

# TRANSFORMATIONAL INFORMATION SYSTEMS IN INTERNETWORKED PUBLIC ORGANIZATIONS

*Completed Research Paper*

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## Abstract

*Organizations are increasingly developing transformative information systems that have significant impact on them as well as their partners in their business networks. However, our understanding of the factors affecting their development and adoption is limited, especially in public organizations. Motivated by this gap in the literature, our research investigates technological innovation initiated by a public company (called KOBACO) in the broadcasting advertising industry in South Korea. KOBACO developed a system to overhaul the process of placement of advertisements in broadcast channels. The system has been used industry-wide, but its adoption varies significantly among KOBACO's clients. We adopt Van de Ven's theory to explain initiation and introduction of KOBACO's transformational information system. We also use ambidexterity theory to explain how KOBACO achieves a balance between exploitation and exploration that is needed to meet the needs of partners in its network.*

**Keywords:** transformation, internetworked organizations, Van de Ven's theory, ambidexterity

## Introduction

Information technology (IT) has the ability to instill change and innovation in private and public organizations. While private organizations have long been employing IT to increase competitiveness, public organizations have only recently been undergoing dramatic transformation through e-government efforts (Moon and Bretschneider 2002). Innovative IS (IS) facilitate technology-enabled transformation of organizations to achieve a variety of goals such as the cost reduction, increased of transparency, and efficient service delivery (Irani et al. 2006). While traditional IS has been internally focused, recently the focus has expanded to intra-organizational systems which meet the needs of diverse stakeholders. Current literature on how innovative IS is developed and adopted in an inter-organizational network with both public and private organizations is limited. Also, how organizations achieve a balance between exploitation and exploration under complex social contexts is not well understood.

Following Irani et al.'s (2006) call for the study of such innovative IS that facilitates transformation in public organizations, we investigate technological innovations initiated by a public company in an broadcasting advertising industry. We apply Van de Ven's industry infrastructure framework (Van de Ven 2005; Van De Ven et al. 1999) and ambidexterity theory (March 1991) to investigate how in innovative IS, the innovation process proceeds through complex social interactions among key stakeholders and the environment, and how an innovative IS can be used both exploitatively and exploratively by internetworked organizations. Specifically, our research seeks to answer the following research questions:

1. How do contextual factors and infrastructure in particular, affect the development and adoption of innovative IS in public organizations?
2. How can innovative IS in public organizations be developed and adopted to achieve ambidexterity to meet the needs of networked partners?

The study seeks to contribute to IS research through a detailed analysis of an innovative IS development by an industry leading public company in South Korea and its adoption by a group of networked private organizations. The analysis identifies factors affecting the development and adoption of innovative IS. In addition, this study examines how Van de Ven's institutional theory can be adapted to understand innovative IS adoption. Also, it examines how a public organization can achieve ambidexterity with the use of an innovative IS. The paper is structured as follows. The next section introduces a review on innovative IS in public organizations and theoretical background on institutional view and ambidexterity theory. Next, we present our case study, followed by a discussion of the contributions and implications for both research and practice.

## Theoretical Background

### *Innovative Information Systems in Public Organizations*

Public organizations are considered rigid, risk-averse, and unwilling to make radical changes (Bozeman and Kingsley 1998). IS in public organizations appears to focus on incremental changes, e.g., automating or aiding existing processes and procedures without changing related processes and structures. While prior research examined the factors affecting their successful IS implementation (Kawalek and Wastall 2005; Pan et al. 2006), transformational changes in public organizations and their stakeholders through the implementation of innovative IS have received very little attention (Ghoneim et al. 2011).

Recent studies provide mixed results on how much change a new IS induce in public organizations. Some empirical studies suggest low impact outcomes by IS projects, while others note significant changes in business processes and services (Andersen et al. 2010). In the latter cases, public organizations actively engage in IS-enabled transformation to reduce costs, increase transparency, and improve service quality (Hanna 2010). However, little is known about the factors that influence public organizations to develop innovative IS. Our study is motivated by this concern and uses two theoretical lenses (Ven de Ven's Institutional View theory and Ambidexterity theory) to further our understanding in this area.

### ***Institutional View - Van de Ven's Theory***

We employ an institutional perspective to evaluate initiation and adoption of a technological innovation of a public company in the broadcast advertising industry in South Korea. This organization was established by a special law in 1981 and has been a sole provider of ad-slots in broadcasting industry in South Korea. Though the innovation was developed by a single company, it affected the entire broadcast advertisement industry because the monopolistic position of the company was protected by law. For this reason, an industry-level theoretical lens is needed to understand the context of the innovation in this organization. The focal innovation is embedded in a very peculiar context bridging the public and the private sectors because the public sector is pushing for its innovations for private sector use. To understand such intriguing context of the introduction and adoption of the innovation, we have chosen an industry-level framework, an institutional perspective to describe the complexity of the innovation context.

Institutional theory is one of the most influential theories in intensive studies on organization-environment relations from the late 1970s till today (Hatch and Cunliffe 2006). Some recent IT studies with emphasis on organizational context consider the institutional setting as an important contextual component (Chiasson and Davidson 2005; Crowston and Myers 2004; Lamb and Kling 2003). However, different definitions and views exist on "institutional" environment to which organizations and their innovations are exposed. While "institutional" environment can be narrowly defined with limiting the institutional context mostly to legal and regulatory arrangements (Crowston and Myers 2004), it can also be defined as an elaborate set of rules and requirements that organizations must conform to in order to attain support and legitimacy (Lamb and Kling 2003). Among others, we concur with Van de Ven in his comprehensive perspective on institutional context.

Van de Ven's framework is based on an open systems view acknowledging that technological and institutional innovations reciprocally produce each other. It compiles components from both technology imperative perspective and institutional determinism. Van de Ven's framework suits this study, as the framework adopts the inter-organizational field as the unit of analysis and focuses on the infrastructure necessary to develop and commercialize technology-based innovations. In particular, the framework fits our process-oriented view that the innovation emerges over time and that the infrastructure emerges through numerous events that influence each other over an extended period of time. The proponents also state that innovation process needs to consider numerous actors not only in for-profit sector, but also the public and not-for-profit sectors, which suits our case as well.

Van de Ven and colleagues (1999) argue that successful diffusion of innovations through commercialization is a collective achievement that resides not only in the parent organization of the innovation but also in the construction of an industrial infrastructure that facilitates and constrains the innovation. They suggest a framework to analyze infrastructure including 1) institutional arrangement to legitimize, regulate, and standardize a new technology; 2) public-resource endowments of basic scientific knowledge, financing mechanisms, and a pool of competent labor; 3) development of markets, and consumer education; and 4) proprietary research and development, manufacturing, production, and distribution functions by private firms to commercialize the innovation for profit.

The industry infrastructure view is adopted in this study to provide theoretical framework to understand the unique context of the focal innovation and to explain the adoption and diffusion of the focal innovation in comparison with failed attempt of a similar innovation in same context.

### ***Ambidexterity Theory***

Ambidexterity is defined as the capacity to achieve alignment and adaptability at the same time (Tushman and O'Reilly 1996). Alignment refers to the coherence among all the activities of the organization so that they are working together towards the same goals. Adaptability refers to the capacity of the organization to reconfigure itself quickly to changing demands. Ambidexterity theory explains that successful organizations in a dynamic environment are those that are ambidextrous, which means being able to manage today's business in an efficient way (exploitation), while also being adaptable to changes in the tomorrow's environment so that they can still be successful in the future (exploration) (Duncan 1976).

Early research on organizational ambidexterity maintains that organizations cannot pursue both exploitative and explorative activities simultaneously (Hannan and Freeman 1977; Miller and Friesen 1986). However, March (1991) argues that organizations should be ambidextrous to be competitive. Prior research supporting this perspective notes that organizations can be ambidextrous although there is a trade-off between engaging to be exploitative and

explorative. Therefore, successful organizations carefully consider the trade-off between exploitation and exploration and find the optimal balance point (Gupta et al. 2006).

Prior research investigates the predictors and consequences of organizational ambidexterity mostly in the context of private organizations (Adler et al. 1999; Gibson and Birkinshaw 2004a; MacDuffie et al. 1996). However, factors affecting a public organization to adjust the balance point to initiate an innovative IS may differ from that of a private organization. Likewise, if a private organization uses an innovative IS initiated by a public organization, the private organization may need to adjust the balance point in line with the specific context of the public organization. Moreover, when different private organizations use the same innovative IS initiated by a public organization, each may use it differently depending on their organizational capabilities. Some organizations may take an explorative stance to find an opportunity to better use the system from more strategic perspective, while others may take an exploitive stance to use the system from more operational efficiency perspective. This study posits that organization's ambidextrous strategies on developing and using a transformative information system may be influenced by several factors. We investigate these factors in the context of the development and adoption of an industry-wide public management information systems (PMIS).

## **Research Method**

### *Context of Study*

#### **History of KOBAnet**

KOBACO was set up as a public company by special law in South Korea in 1981. The purpose of the company was to sell advertising (AD) slots to AD agencies and advertisers on behalf of broadcasters. KOBACO has been a sole provider of AD slots for TV and Radio, except for cable and satellite TV. As of 2008, 148 broadcasters and 300 AD agencies work with KOBACO. To obtain sales information and to purchase AD slots, these organizations had to visit KOBACO in person or use fax until late 1990s.

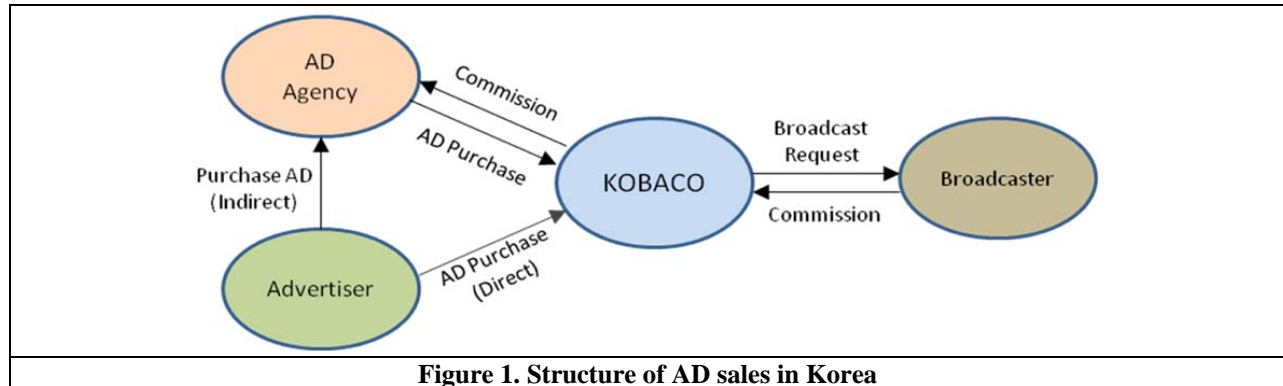
In 1998, KOBACO initiated the development of a new IS called KOBACO 1.0. KOBACO felt the need to innovate their services, in part due to a financial crisis in South Korea. Another motivation for KOBACO was the consideration by the government and the congress to introduce competition in the industry. KOBACO 1.0 received limited success due to immature environment and lack of commitment from sales departments of KOBACO. A new system called KOBAnet was implemented in 2003. Based on KOBAnet, an online AD material transmission system called KODEX was developed to support conversion and transmission of AD material from KOBACO to broadcasters. Previously, AD materials (e.g. TV beta-cam tape: 30,000, Radio reel tape: 50,000 per year) were delivered to broadcasters via mail or in-person. With the development of KODEX integrated with KOBAnet, the AD materials can be forwarded to broadcasters in real time in the form of digital files. KOBAnet was well received by the clients of KOBACO. Advertising professionals using KOBAnet reported that the system enabled them to dramatically reduce the manpower, time and expense that would be required in an off-line transaction. The Korean government recognized KOBACO with an excellence award for business innovation. KOBAnet received highest evaluations from users among public companies under the Ministry of Culture, Sports & Tourism.

Currently, more than 1,300 users from 389 organizations (TV: 52, Radio: 96, DMB: 3 - 2011) are using KOBAnet. KOBACO is developing a customer relationship management application based on KOBAnet. KOBACO initiated the development of KOBAnet system to provide better service to stakeholders, thereby improving its competitiveness for the future. Since early 1990s, the government and congress had been considering introducing competition to this industry. Due to the fear of disrupting existing structure and political pressures, this proposal has not yet been implemented. In November 2008, the Constitutional Court of Korea ruled that the special law through which KOBACO was established was not constitutional. The Korean congress passed a law to introduce a limited competition to the broadcasting industry in 2012.

#### **Description of AD sales**

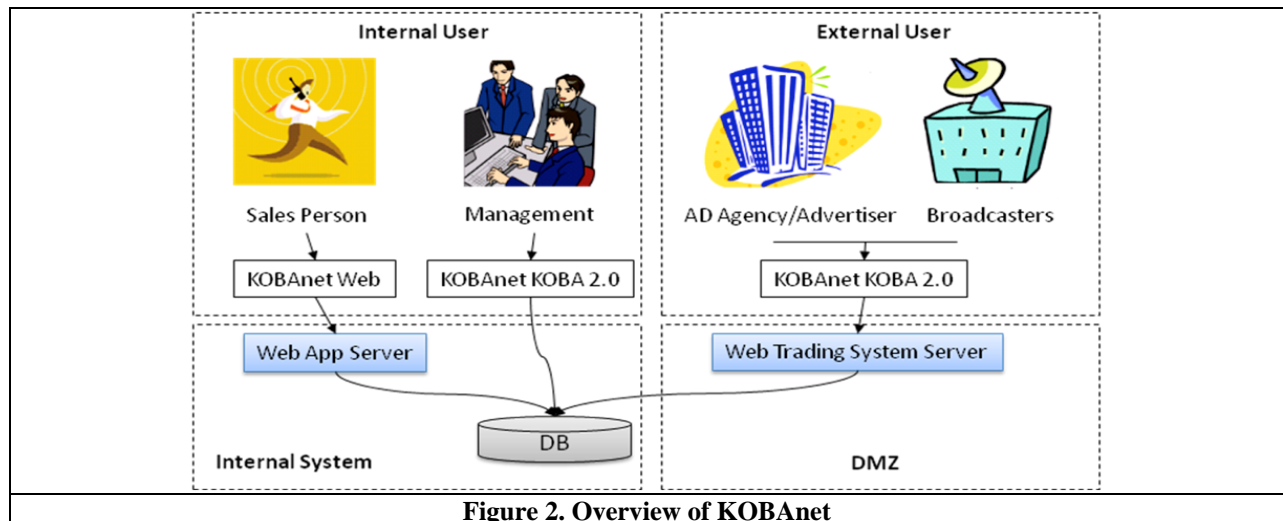
KOBACO acts as a media representative, marketing AD slots on behalf of TV, Radio, and terrestrial broadcasters, as shown at Figure 1. Broadcasters send information on available AD slots to KOBACO. Then, KOBACO makes a

sales package for purchase by its clients. AD agencies and advertisers purchase AD slots provided by broadcasters through KOBACO. Broadcasters receive sales information along with their order of AD broadcasting (in a document called the Q-sheet). Broadcasters broadcast their programs and advertisements purchased through KOBACO. While this process was paper-based until the establishment of KOBAnet.



### Description of KOBAnet

KOBAnet consists of two systems: KOBAnet Web and KOBACO 2.0. KOBAnet Web is used by KOBACO sales professionals to confirm sales. Figure 2 shows the overview of KOBAnet. KOBACO 2.0 has three main users: KOBACO sales management, broadcasters, and AD agencies. KOBACO sales management professionals use KOBACO 2.0 to coordinate sales and finalize the order of advertisements. Broadcasters use KOBACO 2.0 to manage AD slots of TV/Radio programs. AD agencies use KOBACO 2.0 to manage purchase of AD slots and AD materials.



### Research Design

A case study approach was adopted to investigate the technology innovation that has impacted the entire Korean Broadcasting industry. Case study is well suited to understand IT-based innovation in organizational contexts (Darke et al. 1998) and single cases can provide rich description and understanding by allowing in-depth analysis by researchers (Walsham 1995). This methodological choice is also consistent with Yin's suggestion to consider three conditions to choose a proper research method: (1) the type of research questions posed; (2) the extent of control an investigator has over actual behavioral events; and (3) the degree of focus on contemporary as opposed to historical events (Yin 2009). First, case study is more appropriate to handle how and why questions than what questions. The research questions posed in this study favor a case study approach. Second, we do not have any intention or are in a position to manipulate the development of the innovation or influence behaviors of involved stakeholders. Third, this innovation is currently in use in multiple organizational contexts with potentials for expansion and phase out.

The research was designed as a single case study with multiple organizations involved; the innovation provider and multiple user organizations industry-wide. Thus, we define the case study site as the network of adopting organizations and our analysis would be at the network level or the industry level because in this case the network covers the entire industry.

The main data sources were documents and interviews. The researchers were able to get enormous amount of extensive data files from KOBACO including the company overviews, the project development data, and customer satisfaction survey data over several years. Two of the authors planned and conducted interviews from various stakeholder organizations. A total of 25 interviews have been carried out with individuals from 21 organizations (see the Table 1). All interviews were semi-structured and lasted typically between 30 to 60 minutes. These individual interviews were recorded and transcribed later.

<b>Table 1. Summary of Details about the Informants</b>				
		Number of Organizations	Number of Subjects	Roles in the Organization
KOBACO (K)		1	3	IT-Manager (IM, 2), Sales-Manager (SM, 1)
Broadcasters (B)	Small (S)	4	5	Director (D, 1), Manager (M, 3), Deputy manager (DM, 1)
	Large (L)	3	4	Director (D, 1), Manager (M, 1), Deputy manager (DM, 2)
Ad-agencies (A)	Small (S)	5	5	Director (D, 1), Manager (M, 4)
	Large (L)	8	8	Director (D, 1), Manager (M, 7)

Interview guidelines prepared before interviews were tailored to different stakeholder groups of interviewees such as the provider firm, the broadcasting companies and advertisement agencies. Advertising agencies were sub-categorized based on size since their interests and perspectives could be significantly different depending on their size. Two researchers took part in most of the interviews. Notes were taken during or right after each interview. The two authors also had a brief review session after each interview to exchange their data and summarize major points.

The data including the interview notes, transcribed text, and all related documents were then analyzed using the theoretical frameworks chosen. First the researchers sought a chronological understanding of the processes of the innovation development and adoption using Van de Ven's infrastructure theory. The analysis using the framework revealed why the innovation attempt was successful while an attempt of a similar innovation failed several years before. Then, the authors analyzed the data from different user groups' perspectives. We have developed content coding categories related to explorative and exploitative evaluations of users. The following section presents detailed results of the analysis.

## Results

We have analyzed the case from two different perspectives to answer the research questions posed in this study. The first part of the analysis focuses on the understanding of the development and adoption of the innovation in the public sector using Van de Ven's infrastructure framework. The second part analyzes the different evaluation and adoption perspectives on the innovation in the public sector using the ambidexterity framework.

### *Findings from Van de Ven's Framework*

The review of the literature on IS in the public sector suggests that our understanding is quite limited on questions like how IT-based innovations are developed and adopted and why they succeed or fail. We have analyzed our data according to the four schematic categories of Van de Ven's industry infrastructure theory. The four-category analysis as shown at Table 2 shows how a particular innovation has been developed and adopted and how the processes were shaped interacting with the infrastructure level factors. The impact of the factors becomes more obvious and dramatic when the focal innovation is contrasted with one that was attempted several years before, but failed.

### Proprietary activities

The proprietary activities component focuses on the actions of individual firms that typically appropriate basic knowledge from the public domain and transform it into proprietary technology innovation. Within KOBACO, there had been on-going efforts to digitize paper-based transactions and report generation methods. In late 1990s, there was an attempt to implement an intranet-based sales reporting system within KOBACO, but the effort turned out to be a failure with main users avoiding the use of it. In early 2001, KOBACO began its endeavor to develop a more ambitious internet-based system to process transactions with AD companies and broadcasting companies.

There was a devoted project manager for the new system development effort. As a middle-level manager, he had close connections with the sales department (end users of the system). He also had a long-term vision for the industry and its technology use. The following comment testifies his leadership in the project:

*“... It is hard to push such project over a leadership change period. He (the project manager) was perseverant and aggressive in the system development project. Without him, I do not think we will be using KOBAnet today... He did not have any IT background at all, but ironically, that turned out to be a positive factor in the project.” (K-SM)*

The project manager persuaded middle level managers and was successful in internal marketing and promotion of the system. Triggered by the change in the institutional environment (see below), the company leadership sought strategic initiatives to secure the company's position in the market. KOBAnet was internally marketed as such and had enough funding for its development. Overall, the company persisted in developing the system over several years, and it subsequently developed and gained access to the complementary assets to develop and distribute KOBAnet.

### Resource endowments

Public-resource endowments are critical to developing most technology-based innovations. Basic scientific or technological research and financing of such research is one of the foundation components for innovations as well as another essential resource component of a pool of competent human resources. For the case of KOBAnet, the social infrastructure was mature enough by the time of its development. The IT infrastructure was in robust shape in South Korea in early 2000s and the internet was widely available.

*“... the technology trend played a role. In almost every sector, companies are moving towards information systems and online systems. Internet-based home stock trade systems caught up by then. (AL-M)”*

By the time of KOBAnet was released, broadband internet was widespread in South Korea and communication technologies were mature enough. With maturing social IT infrastructure, it began to be recognized that the broadcasting industry needed to move further to digital technology.

*“The necessity and importance of IT was not recognized because we just started using Internet in the late 1990s. KOBACO system was developed after 2000. (K-SM)”*

In a nutshell, the social IT infrastructure and industry-level technologies and need for them was mature enough to push innovations like KOBAnet.

### Institutional arrangements

The case of KOBAnet is interesting and rather unique in that the company, KOBACO, holds a monopoly position protected by law in advertising sales industry. However, the firm's monopoly position was decided unconstitutional in 2008. The company was pressured to build up competitiveness before the market would be deregulated though the action plan for the industry deregulation has been put on a halt for years amid political debates. Ironically, the ruling of the federal court in 2008 turned out to be one of the strongest motivations for the development of KOBAnet. Inside KOBACO, a special task-force team was formed and later integrated into the organizational structure. The company launched well-organized efforts to take initiatives in industry standardization for ad sales before deregulation is implemented in the near future.

*“After the new CEO took over... the special task force was formed... later people at the task force joined IS team to develop KOBAnet... now things are standardized to process tasks fairly and quickly. (K-IM)”*

## Market consumption

The broadcasting industry was growing fast and naturally the volume of volume in advertisement sales also grew tremendously. The industry needed a better way to handle increased demand and sales volume and it reached the saturation point where the old method of sales processing using pen and pencil, snail mail, fax and physical delivery of ad materials could not support the increasing demand any more. Market liberalization in sister industries such as cable TV advertisement sales increased pressure to seek better sales management system in the industry KOBACO belonged.

In summary, demand for better service and recognition of importance of clients' satisfaction began to come from both inside and outside of KOBACO.

<b>Table 2. Findings from Van de Ven's Framework</b>	
	Major findings
Proprietary activities	<ul style="list-style-type: none"> <li>Devoted project leader</li> <li>New company CEO</li> <li>Close connection with the end-users throughout development</li> <li>Strong support from middle management</li> <li>Internal marketing and promotion</li> </ul>
Resource endowments	<ul style="list-style-type: none"> <li>Sufficient budget</li> <li>Internet widely available and technology is mature</li> <li>Social infrastructure mature</li> <li>Broadcasting industry moving to digital technology</li> <li>Significant commitment to training and interaction with users</li> </ul>
Institutional arrangements	<ul style="list-style-type: none"> <li>Political debates on possible deregulations on the industry in the near future</li> <li>Special task force team was formed and integrated into the organizational structure later</li> <li>Well-organized effort in standardization</li> </ul>
Market consumption	<ul style="list-style-type: none"> <li>Market need for a better system to handle increased volume and to support new sales methods</li> <li>Competition on sight</li> <li>Market liberalization in close industries such as cable TV advertisement</li> <li>Demand for better service and clients' satisfaction come from both in and out of KOBACO</li> </ul>

## Findings from Ambidexterity Framework

Organizations pursues both exploitative and explorative activities with a new IS (Gibson and Birkinshaw 2004b). Exploitative activities include seeking short-term benefits by coordinating and streamlining activities related to the use of the IS. Explorative activities aim to increase the ability to capture and move quickly toward new opportunities which can be created by a new IS. These activities are considered as an investment for realizing future opportunities. With the introduction and adoption of KOBACO system, KOBACO, a leading organization in broadcasting advertising industry, showed two patterns of activities from ambidexterity point of view as shown in Table 3.

<b>Table 3. Exploitative and Explorative Activities at KOBACO</b>	
Exploitative Activities (Incremental improvements of firm capabilities)	Explorative Activities (Creation of new capabilities and novel solutions)
<ul style="list-style-type: none"> <li>Processing electronic requests for AD slots for faster transaction and improved customer satisfaction</li> <li>Reduce manual data input and conversion</li> <li>Faster and more accurate checking of AD sales</li> <li>User-friendly interface</li> <li>Reorganization of data for faster export by its clients</li> <li>Speedy organization of AD for broadcasting</li> <li>Create faster and higher quality AD reports for managers and clients</li> </ul>	<ul style="list-style-type: none"> <li>Supporting electronic transmission of AD sales and AD material</li> <li>Analysis of data to understand advertisers' preferences and patterns</li> <li>Communicating stakeholders to improve KOBACO system</li> <li>Dynamically developing new sales packages (e.g. GRP, volume discount, special package for low-budget advertisers)</li> <li>Restructuring of organization for stronger support to sales department</li> <li>Standardization of AD codes for industry-wide system</li> </ul>

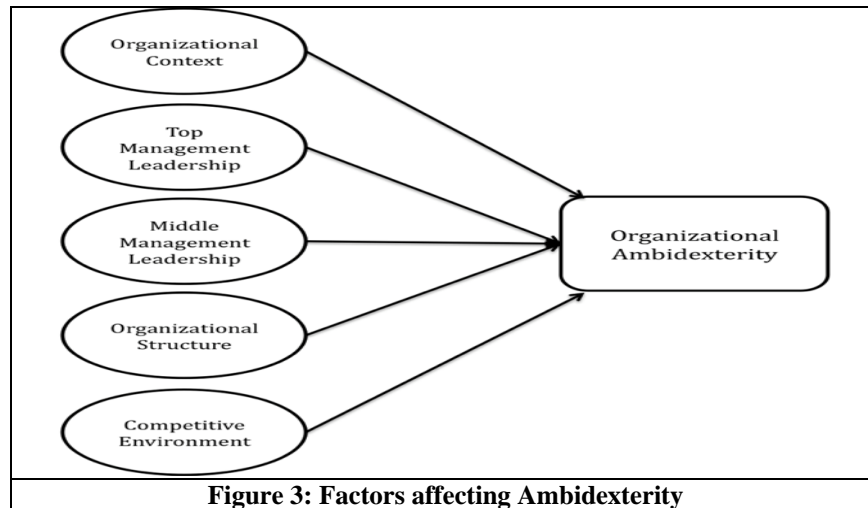


	integration <ul style="list-style-type: none"> <li>• Development of a new information system to integrate with KOBACO system and other internal information systems</li> </ul>
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### ***Factors affecting ambidextrous activities***

Inter-organizational information systems (e.g. KOBAnet in our case) can be the primary sources of business growth and competitiveness (Chatfield and Bjorn-Andersen 1997). In adopting and using such systems, some organizations may take an explorative strategy to find opportunities to better use the system in the future, while others may take an exploitative strategy to use the system more efficiently now.

Through our case study, we found several factors affecting these ambidextrous activities, i.e. organizations' exploitative and/or explorative use of information systems (shown at Figure 3).



Our data suggest that the *first critical factor* is organizational context. When the context of an organization is set to nurture ambidexterity activities, employees are encouraged to think and behave for themselves to be both exploitative and explorative in doing their jobs. The creation of a shared vision, appropriate compensation scheme, and exemplary leaders encourage ambidextrous behavior (Adler et al. 1999; Lewis 2000 ).

KOBACO developed and shared a new vision with the arrival of new top management. Its vision statement suggests that its goal is to be an ambidextrous organization and a leader in broadcast advertising. It aims to maintain an industry leader's position to develop innovative solutions and deliver best services to its clients. It also changed its compensation scheme to favor ambidextrous employees. In addition, it selected well-respected employees to lead task force teams for the development of explorative solutions.

*"In the long-term perspective, what type of organization, either public or private in the future, KOBACO is working on KOBAnet. This is related to KOBACO's revenue. On the other hand, as a service provider (in the media industry), If KOBACO wants to survive as a media rep company in the future, things such as KOBAnet would be crucial. (AL-D)"*

The *second critical factor* is top management leadership (Tushman and O'Reilly 1996). Leadership from senior executives is an important factor affecting organizational culture of exploration. In particular, a new top management can encourage the organization to reevaluate the current approach and initiate a future-oriented one in the use and development of a new IS. Prior studies note that leadership of senior executives can affect other factors such as structural and contextual factors. Lubatkin et al (2006) asserts that leadership can be an independent antecedent of organizational ambidexterity. Top management manages the balance between exploitation and exploration by bringing in new competencies to organizations and dynamically aligning organizational resources (Mom et al. 2009).

In KOBACO, a new top management installed in 2002 instilled confidence in its employees. It also made a structural change in KOBACO and created special task force teams. These teams develop strategies to engage in

ambidextrous activities. Key members of the teams were assigned to the IS department to initiate the development of KOBACO system.

*“CEO pushed that KOBACO should be competitive.... consciousness of crisis from external forces... (KOBACO sales manager). Our objective was to make KOBACO a leader in broadcasting industry... All other companies would develop their systems dependent on the data from KOBAnet. This would eventually make the cause of KOBACO’s existence, strengthen its status, and provide better service. (K-IM)”*

The *third factor* is middle management leadership (Beckman 2006; Floyd and Lane 2000). While prior research has focused on the importance of top management in organizational ambidextrous activities, recent research investigates the role of leadership from different hierarchical management levels. Floyd and Lane (2000) assert that middle managers at ambidextrous organizations may engage in explorative activities at operation levels by creating and testing innovative solutions while top managers select and exploit promising solutions.

In KOBACO, serious commitment from middle management has been critical to the development of its information systems (Caudle et al. 1991). A few middle managers who handled both technical and managerial issues in taking an explorative approach played a key role in the development of KOBAnet. This was not immediate benefits, but long-term opportunities provided by the system. While top management in public organizations in Korea tends to change every a few years, middle management works at the organization for a long period of time. Not all mid-level managers can initiate and manage long-term development or explorative approach to information system. Respect from ordinary employees and recognition from top management are required for the middle management to take an explorative approach. Dedicated commitment and strong leadership from middle management, however, have been key factors in sustaining projects which might take long time with no visible and immediate return.

*“It is a matter of people. For example, IT manager K took the bullet and work IT task force for seven or eight years. It is a very long time (considering the regular task rotation in every two or three year at KOBACO). At KOBACO, where is a man like him who takes an initiative with future visions and confidence. (K-SM)”*

*“As to KOBAnet development, I think the IT manager K is the person who deserves recognition. Despite a lot of difficulties, he strived through. He played the most important role in making KOBAnet a successful system. (BL-D)”*

The *fourth factor* is organizational structure. For organizations to be ambidextrous, they should develop structural mechanism to deal with competing demands for exploitation and exploration (Raisch et al. 2009). As to how to develop such structural mechanism, prior research suggests two distinct approaches: differentiation and integration. Researchers supporting a differentiation approach argue that organization units develop different structures and contexts depending on their focus of either exploitation or exploration (Benner and Tushman 2003; Tushman and O'Reilly III 1996). For example, organization units focusing on exploitation are larger, more centralized, and less flexible than those responsible for exploration. Gilbert (2005) notes that structural differentiation is necessary to handle different demands from emerging markets and current business opportunities and maintain either exploitation or exploration competency. This stream of research suggests that ambidextrous organizations should develop parallel structures which run both exploitative and explorative units. In addition, these two types of units inside an organization should be spatially separated. Researchers supporting an integration approach argue that employees' pursuit of both exploitation and exploration depends on contextual design by organizations (Gibson and Birkinshaw 2004b). For example, the behavioral integration of top management plays a pivotal role in facilitating the processing of disparate demands for achieving ambidexterity (Lubatkin et al. 2006).

In our case, we found that KOBACO created task force teams to develop KOBAnet and related systems. The task force team was small (eight employees on average), decentralized, and flexible to explore opportunities to develop a new information system. Despite the small size of the team, each member represents sales related functions. The team reported directly top management. The team coordinated with human resources department so that team members could change flexibly. Members at different units were arranged to work at the team temporarily. After the implementation of KOBAnet, the task force is disbanded. However an existing IT department expands to IT division. The members of the task force moved to IT division. These organizations combine efficiency seeking organizational structure as well as dynamism driven organizational structure (Nonaka 1994).

The *fifth factor* is competitive environment (Gibson and Birkinshaw 2004b; Levinthal and March 1993; Volberda 1999). Prior research notes that dynamic and competitive business environment plays an important role in shaping ambidextrous behavior. A highly dynamic and competitive environment can make organizations strike a good balance between exploitation and exploration (Auh and Menguc 2005; Jansen et al. 2006).

*“(In the expectation of the introduction of competitors of KOBACO), the company made such thing (KOBAnet) to have its own competitiveness...I think this is a strong weapon. We cannot market our products with only mouths all the time (like we did in the past)... in the past we fought with guns and knives. It is like now we have an atomic bomb. (K-SM)”*

In our case, organizations in the broadcasting advertising industry have faced an increasingly dynamic environment. KOBACO has perceived pressure from both the government and the market that it had to become ambidextrous and develop innovative solutions for maximizing clients' satisfaction. The pressure on KOBACO to offer efficient solutions currently and develop competitive opportunities in the future was tremendous. KOBACO's client organizations felt a serious environmental pressure with the introduction of KOBACO system. They had to adopt and adapt to KOBACO system.

## Discussion

We have presented a case study of a transformational e-government information system that enabled a broadcasting advertising industry in South Korea to be efficient and effective. The innovation has been successfully developed and adopted by broadcasters and advertising agencies. Despite wide acceptance across the industry, organizations adopted the systems differently. In addition, this innovation has been driven by a public company, KOBACO, which has faced competitive market environment. To understand the reason behind different acceptance and the factors affecting the innovation by KOBACO, we used the industry infrastructure framework and ambidexterity theory in an attempt to expand our knowledge on the development and adoption of innovative e-government systems.

The first contribution of this research is the insights it provides into innovations of public organizations under pressure. This study analyzes the context of IT innovation by a public company. We focus on the components of the industry infrastructure framework suggested by Van de Ven (2005). Raisch et al. (2009) note that research on conditions under which ambidexterity leads to success is scarce. We apply the Van de Ven's framework to identify the conditions under which organizations develop and use innovative IS for achieving ambidexterity. Our analysis answers the first research question of how identifies several factors affecting the development and adoption of innovative IS. We identify market consumption as a motivation provider. KOBACO felt the strong need to be competitive for its own survival in the future market where it would face fierce competition. KOBACO identified information system as a key tool to make it competitive. Our study found that under what circumstances an effort to develop an innovative system by a public company would succeed or fail. In early phase of design and development, institutional arrangement played critical roles. In particular, the formation of a special task force team signaled stakeholders that KOBACO was dedicated to the development of an innovative information system. This structural coordination was necessary to manage the tension between differentiation and integration for achieving ambidexterity (Gulati and Puranam 2010). Researchers note that differentiation and integration are not alternative but complementary mechanisms for achieving organizational ambidexterity (Lawrence and Lorsch 1967). In addition, the need for exploration and exploitation may vary over time as well as across initiatives. KOBACO handled this by setting up a task force which focused on exploration. After KOBAnet was developed and implemented, the task force was integrated to IT division which is expanded from prior IT department. IT division focused on exploitation activities. In terms of structural ambidexterity, the task force team was evolved over time. First the team was created as a differentiated unit during the exploration phase. After the development, the team was integrated with the existing structure. To ensure the continuation of the work and balance between exploration and exploitation, most team members moved to the expanded IT division. Proprietary activities and resource endowments played an important role during the development and maintenance phase. Well-coordinated effort by middle managers with a new CEO's support was identified as the main drivers of the KOBAnet development and its success. Sufficient interaction and training with stakeholders throughout the development and training phases also played a critical role in making the project successful. In contrast market consumption in terms of motivation was weak. KOBACO 1.0 was developed to generate sales related reports faster. The project received limited support in terms of institutional arrangements. A part of IS department was assigned to the project which received a nominal support from top management. During the development phase, insufficient interaction with stakeholders was made. This led to a failure to gain stakeholders' commitment to use KOBACO 1.0.

The insights from the analysis of the case through ambidexterity theory address the second research question of how organizations develop and innovative IS to meet the needs of networked partners. Our analysis identifies exploitation and exploration activities of KOBACO and its networked partners. KOBAnet made both KOBACO and its networked partners engage in both exploitive and explorative activities. The development of KOBAnet is an

exploration-oriented activity whereas the use of KOBAnet is exploitation-oriented activity. Business efficiency and effectiveness of KOBACO were improved with increased its clients' satisfaction. We identify the factors affecting ambidextrous use of KOBAnet. KOBACO's networked partners engage in both exploitive and explorative activities. For the networked partners, firm size is identified a determining factor for ambidextrous use of innovative IS. Prior study on innovation diffusion notes that size is an indicator of resource and infrastructure which supports innovativeness (Moch and Morse 1977; Rogers 2003). For example, a prior adoption study on telecommunication technology finds that technology adoption correlates firm size, revenue, and employees. In our case, large organizations have resources on both technical and non-technical areas. They had internal IT departments to integrate their systems with KOBAnet and attended stakeholders' meeting regularly provided by KOBACO. These IT departments have a variety of specialists whose skills and knowledge to enhance organizational capability (Kimberly and Evanisko 1981; Rogers 2003). This capability was critical to use KOBAnet exploitatively and develop an integrated system exploratively. Large organizations shared their ideas on the development and integration at the meetings, through which they could also recognize what other competitors are doing.

These insights contribute to the existing body of knowledge on IS. Earlier studies have emphasized the adoption, diffusion, and impacts of PMIS (Movahedi and Lavassani 2011; Palanisamy and Mukerji 2011). In contrast, the insights from our analysis of KOBACO case add to our understanding of how innovative public information system can be developed and shaped over time through interactions in the public broadcasting context, thereby adding to public-IS research.

Our study also provides an insight on how stakeholder organizations use innovative IS differently. Some organizations use innovative IS exploitatively focusing on short-term efficiency and effectiveness while others use innovative IS exploratively focusing on long-term benefits. This does not mean that these explorative organizations do not use innovative IS exploitatively. Both types of organizations recognize the benefits of ambidextrous use of transformational IS. They strike their own balance between explorative and exploitive use depending on their situation (e.g. size, available resource). More study on the factors affecting this balance decision is needed. Our study of KOBACO case adds the contextual and structural insights into innovation processes of broadcasting AD systems in South Korea by providing analysis that can help us further explain the challenges involved. This study has provided a broader perspective on public IS.

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