The Study on the Effect of ISP(Information Strategic Planning) at the Institutional Sites

Hyun-Suk Suh[†]

ABSTRACT

Understanding what lies beneath the relationship between ISP and its implementation is an significant area of inquiry in the ISP research. Through an empirical analysis and complementary case examples the current study examines this relationship at six different university sites which undergone both of these processes years from 1995 to 2001. The face-to-face, in-depth interviews were conducted to those participated in both of these processes. A questionnaire survey was also conducted to same participants to elevate the quality of the validity and reliability of the measures. Due to the limitation of the access to the data, it was not possible to compare how similar the final implementation outcomes are from what was originally planned in ISP to some sites. However the study finds that such organizational factors as management support, communication, and organizational culture at the ISP play an important role in the implementation process. This paper proposes that these organizational factors although little they seem to directly affect each individual elements in the implementation process, its latent impact is critical as a whole.

Key words : ISP(Information Strategic Planning), Implementation, University Informatization

1. Introduction

The investment in information technology (IT) is steadily increasing as a central strategy of the organization to achieve competitive advantage in today's dynamically changing environment. Many companies consider thoughtfully about the information systems (IS) investment as the essential part of the business planning. Empirical studies of IS planning practices indicate that the wide variations do exist

depending upon different organizational styles[1]. All in all, the IT investment can simply be divided into two stages; the planning and the execution. The execution or implementation simply means carrying out the contents constructed during the planning stage. However, the execution of full contents from the planning stage is seldom found in most of ISP projects undergone in the organizations. The previous studies found that the fulfillment rate of ISP at the implementation stage may not be desirable as it seems. Letherer and Sethi (1996) found that after more than two years into the implementation horizon, a mere 24% of the ISP projects had been actually initiated[2]. This in turn, put significant emphasis on the needs for the

study on the relationship between the planning (ISP) and the implementation. Prior studies revealed the incomplete implementation of ISP will bring about two crucial problems in the organizations[3][4][5]. First, the failure to undertake or incomplete implementation of the ISP can cause the organization to correctly prioritize tasks in the future. That is because, all the key tasks had been carefully extracted and prioritized during the planning stage. Also these tasks are interconnected to one another. If they are not operated in the correct order and proper manner, the organizations may not achieve the effectiveness of the implementation as was planned. Moreover, they may undergo difficult times in setting up and prioritizing tasks at another time frame in the future. Second, the incomplete implementation may cause organization a dissatisfaction or even below the permissible level of expectations, which can lead to a distrust in IT investment. Consequently, the discontinuation of IT investment will occur. This in tern, will lose the organization a chance to be equipped with core IT competencies.

The current study tries to answer the query of what underlying factors during the ISP project deeply involved with the outcome level of implementation fulfillment at later stage. To do so, the data was collected from six different ISP projects conducted at different university sites in Korea. The reasons for choosing the study sites as the academic field are be twofold. (1) The educational institution has been characterized as comparatively far less dynamic organization, which is not willing to accept the new changes. This means the successful ISP fulfillment at implementation stage are harder to find here. It is of our vast concern to observe how this characteristic interact with and affect on the project to produce unique results. (2) Another distinctive characteristic of the academic environment is the presence of the diverse heterogeneous groups that may play different roles they pursue in the organization. Different groups such as management, professors, students, and other bodies may contradict to each other in terms of prioritizing tasks for the future planning of the university. Therefore current presumes the diversity of groups may produce variety of factors emerge in the

linkage between the ISP and the implementation.

Many factors contribute to the successful implementation of ISP. The technology, human resource, environment, and organizational factors all put substantial weights on the implementation outcomes. The aspects of social environment or organizational culture have long been recognized as important in this regard. The socio-organizational factors such as the role of the users, the degree of management support, the level of risk and complexity of the project all largely determine the outcome levels of the implementation. For this purpose, this paper attempts to bring focus and renewed emphasis on the role of the socio-organizational factors in ISP process.

Among the zillions of factors in socio-organizational department, the following five items are carefully screened as the study variables: the project complexity, management support, organizational attitude toward the new system, project communication, and rivalry environment. These endogenous variables have been chosen not only because of their contributions are significantly stand out in previous studies but also their weighted importance from the years of conducting the consulting projects in the actual fields[6][7][8]. For exogenous variables, the project scheduling, content, and cost are chosen to as the accomplishment level of the implementation. The project scheduling refers to how much of the "time scheduling" set during the ISP stage are carried on to the implementation stage. The content refers to how much of the "output" produced during the ISP are fulfilled at the implementation stage. Finally, the cost refers to "comparison of the actual cost" spent in the implementation stage from that of what originally planned at ISP stage. The actual cost spending in the implementation stage is important to look at. This is because even companies initially agreed on spending certain amount during the planning stage, they tend to cut down the cost at the implementation later on, due to various reasons. This decision from the top management, not only reduces the amount will be spent but also the overall effectiveness of ISP and end up with dissatisfied results.

As with the governmental open door policy and

frequent changes in educational system, today's academic institutions are exposed in more severe competitions more than ever before. As growing interest on the informatization being considered as core competencies, the investment on IT systems is not an option anymore for many academic institutions. Under such circumstances, the ISP and its implementation projects are indispensable. And understanding the connectivity between the two is the kernel of successes in the informatization projects. The results of the study and their implications will be the motivator not only to practitioners' understanding as to how to carry out an effective ISP process but also to management consultants for the improvement of task fulfillment for their future project concerns.

2. Literature Reviews

In the following, the terminologies for the current study is defined through relevant literatures.

2.1 Definitions of ISP

The term, ISP is being defined in many researches and studies. Some of the studies use the term as SISP (Strategic Information Systems Planning) while others use it as ISP (Information Strategic Planning). Some of the widely used definitions from various researches will be stated in the following.

ISP has been defined as "the process of identifying a portfolio of computer based applications that will assist an organization in executing its business plans and realizing its business goals"[9]. ISP also includes the specification of database and systems to support those applications. ISP might also entail the discovery of new applications with the potential to create an advantage over the competitors[10]. Generally, the term ISP should mean the search for applications with a high impact and the ability to create an advantage over the competitors. This planning activity requires substantial resources in terms of managerial time and budget. Therefore the process must deliver benefits beyond the resources necessary to sustain it, in order to contribute

positively to organizational effectiveness.

2.2 Definitions of Implementation

The term, implementation is being defined by many researches and studies. Some of the organizational based definitions are in the following.

Pan at al., (2007) defined the implementation as all organizational activities working toward the adoption, management, and routinization of an innovation[11]. Nutt (1986) defined implementation as a procedure directed by a manager to install planned change in an organization[12]. According to Klein and Sorra (1996), implementation is the process of gaining and targeted organizational members' appropriate and committed use of an innovation[13]. In the context of implementation, the individuals acting as the catalyst during the change process to ensure successful organizational adaptation to a new system or innovation. This success of the change effort is determined by how well the designers, clients, and decision makers deal with the key issues at each micro level stage of the planning and implementation stage. This in turn, will bring the gap down between design and utilization.

2.3 Researches on the Success of ISP

Lederer and Sethi (1988) in their study of the implementation of strategic information systems planning methodologies, found the following fact: The organizations with less participation in the IS department for business planning had more severe problems than organizations with greater participation[14]. It was stated that the participation enables the IS department for better understanding of the top management's objectives and thus, to ensure that ISP outputs match their goals. Benjamine et al., (1985) observed the chief information officers in leading edge companies in their ISP study[15]. They found out that the more highly placed IS executives can relatively easier to initiate, carry out, and analyze ISP exercises compare to lower level personnel. Therefore, the organizations, which top IS executives reported to a president or vice president had less problems than those reported to a

lower level of operators such as a controller. This implies that management support from the higher authority can better lead the project.

Lederer and Mendelow (1990), in their study, offered a four broad suggestions for improving the coordination of IS plans with business plans[16]. They are (1) encouraging business management participation (2) management's planning process (3) participation in the business management's planning process, and (4) establishing an IS plan. The more emphasis was put on the first three items and they were operationalized as (1) the top management participation in ISP (2) the IS managers knowledge of business plans, and (3) their participation in business planning. Salmela and Lederer (2000) have developed a theory of strategic information systems planning. The theory consist of an input and output model consist of seven constructs[17]. The seven constructs are (1) the internal environment (2) the external environment (3) the planning process (4) the strategic information plan (5) the implementation of strategic information plan (6) the planning resource, and (7) the alignment of strategic information plan. Lederer and Salmela demonstrated that the most important relationship in the theory is the effect of the plan on its implementation.

Many researchers suggested that one of the key factors for the successful ISP is the close linkage between the IS strategy and business strategy[18][19]. This alignment heightens the stature of IS through understanding organizational objectives by the top IS planners. The mutual understanding between top managers and IS planners bring about the positive results of the projects. Parise and Henderson (2001) stated that the cooperation is critical for the success of ISP in the organization[20]. The level of cooperation is important in order to reduce potential conflict which can jeopardize the implementation of strategic IS plans. In essence, IS planners should ensure that "key" coalitions and bases of power within the organization are supportive of the process and content to obtain a general level of agreement on development priorities and a level of coordination concerning development standards and IT use among organizational sub groups. Such actions reflect the importance of creating a partnership between IS and user groups for successful implementation efforts.

2.4 Organizational Perspective of ISP

A number of studies focus their scope on the value of ISP from the organizational perspective. Numerous studies all show these factors play an important role in the process of ISP. Current study chose four important factors from the literatures, which assumed to be relevant especially to university ISP. The study added one more item of "communication", which is assumed to be relevant with other factors in the study model. These findings are presented in the following.

2.4.1 Project complexity

McFarlan (1981) found out that three influential key factors play a role in the success of the project: the size, structure, and the level of the technical experience of the information systems staff and project team. Systems differ dramatically in their size, scope, level of complexity, and organizational and technical components[21]. It is said that the more complex systems will increase the likelihood of failure of the project.

2.4.2 Management support

Gottschalk (1999) found in his study, some of the organizational factors critically influence at the implementation; management participation, monitoring, knowledge, and enthusiasm about the project[22]. He stated that the more positiveness of these factors present during the process, would likely to increase the rate of success of the project.

2.4.3 Potential resistance

Ginzberg (1981) in his study of "Early diagnosis of MIS implementation failure" found out that the more positiveness of following factors highly likely contribute to the rate of success of implementation; the degree of systems related training received by the information systems users, users' understanding of systems' functional and technical features, users' participation in systems projects, users' involvement in

the operation of information systems, and users' support of the implementation[23].

2.4.4 Anticipated changes in the external environment

Gottschalk (1999), again found that anticipated changes in competitor behavior, government regulations, and information technology play an important role at the implementation[24].

3. Research Model

This paper hypothesizes the five factors in the ISP will affect the level of success on the implementation as shown in <Figure 1>. Four of these factors were chosen from the previous researches, while an item 'communication' was added specifically for the purpose of the current study, considered as important contributor in this process.

The study mode assumes five tangible and intangible variables; the project complexity, management support, culture, environment, and communication exist in the process of ISP. During the process, these variables interact each other or independently act upon, that can potentially affect on the implementation success rate. The study defines "implementation success rate" as 1) if the contents of the implementation is exactly same as that of ISP 2)

if the scheduling of the implementation is "on time"

< Table 1> presents the definitions of our study variables and their indicators. There are sub categories for each key element. These sub categories can be considered same as the indicators of the study variable; key element. For example, an independent variable "Project size" has three different indicators: cost, human resource, period, and system. Each indicator has been defined in the table.
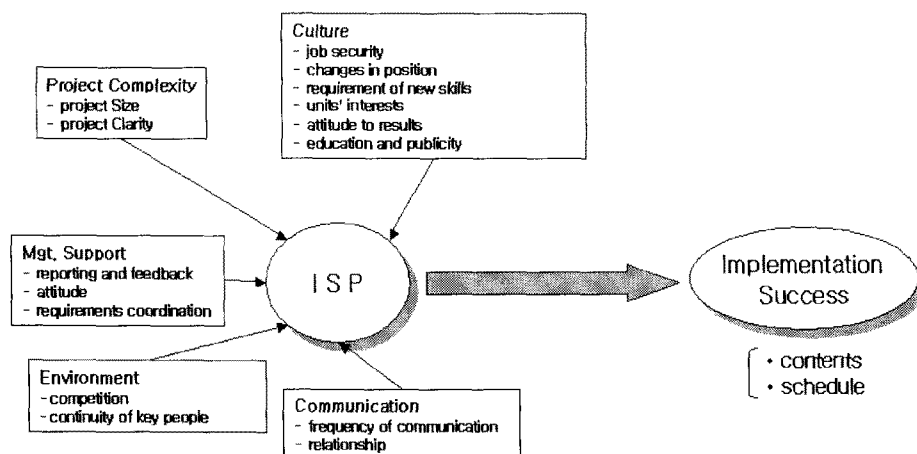
<Table 2> represents the dependent measures of the study variable. There are no indicators for each variable because these are self explanatory measures.

3.1 Hypotheses

As mentioned earlier, the five endogenous variables are the causes for two exogenous variables. Each of our independent variable had indicators to ensure reliability of the measure. These hypotheses are stated below.

Hypothesis 1 : High level of the project complexity is highly likely associated to the successful implementation outcomes.

H 11 : The larger the project size is less likely associated to the successful implementation outcomes.

H 12 : The high level of the project clarity is highly likely associated to the successful implementation outcomes.

<Figure 1> Successful Implementation of ISP at University Sites

<Table 1> Independent Variables

Organizational Factor		
Key Element	Sub Categories	Definition
Project Complexity		
Project Size	Cost	The budget planned for the implementation
	Human Resource	The number of consultants, vendors, staffs and sections being involved
	Period	The duration of the planned implementation
	Systems	The number of systems affected by the implementation as was planned
Project Clarity	Availability	The ease of achieving project related information
	Variety	The variety of the sources of information to perform the project
Management Support		
Reporting and feedback		The frequency of feedback from CEO / The frequency of reporting to CEO
Attitude	Staff Support	The number of full time and part time support of staff for the ISP
	Support of the Facility	The quality of facilities provided for the project team
	Mental Support	The quality of mental and social support provided to the project team
Requirements Coordination		Top Manager's coordination of the needs and problems during the project
Management Knowledge		Top Manager's knowledge and understanding of the project
Culture		
Job Security	toward Staffs	The apprehension for the loss of employment by the new system
Change in Position	toward Staffs	The apprehension for the change in position by the new system
Requirement of New Skills	toward Staffs/Faculty	The apprehension for the learning of new skills
Attitude toward New System	toward Staffs/Faculty	The attitude towards the new system
Units' Interest	toward Staffs/Faculty	The conflicts due to the different interest from different units
Education and Publicity	toward Staffs/Faculty	The number of education received by the staffs and faculties
Environment		
Competition	University Position	The social position/status of the university
	Competitor	The competitor's introduction of IT
Continuity of Key Person	IT manager / CEO	The support of the key person until the ISP process was terminated
Communication		
Frequency of Communication	Briefing	The frequency of reporting to CEOs
	Meeting	The frequency of meetings with the project related person
	Interview	The frequency of interviews with the target person
	Workshop	The frequency of the workshops
Relationship	Faculty	The relationship between consultants and faculties
	Staff	The relationship between consultants and staffs
	Student	The relationship between consultants and students

<Table 2> Dependent Variables (DV)

Schedule	The time schedule of implementation during ISP process
Contents	The contents of implementation during ISP process

Hypothesis 2 : High level of the management support is highly likely associated to the successful implementation outcomes.

H 21 : The high level of feedback is highly likely associated to the successful implementation outcomes.

H 22 : The high level of the staff support is highly likely associated to the successful implementation outcomes.

H 23 : The high level of the facility support is highly likely associated to the successful implementation outcomes.

H 24 : The high level of the mental support is highly likely associated to the successful implementation outcomes.

H 25 : The high level of the coordination is highly likely associated to the successful implementation outcomes.

H 26 : The high level of the CEO knowledge is highly likely associated to the successful implementation outcomes.

Hypothesis 3 : High level of the culture is less likely associated to the successful implementation outcomes.

H 31 : The high level of the worry of job security is less likely associated to the successful implementation outcomes.

H 32 : The high level of the worry of change in position is less likely associated to the successful implementation outcomes.

H 33 : The high level of the requirement of new skill is less likely associated to the successful implementation outcomes.

H 34 : The high level of the positive attitude towards the new system is highly likely associated to the successful implementation outcomes.

H 35 : The high level of the conflict in unit's interest is less likely associated to the successful implementation outcomes.

H 36 : The high level of the education of the new system is highly likely associated to the successful implementation outcomes.

Hypothesis 4 : High level of the environment is less likely associated to the successful implementation outcomes.

H 41 : The high level of the competition is highly likely associated to the successful implementation outcomes.

H 42 : The high level of the continuity of the key person is highly likely associated to the successful implementation outcomes.

Hypothesis 5 : High level of the communication is highly likely associated to the successful implementation outcomes.

H 51 : The high level of the frequency of the communication is highly likely associated to the successful implementation outcomes.

H 52 : The high level of the positive relationship among employees is highly likely associated to the successful implementation outcomes.

4. Methodology

The data were collected through surveys and interviews from project related persons in the study sites. All of them have involved in ISP projects of universities in the study sites. The respondents can be differentiated into three groups: the consultants, the practitioners from school, and the implementers. It was assumed that the opinions of these groups of people may vary due to the homogeneity of the group and the conflicting interests. Therefore it was necessary to gather information from all three groups of people. Respondents are composed of 11 consultants (73%) who had planned the implementation tasks and four staffs (27%) who were the team managers of the university. There was one implementer who belongs to the consultant group. Let alone the different interest of the different groups, the universities have the different characteristics. <Table 3> represents the characteristics of each university project.

To verify whether the implementation was successful, the data on dependent variables; the planned schedule and the contents, were collected from the people who participated at the implementation process. These data were collected through another set of face

〈Table 3〉 Characteristics of 6 University ISP Projects

Case	Features
Univ. A	It is a celebrated national university, and its vision is to establish the graduate centered university at the international level. The project objective is to improve professor's research support function, effective academic management system, automation of administrative operation and the reinforcement of educational support function through the integrated information database system.
Univ. B	It is a local private university, and the vision is to become the best university in the regional area. The primary objective of the school are to merge two campuses and the computerized and efficient business operation through the integrated information database system. The scope of project are the academic/knowledge management, administrative management, e-mail and information plaza.
Univ. C	It is specified university in science and technology. Its vision is to grow into the research centered university at the international level. It already had the superior information database system, and the schools' vision is to implement the integrated information system, which considered the synthesized research management. The project scope include financial management, human resource management, academics management and research management.
Univ. D	Its vision is the actualization of the intelligent campus and to lead the change of university education by relating the advanced information technology to the education and research. The project scope is to build educational information system and knowledge management system.
Univ. E	Its vision is the actualization of the informative campus leading the knowledge based society by the efficient operation and the strategic application of information technology. And the project objective is the construction of effective administration supportive system and knowledge based education/research environment.
Univ. F	Its vision is to provide the informative and knowledge based university in local society. And the project objective is to provide the support of education and research, the support of advanced services for students, the raising of administrative and managerial efficiency and contribute to the local community.

〈Table 4〉 Administrative Information Systems at University

Administrative Management System	Financial Mgt. System Accounting Mgt. System Procurement/Asset Mgt. System Human Resource Mgt. System Student Support Mgt. System
Academic Management System	Admission / Registration / Enrollment / Examination / Grading / Graduation / Dormitory / Scholarship / Employment of Student
Research Management System	Research Project Mgt. System Research Expenses Mgt. System Research Results Mgt. System Research Center Mgt. System

to face interviews from the implementers. This extra interview process was necessary due to the absence of the documented data on the implementation. For some cases, these data were never produced. Therefore, the only possibility to access to this data was to rely on the memories of the implementers.

Under the circumstance, which the documented data on implementation is absent, current study will direct its research focus on the qualitative analyses of the interview data for our independent variables. As mentioned earlier, various pervious studies deal with the success factors in ISP. However these factors are dressed from the perspective of a general ISP boundary, not content specific to a homogeneous group, such as the universities. Therefore it is meaningful to

further explore these issues on the study sample.

To help understanding of the university inorganization, the following paragraphs explain background information.

University informatization is composed of two areas-one is the administrative informatization for the efficient business operation through the integrated administrative information system, and the other is the educational informatization which manages the knowledge in university and is linked with the digital library and the virtual educational system.

Administrative informatization system composed of three systems ; the administrative management system, academic management system and research management system. And 〈Table 4〉 shows the detailed contents of each system.

〈Table 5〉 Component of Educational Informatization

KM	Process	Creation/Collection Accumulation/Processing Distribution/Diffusion Providing/Monitoring
	Culture	Mind Constitution Institutionalization Propagation and Education
	Contents	Identification of the Needed Knowledge Knowledge Formation and Digitalization
	Leadership	Establishment of KM Strategy Organization of KM Team
	Technology	KM System Groupware, EDMS
Digital Library	Information Collecting and Processing	Collecting the existing media data (book, paper, tape, film, microform) Collecting the digital data (File, Multimedia, HTML) Database construction of data Digitalization of the existing data
	Information Providing Service	Classification System for easy search Search System for convenient use Proposition of Various Related Information
	Library Managing System	Management of organization Management of users Management of H/W, N/W and System Management of Data
Virtual Education	Process	Planning Developing of Course Application of Course Course Managing / Examination
	Contents	Virtual education model Configuration of course Field of Education Class of Lecture
	Organ	Establishment of Virtual Education Strategy Organization of Virtual Education Team Mind Constitution / Institutionalization Propagation and Education
	System	Virtual Education System (For Student, Administrator, Professor) Media Production System

These sub systems will be synthesized into one integrated information system, enable the smooth sharing / transporting of data and develop into the decision supportive system at last.

Educational informatization has three categories of KM, digital library and virtual education.

KM is the series of knowledge management process which establishes the system for the effective capture, constitution, diffusion and utilization of information and knowledge.

And Digital Library is the process of digitalizing the required data and connecting them to the network to have the users search and acquire them for the possession of the academic information and knowledge.

Cyber education is the overall process of planning the cyber education, developing the courses, receiving the lecture application, managing the class, testing and the external collaboration.

5. Result

5.1 Issues

From the collected interview data, the issues that belong to each indicator of the study variables are raised. These issues are content specific to the university site. Each university has raised variety of issues. For instance, for a variable "project complexity",

one of the indicators is convergence of requirement. The variety of issues concerning the convergence of requirement has risen from different university. For instance, one university raised the issue of shortage of time for collection of data, while another university raised an issue of the lack of the ability of consultant to adequately carry out the project. Underneath the various issues raised from the different universities we studied, there are similarities that can be grouped together. In <Table 6> these are grouped, organized and defined.

<Table 6> Issues of the Characteristics and Common Factors

Factors	Key element	Indicator	Issue	Definition
Project complexity	Project Clarity	Easiness of requirement	Easiness of achievement	Easiness of achieving the requirements of the project
		Convergence of requirement	Time	The urgency of time to collect data to converge requirements
			Variety of contents	The diversity of requirement to conduct the project
Management support		Reporting and Feedback	Comprehension of CEO	The understanding of CEO about the project issues
			Ownership of CEO	The ability of CEO to control the project in and out
	Attitude	Staff support		
		Facility support		
		Mental support		
		Requirement Coordination	Role of coordinator	The degree of the performing the role by the coordinator
			Clearness of decision making	Ability to make decisions of details(e.g. budget) and matters related to project clearly.
		Management knowledge	Understanding and knowledge of project	The understanding of the scopes, schedules, systems, and budgets of project .
Culture		Job Security	Job factors	The existence of threatening factors (e.g. the previous case of lay-offs and etc.) to continuation of the job
			Demand	The occurrence of personnel demand due to the new system implementation
		Change in position	Role change	The fear of changing the existing role due to the new system implementation
		Requirement of new skills	Education	Needs to acquire new knowledge and skills
			Attitude	The attitude of people toward acquiring new technology skills and knowledge
		Attitude to results	Attitude toward project	The understanding of the practitioners to perform the project
		Units' interests	Opinions of faculty	Faculty opinions
			Control of the department	The change of the department power and roles sue to the system implementation
			Insufficiency of sharing information	Insufficiency of sharing information among stakeholders to change of the tasks and roles due to the system implementation
		Education and publicity		
Environment	University position			
	Competitor	Influences of competitors		
	Continuity of key people	Continuity of key people	change of key people	Change of the key person(s) who has critical influence to the project.
Communi-cation	Frequency of communication	Briefing (CEO)	periodical /occasional	Number
			formal /informal	Number
			face to face	Number
		Meeting (Staff)	periodical /occasional	Number
			formal /informal	Number
			face to face	Number
		Interview	periodical /occasional	Number
			formal /informal	Number
			face to face	Number
		Workshop		Number
	Relationship	Faculty		Number
		Staff		Number
		Student		Number

The variety of responses is raised from each university for following variables; the staff support, facility support, mental support, education and publicity, university position, and influences of competitors. These responses differ in terms of the nature of the data collected. Moreover, the items such as the briefing to CEO, meeting with staff, interview and workshop showed different forms and values for each university uses.

5.2 The response attitude among universities

<Table 7> represents the comparison data among universities for their response attitude along with averages of the key element.

For response category, the plus sign represents such universities responded positively toward the indicator. The minus sign represents the universities responded negatively toward the indicator. For example, there are 7 indicators under that variable "management support." The universities B, C, D, and E specially scored positive attitude overall. On the other hand, the universities E and F showed that the management had a lack of understanding about the project. The average scores represent the average of each indicator on total participated schools.

<Table 7> Comparison with Universities

Factor	Key Element	Avg.	Issues	Responses (+)	Responses (-)
project complexity	Easiness of requirement	3.87	① Easiness of achievement	B, C, D	A, E, F
	Convergence of requirements	4.87	Time		E
			Variety of contents		E, F
Management Support	Reporting and Feedback	4.73	Comprehension of CEO	E	
			Ownership of CEO		C, F
	Staff support	5.33		B, C, D, E.	
	Facility support	4.80		B, C, E	
	Mental Support	4.33		D, E	
	Requirement Coordination	3.33	Role of coordinator		D, E
			Clearness of decision making		C
	Management Knowledge	4.07	Understanding and knowledge of project	D	E, F
Culture	Job security	4.60	Job factors	A, C, E	B, D, F
			Demand	C, F	
	Change in position	4.53	Role change		E
	Requirement of new technology	4.93	Education	A, C	E
			Attitude	B, E.	
	Attitude to results	5.13	Attitude toward the project		
	Units' interest	4.40	Opinions of faculty		
			Control of the department		D, E.
			Insufficiency of sharing information		
	Education and publicity	5.47		A, B, C, D, E	
Competitors and Environment	University position	3.93		A, C, D	E
	competitors	4.67		C, D, E	
	Continuity of key people	4.17	Change of key people	E	
Communication	Briefing (CEO)	4.53	Periodical/occasional		
			Formal/informal		
			Face to face		
	Meeting (Staff)	5.67	Periodical/occasional		
			Formal/informal		
			Face to face		
	Interview	5.47	Periodical/occasional		
			Formal/informal		
			Face to face		
	Workshop	5.33			
	Relationship of Faculty	5.07			
	Relationship of Staff	5.80			
	Relationship of Student	4.47			

<Table 8> represents the average score from each university. For example, the indicator of "easiness of requirement" under a variable project complexity, the average scores for the universities B and C scored 6.0 and 5.5, while the universities A, D, E, and F scored 3.5, 3.0, 3.83, and 2.5 consecutively.

Under the response category shows positive sign if the average score of the university is above four (4) and negative sign if below four (4). The score four was chosen as a turning point for negative to positive attitude because it was a middle score in the Likert type scale used in the questionnaire survey, ranging from 1 to 7. The scores 1 to 3 presents negativity in the response while the score 5 to 7 presents positivity. The 4 being neutral. The reason for doing this is to provide the triangulation of the quality of the information collected. This is because some respondents did not provide the qualitative aspects of data but just filled out on the questionnaires only.

<Table 8> The Average of Universities

Factor	Key Element	Avg.	A	B	C	D	E	F	response (+)	response (-)
project complexity	Easiness of requirement	3.87	3.50	6.00	5.50	3.00	3.83	2.50	B, C	A, D, E, F
	Convergence of requirement	4.87	4.50	5.00	5.00	5.50	4.50	5.50	All	
Management Support	Reporting and Feedback	4.73	4.50	4.00	4.50	3.50	5.17	5.50	A, C,E, F	B, D
	Staff support	5.33	4.50	5.00	6.00	5.50	6.00	3.50	A, B, C, D	E
	Facility support	4.80	3.00	5.00	6.00	4.50	5.33	4.00	B, C, D, E	A, F
	Mental support	4.33	4.00	6.00	4.00	5.00	4.67	2.50	B, D, E	A, C, F
	Requirement coordination	3.33	4.00	5.00	2.00	4.00	3.50	2.00	B	A, C, D, E, F
	Management Knowledge	4.07	4.00	5.00	4.00	6.50	3.50	3.00	B, D	A, C, E, F
Culture	Job security	4.60	4.50	7.00	3.00	5.50	4.33	5.00	A, B, D, E, F	C
	Change in position	4.53	5.00	6.00	3.50	2.50	4.83	5.50	A, B, D, F	C, D
	Requirement of new skills	4.93	3.00	5.00	6.00	5.50	5.33	4.00	B, C, D, E	A, F
	Attitude to results	5.13	3.50	6.00	6.00	5.50	5.50	4.00	B, C, D, E	A, F
	Units' interest	4.40	4.50	5.00	5.00	3.00	4.00	6.00	A, B, C, F	D, E
	Education And publicity	5.47	5.00	5.00	6.50	5.50	5.50	5.00	All	
Environment	University position	3.93	5.00	4.00	5.50	6.00	3.17	1.50	A, B, C, D	E, F
	competitor	4.67	5.50	5.00	4.50	3.00	4.67	5.50	A, B, C, E, F	D
	Continuity of key people	4.17					4.17			D
Communication	Briefing (CEO)	4.53	4.50	5.00	5.50	5.00	4.17	4.00	A, B, C, D, E	F
	Meeting (Staff)	5.67	6.50	6.00	7.00	3.50	5.33	6.50	A, B, C, E, F	D
	Interview	5.47	6.50	6.00	6.00	4.50	5.17	5.50	All	
	Workshop	5.33	5.00	5.00	6.00	4.50	5.50	5.50	All	
	Relationship of Faculty	5.07	4.50	5.00	5.00	4.00	5.33	6.00	A, B, C, E, F	D
	Relationship of Staff	5.80	5.50	6.00	6.50	6.00	6.00	4.50	All	
	Relationship of Student	4.47	4.00	4.00	4.50	5.00	4.67	4.00	C, D, E	A, B, F

5.2.1 Project complexity

For project complexity, the universities B, C, and D have not much problems on the issues such as the easiness of gathering information, converging different opinions, adequacy of time to conduct the project, and finally preparation before the actual project have began. For universities E and F stated most problems in this category. For an university A, at the time when ISP was processed, not many people were familiar about the informatization, nor did they know how to carry out the project properly. Although the positive responses came out from the university C on this item, some of them felt it was not easy at all to converge all different requirements from the school. This was due to the

different organization within the school had differences from the way they see informatization and the impact that may affect from the results. For university D, the CEO had a typically strong will for the informatization to be carried out.

5.2.2 Management Support

In reporting and feedback, Univ. E showed that the CEO comprehended the nature of the project to the level of expectation. The universities C and F reported as the lack of ownership of CEO. In university C, the vice president was not interested in the project. He attended to the meeting only couple of times throughout the whole project.

There are no characteristics and common factors in the supports of human resources and facilities, but all respondents have the positive views. To put it in another way, the supports are in adequate level.

Mental support represents the mental considerations in performing operations. In case of universities D and E, both scored as positive. The university E was reported that only practitioner's support was provided but not CEO's

In coordination, both universities D and E responded as the insufficient ability of the coordinator. The university C was not able to make important decisions clearly. Adjusting different opinions from different organizations of the university is not an easy job to do. Most universities experienced the political issues on this subject. The most problematic area of opinion adjustment was to bring consensus among professors.

In the responses to management knowledge, the CEO in university D has a good comprehension of project need. In case of university E, the operational process was well comprehended by the CEO. However, it was reported that CEO did not understand the overall meaning of the project as to why this operation is needed and what benefits can this project bring.

5.2.3 Culture

In terms of the "job security", each university showed different attitude. The university E shows the most positive attitude. This is because the president promised "no more lay offs" through the ISP process

before the project began. The university A is a national university. And national universities do not lay people off employees easily due to the complicated governmental process. The university C limited their scope only on the enhancement of the operational efficiency, which made the employees feel safe about the lay offs. Moreover, university C needed to hire individuals who have the expertise in IT area. However, in case of the university D, the employees undergone lay off process once through BPR (Business Process Reengineering) and people worried much about happening it again. In case of university B, they were under the influence of IMF at the time of ISP was undergone. Therefore the threats for reducing workforce surely presented not only because of the process but heavily dependent to our economic situation.

In terms of the "change of the individual position", only university E responded negatively because the office of student affairs worried if their role may be transmitted to the center of student support.

In terms of "requirement of new technology", universities A and C showed positive attitudes. The university A had relatively low technological skill and knowledge. Therefore the introduction of new technology provided the positive image of their future. The university C not only had the positive image of it, but they even requested systematic educational program for future to be introduced technology. For university E the employees generally had the positive image as overall.

For the "attitude of result from implementation", most universities showed positive implementation after image. In reality, after the period of system adaptation, the effectiveness of system increased in most cases.

5.2.4 Competitors and Environment

For social status of the university, the responses from universities A, C, and D were positive and they thought that they had high status. But university E answered that they have the high status only on IT. The university B stated that status of IT is a top level in the local area limited. The university A also referred

their IT status as top because they were the first to undergone ISP among all the national universities in Korea.

Most universities such as universities C, D, and E replied that the "influence of competitor" did exist. The university D was influenced by the fact that other universities introduced information systems such as ERP. The university C had the vision of accomplishing the informatization to the level of the leading universities such as CALTEC, CMU.

For an item of change of key people "who has the critical power in performing the project, only university E experienced the switch of the president during the project.

5.2.5 Communication

Communication is composed of items as briefing to CEO, meeting with practitioners, interview for converging the views of stakeholders, and workshop. These responses were all different in frequencies and forms from each university.

In "relationship of faculty", universities A, B, C and E responded positively. In "relationship of practitioners", most of respondents provided positive answer, saying that they had adequate level of communication. The relationship with students was expected as high level at the beginning of the study. However it was found that due to the nature of the project, the level of communication with students is limited only to at the data collection stage and not during when the actual project was running.

5.3 Comparison of the views between consultants and practitioners

The sample population in the study can be separated into two homogeneous groups: the consultants and practitioners. It was assumed that these two groups could have different viewpoints looking at the same subject.

5.3.1 Project Complexity

For the item of project complexity, the consultants stated that they had difficulties of coordinating various

project requirements while practitioners had no idea if they've requested variety of requirements.

It was prominent among consultants that time and scheduling were tight and the pre requisition of the project was much for them to handle properly. From the practitioner's viewpoint, they thought the consultants were lack of business mind while performing the project.

5.3.2 Management Support

The measure for "management support" consists of indicators such as the reporting and feedback, staff support, mental support, requirement coordination, and management knowledge. Some of the important findings are below. The consultants worked in university E stated that the lack of comprehension and ownership of CEO was problematic.

For the "staff support", most consultants agreed that the number of staffs was not small but their quality of work was below from what was expected. For "mental support" most consultants responded positively. However in case of university C, they responded negatively because the work was relatively tight and they were not supported from the management.

5.3.3 Culture

In general, the practitioners replied that they had positive attitudes towards the introduction of new technology while some consultants felt skepticisms from the practitioners. These two different views are driven from the different situation they face; the socially accepted opinions, the politically correct opinions. In terms of "inter departmental conflict", the consultants felt the degree of conflict was much severer than the degree practitioner felt. The practitioners worried there might be a migration of power transfer among different departments due to new technology implementation.

5.3.4 Environment

One of the dominant factors to look at the external environment was the "influence from the competitors". In general, the consultants felt the level of influence from the competitors were high while the practitioners

felt only a small amount of competitiveness from the external environment.

5.3.5 Communication

In general, both consultants and practitioners felt the level of communication was adequate. For the indicators of "communication", such items as the number of interview, workshop, meeting, and relationship among related personnel were measured. Unlike other measures, these items were not able to be standardized. Therefore the adequacy of communication level was totally dependent on the perception of the individuals in the project regardless of their actual occurrence. Another words, although most individuals do not accurately remember how many times have they occurred during the project, they are clear recall if it was in adequate level or not. This implies the mere number of its occurrence has a small impression to employees. The individual perception of the communication quality comes before just the number of its occurrence to them. The results show only university D had some problem dealing with university staffs and faculties.

6. Conclusion

The current study investigated the presence of organizational factors and their influence on the levels of the implementation outcomes. For endogenous measures, five factors have been defined: the complexity of the project, management support, culture, environment, and communication. These variables have been selected partly through the literature reviews and through the analysis on cases of university ISP, which they are assumed to have significant impact on the dependent measures. The independent variables have several indicators to ensure the reliability and the validity of each measure. These indicators have been examined thoroughly through qualitative interviews and quantitative questionnaire surveys.

The qualitative interviews applied on six universities revealed the following facts. For an item of "project complexity", following issues have been brought out:

the variety of requirement, time limitation to conduct the project, and time limitation to prepare for the project. The respondents in Univ. B, C, and D replied that they felt easiness on these issues. On the other hand, the university A, E, and F replied they had some complications and limitation on the issues. For and item of " management support", the issues such as the CEO's understanding of the project, the ownership of CEO, the CEO's role as a coordinator, and their power on decision making process. All but universities C and F replied that the lack of support of CEO was bit problematic to carry out a project. Contrary to each other, the Univ. D showed that CEO's understanding and knowledge about the project was sound but showed the lack of skills in adjusting conflicts and issues for the project to run smoothly. For an item of "culture", such issues as job lay offs, the requirement of highly qualified employees on newly implemented technology, the occurrence of power transfer due to the introduction of new system, the needs for education to prepare for the new system, and finally the insufficient information exchange among stakeholder have been brought out. The Univ. A, C, E, and F showed positive attitude toward the culture while Univ. B and D showed some negativity. The Univ. B showed positive attitude on new system while they showed negativity on job lay-off. For an item of "environment", the threat of competitors, and the continuity of the key personnel throughout the project were the primary indicators. All universities felt no severe problems on these items. For an item of "communication", no issues came out. The individuals felt adequate levels of communication during the project.

Although the number of sample size in our study was not adequate to conduct multivariate statistical analyses, a part of univariate analysis was conducted. For an overall measure across all universities, the mean score for "communication" was scored highest as 5.22 followed by "management support" as 4.43, "complexity of the project" as 4.37, "culture" as 4.33, and finally "environment" as 3.33 as lowest.

In order to find out the underlying patterns of the study samples the severity score was measured. The respondents who scored 5, 6, or 7 on a scale from 1 to

7 referred to as moderately severe. For study variables in our study, the "complexity of the project" scored 60%, "management support" scored 67%, "culture" scored 40%, "environment" scored 20%, and "communication" scored 93% towards positive attitude. The results show that the attitudes of "culture" and "environment" scored low. This means the negative attitude of individuals was embedded in these tow measures. The negativity of "environment" was ignorable due to the nature of the questions and the manner that they were presented. Therefore, only "culture" showed as problematic among all other variables. In further search why it was measured the way they are, the indicators of "culture" were re examined. The results show such indicators as job security (scored 40% in severity measure), change in position due to the introduction of new system (scored 27%), and unit's interest towards new system (scored 27%) showed high negativeness overall. The universities B, D, and F showed high anxiety in "job security." The universities A, B, E, and F showed high anxiety in "change in position." Finally the universities A, B, C, E, and F showed high anxiety in "unit's interest"

On the other hand, the communication scored as highest positivity followed by the management support, across the all universities.

7. Limitations and Contributions

The limitations of the study are two folds; the lack of study samples to run the statistical analyses and the absence of the measurable data on our dependent variables.

The primary goal of the study was to search for the underlying concepts of the study variables. These were achieved through in depth interviews. However the number of interviewee was not large nor were they easy to find. As was mentioned earlier these projects were conducted over the last 5 to 6 years and it was not easy to find people who performed the project or bring out the vivid memories from them. Because of this reason, the data on the implementation were not able to be achieved. In most projects the implementation data are not kept in papers. Only the interviewer on university D who participated both in ISP and the implementation processes could provide implementation data.

As was presented earlier, the primary contribution of the study was to dig out the 'university specific' factors of ISP process that might later have the significant impacts on the implementation stage. Searching for these factors are extremely important because they should be well controlled at the stage to be a fertilizer for the implementation success later on. From this perspective the current study provided a solid base to support for the follow up researches by driving out these important factors using in-depth qualitative research tool, along with some of the quantitative method. When the data of dependent measures are achieved, the measures of association in our study model be strengthened.

References

[1] Hann, Jim and Weber, Ron. (1996). Information systems planning: A model and empirical tests. *Management Science, 42*(7), pp.1043-1064.

[2] Lederer, Albert L. and Vijay, Sethi (1996). Key prescriptions for strategic information systems planning. *Journal of Management Information Systems, 13*(1), pp.35-62.

[3] Earl, M. J. (1993). Experiences in strategic information systems planning. *MIS Quarterly, March*, pp.1-24.

[4] Premkumar, G. and W. R. King (1994). Organizational characteristics and information systems planning: an empirical study. *Information Systems Research, 5*(2), pp.75-109.

[5] Lederer, Albert L. and Sethi, Vijay (1988). The implementation of strategic information systems planning methodologies. *MIS Quarterly, September, 12*(3), pp.445-461.

[6] Gottschalk, Petter (1999). Implementation predictors of strategic information systems plans. *Information Management, August, 36*(2),
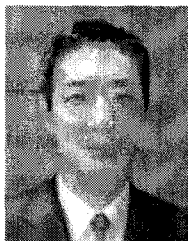
pp.77-91.

[7] Segars, Albert H., Grover, Varun, Teng James T. C. (1998). Planning system dimensions, Internal coalignment, and implications for planning effectiveness. *Decision Sciences, Spring, 29*(2), pp.303-345.

[8] Lederer, Albert L. and Sethi, Vijay (1988). The implementation of strategic information systems planning methodologies. *MIS Quarterly, September, 12*(3), pp.445-461.

[9] Lederer, Albert L. and Sethi, Vijay (1988). The implementation of strategic information systems planning methodologies. *MIS Quarterly, September, 12*(3), pp.445-461.

[10] Sersland, Daniel R. (1987). Competitive Advantage: Creating and Sustaining Superior Performance. *Transportational Journal, Spring, 26*(3), pp.63-63.

[11] Salmela, Hannu and Lederer, Albert L. (2000). Information Systems Planning in a Turbulent Environment. *European Journal of Information Systems, 9*(1), pp.3-13.

[12] Pan, Gary, Hackney, Ray, Pan, Shan L. (2007). Information Systems Implementation Failure. *International Journal of Information Management, 28*(4), pp.259-269.

[13] Klein, K. J. and Sorra, J. S. (1996). "The challenge of innovation implementation", *Academy of Management Review, 21*(4), pp.1055-1088.

[14] Lederer, Albert L. and Sethi, Vijay (1988). The implementation of strategic information systems planning methodologies. *MIS Quarterly, September, 12*(3), pp.445-461.

[15] Benjamin, Robert I., Dickinson Jr., Charles, and Rockart, John F. (1985). The changing role of the corporate information systems officer. *MIS Quarterly, September, 9*(3), pp.177-188.

[16] Lederer, Albert L. and Mendelow, Aubrey L. (1990). The impact of the environment on the management of information systems. *Information Systems Research, 1*(2), pp.205-222.

[17] Salmela, Hannu and Lederer, Albert L. (2000). Information systems planning in a turbulent environment. *European Journal of Information Systems, 9*(1), pp.3-13.

[18] Das, Sidhartan R., Zahra, Shaker A., Warkentin, Merrill E. (1991). Integrating the content and process of strategic MIS planning with competitive strategy. *Decision Sciences, Nov/Dec, 22*(5), pp.953-984.

[19] Parise, S. and Henderson, J. C. (2001). Knowledge resource exchange in strategic alliances. *IBM Systems Journal, 40*(4), pp.908-924.

[20] Parise, S. and Henderson, J. C. (2001). Knowledge resource exchange in strategic alliances. *IBM Systems Journal, 40*(4), pp.908-924.

[21] McFarlan, F. Warren. (1981). "Portfolio approach to information systems", *Harvard Business Review, Sept/Oct, 59*(5), pp.142-150.

[22] Gottschalk, Petter (1999). Implementation predictors of strategic information systems plans. *Information Management, August, 36*(2), pp.77-91.

[23] Ginzberg, Michael J. (1981). Early diagnosis of MIS implementation failure: promising results and unanswered questions. *Management Science, 27*(4), pp.459-478.

[24] Gottschalk, Petter (1999). Implementation predictors of strategic information systems plans. *Information Management, August, 36*(2), pp.77-91.

Appendix A

<Mean and Positive percentage of answers>

Univ. (sample N)	Univ. A (2)			Univ. B (1)			Univ. C (2)			Univ. D (2)			Univ. E (6)			Univ. F (2)			Total(15)		
	Mean	5,6,7	6,7	Mean	5,6,7	6,7	Mean	5,6,7	6,7	Mean	5,6,7	6,7	Mean	5,6,7	6,7	Mean	5,6,7	6,7	Mean	5,6,7	6,7
Availability	3.50	50%	50%	6.00	100%	100%	5.50	100%	50%	3.00	0%	0%	3.83	17%	17%	2.50	0%	0%	3.87	33%	27%
Variety	4.50	50%	0%	5.00	100%	0%	5.00	100%	0%	5.50	100%	50%	4.50	50%	33%	5.50	100%	50%	4.87	73%	27%
Feedback	4.50	50%	0%	4.00	0%	0%	4.50	50%	50%	3.50	50%	0%	5.17	67%	50%	5.50	100%	50%	4.73	60%	33%
Staff Support	4.50	50%	50%	5.00	100%	0%	6.00	100%	50%	5.50	100%	50%	6.00	100%	67%	3.50	50%	0%	5.33	87%	47%
Facility Support	3.00	50%	0%	5.00	100%	0%	6.00	100%	100%	4.50	50%	0%	5.33	83%	50%	4.00	50%	0%	4.80	73%	33%
Mental Support	4.00	50%	0%	6.00	100%	100%	4.00	50%	50%	5.00	100%	0%	4.67	67%	17%	2.50	0%	0%	4.33	60%	20%
Coordination	4.00	0%	0%	5.00	100%	0%	2.00	0%	0%	4.00	50%	0%	3.50	17%	0%	2.00	0%	0%	3.33	20%	0%
CEO Knowledge	4.00	50%	0%	5.00	100%	0%	4.00	0%	0%	6.50	100%	100%	3.50	17%	17%	3.00	0%	0%	4.07	33%	20%
Job Security	3.50	50%	0%	1.00	0%	0%	5.00	100%	0%	2.50	0%	0%	3.67	50%	17%	3.00	0%	0%	3.40	40%	7%
Change in Position	3.00	0%	0%	2.00	0%	0%	4.50	50%	0%	5.50	100%	0%	3.17	17%	17%	2.50	0%	0%	3.47	27%	13%
Requirement of New Skill	3.00	0%	0%	5.00	100%	0%	6.00	100%	100%	5.50	50%	50%	5.33	67%	50%	4.00	50%	50%	4.93	60%	47%
Attitude for Result	3.50	0%	0%	6.00	100%	100%	6.00	100%	100%	5.50	100%	50%	5.50	83%	50%	4.00	50%	0%	5.13	73%	47%
Units' Interest	3.50	0%	0%	3.00	0%	0%	3.00	0%	0%	5.00	100%	0%	4.00	33%	17%	2.00	0%	0%	3.60	27%	7%
Education & Publicity	5.00	100%	0%	5.00	100%	0%	6.50	100%	100%	5.50	100%	50%	5.50	67%	50%	5.00	100%	0%	5.47	87%	40%
University Position	5.00	100%	0%	4.00	0%	0%	5.50	100%	50%	6.00	100%	100%	3.17	0%	0%	1.50	0%	0%	3.93	40%	20%
Competitor Influence	2.50	0%	0%	3.00	0%	0%	3.50	50%	0%	5.00	50%	50%	3.33	17%	17%	2.50	0%	0%	3.33	20%	13%
Continuity of key people													4.17	67%	33%				4.17	67%	33%
Comm_Brief	4.50	50%	50%	5.00	100%	0%	5.50	100%	50%	5.00	50%	50%	4.17	33%	17%	4.00	50%	50%	4.53	53%	27%
Comm_Meeting	6.50	100%	100%	6.00	100%	100%	7.00	100%	100%	3.50	50%	0%	5.33	83%	50%	6.50	100%	100%	5.67	87%	67%
Comm_Interview	6.50	100%	50%	6.00	100%	100%	6.00	100%	100%	4.50	50%	50%	5.17	83%	33%	5.50	100%	50%	5.47	87%	60%
Comm_Workshop	5.00	100%	50%	5.00	100%	0%	6.00	100%	100%	4.50	50%	0%	5.50	100%	33%	5.50	100%	50%	5.33	93%	33%
Rel_Faculty	4.50	50%	100%	5.00	100%	0%	5.00	50%	50%	4.00	0%	0%	5.33	83%	50%	6.00	100%	100%	5.07	67%	40%
Rel_Staff	5.50	100%	0%	6.00	100%	100%	6.50	100%	100%	6.00	100%	100%	6.00	100%	83%	4.50	50%	0%	5.80	93%	73%
Rel_Stu	4.00	0%	0%	4.00	0%	0%	4.50	50%	0%	5.00	50%	50%	4.67	33%	17%	4.00	0%	0%	4.47	27%	13%
Complexity of Project	4.00	50%	0%	5.50	100%	0%	5.25	100%	0%	4.25	50%	0%	4.17	50%	17%	4.00	50%	0%	4.37	60%	7%
Mgt. Support	4.00	50%	0%	5.00	100%	0%	4.42	50%	0%	4.83	100%	0%	4.69	83%	0%	3.42	0%	0%	4.43	67%	0%
Culture	3.58	0%	0%	3.67	0%	0%	5.17	100%	0%	4.92	100%	0%	4.53	33%	17%	3.42	0%	0%	4.33	40%	7%
Environment	2.50	0%	0%	3.00	0%	0%	3.50	50%	0%	5.00	50%	50%	3.33	17%	17%	2.50	0%	0%	3.33	20%	13%
Communication	5.43	100%	0%	5.40	100%	0%	5.97	100%	50%	4.50	50%	0%	5.10	100%	17%	5.27	100%	0%	5.22	93%	13%
Average	4.24	48%	20%	4.65	70%	26%	5.11	74%	50%	4.80	65%	33%	4.60	56%	33%	3.87	43%	22%	4.55	58%	31%

Hyun-Suk Suh

1994   U of Wisconsin-Madison
        (M.S. in IE)
2000   U of Wisconsin-Madison
        (Ph.D. in Sociotech Systems)
2000~2004   LG-CNS Business
        Consultant
2004~Current   Chung-Ang University
        (Busines School)
E-mail : hssuh@cau.ac.kr