ANALYSIS OF THE IT SOLUTION ADOPTION TIMMING: CASES OF KOREAN COMPANIES

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Abstract

IT systems have become more significant as a corporate asset in terms of business strategies. Enterprise customers are facing the challenge of reducing cost and time while the demand for successful implementation of IT solutions is increasing. Reducing the cost and risk of IT solution implementation and gaining information about successful IT investment is critical for decision makers. However, information of successful IT implementations has been limited or not readily available.

Since IT success cases are one of the key sources of information about successful IT implementation, this paper analyzed 1,240 Korea IT success cases during the past 28 years. We studied which IT solutions were adopted and its adoption time, comparing commercial and non-commercial sectors, and furthermore, three industries in the commercial sector. Statistical results show that the commercial sector adopted IT solutions several years earlier than the non-commercial sector while there was no year difference among the three commercial industries.

Keyword: IT solutions, success case, classification method, IT solution adoption, speed of IT solution adoption

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1. INTRODUCTION

IT systems have become a significant part of corporate assets in terms of supporting current business strategies and adopting new business strategies (Henderson and Venkatraman, 1993). Enterprise customers are facing the challenge of reducing cost and time while demand for the successful implementation of IT solutions is increasing. Due to the economic downturn at the end of 2008, enterprise customers have reduced their IT spending by -7.1 % (Ha, 2009) while the ratio of IT cost to existing systems increased in Korea (Knowledge Research Group, 2007). Information on successful IT investment is one of the key areas for decision makers to consider in order to reduce costs, potential risks, and implementation time.

Obtaining information about successful IT implementations has not been easy: Corporations publish successful IT implementation cases in seminars, presentations, consulting reports, IT magazines, and publications from vendors and, therefore we have used as our main sources IT magazines and publications from IT solution vendors in this research.

In this paper, which is an analysis of 1,240 Korea IT success cases from eight different sources during a 28 year period from 1982 to 2009, we look at which IT solutions were adopted and when, comparing commercial and non-commercial sectors and three commercial industries by answering the following two questions: 1) What is the difference in terms of IT solutions deployment? and 2) What is the difference in terms of the adoption timing of IT solutions?

For example, even though it is generally accepted that the commercial sector adopts IT solutions earlier than the non-commercial sector, there has been little solid research to back

this up. Our analysis of the difference of adoption timing can provide valuable information about which sector or industry adopted IT solutions earlier than others and why.

In section 2, this paper presents an overview of the research on the classification method of IT solutions, and proposes a new IT solution classification method in order to classify IT solutions for the detailed IT deployment analysis. Section 3 gives the data collection method and the analysis of IT success cases by industry and three IT categories. Finally, Section 4 presents the comparison analyses between commercial and non-commercial sectors and among the three commercial industries.

2. CONCEPTUAL DEVELOPMENT OF IT SOLUTION CLASSIFICATION METHOD

2.1. Literature Review

There are several key areas for improving corporate performance such as providing a more secure IT environment, improving employee productivity, and enhancing business processes and strategic decision capabilities. In order to develop and sustain the IT capability for providing the benefits of IT solutions, corporations utilize their internal and external resources related with IT. In order to explain and classify the resources of IT capability, the resource-based view (RBV) has been widely used (Ross et al., 1996; Byrd and Turner, 2000; Bharadwaj, 2000; Tippins and Sohi, 2003; Bhatt and Grover, 2005; Ray et al., 2005). The first capability of the RBV is the resource related with knowledge of IT people. Bharadwaj (2000) defined this resource as human IT resources including technical IT skills needed to develop IT applications. The second one is the resource related with external environment. Bharadwaj (2000) defined this as IT enabled intangibles including customer orientation, knowledge asset and synergy while Bhatt and Grover (2005) described this resource as the

dynamic capability which reflects the level of response to environmental threats and leverages the opportunities. The third capability is the resource related with technical IT infrastructure. Bhatt and Grover (2005) described this technical IT infrastructure as value capability. Microsoft defined IT infrastructure as the important framework and strategic assets for managing and sustaining corporate efficiency by proving necessary services and applications through software (Microsoft, 2006).

While RBV explained all IT related resources in corporations, the technical layer view explains the IT infrastructure as several layers of IT solutions (Duncan, 1995; Broadbent and Weil, 1997; Ross and Weil, 2002; Lee, 2008; Choi, 2009; Microsoft, 2008). (Table 1) In order to develop an appropriate classifying method for IT solutions implemented related with the IT infrastructure, previous research on the technical layer view for classifying the IT infrastructure were reviewed.

<Insert Table 1 here>

In a technical-based view, Duncan (1995) classified IT Infrastructure as having four layers: platform, network, key data, and core data processing applications. In 1997, Broadbent and Weill (1997) classified it as three layers: IT components, human IT infrastructure, and shared IT service. Ross and Weil (2002) classified IT architecture as five layers: 1) high volume transaction processing, 2) real-time response, 3) analytical and decision support, 4) work group support and enterprise based on IT Processing type, and 5) business context, business purpose, and business requirement. For analysis of IT spending and IT issues, IDC Korea (Lee, 2008; Choi, 2009) used its own IT solution classification method and classified the IT solution as having three types: 1) hardware, including personal computer, server, and storage; 2) software, including ERP (Enterprise Resource Planning), CRM (Customer Relationship

Management), SCM (Supply Chain Management), KMS (Knowledge Management System), BPM (Business Process Management), BI (Business Intelligence), SMS (System Management System) and security; and 3) the telecommunication equipment and IT services.

Microsoft, one of the largest enterprise software solution providers in the world, developed its IT optimization framework (Microsoft, 2008) in order to classify customer's IT solutions into three categories: core infrastructure optimization model, business productivity infrastructure optimization model and application platform optimization model. However, because Microsoft's IT optimization framework was developed to classify the IT solutions of Microsoft, that framework cannot adequately explain the IT solutions from other IT solution providers such as ERP and SCM. We chose and extended the IT optimization framework of Microsoft to cover more IT solutions in order to analyze and explain the adoption of IT solutions.

2.2. Research Model: classification method of IT solutions

The proposed classification method classified IT solutions into three categories: infrastructure solution, business productivity (BP) solution, and enterprise system (ES) solution (Figure 1).

<Insert Fig. 1 here>

The infrastructure solution category is related to efficient IT management in areas such as network, security, and system management. The benefit of solutions from the infrastructure category affects all employees and provides a more secure and flexible IT environment while IT solutions of the BP solution category such as Unified Communication (UC) and KMS are solutions for enhancing the productivity of employees. The benefit applies to all employees who use these BP solutions. Finally, ES solutions such as ERP, SCM, and CRM are for managing corporate business processes and supporting the corporate decision-making process. According to Shang and Sheddon (2002), the ES solution is a set of packaged application software modules with an integrated architecture that contains deep knowledge of business practices as a form of generic "semi-finished" products. In detail, the infrastructure solution category helps a corporation create a secure and well-managed IT environment while reducing the overall IT cost. This solution area is efficient in deploying and managing server, network, security, database, performance, backup, and directory services. We classified the core infrastructure into 19 IT solutions: 1) network, 2) security, 3) virtualization, 4) system management, 5) data center, 6) disaster recovery, 7) archiving, 8) application performance management, 9) storage, 10) server, 11) EAI (Enterprise Application Integration), 12) EDI (Electronic Data Interchange), 13) database, 14) WAS (Web Application Server), 15) directory service, 16) desktop, 17) printing solution, 18) CAD (Computer-Aided Design) and 19) backup.

BP solutions include a set of solutions that will increase the productivity of employees. Furthermore, it should improve the capability of analyzing and making business decisions for improved performance. This solution consists of various solutions for employees such as unified communication and collaboration systems, email systems, approval systems (i.e., Groupware), enterprise content management systems, enterprise search systems and enterprise portals. The BP solution category has 10 IT solutions: 1) UC (Unified Communication), 2) ECM (Enterprise Contents Management), 3) BSC (Balance Score Card), 4) Electronic Mail system, 5) Groupware, 6) Office system, 7) EP (Enterprise Portal), 8) PMS (Project Management System), 9) KMS and 10) enterprise search.

ES solutions provide IT solutions that drive business forward by quickly delivering business process improvements through ERP, SCM, and CRM and making custom solutions by productive development platforms and web platforms. It also provides a process connection between corporations and external business stakeholders such as customers, partners, and government agencies. This solution consists of various solutions for corporations such as ERP, SCM, CRM, PDM, PRM, development platforms and web platforms. The ES solution category has 15 IT solutions: 1) ERP, 2) CRM, 3) SCM, 4) PRM (Partner Relationship Management), 5) custom developed solution, 6) PDM (Product Data Management), 7) e-Procurement system, 8) BI, 9) eLearning system, 10) development, 11) BPM (Business Process Management), 12) mobile system, 13) EDM (Enterprise Data Management), 14) FMS (Facility Management System and 15) web portal system.

3. COLLECTION OF IT SUCCESS CASES AND PRELIMINARY ANALYSIS 3.1. IT success case

IT success cases are the stories of successful implementation of specific IT solutions in a company and are published in IT magazines and vendor web pages. Obtaining valuable information from the IT success case is one of several ways to know about successful IT investment. Usually corporations publish these success cases in seminars, presentations, consulting reports, IT magazines, and publications from vendors. Publishing their successes shows that they have obtained several benefits from successful IT solution adoption. An IT success case is presented with a description of the adopted solution and its benefits along with an interview with customers. Shang and Seddon (2002) stated "The published success stories represent a rich source of carefully collected, accessible, up-to-date information about IT solutions that have not been available hitherto for research into information systems." They also comment on the risks of using vendor published data. "Stories published by vendors could be representing their products in the most favorable light and are therefore unlikely to discuss any failures. On the other hand, vendors need approval from their clients

to publish, and the client can be contacted directly to confirm the details of the claimed benefits. When the above limitations are recognized and compensated for, web published vendor success case stories represent a new and valuable source of information about the benefits from implemented IT solutions."

When it comes to collecting information about IT success cases, there are eight important facts to include: 1) company name, 2) industry type of the company, 3) IT success case name, 4) solution category, 5) solution name , 6) benefit of IT success case, 7) the source of the IT success case and 8) publication date (year and month).

3.2. Collection of IT success case

A total of 1,240 IT success cases, published between 1982 and 2009, were collected from eight different sources: Management & Computer (the oldest IT specialized magazine in Korea), Computer World, CIO Korea, eWeek, Electronics Times, custom magazines from Oracle Korea and Microsoft Korea, and, web sites from HP Korea. Management & Computer discontinued publication in 2009 and eWeek in 2008 (Table 2).

From IT vendors, Microsoft Korea published 194 cases on its web site (www.microsoft.com/ korea/customerevidence/) and in Innovator, Microsoft Korea's internal magazine for customers, while Oracle published 124 cases on its web site (http://www.oracle.com/global/kr/customers/index.html) and in its magazine to customers. The numbers in Table 1 show the years and the magazines that were checked for collection. No data shows that there was no publication in those years.

<Insert Table 2 here>

3.3. IT success case analysis by the industry

Based on KSIC (Korea Standard Industry Classification) guideline, collected success cases were analyzed based on the commercial and non-commercial sector and appropriate industries (Table 3). 211 cases were from five industry groups in the non-commercial sectors such as the department of government, government agencies, hospitals and higher educational institutes, and 1,029 cases were from twelve commercial industries including finance, manufacturing, information and communication, wholesale and the construction industry. The manufacturing industry had the largest number of IT success cases (33%), the finance industry had the second largest, with 256 cases (21%), while the information and communication industry had 169 success cases (14%). These three commercial industries had 68% of the total number of success cases.

<Insert Table 3 here>

3.4. IT success case analysis by three IT solution categories

Out of 1,240 success cases, 706 cases (57%) are classified as enterprise system solutions, 379 cases (31%) are classified as infrastructure solutions and, finally, 145 cases (12%) are classified as business productivity related solutions. 10 success cases which did not fall into one of these three categories, such as building an IT server room or a customer call center, were not used for our analysis.

The Enterprise system solution category has the most success cases because many success cases of the custom developed solution were published. During the mid-1990s, the number of success cases in the ES category was much higher than that of infrastructure or BP categories due to the high implementation of packaged solutions such as ERP, SCM, CRM, and PDM. The infrastructure category comes second because, from the early 2000s, many IT success

cases related with new infrastructure solutions such as virtualization, application performance management, archiving and EAI were published and several success cases about security were published in order to adopt security solution for safe IT environment .

Business productivity solution category is the least implemented IT solution category because the IT solutions related to the enhancement of employee productivity are relatively new IT solutions. When we classified Korea's enterprise IT issues from The IDC Korea into three categories, BP was the category of least interest ,with 4.1% in 2009, even though interest in the BP category in 2009 was greater than that of 2008 (Table 4).

<Insert Table 4 here>

4. ANALYSIS AND RESULTS

4.1. Commercial and non-commercial sector analysis

In terms of IT investment, commercial and non-commercial sectors generally have different goals. Since the main objective of commercial companies is to make a profit by increasing revenue and reducing costs, the main purpose of IT investment is to help realize these objectives. However, because the main objectives of non-commercial sectors are not related with making profit, the purpose of IT investment may be different (Weill and Ross, 2004). Analysis of the IT solution deployment and the timing of IT solution adoption, in terms of the difference between the two sectors, are discussed by analyzing IT success cases.

The commercial sector adopted IT solutions of Infrastructure in every field evenly while the non-commercial sector showed a higher success case percentage in security, DR (Disaster Recovery) system, and backup solutions than the commercial sector (Figure 2). This can be interpreted to mean that the non-commercial sector focused on hardware-based solution deployments rather than software-based. This trend coincides with the top issues in the noncommercial sector (Lee, 2008; Choi, 2009), which from the IDC Korea reports are related with more hardware-related issues such as security, system integration, hardware purchasing, and network upgrades, unlike that of the commercial sector.

The percentage of system management solution in the commercial sector is higher. This may mean that the commercial sector had more interest in IT resource optimization and system stability by the system management solution than just the deployment of hardware-based solution due to more pressure on cost saving (Ha, 2009). Companies in the information and communication (I&C) industry had an especially large number of success cases in this system management solution in order to utilize their huge IT resources more efficiently. In addition to the system management solution, all success cases of EAI were from the commercial sector. This also shows that commercial companies invested in the integration of existing IT systems in order to increase the efficiency of their IT resources and implemented solutions.

<Insert Fig. 2 here>

In terms of BP category, the commercial sector showed a more relatively even distribution of success cases than the non-commercial sector (Figure 3). UC and ECM and groupware solution have a higher percentage in the commercial sector. This may mean that the commercial sector focused more on collaboration between their employees and partners with UC, ECM, and groupware solutions. Recently, success cases of UC are growing quickly, which means that enterprise companies are seeking investment on saving costs in communication and enhancing collaboration between employees.

On the contrary, the non-commercial sector shows a high percentage in EP and KMS. This implies that the non-commercial sector is interested in solutions for capturing the knowledge of their employees and facilitating information-sharing between employees.

<Insert Fig. 3 here>

In the ES solution category, the custom developed solution has highest percentage, 72% in non-commercial and 52% in the commercial sector (Figure 4). In terms of standard business process-based package software such ERP, SCM, PDM, and CRM, the percentage in the commercial sector is higher than the non-commercial sector. The non-commercial sector did not have any success cases of CRM, SCM, PRM, PDM solutions.

In terms of BI, development tools and web portals, both sectors have very similar percentages and BI has been a common solution in both sectors and has showed similar results in both sectors in areas such as enhancing the accuracy of data and supporting decision-making.

In this section, we discuss the speed of IT solution adoption with the year difference between commercial sectors and non-commercial sectors by analyzing their IT success cases. This analysis of the year difference can provide the answer to which sector adopted IT solutions earlier than others. We used the publication year of the success case to calculate the difference. A statistical method, the t-test, was used to find the year difference. Two different methods, average publication years of success cases and average publication years of first success cases, were used to find the year difference.

(1) Year difference of average publication year of success cases

It means the difference of the average publication year of success cases between sectors and shows which sector or industry implemented earlier than others. When we conducted the t-test to find the statistical difference of average publication year of success cases between commercial and non-commercial sectors, we found the statistical difference with a significance level 0.05 (t= -2.051, p<.05) (Table 5). (2) Year difference of average publication year of first success case

It means the difference of average publication year of the first success cases between sectors shows which sector published the first success cases in each IT solutions. When we conducted the t-test to find the statistical difference of average publication year of first success case between commercial and non-commercial sectors, we found a statistical difference with significance level 0.01 (t= -3.417, p<.01) (Table 5).

By the average publication year of success cases (Table 6), we can say that the commercial sector published earlier than the non-commercial sector, with -1.48. By the average published year of first success cases, the commercial sector published much earlier than the non-commercial sector, with -4.32. This greater number shows that some leading Korean companies in the commercial sector published first success cases of IT solutions much earlier than leading companies or organizations in the non-commercial sector. For example, in 1986, POSCO, ranked 5th in metal industry on the 2009 Fortune 500 list (Fortune, 2009), published the first success case of network solution with its implementation of optical LAN (Local Area Network) while the national library of Korea published the non-commercial sector's first success case in 1996 with the implementation of ATM (Asynchronous Transfer Mode) solution.

<Insert Table 5 and 6 here>

4.2. IT success case analysis among three commercial industries

Out of 12 commercial industries which had IT success cases, three major commercial industries, manufacturing (405), finance (256), and information and communication (169) industries, which had more than 100 success cases were selected to be analyzed (Table 3).

In the infrastructure category, the finance industry showed a high percentage of network, security, DR system and storage solutions (Figure 5). This may mean that the finance industry has been interested in setting up large IT systems with more security solutions and a faster environment with the adoption of network solution. The manufacturing industry adopted every IT solution of this category and EAI had an especially high percentage compared to other industries. This can be interpreted that the manufacturing industry has more IT systems for different IT solutions such as ERP, SCM, CRM, and PDM than other industries. Therefore, demand for the integration of those systems was a big issue and for this reason there was a greater investment in the EAI solution. Most EAI related success cases were published by several leading manufacturing companies who had already implemented ES solutions such as ERP, SCM, KMS, and EP to reduce costs, increase development speed, and enhance flexibility.

Information and communication (I&C) industry showed a high percentage in the system management, data center and database area. This can be interpreted to mean that the I&C industry focused on providing large-scale IT service to end users through better utilizing their huge IT system resources such as servers and storage equipment. From an IDC Korea report (Lee, 2008), 60% of companies surveyed by I&C industry had already adopted ITSM solution as compared to 20% of the finance and manufacturing companies.

In the business productivity category, ECM solution is the highest in terms of the percentage of success cases. KMS and UC come in second (Figure 6). The finance industry showed a very high percentage in EP and groupware. This means that the finance industry focused on delivering company-wide information and collaboration to their employees through business productivity related IT systems. The finance industry has a higher percentage in KMS and ECM solutions than the manufacturing industry. This shows that the finance industry had more interest in developing and sharing the unstructured knowledge of

their employees through ECM and KMS solutions while KMS was selected as the first software solution to-be adopted in the future by the survey of 204 Korea companies (Knowledge Research Group, 2007).

The manufacturing industry showed a higher percentage in UC, BSC and email solutions and a lower percentage in KMS and enterprise portal solutions, because of greater interest in facilitating collaboration with their employees and partners through UC and mail systems. IDC Korea (Lee, 2008) reported that discrete manufacturing companies are interested in the adoption of UC solutions such as VOIP and video conferencing solution in order to reduce the telecommunication cost of global operations.

In the ES solution category, the finance industry shows a higher custom developed solution percentage than other industries (Figure 7). This result of this research implies that the finance industry has focused on gaining a competitive advantage through advanced and unique self-developed systems such as Home Trading System (HTS) in securities industry, and a transaction management system migration to UNIX in the banking industry rather than deploying industry standard process systems.

Like the finance industry, I&C industry shows a high percentage of custom-developed solutions. BI, development and web portal solutions of I&C industry also have higher percentages than averages of the commercial sector. Our research shows that I&C industry has also focused on developing custom solutions with web development in order to gain a competitive advantage over competitors with self-development systems for their core business such as advanced network management systems, real-time billing systems and vast CRM systems.

Unlike the other two industries, the manufacturing industry has shown a very high usage of packaged solutions such as ERP, SCM and CRM. One of the most important IT issues in the manufacturing industry was the successful implementation of the global based ERP system or its upgrade and other management systems such as SCM, a collaboration system for managing the fast growing global operation (Knowledge Research Group, 2007). Several global manufacturing companies such as Samsung Electronics, LG Electronics and POSCO invested early in these packaged solutions and generated several success cases published from the mid-1990s.

Business intelligence is a common solution among all three industries. The implementation of BI and DW was one of the most important issues from Enterprise IT issues of IDC Korea. According to IDC Korea (Lee, 2008), the finance industry was very active in terms of adopting BI solution in order to comply with new government regulations such as BASEL II, and the Capital Market Consolidation Act. The manufacturing industry also showed interest in BI solutions to facilitate better decision-making for its local and growing global operation (Knowledge Research Group, 2007).

In contrast to the previous test, the one-way Anova test was used to find the year difference among three commercial industries. Table 7 summarizes the average publication year of success cases and average publication year of first success cases. Table 8 shows the result of the one-way Anova test and no statistical difference was found and we can therefore say that there is the no difference among the three industries.

<Insert Table 7, 8 here>

5. DISCUSSION AND IMPLICATIONS

5.1. Discussion of findings

In terms of IT solution deployment, while the non-commercial sector focused on the deployment of network, security, and custom developed solutions, the commercial sector adopted IT solutions for optimizing IT resources with system management, APM and EAI

solutions and packaged IT solutions such as ERP, SCM and CRM. For example, all success cases of EAI, APM and SCM were published by the commercial sector. Also, the commercial sector focused on adopting IT solutions for collaborating between employees and partners using EDI, UC, and mail solutions.

The manufacturing industry focused on packaged IT solutions such as ERP, SCM, PDM, and PRM, while the finance and information and communication industries showed an interest in custom developed solutions and IT solutions for business productivity such as ECM and KMS solutions. Interestingly, BI is one of the most common IT solutions in both the commercial and non-commercial sectors and among the three industries with 53 success cases from 45 companies and the number of BI success cases has been growing since the early 2000s.

With analysis of the timing of IT solution adoption, we showed that the commercial sector adopted 1.5 year earlier than the non-commercial sector, and, based on the analysis with first success cases, the commercial sector deployed its first IT solutions 4.3 years earlier while the analysis of three industries shows no statistical differences. Among the three IT categories, infrastructure solution category shows the greatest difference (5.7 years) while the year differences from enterprise system solution and business productivity is less than 4 years.

5.2. Implications

From this analysis, three implications were found. First, in terms of IT solution deployment, we found that the commercial sector focused on adopting packaged solutions in order to adopt the standard business process from solution vendors such as SAP, i2, Oracle and collaboration solutions for improving the speed of communication to reduce cost and to develop their products and services faster than competitors. Also, with high percentages of IT solutions for optimizing IT systems, the commercial sector managed their existing IT resources more efficiently with new system management solution for cost saving and enhancing the quality of IT services. For example, the high percentage of system management solution of I&C industry implies that I&C industry faced greater pressure in terms of managing their huge IT systems more efficiently.

Second, BI is the common IT solution for all industries from the education industry to the food industry. The 53 BI success cases that were collected show that the focus on information in organizations has moved from the accumulation of data by OLPT solutions such as ERP, SCM and custom developed solution to better utilization of accumulated data for the decision-support and compliance of government regulation.

Finally, in terms of the speed of IT solution adoption, earlier adoption of IT solution from the commercial sector shows that several leading commercial companies were eager to adopt new IT solutions which would benefit their organizations. For example, the several leading commercial companies such as POSCO and Samsung Electronics have adopted new IT solutions earlier than other companies to gain competitive advantage in a serious competitive environment.

5.3. Limitation and future research

Only Korean success cases are researched; however, comparison analysis with the success cases from other developed countries is possible and valuable in terms of finding differences of IT solution adoption and issues between Korea and other countries.

The detailed post-analysis of IT success cases can be considered as a topic of future research in order to understand the challenges they had and how corporations managed after publishing success cases. For example, intensive post-success-case-analysis of 104 companies which published 131 ERP success cases is possible to understand what challenges they faced and what benefits they gained after successful ERP implementation. Finally, the

trend analysis of benefits from IT success cases during the past decades can be considered for future research.

6. CONCLUSION

It is important to understand which IT solutions were adopted and what were the year differences in terms of the speed of IT solution adoption. With that information, we can know the real issues and concerns related with IT systems implementation and what benefits from IT solutions corporations want to gain. With an empirical analysis of IT success cases, we first presented the differences between the commercial and non-commercial sectors and in three major commercial industries. Second, by the statistical analysis, we have validated the year differences in terms of the speed of IT solution adoption. This analysis showed that the commercial sector has adopted IT solutions earlier than the non-commercial sector. However, among the three commercial industries, there was no year difference. In conclusion, this empirical analysis, using the IT success cases of Korea during the past 28 years, gives an explanation of the long-term status of Korea in terms of IT solution adoption and is helpful for field IT people to understand what other companies did for their IT systems.

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Table 1. Previous research on IT capability and classification of IT solutions

	Author	Description
	Ross et al. (1996)	3 Assets ((1) Human asset (2)Relationship Asset (3) Technology Asset)
	Byrd and Turner (2000)	2 Categories ((1) Technical IT infrastructure (2) Human IT infrastructure)
	Bharadwaj (2000)	3 Capabilities ((1) IT infrastructure (2) Human resource (3) IT enabled intangibles)
Resource-Based View	Tippins and sohi (2003)	3 Clusters ((1)IT Operations (2)IT Knowledge (3)IT Objects)
	Bhatt and Grover (2005)	3 Capabilities ((1) Value Capabilities (2) Competitive Capabilities (3) Dynamic Capabilities)
	Ray et al. (2005)	5 Capabilities ((1) Technical IT Skills (2) Generic Information Technologies (3) IT spending (4) Shared Knowledge (5) Flexible IT Infrastructure)
	Duncan (1995)	4 Layers ((1) platform, (2)network, (3)key data, (4) core data processing applications)
	Broadbent and Weill (1997)	3 Layers ((1) IT components,(2) human IT infrastructure,(3)shared IT service)
Technical-Based View	Ross and Weill (2002)	 5 Layers ((1) High volume transaction processing (2) Real-time response (3) Analytical and decision support (4) Work group support and enterprise based on IT Processing type (5) Business context, business purpose, and business requirement)
	IDC (2008, 2009)	3 Layers ((1) Hardware (2) Software (3)Service)
	Microsoft (2008)	3 Layers((1) Core Infrastructure, (2) Business Productivity Infrastructure (3) Application Platform

Year	Manageme nt & Computer	Computer World	Electron ic Times	CIO Korea	eWeek	Micros oft Korea	Oracle Korea	HP Korea	Total
1982	11								11
1983	10								10
1984	9								9
1985	13	0							13
1986	26	0							26
1987	8	1							9
1988	2	0							2
1989	6	0							6
1990	3	0							3
1991	0	0							0
1992	4	0							4
1993	9	2							11
1994	2	0							2
1995	12	0					1		13
1996	19	0		0			2		21
1997	13	0		10			10		33
1998	15	9		12		5	3		44
1999	29	4		16		10	0		59
2000	22	5		1		12	4		44
2001	17	20		6		12	6		61
2002	17	17		7		21	20		82
2003	9	29		8	18	17	15		96
2004	14	17		3	37	20	14	1	106
2005	19	22		8	13	28	13	0	103
2006	29	42		13	17	28	8	3	140
2007	18	64		23	26	19	10	0	160
2008	0	34		8	12	19	7	0	80
2009	1	15	57	5		3	11	0	92
Total	337	281	57	120	123	194	124	4	1240

Table 2. Sources of Korea IT success cases

	Commercial				
Inductive nome	and	KSIC	Numb	Percent	
Industry name	Non-	Code	er of	age	
	Commercial		Case	-	
Manufacturing	Commercial	10 - 33	405	32.7%	
Financial and insurance activities	Commercial	64 - 66	256	20.6%	
Information and communications	Commercial	58 - 63	169	13.6%	
Public administration and defense ;	Non-	0.4	110	0.00/	
compulsory social security	Commercial	84	112	9.0%	
Wholesale and retail trade	Commercial	45 - 47	83	6.7%	
Education	Non-	95	477	2.00/	
Education	Commercial	85	47	3.8%	
Transportation	Commercial	49 - 52	39	3.1%	
Construction	Commercial	41 - 42	33	2.7%	
Human health and social work activities	Non-	86 87	32	2.6%	
Human health and social work activities	Commercial	00 - 07			
Professional, scientific and technical	Commercial	70 73	22	1.8%	
activities	Commercial	10-13		1.070	
Electricity gas steam and water supply	Non-	35 - 36	16	1.3%	
Electricity, gas, steam and water suppry	Commercial	55 50			
Accommodation and food service activities	Commercial	55 - 56	9	0.7%	
Business facilities management and	Commercial	74 - 75	8	0.6%	
business support services	Commercial	74-75	0	0.070	
Membership organizations, repair and other	Non-	94 - 96	4	0.3%	
personal services	Commercial)4 -)0	-	0.370	
Real estate activities and renting and	Commercial	68 60	2	0.20/	
leasing	Commercial	00-09	۷	0.270	
Agriculture, forestry and fishing	Commercial	05 - 08	2	0.2%	
Mining and quarrying	Commercial	01 - 03	1	0.1%	

Table 4. IT issues by IT solution categories by IDC reports

Category	Cases (2008)	Percentage (2008)	Cases (2009)	Percentage (2009)
Infrastructure Solution	59	20.5%	110	34.8%
Business Productivity Solution	3	2.1%	13	4.1%
Enterprise System Solution	107	37.2%	99	31.3%
Others	116	40.3%	94	29.7%
Total	285	100.0%	316	100.0%

Table 5. Result of t-test between commercial and non-commercial sectors

	Sector	N	Mean	Standa rd Deviat ion	t	Sig. (2- tailed)
Average of publication Years	Commercial Sectors	44	2003.36	3.42		0.044*
	Non-Commercial Sectors	31	2004.84	2.47	-2.051	
Average of first success case year	Commercial Sectors	44	1997.77	5.69		
	Non-Commercial Sectors	31	2002.1	4.94	-3.417	0.001**

* statistically significant at the 5% level, ** statistically significant at the 1% level

Table 6. Summary of average and year differences between commercial and non-commercial sectors

		Infrastructure	Business Productivity	Enterprise System Solution	Total
	Number of Success case	315	119	588	1,022
Commercial Sector	Average of publication years	2002.89	2003.70	2003.74	2003.36
	Average of first success case years	1997.03	1999.10	1997.2	1997.77
Non- commercial Sector	Number of Success case	64	26	118	208
	Average of publication years	2005.53	2005.20	2003.69	2004.84
	Average of first success case years	2003.25	2002.11	2000.70	2002.10
Difference	Average of publication years	-2.64	-1.51	0.05	-1.48
	Average of first success case years	-5.72	-3.01	-3.50	-4.32

Table 7. Summary of average and year differences among three industries

IT Solution Categories		Infrastructure	Business Productivity	Enterprise System Solution	Total
	Number of Success case	72	30	149	251
Finance Industry	Average publication year	2003.6	2003.0	2002.2	2002.9
	Average first success case year	1999.8	2000.4	1999.9	2000.0
Manufacturi ng Industry	Number of Success case	98	43	262	403
	Average publication year	2003.0	2004.5	2001.1	2002.9
	Average first success case year	2000.6	2002.1	2000.0	2000.9
Information and Communicat ion Industry	Number of Success case	80	20	68	168
	Average publication year	2004.1	2003.3	2002.5	2003.3
	Average first success case year	2001.1	2000.5	2001.0	2000.9

	Industry	N	Mean	Standard Deviation	F	Sig.
	Finance industry	31	2003.94	3.146		.901
Average of publication Years	Manufacturing industry	44	2003.73	4.014		
	Information and Communication industry	30	2003.54	2.373	.104	
	Total	105	2003.74	3.328		
Average of first success case year	Finance industry	31	1999.97	5.916		.763
	Manufacturing industry	44	2000.72	6.096		
	Information and Communication industry	30	2000.93	3.463	.271	
	Total	105	2000.56	5.368		



Fig. 1. Proposed three IT solution categories of IT solutions



Fig. 2. Comparison of infrastructure solution category between commercial and noncommercial sectors



Fig. 3. Comparison of business productivity solution category between commercial and noncommercial sectors