different views. They commonly indicated that IT management would require long-term forecasts. According to top managers, changing policies, architecture and infrastructure should not be subjected to subunit management neither individual decisions. The issues involved with dealing with fast environmental changes are perceived as a top priority, whereas, most interviewees doubted that the decentralized IT governance style could be maintained. Partially, the top managers admitted that empowering extending features and exploring better alternatives would be justified. From the interview, we learned that the contingent view regarding environmental instability needs to be investigated further.

VI.   CONCLUSION

Based on the view of the contingent effect of the IT governance style [12], this study investigates influences on internal and external information processing, and the perception of environmental instability. We believe that the findings from our study contribute to the research on understanding strategic alignment with IT governance. To our knowledge, this study is one of the early attempts to observe the contingent effects of IT governance with an information processing view. Previous theoretical achievements on the relationships between IT governance and corporate strategies were mainly obtained from logical discussions and qualitative data, using a small number of respondents. Our study is different in that we collected 24 selected companies' top managers, who had made exhaustive efforts to build successful IT governance styles. Those information-rich samples provided us with invaluable insights.

The practical value of this study may be mainly found within the contextual boundary of Korea. As a matter of fact, one of the interviewees stressed: "The importance of IT governance has been discounted in Korea." We feel that ad-hoc manners or anarchic governance are widely spread. This is surprising since Korea has been known as one of the advanced regions in information technology. We hope that our findings refresh researchers' and industry practitioners' interests in IT governance issues and key contingent outcomes.

This study can be further developed in several directions. First, data needs to be expanded in terms of size and scope. By analyzing interviews from various leaders in different industrial sectors, our findings can be more generalized. The second direction is to consider more strategic variables for investigating the contingent effects of different IT governance styles. In the current study, we narrow down the scope to information processing issues by adding environmental instability. We believe that an additional theoretical lens can provide extended insights.

REFERENCES

[1] N. Ahituv, S. Neumann, and M. Zviran, "Factors Affecting the Policy for Distributing Computing Resources," *MIS Quarterly*, vol. 13, no. 4, pp. 389-401, 1989.

[2] S. Alshawi, , Z. Irani, and L. Baldwin, "Benchmarking Information Technology Investment and Benefits Extraction," *Benchmarking: An International Journal*, vol. 10, no. 4, pp. 414-423, 2003.

[3] A. E. Brown, and G. G. Grant, "Framing the Frameworks: A Review of IT Governance Research," *Communications of the Association for Information Systems*, vol. 15, pp. 696-712, 2005.

[4] C. V. Brown, and S. L. Magill, "Alignment of the IS Functions with the Enterprise: Toward a Model of Antecedents," *Management Information Systems Quarterly*, vol. 18, pp. 371-371, 1994.

[5] R. M. Burton, B. Obel, S. Hunter, M. Søndergaard, and D. Døjbak, *Strategic Organizational Diagnosis and Design: Developing Theory for Application*, Kluwer Academic Pub, 1998.

[6] A. Chanopas, and D. Krairit, "Managing Information Technology Infrastructure: A New Flexibility Framework," *Management Research News*, vol. 29, pp. 632-651, 2006.

[7] W. M. Cohen, and D. A. Levinthal, "Absorptive Capacity: A New Perspective on Learning and Innovation," *Administrative Science Quarterly*, vol. 35, no. 1, pp. 128-152, 1990.

[8] T. H. Davenport, and L. Prusak, Information Ecology: Mastering the Information and Knowledge Environment, Oxford University Press, 1997.

[9] G. G. Dess, and D. W. Beard, "Dimensions of Organizational Task Environments," *Administrative Science Quarterly*,vol. 29, no. 1, pp. 52-73, 1984.

[10] Gartner, "Gartner Dictionary Online," available at http://www.gartner.com/it-glossary/it-governance, accessed on 1 December, 2012.

[11] S. M. Huang, C. S. Ou, C. M. Chen, and B. Lin, "An Empirical Study of Relationship between IT Investment and Firm Performance: A Resource-based Perspective," *European Journal of Operational Research*, vol. 173, pp. 984-999, 2006.

[12] R. F. Hurley, and G. T. M. Hult, "Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination," *Journal of Marketing*, vol. 62, pp. 42-54, 1998.

[13] ITGI, Board briefing on IT Governance, 2001

[14] J. J. Jansen, F. A. Van Den Bosch, and H. W. Volberda, "Exploratory Innovation, Exploitative Innovation, and Performance: Effects of Organizational Antecedents and Environmental Moderators," *Management Science*, vol. 52, no. 11, pp. 1661-1674, 2006.

[15] R. L. Kumar, "A Framework for Assessing the Business Value of Information Technology Infrastructures," *Journal of Management Information Systems*, vol. 21, pp. 11-32, 2004.

[16] D. A. Levinthal, and J. G. March, The Myopia of Learning," *Strategic Management Journal*, vol. 14(S2), pp. 95-112, 1993.

[17] A. Y. Lewin, C. P. Long, and T. N. Carroll, T. N, "The Coevolution of New Organizational Forms," *Organization Science*, vol. 10, no. 5, pp. 535-550, 1990.

[18] D. Miller, and P. H. Friesen, "Strategy-making and Environment: the Third Link," *Strategic Management Journal*, vol. 4, no. 3, pp. 221-235, 1983.

[19] M. S. Pang, "IT Governance and Business Value in the Public Sector Organizations: The Role of Elected Representatives in IT Governance and Its Impact on IT Value in US State Governments," *Decision Support Systems*, vol. 59, pp. 274-285, 2014.

[20] R. R. Peterson, "Integration Strategies and Tactics for Information Technology Governance," in W. V. Grembergen (eds.) *Strategies for Information Technology Governance*, Idea Group Publishing, pp. 37-80, 2004.

[21] K. Potter, M. Smith, J. K. Guevara, L. Hall, and E. Stegman, *IT Metrics: IT Spending and Staffing Report*, Gartner, 2011.

[22] A. Prasad, J. Heales, and P. Green, "A Capabilities-Based Approach to Obtaining a Deeper Understanding of Information Technology Governance Effectiveness: Evidence from IT Steering Committees," *International Journal of Accounting Information Systems*, vol. 11, no. 3, pp. 214-232, 2010.

[23] J. F. Rockart, "The Line Takes the Leadership-IS Management in a Wired Society," *MIT Sloan Management Review*, vol. 29, no. 4, pp. 57-64, 1988.

[24] V. Sambamurthy, and R. W. Zmud, "Arrangements for Information Technology Governance: A Theory of Multiple Contingencies," *MIS Quarterly*, vol. 23, no. 2, pp. 261-290, 1999.

[25] J. B. Sørensen, and T. E. Stuart, "Aging, Obsolescence, and Organizational Innovation," *Administrative Science Quarterly*, vol. 45, no. 1, pp. 81-112, 2000.

[26] P. Weill, "Don't Just Lead, Govern: How Top-Performing Firms Govern IT," *MIS Quarterly Executive*, vol. 3, pp. 1-17, 2004.

[27] P. Weill, and J. W. Ross, IT Governance: How Top Performers Manage IT Decision Rights for Superior Results, Harvard Business Press, 2004.

[28] C. L. Wilkin, and R. H. Chenhall, "A Review of IT Governance: A Taxonomy to Inform Accounting Information Systems," *Journal of Information Systems*, vol. 24, no. 2, pp. 107-146, 2010.

[29] Y. Xue, H. Liang, and W. R. Boulton, "Information Technology Governance in Information Technology Investment Decision Processes: The Impact of Investment Characteristics, External Environment, and Internal Context," *MIS Quarterly*, vol. 32, no. 1, pp. 67-96, 2008.

[30] S. A. Zahra, and W. C. Bogner, "Technology Strategy and Software New Ventures' Performance: Exploring the Moderating Effect of the Competitive Environment," *Journal of Business Venturing*, vol. 15, no. 2, pp. 135-173, 2000.