

# Strategic Application and Adoption of Information Systems: Case Studies of Korean Companies

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## ABSTRACT

Korea has shown a tremendous leap in economic development in a short span of time, and the world is watching Korea's economy with keen interest. Development of industries that are implementing information systems (IS) has played a role in leading economic growth in Korea. Because of the success of Korean firms, the creation of case studies for implementing IS in Korean firms was attempted. Despite the many case studies, analysis of the motivations and results, for implementing IS as a firm's strategic purpose, was rarely conducted. Therefore, this paper investigates some Korean firms' cases studies in order to show the best practice example of implementing and adopting IS strategically. Nine cases of Korean firms' strategic use of IS were analyzed in various industry fields. Each case consists of the following four categories: company overview, background implementing IS, adoption of IS for strategic purpose, and the results of implementing IS. In order to help various companies to take an action with their IS implementation and its strategic use, implications from the cases are summarized to show how Korean firms strategically introduced IS for solving particular problems that they had faced.

Keywords: Information Systems, Information Technology, Strategic Application, Strategic Adoption, Korean Companies

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## 1. INTRODUCTION

The Republic of Korea has achieved noticeable economic growth, becoming one of the Group of 20 (G20) economies. Information technology and information system (IT/IS) have made considerable contributions to the growth of Korea's economy (Reinert, 2007; Mah, 2000). As the rate of Korea's economic growth has increased, the amount of output in the IT/IS industry and the amount of exports and imports in the IT/IS industry have increased (Davenport and Prusak, 1998). Moreover, the na-

tional information index of Korea and proportions of the IT/IS industry in Korea's economy have also increased. Thus, IT/IS are among the critical success factors which have impacted on the growth of Korea's economy.

IT/IS have made noticeable contribution to the growth of Korean firms as well as to the Korean economy (Kim, 2004). In recent years, many Korean firms invested in IT and adopted various IS. Around 70% of the Korean firms invested in their IT service, and approximately 50% of the Korean firms invested in hardware, software, and employee's education, respectively.

For the “support work of activity”, “integrated work”, “operation”, “supply”, “connection with customers”, etc., Korean firms used and adopted diverse IS, such as enterprise resource planning (ERP, 27.7%), electronic procurement (e-procurement, 14.4%), customer relationship management (CRM, 9.5%), supply chain management (SCM, 7.1%), and knowledge management systems (KMS, 5.6%), etc. (Chaudhry, 2005). It is definitely worth mentioning that IT/IS have played an important role in Korean firms’ growth.

Since the 1997 International Monetary Fund (IMF) financial crisis, which gripped Korean firms and the Korean economy, the effective management of knowledge and information has become a more important issue for Korean firms (Kim and Oh, 2004). In our information-oriented society, Korean firms attempted to not only manage knowledge and information effectively, which are critical factors for reducing uncertainty when making a decision but also to use knowledge and information strategically. Thus, many case studies about successful IS implementation in Korean firms were carried out since the late 1990s. This means that the strategic use of IS is one of the most important factors for gaining competitive advantage. However, this requires further studies about fundamental concepts, such as “Why did Korean firms need IS?”, “How did Korean firms adopt IS?”, “What is the performance of IS implementation in Korean firms?”, etc. (Harris and Katz, 1988; Ives and Vitale, 1988; Weill and Olson, 1989).

Therefore, the purpose of this paper is to examine Korean firms’ cases in order to demonstrate the importance of the strategic use of IS in Korean firms. This paper presents successful cases of implementing IS in Korean firms, and the cases are chosen and classified on the basis of IS types and industry fields. A total of nine Korean firms’ cases are examined, which include Samsung Electronics, Samsung-Tesco, LG Philips, POSCO, Hyundai Card, Lotte Department Store, KT, Asiana Airlines, and Mando. Each of these case studies consists of four categories: 1) company overview, 2) background of IS implementation, 3) adoption of IS for strategic purposes, and 4) the results of implementing IS.

The remainder of this paper is organized as follows: Section 2 describes contributions of IT/IS to Korea’s economy and the current status of IT/IS in Korean firms. Furthermore, this section also derives the importance of implementing IS in Korean firms on the basis of the current status. Section 3 presents case studies on strategic uses of IS in Korean firms, provides an introduction of the firms, shows why the firms needed IS, how the firms adopted IS, and what benefits the firms received. Section 4 describes implementations of the case studies based on the IS types. Section 5 presents the conclusions, including summary, contributions, and the possible further research in this field.

## 2. LITERATURE REVIEW

### 2.1 Impact of IT/IS on Korea’s Economy

The Korean economy has been growing with the development of the IT/IS industry since the late 1990s. The following evidence shows how much the development of the IT/IS industry has impacted Korea’s economic growth: 1) the amount of output in the IT/IS industry, 2) amount of exports and imports in the IT/IS industry, and 3) national information index.

Table 1 shows the trend of output in the IT/IS industry from 1990 to 2005. The IT/IS industry’s contribution to Korean industry increased from 6.7% (1990) to 8.5% (1995), and then to 12.3% (2000). The amount of output in the IT/IS service industry in 2000 was US\$ 37 billion, which was about three times larger than the output of the IT/IS service industry in 1995 (US\$12 billion). Moreover, from 1990 to 1995, the total output of the IT/IS industry increased by 2.6 times, and the investment into the IT/IS device industry also increased by 2.5 times (The Bank of Korea, 2003). Table 2 shows that the amount of exports and imports in the IT/IS industry increased between 1990 and 2002.

Based on the rapid development of the code division multiple access (CDMA) and the dynamic RAM

**Table 1.** The trend of the output of the Korean information technology and information system (IT/IS) industry

	Year						(B)/(A)	(C)/(B)
	1990		1995		2000			
	Amount* (A)	Proportion (%)	Amount (B)	Proportion (%)	Amount (C)	Proportion (%)		
IT/IS device	22	5.4	57	6.8	127	9.2	2.53	2.24
IT/IS service	5	1.2	14	1.7	43	3.2	2.76	3.05
Total output of IT/IS	27	6.7	71	8.5	171	12.3	2.57	2.40
Total output of Korea’s Industry	416	100.0	841	100.0	1392	100.0	2.02	1.66

\* Amount: US\$ billions.

semiconductor, the proportion of exports in the IT/IS industry increased from 8.4% (US\$5 billion) in 1990 to 16.4% (US\$22 billion) in 2002. The amount of exports increased between 2000 and 2002, whereas the amount of imports decreased during the same period. This means that the IT/IS industry contributes to the profitability of Korea's economy.

The outcome of Korea government's policy was noticeable in terms of the supply for IT/IS infrastructure. Table 3 shows the national information index (NII), which implies PC, Internet host, Internet user, cellphone, etc. (Ministry of Information and Communication of Korea, 2004).

**Table 2.** The trend of the proportion of Korean IT/IS exports and imports

Year	Proportion of the IT/IS industry in Korean industry	
	Exports	Imports
1990	8.4	2.3
1995	6.9	2.3
2000	12.7	5.4
2005	16.4	5.0

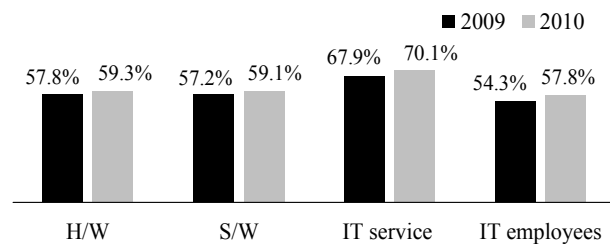
Values are presented as percentage.  
 IT/IS: information technology and information system.

In general, the economic status of the IT/IS industry can be inferred by its proportion of the gross domestic product (GDP). After 2000, the annual average growth rate of the IT/IS industry was about 15.7%, which was three times as much as the GDP growth rate of 5.4%. Thus, the IT/IS industry led the economic growth in Korea substantially by contributing 2.2% of the annual average GDP growth rate. In 1996, the proportion of the IT/IS industry in the GDP was 6.2%, whereas the proportion in 1996 was 17.4% of the GDP. This means that the IT/IS industry's impact on the Korean economy had

increased. In 2010, the proportion of the IT/IS industry's exports was 32.9% and the amount of the trade balance was US\$78 billion, which was an all-time high (Kim, 2011). Therefore, it is certain that the IT/IS industry is the one of the most powerful industries for Korea's economic growth.

## 2.2 Status of IT/IS in Korean Firms

Figure 1 shows the status of investment into IT from 2009 to 2010 that 70% of firms have invested in IT services including the IT maintenance and repair (Ministry of Knowledge of Economy and National IT Industry Promotion Agency, 2011). Approximately 50% of firms invested in hardware (H/W), software (S/W), and IT human resources. In 2009, 70% of firms invested "less than US\$10,000" on the basics of the IT, such as the Internet and PC, whereas 15.1%, 4%, and 8% of the firms invested "US\$10,000 to US\$30,000", "US\$30,000 to US\$100,000" and "more than US\$300,000", respectively.



**Figure 1.** Firms investing in information technology (IT) by areas. H/W: hardware, S/W: software.

The proportion of firms that employ a chief information officer (CIO) is 23.3%. Currently, 32% of firms have IT organization (the firms with "IT-dedicated organization" are 19.2%, firms with an alternative organization which is responsible for information are 12.6%),

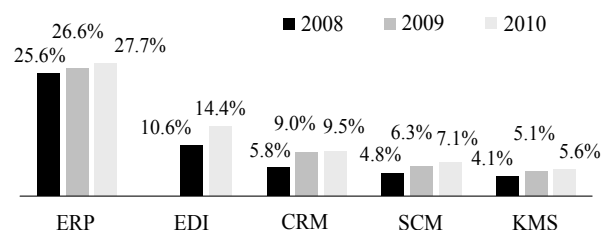
**Table 3.** National information index and national information index rankings

Nation	National information index			National information index rankings		
	1996	2000	2003	1996	2000	2003
Sweden	95	91	95	4	5	1
Denmark	92	92	95	5	4	2
United States	99	99	95	1	1	3
Swiss	88	90	94	8	7	4
Island	N/A	N/A	91	N/A	N/A	5
Canada	92	91	89	6	6	6
S. Korea	52	78	89	22	14	7
Netherlands	85	93	85	9	3	8
Norway	99	93	85	3	2	9
United Kingdom	74	81	85	13	11	10

whereas 68.2% of firms do not have organization for IT. Over 70% of firms do not have IT employees (including contract or outsourced workers), or they have IT employees that equal to less than 1% of total employees. Moreover, the proportion of IT employees in 1–5% of the firms is 15% of the total number of employees; the same proportion in 7% of the firms is approximately 5–10%, and in 6% of firms is more than 10%. Among the work performed in firms outsourcing IT, the proportion of maintenance work is 19.8%, development is 8.5%, and planning work is 3.8%.

In firms where there is a collaboration with other firms, which accounts for 75.6% of firms, 49.6% of the firms use IT for collaboration. It appears that 26% of firms which are collaborating with others do not use IT in their collaboration. The level of use of IT in collaboration of electronics firms shows that the level of use for non-manufacturing firms is higher than that of manufacturing firms.

IS are most often used for supporting (77.4%) and integrating (38.5%) the activities in firms, operations (37.8%), supply (28.2%), and connections with customers (27.7%). In terms of practical usage of IT, the proportion of firms using ERP is the highest (27.7%), followed by e-procurement (14.4%), CRM (7.1%), SCM (7.1%), and KMS (5.6%) as shown in Figure 2 (Ministry of Knowledge of Economy and National IT Industry Promotion Agency, 2011). As the environment for employees improved, the proportion of firms using mobile business, such as mobile Internet and personal digital assistants (PDAs), has increased from 5.8% (2007) to 14.4% (2010).



**Figure 2.** Adoption rate of information system for integrated work activities. ERP: enterprise resource planning, EDI: electronic data interchange, CRM: customer relationship management, SCM: supply chain management, KMS: knowledge management systems.

### 2.3 Strategic Uses of IS in Korean Firms

In the global environment, for more effective management of knowledge and information, Korean firms focused not only on managing, keeping, and reusing knowledge and information but also on investment in the management of knowledge and information (Duffy, 2001). However, practically, it is difficult for managers in the firms to manage the value-added knowledge and information. Thus, it has been emphasized that system-

atic management of knowledge and information is required for creating new firms' resources, and determining their strategic direction (King *et al.*, 1989; Weber and Pliskin, 1996).

Today, global firms are faced with a knowledge-based environment where knowledge and IT need to be integrated in order to obtain competitive advantages. Thus, it is important for firms to strategically use their resources, such as information and knowledge. The effective management of a firm's resources is their critical success factor, which reduces their uncertainty when they make a decision (Atkins, 1994; Davenport and Prusak, 1998). Firms can be more competitive than their competitors through the acquisition, integration, storage, sharing, and adoption of knowledge and information (Zhang, 2005; Grant, 1996).

The direct impact of IS is "capital deepening", which increases production at the production function level (labor, capital). Capital deepening increases outputs with the adoption of efficient facilities or the replacement of other factors of production, such as labor capital. In actuality, some research shows that the productivity of IS was increased as the prices declined and expenses increased back in the 1990s (Jorgenson and Stiroh, 1999, 2000). IT not only increases productivity (inputs over output) but also the effect of "positive externality." Some processes for of production, consumption, and logistics can be simplified when IT investments are expanded. For example, firms suffering from financial trouble, due to inefficient inventory management, reduced their inventory costs through material re-quirement planning (MRP), which is based on IT management (Lee *et al.*, 2007).

In the late 1980s, it was emphasized that the "strategic use of IS" or the "competitive advantage of IT" is an important issue (Cavaye and Cragg, 1993). The strategic use or competitive advantage of IT is defined as the firms not only utilize information and technology, but also link information and technology to their strategies for getting a competitive advantage (McFarlan *et al.*, 1983; McFarlan, 1984; Parsons, 1983; Porter and Millar, 1985). Some case studies or theoretical studies show that it is important to get a competitive advantage through the strategic use of IS, but this theory requires more studies about the relationship between a firm's strategy and their performance (Harris and Katz, 1988; Ives and Vitale, 1988; Weill and Olson, 1989).

## 3. CASE STUDY

### 3.1 Samsung Electronics

#### 3.1.1 Overview

Samsung Electronics is a multinational electronics and IT company founded in 1969. Samsung has approximately 160,000 employees with factories and retailers

in more than 60 countries across the world. The revenue of Samsung Electronics was estimated at US\$117.4 billion in 2009, making it the world's biggest IT company in the world, outpacing Hewlett-Packard (Song and Christian, 2010). Samsung Electronics' major business areas are semiconductors, telecommunications, home appliances, and liquid crystal display (LCD) digital appliances. It is the market leader in more than 60 markets, including mobile phones, television, digital displays, DRAM, flash memory, etc. Especially, their market position with semiconductors and televisions places them as the world's overwhelming leader. Samsung had emphasized innovation in its management strategy since the early 2000s, and it has again highlighted innovation as part of its core strategies when it announced the Vision 2020 plan in which the company set an ambitious goal of reaching US\$400 billion in sales revenue within 10 years.

### 3.1.2 Background of SCM

In the 1980s, Samsung Electronics began to enter the global marketplace as a small consumer electronics company. After that, in the late 1990s, IT-related markets were increasingly getting bigger, and Samsung Electronics eventually grew to become one of the largest electronic companies in the world. As a rapidly growing company, it had to discard its previous system, and build a new system that fit the newer and bigger Samsung Electronics. One of these key innovations was implementation of SCM. Samsung Electronics needed to have quick reactions in rapidly changing markets. As business areas with many continuous innovations, IT-related markets suffer frequent changes. In addition, as a global corporation with worldwide divisions, Samsung Electronics needed a centralized supply control. Before implementing SCM, the supply chains of Samsung Electronics were controlled by regional divisions, and these decentralized supply control managers had numerous disadvantages. With an unreliable demands forecast, and a lack of unified standard information, no strategic planning for inventory and low reliability of delivery dates were the foremost problems of in Samsung Electronics' supply control system.

### 3.1.3 Adoption of SCM

Samsung Electronics introduced SCM in order to enable rapid planning for fast reactions to market changes. Demand predictions by salespeople and order information have the possibility to be distorted by unsuitable support of the middle of the organization. Because a firm's future projects are based on this distorted market information, the inaccurate information can directly lead to wrong or inefficient project plans. In order to solve this problem, Samsung Electronics attempted to integrate all the planning steps into one concurrent plan.

Thus, Samsung Electronics could predict demand with information integration by implementing SCM. Sales information and demand predictions were generated by

a local marketing group who had contact with the customers, and these groups were controlled by the strategic marketing group in the headquarters. Information management in this kind of system is very likely to cause incorrect demand predictions without the help of a concurring collection of demand data. Through the centralization, and with the integration of IS, setting up more accurate production plans was possible.

These actions enabled real-time deliveries to customers by introducing SCM. Quality, time limit for delivery, and the price of products are all equally applied to high-tech products. In order to deliver products that sustain high-quality within the contract term, it was important for Samsung Electronics to acquire a credible date that their company can guarantee. Thus, an allocation of resources in advance, based on the current situation, was essential for on time delivery through reliable information sources, and this was possible with SCM.

### 3.1.4 Results and effects

While implementing SCM, Samsung Electronics archived improvements on process management. The process management cycle has been shortened from monthly action to daily action. In other words, Samsung Electronics utilized real-time business information, and was able to make the correct project plans quickly. It enabled the simultaneous planning and execution of worldwide manufacturing and sales plans in the integrated single system. Moreover, by integrating dispersed local information management into one centric management process, it was possible to eliminate all of the inefficiencies that originated from inaccurate forecasts (You, 2009).

## 3.2 Samsung-Tesco (Homeplus)

### 3.2.1 Overview

Samsung-Tesco was established in 1999 as a joint venture of Samsung and Corporation and Tesco (C&T), a global grocery and general merchandise retailer headquartered in the UK. Samsung-Tesco launched a discount store retail chain named "Homplus" in Korea. Homeplus has administrated both hypermarkets and home delivery shopping services. Home plus hypermarket stores supply various home products, such as clothing, electronics, food, books, sporting goods, etc. This chain had been growing rapidly, and has become the second largest hypermarket retail chain in Korea (Park and Rhee, 2008). Samsung-Tesco now has 55 hypermarkets, 42 express stores, and 12,300 employees in Korea with a sales volume of about US\$7 billion in 2008.

### 3.2.2 Background of ERP

In the 2000s, the hypermarket retail chain market was already filled with competitors in Korea, such as E-mart, Walmart, Carrefour (Homever), etc. Major global

retail chains attempted to M&A and have since invaded into new markets, and Korea is one of the new target markets. Against that invasion, local retail chains have started using offensive strategies, and Samsung-Tesco was one of those who needed new strategies for survival. Samsung-Tesco had decided to make new strategies for competitive advantage; however, as they also realized, they needed ERP applications to support those new strategies.

They also needed an ERP system, because of the limits of their pre-existing system. Because of rapid growth for years, the number of their transactions had also considerably increased. The pre-existing management system could not support the firm's huge number of transactions; therefore, they also required a new system to support their rapid growth of transactions. Above all, the needs of a flexible task process and IT environment to achieve a position of market dominance were the most important reasons for the implementation of ERP.

### 3.2.3 Adoption of ERP

Before the ERP system, all processes had been divided up by each department. To use it efficiently, Samsung-Tesco constructed the ERP system to integrate all information within one system. For this reason, the new ERP system had to cover all processes from demand forecasting to accounting. The new ERP system was designed to be added on to the pre-existing system. The new ERP system connects all parts (enterprise information portal [EIP], data warehouse [DW], exhibition, Web-electronic data interchange [EDI], distribution, accounting, point of sale [POS], credit card, etc.), and those parts can access information with an integrated interface. The ERP system enabled all departments to use all information and processes as useable resources.

Samsung-Tesco had realized the need of an ERP system in 2000, and they organized the Tesco business process innovation (BPI) Taskforce team to construct their ERP system in 2002. For 16 months, they constructed and tested the new system. At first they made the "As-Is Business Scenario", Quick-Wins project (code management, inventory accuracy improvement stores, management information system [MIS] reports) to shape the plan. As they fixed the target ERP shape, they selected the package vendor to be Retek and IBM Started Group CRP. As they finished the design of the new ERP system in April 2003 they started tests and trainings in order to achieve quick and unresisted adaptation. Tests and trainings took several months; however, the system worked when they cut over and went live in February 2004.

What they implemented was not just an ERP system, but a retail chain specialized ERP system (Retek). The Retek ERP system has several strong points for retail chain management. First, it has a powerful master management. Master management refers to the broad concept including product, supplier, product classifica-

tion system, etc. A powerful master management can be described in four kinds of elements.

First, the ERP system shows the relationships between stores and partners. It cleared the merchandising processes and managers can now see the flow of products within it. Second, the ERP system provides a flexible organization classification system. Samsung-Tesco retail chain organization consists of six basic classifications, which are company, country, partner, category, region, and branch. The new ERP system helps to make those organization classifications more flexible, and to make grouping and adding entries easier. Next, we discuss efficient product management. It is easy to register products and change product codes using the ERP system. Finally, the ERP system can process input from an external entity. For example, it receives an e-catalogue from a partner, and can process approval requests from the buyer.

The next feature is a variety of promotion. The ERP system offers various promotion functions like simple discounts, multiunit discounts, and it can even mix and match. These functions enable Samsung-Tesco to hold many events, so they can take advantage of opportunities to improve their sales. In addition, the Retek system provides an integration bus. Through the integration bus, the company can exchange data and process information. Data and information in a corporate system environment and a distributed system environment for a supplier are linked by an integration bus. In short, the ERP system offers the optimal integration to the company.

### 3.2.4 Results and effects

As the implementation process of the Retek ERP system was completed, Samsung-Tesco has received many advantages from it. First, because of the ERP system, Samsung-Tesco can manage each of their goods very effectively. Now they can analyze the features of every store's sales by each item, and can use this information when they manage the stock of each store. Second, now they can predict the requested order quality very effectively with ERP. This cut down the cost of labor, and gave some benefits to the company. Third, every department of Samsung-Tesco could now share information on time with an integrated interface. This integrated interface empowered the extendibility and flexibility of the system.

## 3.3 LG Philips LCD

### 3.3.1 Overview

LG Philips LCD Co., Ltd. was founded in 1999 as a joint venture of Netherlands-based Philips Electronics N.V. and South Korean manufacturer LG Electronics, Inc. Today the Seoul, South Korea-based Company has an established international presence in Europe, the United States, and Japan, and a growing presence in China, where it has offices in Taiwan, Hong Kong, and

Shanghai, and a module fabrication office in Nanjing. In addition to its research and development plant, LG Philips LCD has six LCD plants in Gumi, South Korea. LG Philips LCD consistently ranks among the top players in the highly competitive LCD technology market, which supplies panels for products ranging from notebook computers and desktop monitors to high-definition television panels, PDAs, and navigational systems.

### 3.3.2 Background of ERP and HRMS

In a typical year, LG Philips LCD occupied the No. 1 or No. 2 spot in either market capitalization or market share. The company got off to a fast start after the merger, achieving record sales and profit. Within two years, however, an industry-wide slump in sales forced the company to reexamine its business processes across the board. What the company found was some systemic inefficiency that was constraining operating margins. The challenges began with LG Philips LCD corporate structure itself, which consisted of a collection of independent departments, each with different IS and business processes. This led to unnecessary duplication of information and inconsistent data. To remedy the situation, LG Philips LCD adopted a three-pronged strategy of innovation, cost containment, and smart technological investment. LG Philips LCD put together a 10-member team to evaluate the cost, time, and functionality of two competing ERP systems: Oracle E-Business Suite and SAP's ERP offering. Oracle E-Business Suite stood out for several reasons, executives said: multi-language and multi-time zone support, parallel server architecture, complete internet environment support, and support for industry best practices. Beyond consolidating and streamlining manufacturing and finances, LG Philips LCD wanted a system that also would build a more stable, loyal workforce. With more than 9,000 employees worldwide, LG Philips LCD needed a human resource management system (HRMS) that would ultimately enhance employee satisfaction.

### 3.3.3 Adoption of ERP and HRMS

"LG Philips LCD is the number one LCD manufacturer and we continue to grow and achieve our goals by adopting innovative solutions." said Joon-Tai Suh, CIO of LG Philips LCD. As he said, LG Philips LCD thought of HRMS as a breakthrough in maintaining a leading position in LCD industry. Three-pronged strategies of HRMS were innovation, cost containment, and smart technological investment. Thus, the analysis of Hewitt was connected to the adaptation of the Oracle solution. The Oracle stood out because of the multi-language and multi-time zone support, parallel server architecture, complete internet environment support, and also because the system is centralized, and adding new systems and DB administrators were not needed.

The construction range of HRMS in LG Philips LCD was determined inside the concept of a systemic integration of HRMS implementation. The key point

was to acquire feedback among the three components. When the communication/examination was processed, the human resource (HR) process improvement and systems construction received request form pilot test results and forum background. And then, after one stage of HR process improvement and systems construction were finished, Oracle HRMS systems and HR data-mart systems were categorized and gave another request to examination steps again. Likewise, HR process improvement stage controlled to be HR processes and was set up to be an ERP process, leading to process internalization to systems construction. These repetitive steps of feedback among three components were the axis of the construction of implementation of HR systems.

HR implementation was processed for 10 months from January to November 11, 2003. LG Philips LCD outsourced tasks and HR analysis to business and HR specialized consulting firm, Hewitt Associates. This flow was smart, because IT implementation of HRMS was just a tool to make the concepts realized, and the more important thing was to grab a point to be fixed and re-engineered. With the results from analysis from Hewitt Associates, operation analysis of Oracle began, and HRMS and DM (ERP data-mart) were constructed and designed at the same time in manners stated above in the construction range.

The computer-based HR database process was to categorize the characteristics of tasks and employees, so that employees were rearranged to tailor-made positions most fit for them, and placed automatically with a modeling way. The processes sets were comprised of categorizing, descriptive, modeling, diagnosis, results/feedback and plan management. In the categorizing step, LG Philips LCD categorized all tasks in the organization into four task categories, which were split into 17 task groups, 57 task sub-groups, and 258 working sites precisely. All tasks were divided to set up an ideal model for each job site and task, and to build an analysis tool that can meet the task properties with request of employees well. Then, capability models were established such as leadership style, basic style, specialized, and so on. These models were matched to real characteristics of employees. Therefore, a plan management for the short term and the long term finally would be built and executed.

### 3.3.4 Results and effects

By automating its financial and supply chain operations, LG Philips LCD launched an initiative to streamline and improve the way it managed its culturally diverse international staff of nearly 10,000 personnel. In the past, human resources and payroll information at the company was scattered across several departments, so the staff spent much time re-keying and synchronizing data between the systems. And because they lacked easy online access to data, the managers and employees frequently overloaded HR administrators with requests for reports (Oracle Korea, 2005). With its investment in an Oracle-based HR system, LG Philips LCD eliminated

much of the manual labor involved in compiling and distributing HR information. Through self-service HR tools, employees can now go online to check for pay and benefit information, update personal data, and enroll in training programs. Managers use the same system to keep track of team members, run reports, and plan training and other programs that strengthen the company's core areas of competency (Jung, 2005).

Several departments were able to move managers and staff from routine HR transaction processing to more strategic tasks. The company considered this a success on two levels: for the business because it streamlines operations, and for employees because it boosts job satisfaction. LG Philips LCD expects to realize US\$20.9 million in savings over five years from the new system through lower employee turnover, improved productivity management and workforce optimization, and by offering online training options. Specifically, it will see a US\$17.4 million savings in manpower costs, a 28% reduction in payroll management costs, and US\$240,000 on education (Oracle Korea, 2005).

### 3.4 POSCO

#### 3.4.1 Overview

POSCO was established on April 1st in 1968. Pohang works, with a capacity of 9.1 million tons of crude steel production, was established in 1983 after four facility expansions. The construction of the Gwangyang works was started in 1984 after 3 years of site preparation. In October 1992, the program of the fourth facility expansion was completed. POSCO successfully constructed the two biggest steel works in the world in only 22 years; actually it is the shortest period in the steel history. By October 2000, POSCO was fully privatized. POSCO ranked the world's 4th place in terms of crude steel production of 31.1 million tons in 2009 (Stahleisen Communications, 2010). The net profit in 2006 was US\$3.4 billion. The total number of employees working for POSCO is about 17,500.

#### 3.4.2 Background of KM & CoP

To overcome the intensifying "mega-competition" in size, supply network, product technology, and cost innovation, POSCO's response strategy was to become one of the world's big 3 or one of the top 3 global steel leaders with production capacities of 50 million tons or more annually. POSCO wanted to secure global technology leadership by emphasizing a production rate of strategic products-oriented high-end steel exceeding 70% of its total steel production. The company sought to become a universal steel company with its unique, excellent "Way of Working" taking root. The main mission of POSCO's Business Innovation Department was to keep such "Way of Working" up-to-date and to integrate work, innovation, and learning into a consolidated organizational culture. In order to respond to the rapidly

changing business environment and to continue maximizing customer and shareholder values, POSCO firstly needed the infrastructure for enterprise-wide activities linking work, innovation, and learning to contribute to the institutionalization of innovation activities. Secondly, POSCO needed to create core knowledge of the company and make it a company asset to achieve the goal of the management strategy. Finally, POSCO needed to share the know-how, experience, and knowledge by supporting a human network of new, transferred, and soon-to-retire employees.

#### 3.4.3 Adoption of KM & CoP

The role of knowledge management (KM) at POSCO was to serve as key infrastructure for POSCO-type innovation activities for the realization of a global excellent company (POSCO Six Sigma Model) and to support the maximization of synergistic effects in generating business results through knowledge-based work, practice, and promotion of improvement activities. Based on this model, the activities, system, and operation system of community-of-practice (CoP) were appropriately combined.

Learning was related to all activities to expand improvement ideas and capacity through accumulated knowledge from both internal and external companies. The key system, knowledge management system (KMS) was introduced in 2002. Through activities of uploading, evaluating, managing, and using knowledge by employees, it has been a powerful tool for supporting learning activities. This system made it possible for employees to share the knowledge and know-how learned from innovation activities. In addition, it could supply the right knowledge to the right people, and even motivate employees to acquire global competitiveness.

Initially, a small number of employees voluntarily formed a CoP for information exchange at POSCO. As it gained fame as "excellent integrated knowledge"—thanks to its convenience and the outcome of cooperation. However, quite a few CoPs of diverse purposes were formed and used by majority of the employees. After about a year since the introduction of the first CoP, these organizations showed a definite tendency to move the company. In 2006, an attempt to link the result of these voluntary activities to 6 sigma, the innovation activities being promoted strategically by the company was made at Gwangyang Steel Mill, reaping notable success. As a result, CoPs started assuming the role of infrastructure for POSCO-type innovation activities in 2007 and developed into quasi-formal gatherings. Since then, only the CoPs that exhibited dynamism in their activities have been recognized.

At POSCO, CoP was defined as a unique method of innovation activities combining the "spirit" of traditional self-management activities with scientific "management techniques" of 6 sigma as supported by the convenient "IT Infra." As such, at POSCO's CoPs, activities were being carried out in a positive circle where



the job capability of members is enhanced as “24-hour practice and innovation activities”, where trust and fraternity of members are reinforced, and where the results of their activities are turned into organizational knowledge.

Strategies for successfully activating POSCO’s CoPs were as follows. The first strategy involved operating CoPs of various objectives and conducting activities freely without any unnecessary burden. Initially, when recommending voluntary CoPs, POSCO suggested operating CoPs of various objectives such as “job practice meeting”, “information exchange meeting”, “6 sigma project meeting”, and even “friendship promotion meeting”, encouraging the conduct of activities freely without the burden of fueling interest. Cases where valuable outcomes were obtained as a result of activities based on interest, POSCO rewarded the outcome with money and honor to encourage further activities.

The second strategy was placing an emphasis on nurturing CoP leaders. In the course of monitoring CoP activities, POSCO realized that nurturing CoP leaders is a key factor following an analysis of the relationship between “CoP leader activities and level of CoP activation”, and encouraged the sharing of best practices of each by suggesting educational programs to nurture CoP leaders, workshops, provision of opportunities to benchmark other companies, and formation of CoPs for CoP leaders.

The third strategy involved activating CoPs by organization unit. After the initial success at the CoP activation stage, voluntary CoPs began to change their character as strategic CoPs supporting the success of innovation activities of the company. POSCO encouraged the formation and operation of CoPs where all departments and employees were obligated to participate. POSCO also encouraged the transformation of CoPs into a working organization where routine business, innovation, and practice were all carried out at the same time by suggesting the application of a standard map showing the innovation activities that can be carried out within each CoP. POSCO also fueled the enthusiasm of the members of each CoP by promoting interest in and encouragement of CoPs by officers, department managers, and directors of the company to transform POSCO into a knowledge organization where the business organization and CoPs can co-exist. The multiple membership practice cycle suggested as a model in the book titled “CoP Revolution” was put into operation.

The fourth strategy was enhancing the interest of department managers through customized consulting by department. What you see on the left is a dashboard used to diagnose the result of innovation activities at the Business Innovation Department, providing a table of results for semi-annual diagnoses for 120 something departmental organizations. On the left are the data on the detailed diagnosis of “KM/CoP activities” and consulting among dashboard items. The champion receiving this data is supposed to implement business activities in

the proposed preferable direction by referring to the result of diagnosis of CoP activities and feedback by department.

The fifth strategy involved implementing proper change and development for the activity support system. Initial activation was accomplished through the support system of CoP activities by stage. Although it was a well-designed system taking various aspects into account, the CoP support system was continually changed and developed. In principle, routine support was reduced, and reward for the outcome was increased, thus enabling employees of the company to familiarize themselves with the system naturally.

Finally, the seventh strategy involved operating a global CoP for the dissemination of innovation activities. Global CoP programs were actively carried out among steel companies, suppliers, research organizations, and clients.

#### 3.4.4 Results and effects

The first result was the nurturing of “knowledge workers” befitting the knowledge-based informatization society of the 21st century; this requires the habit of making important changes such as incessant practice utilizing quality knowledge held by the company and innovation of each individual’s business and organization of new knowledge obtained as a result of innovation activities into organizational knowledge that can be shared by colleagues (Hong *et al.*, 2011).

In terms of the maturity of POSCO’s CoP activities, the rate of excellence of CoPs was initially at 8%. In 2006, however, the rate exceeded 24% and further reaching 49% by the end of October 2007; thus indicating a rising momentum for the company’s CoP activities. Clearly, most of the POSCO’s CoPs entered a stage of maturity, a phase in the “CoP developmental stages” as formulated by Etienne Wenger in his theory of CoP revolution (Sung, 2008).

Above all, valuable intellectual properties were created from corporate knowledge. To date, there are a total of 340,000 articles including 85,000 dealing with core knowledge. At least 6,000–8,000 users connect to KMS to search more than 120,000 articles and register around 200 articles every day (Hong *et al.*, 2011).

### 3.5 Hyundai Card

#### 3.5.1 Overview

Hyundai Card is a credit card subsidiary of the Hyundai Automotive Group. Its major business is card issuing and operating. Hyundai Card is pursuing a global company status through partnerships with the world’s leading financial company GE Consumer Finance, and it continues to grow rapidly through supports from their customers by obtaining several awards such as being awarded as number 1 in the National Customer Satisfaction Index (NCSI). The result of Net Promoter Score

(NPS) study from Bain & Company, which is a global management strategy consulting company, also indicates that Hyundai Card is the most recommendable card company in the credit card category. The company is recognized internationally for its competitiveness and growth potential. In the past several years, Hyundai Card adopted innovative credit card designs such as mini-card (Hyun, 2003) and transparent card (Kim, 2011). It also achieved outstanding success with differentiated marketing strategy using very very important person (VVIP) card (represented by “the Black” card) (Soek, 2012). With its consecutive successes, Hyundai Card is becoming the benchmark of the finance industry (Kim, 2011).

### 3.5.2 Background of CRM

When Hyundai Card rushed into the credit card business, there were already many competitors. Some examples of incumbent financial companies were Shinhan, Woori, Kookmin, Korea Exchange Bank, etc., and for non-financial companies, there were Samsung, Lotte, etc. Being one of the non-financial companies, Hyundai Card was in a position to compete with the major companies and needed to survive within the red ocean.

As a diversification strategy, Hyundai Card found profitable target segments to make a card for specific customers and their needs. To find profitable targets, CRM was an essential system. Managing the full range of the customer relationship involved two related objectives: 1) to provide the organization and all of its customer-facing employees with a single, complete view of every customer at every touch point and across all channels; and 2) to provide the customer with a single, complete view of the company and its extended channels (Norris *et al.*, 2000).

### 3.5.3 Results and effects

Hyundai Card could solve the problems in the past, such as following company, many competitors. First, they were a follower rather than a leader, but this problem was solved by target segmentation. Being the last in the line of competition, Hyundai Card many disadvantages and did not have a competitive power. Hyundai Card utilized a VVIP strategy (Soek, 2012). By CRM, they segmented customers and did special marketing towards the segmented VVIP. While they keep special relationships with the present VVIP, they continue to make a new relationship with new customers who have the potential to become new VVIPs. Through this strategy based on CRM, VVIP customers were attracted to Hyundai Card and also Hyundai Card had found their competitive edge. In addition, during the case of credit card weak crisis, Hyundai Card conducted capital extension, while all other credit card companies reduced their budgets. This helped Hyundai Card survive the crisis situation.

Secondly, the problem of having many competitors

could be solved through CRM. In order for Hyundai Card to survive and fight their many competitors, they focused on the customers. They continued to maintain relationships between customers in order to find out what the customers complained about other credit card companies. They even used early engagement program (EEP) to observe how customers use credit cards, what they needed 6 months after issuing the credit card. They analyzed customers' needs and then fitted their strategy to them, such as developing fancy designs, creative ads or trends of using credit card. Then, they provided huge and proper events to customers and they could have a competitive power. For instance, Hyundai Card held ‘Super Concert’ 12 times and ‘Super Match’ 11 times. The project provided great entertainment that customers wanted and they could buy it as credit card. It is the most successful strategy and they made pleasant spending with credit cards.

Last year, Hyundai Card and Hyundai Capital signed a contract with Hyosung ITX until 2010 for running a 1,200 seat integrated contact center (Lee, 2010). It is the biggest CRM center in the financial sector and provides overall customer service, such as general consultation, cross selling, and marketing. For the center, Hyundai Card and Hyundai Capital invested KRW30 billion and KRW35 billion, respectively. Through the contact center, Hyundai Card wants to raise its brand image and the quality of customer service.

### 3.5.4 Adoption of CRM

Within the Hyundai Card Marketing division, the ‘customer lifecycle management (CLM) office’ is the CRM team. In this office, more than 60 employees managed the customers by analyzing the 7 million members’, hundreds of data such as buying habits, card use, performance, and life style. In late 2008, Hyundai Card made the program and communication (P&C) team, which strategizes the customer management and communicates with customers using the analyzed data. The P&C team’s role is finding effective communication methods with customer by scientific data analysis. The team found the target customer by products, decided what to deliver in specific ways, and finally observed the customers’ reaction.

To perform CRM successfully, data provided to CRM should be well organized. That is, the database should be well organized. Hyundai Card CRM teams needed a database that contains all data related to each customer they want. Transaction processing systems (TPS) that statistically analyze and store various kinds of customer-oriented data, do the job that CRM teams need. TPSs collected, stored, modified, and retrieved the transactions of the organization. A transaction refers to an event that generates or modifies data that is eventually stored in IS. To be considered a transaction processing system, the computer must pass the ACID test. The

essence of a transaction program is that it manages data that must be left in a consistent state.

They cannot get data about what kinds of IS Hyundai Card is utilizing. They guessed by back tracking IS from the marketing strategy and CRM. TPS was the key IS for CRM because it provided all data of customer relations. But at the time Hyundai Card planned to perform CRM, TPS of Hyundai Card would not be providing all the data CRM needs. There should be innovation of IS into SIS to be used strategically in CRM. After revising TPS for strategic use, CRM could be performed more efficiently and effectively.

### 3.6 Lotte Department Store

#### 3.6.1 Overview

Lotte Department Store is a Korean retail company established in 1979 and headquartered in Seoul, Korea. Lotte Department Store offers retail consumer goods and services, and it is one of the eight business units of Lotte Shopping. Other Lotte companies include the discount store Lotte Mart and the supermarket Lotte Super. Lotte Department Store has opened Avenue, Outlet, Young-Plaza, and even international branches. Lotte Department Store has opened 34 branches, and is the largest firm in Korea. Lotte Department Store has the highest market share in the department store industry (42% in 2010). Hyundai Department and Shinsegae Department Store Co. each has a 20% market share. Lotte, Hyundai, and Shinsegae are the nation's top three companies that have a great part in the market share, about 82%, in the department store industry (Fashionbiz, 2010).

#### 3.6.2 Background of EDI & SCM

Improvement of the relationship with the suppliers was very important to Lotte Department Store, the leading retailer. As communication problems arose in exchanging documents, the sales directly decreased. As Lotte Department Store provided information on the warehouse data to the supplier for free, the company had to maintain a strong relationship with its suppliers. Lotte Department Store needed to provide information on the sales of specific products in the local area to enable the supplier to locate the proper amount of products for each local store.

#### 3.6.3 Adoption of EDI & SCM

Lotte Department Store established Web-EDI, which served information, such as delivery, sales, prices, and tax in 2003. The Lotte EDI system, which is able to reduce office hours and costs for document organization and optimization, shared the information with Internet Lotte Department Store in the domestic market. The EDI system of Lotte connected with other systems, such as POS. Lotte provided all information in the supply chain so that it can function as an important skill in SCM.

By introducing the EDI system, Lotte could comprehend the flow of products through data at a glance and forecast the demand for customers. In terms of forecasting, Lotte could adjust raw material orders with contractors, and there was no distribution waste. The EDI system was able to put the right products in the right place for subcontractors. This could not directly influence the process of transforming inputs into finished products and services. Data from the EDI system just notified Lotte when subcontractors made products, and how many were produced.

Information that was obtained from the EDI system reduced inventory costs through optimization of the volume of products. The exchange of data through the EDI system made understanding each subcontractor much less complicated. By adjusting the EDI system, which reduced work times, Lotte could allot more time to analyzing customer needs and the generation of sales. Lotte attempted to analyze what customers want, and put the right products in the right place. By increasing customer's satisfaction with Lotte, they are able to increase their customer base and status, and could maintain their domestic market share.

Lotte could supply better service to customers by reducing the cost of documents and office hour times. If they accomplish this, it seems that Lotte can spend their time maintaining customers' satisfaction, and establishing a better service system. Because of their increased service to customers, customers trust Lotte and the number of customers goes up. Process innovation means a change in the processes as well as introducing novelty to improve process outcomes. By introducing the Lotte EDI system in 2003, Lotte Department Store changed its processes and accomplished process innovation. Before this innovation was introduced, information on delivery, sales, price, and tax was all conveyed by fax, calls, and by shipping documents. At that time, the analysis of information was not smooth, and using the information was very difficult. The time required for exchanging information with subcontractors took incredibly long.

#### 3.6.4 Results and effects

Introducing the EDI system created not only the ability to reduce office hours and the cost of documents but also the ability to deliver information in real time. Another advantage of the EDI was reduced errors, because EDI removed the necessity to rekey documents at the destination. In EDI, all transactions were accomplished in network systems; therefore, it minimized the occurrence of errors, and made fast and correct information exchanges possible. The details are as follows: Lotte Department Store reduced the time required to order a product for stock to three days, reduced the average time (normally 70 minutes) of checking and writing data to 30 minutes, reduced the time required to check merchandise from four hours to one hour, and reduced the time of the monthly bookkeeping deadline from six hours to three hours.

### 3.7 KT

#### 3.7.1 Overview

Originally founded in 1981 as a public corporation, KT started formerly as Korea Telecom Corporation; it was fully privatized in 2002. In 2009, KT merged with its mobile subsidiary KTF, paving the way to the convergence of fixed and mobile services. Now, KT is one of the top companies providing integrated wired/wireless communication services in Korea. Moreover, it is the first company in the world to commercially launch wireless broadband (WiBro) service (Kim, 2011). KT has an information & communications business, and has the largest portion of the South Korean local telephone and high-speed Internet business. Moreover, KT was selected as a top company in Asia; they were selected as a one of the top companies in corporate governance excellence for Asia.

#### 3.7.2 Background of ERP

KT has gone through a long process of management innovation including 3I, business process reengineering (BPR), management rationalization/restructuring, work-out meetings, knowledge management, and activity-based costing (ABC)/ERP. KT is now facing “privatization”, which brings KT to a new playing field. Now the challenges for KT are “how to rationalize” and “make its established businesses more efficient”, in order to develop new sources of revenue, and make itself more profitable. Separated from the government in 2002, KT implemented ERP in the finance department first. While constructing the ERP in the finance department, KT decided to implement ERP in the supply chain department as well. After a discussion about ERP, the company decided that the ERP would be implemented and integrated with the ERP of the finance department.

#### 3.7.3 Adoption of ERP

The process started by making a decision of how a relationship with ERP in different business functions could lead to a good result. The staff decided to integrate the entire system using ERP. Then, they made a plan for the project that would improve the process by implementing ERP. There are four main parts to the process. One was making the best use of synergy by managing entire managerial factors. The second and third were optimizing the ERP package using rate, and the rate of system utilization and value. After that, they created a team for running the project. Then, they decided on Oracle software as a package and IBM BCS HIT as companies for a consortium to maximize the performance, and following this, the project began.

In June 2002, there was kick-off workshop for the start of the project. However, because they did not solidify the contract with the consortium company, trouble between the companies delayed the beginning. Around July, the project finally began. Then, the team formed four driving strategies and five objectives. The five ob-

jectives are as follows: reduce the lead-time by 65%, reduce the cost ratio of supporting tasks/revenue by 25%, unanimity of real and book data, increase return-on-investment (ROI) by 30%, and reduce inferiority by 30%. The four strategies were: offering managerial information for planning integrated resources, reducing process lead-time, reducing the inferiority ratio by upgrading quality, and strategically reducing the cost of goods for a competitive advantage.

Subsequently, they built the “object-owner system” for achieving the abovementioned goals perfectly. Moreover, they selected English as the prime language for the new system. Finally, they tested which degree was optimal for application.

#### 3.7.4 Results and effects

The result of the project was sensational. They succeeded at integrating the estimate and settlement account. Moreover, they reduced lead time from 45 days to 17 days through two stages: apply soft closing and reduce the error (Kim, 2006). Third, a system that connects the whole of KT was made. Moreover, approval can now be obtained using computers along the workflow. Because the whole system has been digitalized, an extranet has been constructed. Furthermore, I-procurement can now be accessed, and this has reduced procurement costs by KRW2.47 billion, and knocked off seven days. Constructing a warehouse management system resulted in a higher efficiency of work, and a greater accuracy of data. In addition, a transportation management system has been built for higher efficiency of transportation. Through an As-Is system and a To-Be system, managing inventory became easier. Using a barcode system, approximately 2 million master data have been constructed successfully in about 6 million transactions.

### 3.8 Asiana Airlines

#### 3.8.1 Overview

Asiana Airlines is one of the major airlines in Korea, with its headquarters in Seoul. It was established in 1988 by the Kumho Asiana Group. The airline has its domestic hub at Gimpo International Airport, and its international hub at Incheon International Airport. Asiana Airlines has rapidly expanded with a fleet of 69 aircraft providing international services to 66 cities in 21 countries on 82 routes, and they provide domestic services to 12 cities on 15 routes. Asiana Airlines was awarded the prestigious five-star ranking by Skytrax, a United Kingdom-based consultancy, and awarded Airline of the Year by Air Transport World monthly trade magazine published by Penton Media. Asiana has also won the prestigious Airline of the Year Award by Skytrax for 2010.

#### 3.8.2 Background of SCM

Tracking and managing passengers’ baggage has

always been important to successful airlines. Increasing air cargo volume and a higher likelihood of terrorist attacks has made it difficult to improve customer service and beef up security using a barcode-based system. However, a barcode alternative has emerged: radio frequency identification (RFID) technology. Since 9/11, the United States has undertaken a measure to attach RFID tags to all passenger bags, and is considering making it mandatory to affix RFID tags to all incoming air baggage. To nurture new IT technologies, Asiana Airlines decided to initiate the establishment of an RFID-enabled airline baggage tracking and control system with Korea's National Computerization Agency (NCA).

### 3.8.3 Adoption of SCM

Creating the RFID-enabled air baggage tracking and control system demonstration project took seven months, from September 30, 2004 to April 30, 2005. With this project, Asiana aimed to prove that RFID technology can strengthen airline security, accuracy, and the speed of a baggage tracking and control system. This project's overall system architecture placed the transportation system, RFID IS, and Web servers on the back end. The front end included the RFID agent system, tag generators, portable readers, portable gates, and carousel readers.

The Asiana Airlines RFID-enabled air baggage tracking and control system consists of the following main components. The first component is the check-in counter; this is a station where passengers check in their baggage. Here, baggage numbers identical to the baggage tag's barcode are saved in the RFID tags and affixed to the baggage of the departing passengers. The second component is the security checkpoint. The passenger's checked-in baggage is inspected and the results are linked to passenger information in real-time. If warranted, a warning is sent to an airline employee. The third component is the baggage handling system. By using the tag information, the baggage handling system sorts through and handles pieces of baggage, sending them to aircraft for future loading. The RFID reader then scans the RFID tag on the baggage, and it is sent to the corresponding baggage sorting area. The fourth component is the baggage sorting and loading system. This component works with the baggage handling system to sort pieces of baggage according to their destination and flight number, and loads them onto the aircraft. The fifth component is the boarding gate reader. This component checks the final status of a passenger and sends "passenger on-board" (or off-board) information to the transportation system. RFID tags carried by passengers for "cross-pickup check" on arrival are distributed at this stage, and their information is sent to the RFID IS. The sixth component is the baggage reconciliation system. This component carries out final checks, and handles the baggage of any passenger not on board. The seventh component is the carousel. When the baggage arrives at

the carousel, the baggage reconciliation system reads the affixed RFID tag. If the arrival airport does not match the baggage item's destination, it alerts the baggage crew by displaying an appropriate message, such as "wrong destination baggage." The last component is the cross-pickup check. This component reads the passenger-carried RFID tag and the RFID tag affixed to the baggage when the passenger is going through the exit, which has a gate reader installed. It checks whether the baggage information matches the passenger tag information; if someone tries to exit with baggage that is not theirs, a warning lamp and siren go off.

### 3.8.4 Results and effects

RFID technology greatly enhanced the level of security, both at the security checkpoint stage, and by combining the RFID-enabled baggage handling system with a blacklist and "passenger off-board" status information. This allows a real-time assessment of information on baggage checked in by a blacklisted person, or on baggage checked in by a passenger who failed to board the plane. Suspicious baggage can be thoroughly inspected and "passenger off-board" baggage can be immediately identified to help avoid possible terrorist attacks (Asiana Airlines, 2008).

The baggage handling system also benefited from RFID technology via automatic sorting, taking an average of three seconds to handle a piece of baggage. The existing, manual baggage handling system by comparison takes an average of five seconds to handle a piece of baggage. The baggage sorting and loading system rechecked the RFID tags to verify whether baggage was headed to the correct airplane. In case of mismatch, the system identifies the baggage, using warning lamps to send an alert. As a result, the error rate was drastically reduced from when the barcode tag checking and sorting were all done manually. Furthermore, passenger and baggage information can be automatically recognized. This not only enables baggage to be easily located but can also prevent a passenger from mistakenly taking another passenger's baggage (Kim, 2005).

## 3.9 Mando

### 3.9.1 Overview

Mando Corporation is one of the largest original Korean equipment manufacturers and suppliers for automobile companies (Lee, 2008). Halla Business Group, the original founding parent company, currently owns and manages Mando. It was handed over to Halla by Sun Sage B.V, a daughter company of JP Morgan (Moon, 2008). Mando's brake system is supplied not only to Korea's automotive makers, but also to the world's big 3 (GM, Ford, and DaimlerChrysler), because they ensure superior quality. Mando Corporation's sales turnover is estimated at about US\$1.7 billion. Mando mainly focuses on its business area of steering parts, brake parts,

and suspension parts. Mando has been producing anti-lock brake system (ABSs) and traction control system (TCS), enjoying the distinction of having produced such systems for the first time in Korea, and of being the 4th in the world to do so.

### 3.9.2 Background of ERP & SCM

Halla Group's bankruptcy in December 1997 did not cover the insured affiliate's default. Moreover, the investment consortium of JP Morgan acquired management rights and launched Mando. Therefore, in this environment, they needed innovation to secure their future. The global management of Mando was divided into two components (global business network & global standard). First, global business network runs R&D, manufacturing development, and purchase development. Then, global standard was benchmarking best practices and an expansion of investors in Mando standard. Mando's management goal of "Low Cost Manufacturing" has a requirement that employees throw away any apathy, cynicism, or domestic-oriented paradigm, and create an Innovation Mind, paradigm shift, challenge, and an awareness of issues.

### 3.9.3 Adoption of ERP and SCM

Mando had realized the need for competitiveness in globalization, information management, and liberalization in order to cope with the rapidly changing world characterized by sudden turns of the business environment, launching of the World Trade Organization (WTO), and the establishment of the Free Trade Area (FTA). Consequently, Mando introduced extended ERP (Oracle ver.R12) as a strategic decision to strongly innovate its constitution by actively utilizing IT. Extended ERP was the whole application of industry itself as well as corporate strategy, which improves the value of clients and shareholders by optimizing and enabling not only intra-firm but also inter-corporate collaborative processes, management processes, and financial processes.

Mando adopted SCM to maximize efficiency by integrating and managing their inter-branch interface in order to better control the flow of information, goods, and capital through the supply chain connecting suppliers and final customers. It optimized every step in the supply chain, such as manufacturing and circulation, and it provided demanded goods at the desired times and places. Therefore, SCM supported the swift response to the demands of the market and consumers through real-time information sharing among components suppliers, manufactures, and even customers using IT, which provides leading manufacturers and distributors an opportunity to maximize their profits from intimate cooperation with their business partners.

Mando set the scope of SCM to be supply chain planning (SCP), EDI, e-logistics, and supplier collaboration networking system (SCNet), and, from then on, pushed ahead with their SCM project. First, in SCP, Mando improved the accuracy in production plans via

an enhanced linkage between the SCP system and ERP, and then constructed an integrated-production-plan-system linked to clients and cooperators. Second, in an attempt to accomplish a smooth control of their supplier pool information and sharing of international purchase information, Mando enforced the role of EDI from a simple processing of purchases, to a strategic and exploitative purchase involving an evaluation of the firms involved, differentiation, reinforcement of cooperation among suppliers, and management of components. Next, in e-logistics, Mando planned to adopt a global integrated distribution system by systematizing the management of standard information that is currently separated in each operation division, corporate body, and factory, and reestablishing the process. In the process, Mando also sought the management of global distribution information by integrating planning into management. Finally, using SCNet, Mando could establish local production and sales plans based on information (on demand) acquired from the supply chain, present an accurate deadline for landing orders, and construct a system in which all tasks, including landing orders, planning, manufacturing, and purchasing, could be done cooperatively.

### 3.9.4 Results and effects

As for applying SCM, based on ERP, to Mando, there were good results in which the cost of inventory and inventory control was reduced, thus lowering retail prices of commodities, and raising the product margin of the company at the same time (Kim, 2011). Traditionally, upon purchasing raw materials, a numerous amount of paperwork was involved in the steps, such as deciding supply price, delivery time, terms of payment, making the delivery, and the checking of the merchandise, followed by payment in each step, which wasted a great deal of time and money. These indirect costs were cut largely by adopting SCM, as previously inevitable manual tasks in purchase and sales became evitable. Due to swift recognition of consumers' propensity to consume, it was also possible to develop a brand which both manufacturers and distributors can embrace. Therefore, growth in many of the categories and profits could be expected.

## 4. IMPLICATIONS

In Section 3, the nine cases for the strategic use of IS in Korean firms are described. Generally, the companies have not adopted and operated only one or two IS, but these cases represent some of the successful cases for using IS strategically. Table 4 shows the summary of the representative cases using IS classified into IS type and industry field. These are covered by six kinds of IS: HRM, ERP, SCM, EDI, CRM, and KM. Moreover, various kinds of IS are implemented in firms in various industry fields. Firms, not only in the secondary industry,

**Table 3.** Summary table of the cases for strategic use of IS in Korean firms

Industry	HRM	ERP	SCM	EDI	CRM	KM
Manufacturing		Mando	Mando			
Electronic	LG Philips LCD	Samsung Electronics	Samsung Electronics			
Steel						POSCO
Distribution		Samsung-Tesco	Lotte Department Store	Lotte Department Store		
Telecommunication		KT				
Transportation			Asiana Airlines			
Finance						Hyundai Card

IS: information system, HRM: human resource management, ERP: enterprise resource planning, SCM: supply chain management, EDI: electronic data interchange, CRM: customer relationship management, KM: knowledge management.

such as electronics and steel, but those in the tertiary industry, such as distribution, telecommunication, transportation, and finance, also applied ISs.

Many Korean firms have introduced an ERP system in order to tune them into the global standard of enterprise management. It enables companies in increasing transparency in their financial reporting and meeting regulatory compliance; therefore, ERP in major firms is implemented as a basic IS. ERP is usually built into a firm while combining other functions in IS; thus, it supports the essential functions of the business processes and operations efficiently, and it is also tailored to the specific needs of the industry field. In this paper, Mando and LG Philips LCD were suggested as a representative case for combining IS between ERP and another system; however, ERP mostly plays the role of the essential part by integrating vertical managerial levels and horizontal functions of a firm for strengthening the internal capabilities of a firm based on the performance-centric approach. In LG Philips's case, the motto of HRM is "Up-bringing human resources centralized HRM has been regarded as a philosophy of business in task capability with a changeable business environment." With the changeable business environment, the central axis of HRM is performance appraisal systems, such as HR performance in the right time and right place, compensation innovation, fast track promotion, and raising core HR. In other words, HRM presents a direction towards task-specific performance. Based on the management of human resources in the performance-centric approach, finding talented people, keeping talented people, and developing talented people is realized in a firm.

Firms have a tendency to introduce SCM or EDI for archiving process innovation or appropriate response in catching customer's needs, on-time delivery, or production planning. SCM and EDI help firms understand the activities that provide their products or services to customers. The necessity of introducing SCM or EDI is commonly recognized within the companies in the distribution or transportation industry fields, because of its

industry properties. By focusing on SCM and EDI, firms included in the distribution or transportation industry fields can improve operational efficiency by reducing control costs and lead time by uncovering the difficulties between suppliers and external vendors. CRM provides a platform for successful marketing in the rapidly changing market. Companies understand and anticipate current and potential customers' needs. To support the business goals, companies apply CRM to sales, marketing, customer service, professional development, human-resource development, and performance management. There are call centers, direct mail, the Internet, salesmen, and retailers at the touch-point with customers. By applying CRM to the closed loop of marketing, sales, and services, companies have a new 360-degree viewpoint of customers, classify customers dynamically, search the lifetime value of each customer, and provide personalized offers.

KM is considered an approach to create the maximum synergy effect by managing a firm's internal knowledge sharing. Knowledge sharing implies the action to reuse and recreate knowledge at the individual and organizational levels effectively (Chaudhry, 2005). Korean companies which were introduced to KM mostly constructed an intra-portal site for knowledge sharing. Nowadays, there is a tendency to combine CoP operations into KM in order to gain more effective tacit knowledge sharing. Through KM and CoP, firms can improve communication between staff members, and enhance the synergy between staff members.

When all the cases are examined, Korean firms have introduced and applied IS for strategic purposes. The firms tended to deal with the IS in order to solve problems the firms had been faced with. It was not only for enhancing their competitiveness, but also for the creation of an outcome connecting with process innovations. Therefore, by applying the proper IS, companies achieve their competitive advantages under each industry market with qualitative and quantitative performances.

## 5. CONCLUSION

Despite there being many case studies, analysis of the motivations and results of implementing IS as a firm's strategic purpose has rarely been conducted. Therefore, this paper approached the Korean firms' cases of successful IS implementation from the following four categories: company overview, background of implementing IS, adoption of IS for strategic purpose, and the results of implementing IS. In this paper, nine cases of Korean firms' strategic use of IS were analyzed in various industry fields. The six kinds of IS mainly applied in the firms were covered in this paper.

The implications from the Korean cases are summarized as follows: Korean firms strategically introduced IS for solving particular problems that they had undergone. In addition, it is concluded that IS was regularly utilized by firms for raising qualitative and quantitative outcomes by eliminating inefficiency through process innovation. HRM is applied for managing human resources with a quantitative approach. SCM and EDI generally help innovate a firm's processes. CRM is utilized for developing marketing strategies based on customer segmentation. KM and CoP are applied for generating a synergy effect through knowledge sharing in order to strengthen a company's capabilities. In general, it enables Korean firms to archive competitive advantages in each industry field. ERP is implemented and regarded as a basic IS combining with other IS.

This study confirmed the effects of strategic introduction and the use of IS. It implies the fact that particular problems in companies can be solved by applying proper IS strategically. Supporting this fact is nine Korean firm's cases using IS strategically. These cases are applicable for determining solutions for companies faced with certain problems. Through the representative case for each IS type and each industry field, this study should help various companies to take an action on IS implementation and its strategic use, such as small and medium-sized businesses, non-Korean firms, and a company that is about to introduce IS. In other words, companies can benchmark these case studies as a guideline to problem solving, so that the manager of a firm can utilize the results of the case study for setting up its direction of business management and developing strategies for gaining its competitive advantages.

However, our approaches to the issue of identifying the strategic use of IS and its effects are based on empirical study, the case study. In order to validate the implications of the case studies, a statistical approach is required. Thus, validation through survey may be conducted as a further research on strategic use of IS.

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