경영정보학연구
제3권 2호
1993년 12월

IS 프로젝트 선택에 있어서의 편견에 대한 재고찰

홍 성 완[1)]

Reexamining Organizational Bias In Selecting IS Projects

The importance of IS project selection process has been recognized by many IS researchers as well as IS practitioners. The ideal selection process should provide an organization with best IS project from many competing proposals. However, researchers have found that some organizational biases exist in making the selection decisions. This means different selection mechanisms favor projects with different characteristics. The purpose of this study is to reexamine previous findings to determine if the biases still exist in rapidly changing IS environment. An exploratory case study was conducted to gain deeper understanding of the actual IS project selection process. Then scenario approach was used for the empirical study. Some conflicting findings from the previous studies are discussed.

1) STM, 컨설턴트

I. Introduction

The IS(Information Systems) selection process is arguably the most important phase in the IS development cycle [McKeen and Guimaraes, 1989]. How well an organization takes advantages of opportunities to select projects may determine the eventual success or failure of its IS function [Guimaraes and McKeen, 1989; Santhanam, Muralidhar, and Schneiderjans, 1989] or even the continued existence of the organization [Foster, 1986]. Also, the results of the IS project selection made by managers will impact the future activities of the organization [Huff and Munro, 1985].

The increase in the strategic use of IS in organizations makes the selection of projects that provide competitive advantage to organizations more important than ever [Bracheau and Wetherbe, 1987]. This is where project selection plays its most vital role as the linking mechanism between an organization's planning activities and its resultant application portfolio [Norton, 1983]. As a result, the outcome of the selection process has many important implications for organizational performance.

The importance of the IS selectin process has been recognized by many researchers [Lucas and Moore, 1976; McFarlan, 1981; Ginzberg, 1979; Drury, 1984; McKeen and Guimaraes, 1989; Dos Santos, 1989; Santhanam, Muralidhar, and Schneiderjans, 1989]. It has also been found that IS proejct selection is one of the most serious problems facing senior IS executives [Dos Santos, 1989]. The uncertainty in the nation's economy, an overall stabilization in computing budgets, and an erosion of post-1971 recession era patterns for allocating the data processing money have all contributed for such increased awareness among IS practitioners about the importance of the IS project selection activities [Melone and Wharton, 1984]. The focus of this research is the relationship that exists between the organizational group that selects IS projects and the types of IS projects chosen.

II. Literature Review

Research on IS project selection can be categorized into two broad areas, namely, selection techniques and types of selection mechanisms. Research on IS selection techniques has focused on developing optimal way to select IS projects. Many selection techniques have been developed for IS project selection. Cost-benefit analysis is the most popular technique discussed by many researchers. The simplest form of such cost-benefit anaylsis is to use financial

methods such as payback, Return of Investment (ROI), Net Present Value (NPV), and Interal Rate of Return [Guimaraes and Paxton, 1984]. In addition to the cost-benefit analysis, weighted scoring, cost-effective rationing, requirement-costing technique, and dynamic approaches are commonly suggested for evaluating and selceting an optimal set of IS project proposals [Borovits and Zviran, 1987]. Also mathematical forms of selection methods have been widely studied and developed [Borovits and Zviran, 1987; Lucas and Moore, 1976; Shoval and Lugasi, 1987; Klein and Beck, 1987; Santhanam, Muralidhar, and Schneiderjans, 1989].

In the area of IS project selection process mechanisms, McKeen and Guimaraes have conducted several studies. McKeen and Guimaraes (1985) define a selection mechanism as a distinct organizational group that has the authority to select a few IS projects from competing proposals. Four different types of IS selection mechanisms have been identified by them. These are top management, MIS department, steering committee, and user department [McKeen and Guimaraes, 1985]. Guimaraes and McKeen (1988) defined the four selection mechanisms as follows (p.298):

Top managemet - chief executive officer or senior vice president(s).

Steering committee - formally recognized group of senior executives from different departments.

User department - individual manager of department committee.

MIS department - MIS director of MIS committee

Based on these four different selection mechanisms, researchers have investigated whether individual selection mechanism affects the types of IS projects chosen [McKeen and Guimaraes, 1985; Guimaraes and McKeen, 1988; Guimaraes and McKeen, 1989]. In other words, does each selection mechanism select projects with some unique characteristics?

Guimaraes and McKeen (1988) found the existence of significant biases displayed by each selection mechanism and therefore concluded that different selection mechanisms favor different project characteristics. For instance, steering committees were found to favor extremely large projects involved many users, a high level of risk, a substantial degree of organizational change and protracted development time [McKeen and Guimaraes, 1985]. User departments tended to select very small projects that were developed quickly involing lower levels of risk to the organizaton [McKeen and Guimaraes, 1985]. In another study (1989), they found that

projects of vital importance to the organization were selected by top management. Thier findings have important implications in analyzing and predicting an organization's portfolio of IS projects. Since each selection mechanism results in a different portfolio of IS projects, the type of selection mechanisms adopted by organizations will affect the organizational IS portfolio. As a result, who should evaluate and select IS projects becomes a very important concern in organizations.

The purpose of this study is to reexamine their findings to determine if these biases still exist. The growth of end-user computing has brought about many changes in the IS environment [Dearden, 1987]. Computer systems have become more powerful but easier to use. Managers have also become increasingly aware of the importance of IS technology and how to utilize it for better planning and decision making. It is important to see if the findings of Guimaraes and McKeen (1988) hold true in such a changed environment.

Guimaraes and McKeen surveyed 25 organizations and collected data on 6 MIS projects from each organization: the three most-recently accepted projects, and the three most-recently rejected projects. They then analyzed the characteristics of the projects selected and found correlations with the type of selection mechanisms used. Hence the projects that were analyzed were different from one another and has certain pre-existing characteristics.

A more rigorous method to test the existence of biases is to provide the same project proposals to the different selectin groups. The project proposals will describe project characteristics that are biased on a few criteria. After the selection group makes the selectin decision, the selected projects can be analyzed to see if each group favors some specific project characteristics. This methodology has more internal validity because each group receives the same treatment, project proposals. Any correlation between the selection group and project characteristics will prove conclusively that selection groups have certain biases in selecting projects. Hence this methodology is adopted.

The findings of Guimaraes and McKeen (1988) that will be tested relate to steering committee, user groups, and MIS department. Specifically these following hypotheses are to be tested.

H1: When project characteristics are equal, all projects are equally likely to be selected by each selection mechanism.

H2: When project characteristics are not equal, all projects are not equally likely to be selected by each selection mechanism.

H3: Steering committee favors projects with large scope.
H4: Steering committee favors projects with high organizational acceptance.
H5: Users select projects with small scope.
H6: MIS department selects projects with low level of risk.

The first hypothesis was not proved by Guimaraes and McKeen but has been introduced as a control test. Here the project proposals have no biases or specific characteristics. If the selection groups are rational there should be no differences in the type of projects chosen by each group. In other words, each project is equally likely to be selected. The remaining set of hypotheses tests the existence of specific biases. Project characteristics will be biased on specific features and provided to the selection groups to see if they favor these biased projects. The second hypothesis was to test whether the projects are equally likely to be selected if the projects have certain biases. If the hypothesis proves true, it can be concluded that when project characteristics are different, different selection groups select different types of projects or biases exist in the selection decision. Testing rests of the hypotheses will depend whether the second hypothesis proves true or not.

III. Background and Scope

This study consists of two phases of research, an exploratory case study followed by empirical research. The case study was conducted because there exists no study that documents the actual process of IS project selection in any organizations. Researchers have traditionally adopted an outcome method to find the effects of the different selection mechanisms. McKeen and Guimaraes (p.5, 1989) state that "because of the complex nature of this process, this study focused on its end results... the actual selection decision itself." They therefore analyzed projects that were already selected by the different selection mechanisms to identify the underlying relationship and ignored the selection process itself.

The problem of such outcome based research is that it treats the whole organizational selection process as a "black box" and draws its conclusions only from those projects that are selected. This approach fails to answer why certain projects are rejected, why certain projects are sent to a specific decision group, and what organizational standards and procedures are used in dealing with IS project selecion? Secondly, it does not shed any light on projects that do not go through any

of the four selection authorities and yet are developed. In one study, Guimaraes and McKeen (1989) found that in 21 of 32 organizations surveyed projects were developed by bypassing formal selection mechanisms. Projects were being developed by vendors and end-users. Due to these reasons, it was felt necessary to study the IS project selection process in several organizations to gain a deeper understanding of how IS projects are selected.

The case study provided useful information on the IS project selection process but actual proposals could not be collected from the organizations studied. Due to reasons of privacy and confidentiality, the four organizations did not provide their project porposals. Data to test the findings of Guimaraes and McKeen could not be obtained via the case study. Hence an empirical case study based on a scenario approach was conducted to test the 6 hypotheses shown in literature review section.

Scenario studies have been used in research [Alavi, 1984; Courtney, et al., 1983; Doktor and Hamilton, 1973; Henderson and Nutt, 1980; kirs, 1987]. In a scenario study, subjects assume a certain organizational role and make decision based on the problems provided to them [Kirs et, al., 1989]. Kirs et al. (1989) tested the validation of Gory and Scott Morton framework using scenario approach. A set of scenarios was develpoed as representative of the three information types. The subjects used in their study were asked to envision themselves as the manager faced with the given problems and rate the information attributes required for an effective managerial information system to deal with the problems described in the scenarios. The use of scenarios illuminates the interaction of multiple variables, simplifies the model of the organziation or system, aids in the consideration of alternative outcomes, and refines the scope of a study's research objectives [Kahn and Whiner, 1977]. Such advantages of the scenarios make it as an appropriate methodology for this study.

IV. Phase I: Case Study

A convenient sample of four companies in Miami were selected to be cases for this study. Profiles of the four companies are provided in Table 1.

Relatively large companies were chosen based on the assumption that the selection process will be more mature in such companies [Huff and Munro, 1985]. Nine individuals were interviewed in the four organizations. Originally the researcher intended to intrview chief IS executives in

Table 1

	Company A	Company B	Company C	Company D
Industry	Banking	Services	Food	Systems
Sales in 1989	$80.5 Mil*	$2.93 Bil	$555 Mil	$40 Mil
Employees	7,364	23,182	32,500	400

(* - Net Income)

each company. The chief IS ececutive is defined as the highest level executive directly responsible for IS services, without any major non-IS related responsibility [Dos Santos, 1989]. However, because of the difficulty in meeting the highest level IS executive, the next-highest or senior IS managers were interviewed in two companies. In one company, in addition to the IS managers, a business manager who represents the user groups was interviewed because of his important role in the whole selection process. The research used semi-structured and open-ended questions to gather information. The interviews took from 30 minutes to 2 hours. First, the interviewees were asked to describe the IS selection process in their organizations. Then questions were asked. The interviews were conducted to gather descriptive information on the selection process in each organization and to understand similarities and dissimilarities between organizations.

V. Phase II: Empirical Study

Using the information obtained via the case study, the empirical study utilized scenario approach. The goal of research and the nature of the research topic influence the selection of research methodology [Benbasat, 1984]. The difficulty of getting actual proposals from organizations was one reason for adopting the scenario approach. Also it increased the level of experimental control.

1. Description of the Scenario

Detailed decsription of the scenario is provided in Appendix I. A fictitious company named Appetizers, Inc. was created for this study. Six IS projects proposals for the year 1991 were generated for the organzation. Subjects were asked to select three best projects for year 1991. In making

the selection decision, the subjects were asked to assume a role as an end-user, or an IS manager, or a member of steering committee. Additionally, a fourth group was asked to make decsions but not given any specific role. This served as a control group.

Brief explanations of the six projects were provided in the proposals. The proposals provided such information as the initiator of the proposals, background for the proposals, the potential benefits of the proposals, and the potential users of the systems. The next part of the scenario contained information about project characteristics used in evaluating each IS project.

2. Measures

Variables for this study were adopted from the study of Guimaraes and McKeen (1988). They were scope of the project, risk, and acceptance. They describe each variables as follows (p. 299, 1988):

Scope: scope variable ascertains whether and how the project fits within the organizational structure. Included in this variable are characteristics such as: the number of project users, the number and types of department involved, the organziational level of the system, and degree of horizontal and vertical integration.

Risk: risk variable ascertains the ability of the organization to complete the projects as specified. Included in this variable are characteristics such as: degree of innovation, usage of new technology, and project complexibility.

Acceptance: acceptance variable ascertains the ease with which project is accepted by the organization. Included in this variable are characteristics such as: organizational commitment, top management support, congruency with organizational objectives, and the origin of the project initiator and sponsor.

For each variable, several measures were employed. Description of the measurement scales are explained in Table I in Appendix I. Each proposal was evaluated based on these measures and the results of the evaluation is described in Appendix II and Appendix III.

As explained before, this study tested 6 hypotheses. Among them, the first was to test difference in preferences of different selection mechanisms if all projects were similar. The other hypothesese tested specific biases assumed to be displayed in each selection mechanism. To serve this purpose, different sets of project proposals were prepared. In one set of the proposals,

project characteristics as shown in Appendix II were randomly generated. This set of proposals will be called the randomized set. On the contrary, the values in the other set of proposals as shown in Appendix III, are biased on certain characteristics. This set of proposlas, each proposal has strong emphasis on specific variables. Proposal 1 and proposal 5 have high values in the scope variable. Proposal 2 and proposal 5 have high scores in the acceptance variable. Proposal 3 and 6 scored highest in the risk variable. Proposal 4 does not have any special emphasis on any variables.

As a result, a total of 8 groups served as subjects. The randomized set was given to four different selection groups. These proposals were randomly distributed to the subjects.

3. Sample

Research contrasting the decisions of MBA students and managers in organizations has generally failed to find any significant differneces [Remus, 1986]. Therefore using MBA students as managerial surrogates is acceptable. Total of 240 graduate students enrolled in MBA programs served as subjects. They were split into 2 groups. First group was to test the hypothesis 1 and so was given the randomized set of proposals. Second group was to test the rest of the hypotheses and was given the biased set of proposals. The randomized set was given to 120 students and 54 studentss returned the questionnaires. The biased set was given to 120 students and 56 students returned the questionnaires. Each set represents 45% and 46% return rate respectively.

4. Results and Analysis

Analyses are shown separately for hypothesis 1 and the other hypotheses. Analysis of the randomized set of the proposals was done to test the first hypothesis. The frequency of each project selected by the different selection mechanisms is provided in Table 2.

Chi-square statistic was used in testin the first hypothesis. A research question that frequently arises is whether two variables are associated . If there is no association between two variables, we say that they are independent. Chi-square test is frequently used to decide whether two variables in a population are independent. The first hypothesis is to test whether all projects are equally likely to be selected by each selection mechanism. Hence, the chi-square value is calculated for each selection group. In calculating the chi-square values, the expected frequency for each selection mechanism should be calculated first. The expected frequency is

calculated by multiplying the estimated probability by the total sample size. In this case, the estimated probability for each project to be selected is 1/6. For the end user group, the total sample size is 45 and so the resulting expected value of each cell is 7.5. For the steering committee, IS managers, and no role group, the expected values are 7, 7.5, and 5 repectively.

Then the chi-square value for each selection mechanism is calculated using the following formula.

$$X^2 = \sum_{o=1}^{6} \frac{(Fo - Fe)^2}{Fe}$$

Fo: observed value
Fe: expected value

Based on this formula, the chi-square value for each selection mechanism is calculated as shown in Table 3. Then, the test statistic 11.07 is obtained from the chi-square table for df=5 and alpha=0.05. Table 3 shows the results of the chi-square tests.

Table 2

Selection Mechanism	Project1	Project2	Project3	Project4	Project5	Project6	Total
End-user	3	9	9	5	7	12	45
Steering Committee	1	9	11	5	6	10	42
IS Managers	4	10	9	3	8	11	45
No Role	3	3	9	4	3	8	30
Total	11	31	38	17	24	41	162

Table 3

Selection Mechanism	Test statistic	Chi-square value	Decision
End-user	11.07	6.87	Do not reject N.H.*
Steering Committee	11.07	10	Do not reject N.H.
IS Manager	11.07	7.13	Do not reject N.H.
No Role	11.07	7.6	Do not reject N.H.

* : Null Hypothesis

For the rest of the hypotheses, data from the biased set of proposals was used and the result of the selection process is summarized in Table 4.

Based on the results on Table 4, chi-square tests were conducted again. The hypotheses 2, 3, 4, and 5 are to test specific biases displayed by the different selection mechanisms. Before testing each hypothesis a test that shows that each selection mechanism does favor or indicate preference for certain projects should be done first. In other words, it has to be shown that certain projects are favored before investigating what types of projects are favored. This can be tested by analyzing whether all projects are equally selected by the different selection mechanisms. Only if certain projects are favored by certain selecion mechnism, further analysis of the types of biases by the selection mechanism will be meaningful. The expected values for each selection mechanism are 6.83, 7, 8, and 6.5 respectively. Using the chi-square formula, the chi-square values for each selection mechanism are calculated as shown in Table 5. The test statistic 11.07 is obtained for df=5 and alpha=0.05. Results of the chi-square tests indicate that only steering committee displayed certain unique preferences in selecting from the biased set of proposals [Table 5].

Since other selection mechanisms, namely user group and IS managers, did not show any selection preferences among the six proposals, the specific hypotheses related to these groups need not to be tested. Only the two hypotheses related to steering committee were tested. H3 says that steering committee favors projects with large scope and H4 says that steering committee favors projects with high organizational commitment. Project 1 and 5 have high values in the scope variable while project 2 and 5

Table 4

Selection Mechanism	Project1	Project2	Project3	Project4	Project5	Project6	Total
End-user	6	12	7	4	7	5	41
Steering Committee	2	13	5	5	10	7	42
IS Managers	5	12	9	4	9	9	48
No Role	5	10	8	3	10	3	39
Total	18	47	29	16	36	24	170

Table 5

Selection Mechanism	Test statistic	Chi-square value	Decision
End-user	11.07	5.68	Do not reject N.H.*
Steering Committee	11.07	11.142	Reject N.H.
IS Manager	11.07	5.5	Do not reject N.H.
No Role	11.07	8.23	Do not reject N.H.

* : Null Hypothesis

Table 6

Sets of projects	Tset statistic	Chi-square value	Decision
1&5 vs other projects	3.841	0.51	Do not reject N.H.
2&5 vs other projects	3.841	8.7	Reject N.H.

df = 1 and alpha = 0.05

have high values in the organizational commitment variable. Further analysis of the preference of the steering committee contrasts these sets of projects with the rest of the projects and the result is shown in Table 6.

VI. Discussion

The fact that hypothesis 1 is not rejected is not surprising and this was expected. Results proved that if all projects have similar characteristics then the selection group does not favor any projects. In other words, selection mechanisms behave in a rational manner.

The results from the biased set of proposals are, however, different from expectation. It was expected that user group would select projects that had small scope and MIS group would select projects with a low level of risk. Even though a few project proposals were biased on these variables, these were not significantly favored by the two groups. In other words, users did not select only those projects that were small in scope and exclude other project characteristics. Similary, IS managers did not show a preference for low risk projects. While the steering committee favored

projects with high organizational acceptance, it did not significantly favor projects with large scope that have many users and span many departments. There could be several reasons for the discrepancies between the results of this study and those of Guimaraes and McKeen [1985, 1988].

First and foremost, the research methodology is different in the two studies. Guimaraes and McKeen collected proposals from actual organizations while this study employed a scenario approach. In the scenario setting, members of each selection mechanism do not interact with other selection groups and do not have conflicting interests. In actual organizational settings, the situation may not be the same. As obserbved by many researchers, organizations experience many potential conflicts among the various members while introducing and implementing new IS [Davis abd Olson, 1985; Zmud, 1983]. Individual organizational units lobby to gain larger shares of the total pool of information resources [Zmud, 1983] and so influence the decision made by formal selection mechanisms. Sometimes they resist the selection of projects that they feel threaten their parochial interests [Keen, 1981]. Each group has its own vested interest and it may try to select projects favorable to its interests. Ginzberg(1979, p.631) even suggests that political factors may supplement, or even supress, rational criteria in the project selection exercise. It is therefore possible that the different selection mechanisms may emphasize different criteria in making selections. As a result, in actual organizations the different selection mechanisms may display some significant biases in the selection decision that are not obvious when a scenario study is adopted.

The second possible reason is that today, people in organizations, not necessarily IS people, are becoming more knowledgeable about the benefits of technology. Hence, most members of the selection group might favor projects that provides large organizational benefits as opposed to other criteria. In such a situation, the outcome of selection decisions between the groups may not be significant. Guimaraes and McKeen's (1988) research was conducted before 1985 and many changes have taken place since then. Sudies on end-user computing repeatedly demonstrate that users have become cognizant of the role and benefits of IS.

In the case study it was found that users in organizations have a good level of understanding about the IS they use. This is reflected by the fact that in the four organizations studied about 60 to 80% of project proposals are initiated and evaluated by users. Users were also

responsible for many selection decisions.

Among the students who participated in this research, 53% had taken more than 1 MIS course either in their undergraduate program or graduate program. Almost 20 % of students have taken more than 2 MIS courses. Hence, a majority of subjects had some basic understanding about IS. Perhaps, these are the reasons for the different selection mechanisms to display similar patterns of preferences in selecting projects. The steering committee favored projects with high organizational acceptance and this was found to be significant at alpha = 0.05 level. Although the statistical tests failed to detect any significant biases, as shown in Table 5, projects 2 and 5 are preferred by almost every other selection mechanisms [Table 7]. Projects 2 and 5 were biased on organizational acceptance. Thses projects were evaluated as being in line with corporate goals, with high organizational commitment, etc.

When students were asked to briefly explain the reasons for selecting projects, the most frequently mentioned reasons were: "the project has high organizational commitment," "the project is in line with the corporate goal," and "the project has high support from the top management."

A third reason for the discrepancy could be the methodology adopted by Guimaraes and McKeen. They looked at the characteristics of the projects chosen or rejected by different selection mechnisms. Using such an outcome approach they found that steering committee were biased toward large projects, more costly and involved projects. In the case study, it was found that in all four organizations only the large projects are sent to the steering committee for selection. They have different evaluation and selection mechanisms for large and, small to medium project proposals. The proposals which exceed a certain level of financial outlay go to the steering

Table 7

Selection Mechanism	Frequency of selection		% of the project 2 and 5 selected out of the total selection
	Project 2	Project 5	
End-user	12	7	46%
Steering committee	13	10	55%
IS Managers	12	9	44%
No role	10	10	51%

committee while the rest are handled by the users. In three companies the development cost of the new project is used as a criterion to classify large projects from small projects [Table 8]. The proposals requiring less money or time usually go to the users.

It is therefore highly likely that all projects selected by the steering committee tend to be large in scope. This might have been wrongly interpretd by Guimaraes and McKeen as a bias instead of an organizational process reality.

Similarly, Guimaraes and McKeen use the same outcome approach to determine that users favor small projects. In the case study, it was found that in all four companies the project proposals are sent to different selection groups depending on the size, scope, and type of the project. It is quite possible that the organizational procedures have infulenced the results that Guimaraes and McKeen found.

While this study used a scenario approach it was a more rigorous methodology because it gave exactly the same proposals to all the selection groups and there was not many significant differences in the selection outcome. In the light of these findings it might be necessary to conduct more research to examine the nature of IS poject selection biases and outcome in organizations.

The hypothesis that was found to hold true is that the steering committee favors projects with high organizational accepatnce. The items in the organziational acceptance variable include organiational commitment, top management commitment, part of the corporate plan, and the level of the initiator or sponsor. Considering memebers of the steering committee, selecting projects with high scores on these items seems to be very reasonable. In IS project selection, the steering committee is recognized as a group of senior executives from different departments which usually meet on a regular basis to make final decisions on the development or acquisition of IS projects [Guimaraes and McKeen, 1989], and to decide in what order the selected projects should be worked on [Doll, 1985]. Since the members also work on setting the corporate overall plan, they may prefer projects which are congruent with the

Table 8

	Company A	Company B	Company C	Company D
Criteria	Money	Time	Money	Money
Amount	$100,000	6 months	Not defined	$35,000

corporate plan. Also, if the initiator or sponsor is a high level management, the probability that the project is preferred by his colleagues of those in close positions will be high, too.

High commitment from both top management and organization also can be expected to be highly related with the approval rate.

VII. Conclusion

The purpose of this study was to retest some of the important findings in the IS project selection literature related to selection mechanisms. A prelimimary case study was conducted to gather information and to design an appropriate empirical study. The findings suggest that some of the accpeted notions about organziational biases in IS project selection mechanisms may not hold true today. Explanations for these findings were provided.

If biases exist they have to be managed. It appears that the first step is to ascertain conclusively that these biases do/do not exist in real world organizations. Using exact research methods, future researchers may need to explore this in actual organizational settings.

- 참 고 문 헌 -

1. Alavi, M. "An Assessment of the Prototyping Approach to Information System levelopment," Communications of the ACM, 27, 1984, pp. 556-563.

2. Benbasat, I. "An Analysis of Research Methodologies," in the Information system Research Challenge, F. Warren McFallan (ed.), Harvard Business School Press, Boston, Massachusetts, 1984, pp. 47-85.

3. Borovits, I. and Zviran, M. "Computer-Family Selection Methodology for Organizational Informational Information Systems," Information & Management, 12, 1987, 107-115.

4. Brancheau, J.C. and Wetherbe, J.C. "Key Issues in Information Systems Management," 11, 1987, pp. 23-36.

5. Courtney, N.L., DeSanctis, G.L. and Kasper, G.M. "Continuity in MIS/DSS Lboratory Research: The Case for a Common Game Simulator," Decision Sciences, 14, 1983, pp. 419-439.

6. Davis, G.B. and Olson, M. Management Information Systems: conceptual Foundations, Structure, and Development (2nd Edition), McGraw-Hill, Inc., New York, 1985.

7. Dearden, J. "The Withering Away of the IS Organization," Sloan Management Review, 1987, pp. 17-35.

8. Doktor, R.H. and Hamilton, W.F. "Cognitive Style and the Acceptance of Management Science Reommendations," Management Science, 19, 1973, pp. 884-894.

9. Doll, W.J. "Avenues for top Management in Successful MIS Development," MIS Quarterly, 9, 1985, pp. 17-35.

10. Dos Santos, B. "Selecting Information Systems Projects: Problems, Solutions and Challenges," IEEE Transactions in Systems Management, 1989, pp. 131-140.

11. Drury, D.H. "An Evaluation of Data Processing Steering Committees, " MIS Quarterly, 8, 1984, pp. 257-266.

12. Foster, R.N Innovation: The Attacker's Advantage. Simon & Schuster, New York, 1986.

13. Ginzberg, M. "Improving MIS Project Selection," OMEGA, 7, 1979, pp. 529-537.

14. Guimaraes, T. and McKeen, J. "Organizational Bias in the Selection of MIS Projects," OMEGA, 16, 1988, pp.1 - 11.

15. Guimaraes, T. and McKeen, J. "The Process of Selecting Information Systems Projects," Data Base, Summer 1989, pp. 18-24.

16. Guimaraes, T. and Paxton, W.E. "Impact of Financial Analysis Methods on Project Selection," Journal of Systems Management, February 1984, pp. 18-33.

17. Henderson, J.C. and Nutt, P.C. "The Influence of Decision Style on Decision Making Behavior," Management Science, 26, 1980, pp. 371-386.

18. Huff, S.L. and Munro, M.C. "Information Technology Assessment and Adoption: A fiekd Study," MIS Quarterly, 9, 1985, pp. 327-340.

19. Kahn, H. and Weiner, A.J. The Year 2000, MacMillan, New York, NY, 1977.

20. Keen, P.G.W. "Information Systems and Organizational Changes," Communications of the ACM, 24, 1981, pp. 24-33.

21. Kirs, P.J. An Experimental Investigation into Levels of User Involvement in System

Development Across System Types, Unpublished Ph.D. Dissertation, State University of New York at Buffalo, NY, 1987.

22. Kirs, P.J. and et al. "Validation of Gorry and Scott Morton Framework," MIS Quarterly, 13, 1989, pp.183-197.

23. Klein, G. and Beck, P. "A Decision Aid for Selecting Among Information System Alternatives," MIS Quarterly, 11, 1987, pp.177-185.

24. Lucas, H.C., Jr. and Moore, J.R., Jr. "A Multiple Criterion Scoring Approach to Information Systems Project Selection," Infor, 14, 1976, pp. 1-12.

25. McFarlan, F.W. "Portfolio Approach to Information Systems," Harvard Business Review, September-October 1981, pp. 142-150.

26. McKeen, J. and Guimaraes, T. "Selecting MIS Projects by Steering Committee," Communications of the ACM, 28, 1985, pp. 1344-1352.

27. McKeen, J. and Guimaraes, T. "Comparison of IS Selection Mechanisms," Working Paper, 1989, pp. 1-40.

28. Melon, N.P. and Wharton, t.J. "Strategies for MIS Proejct Selection," Journal of Systems Management, 1984, pp. 26-31.

29. Norton, D.P. "The Applications Portfolio," in Managing the Data Resource Function, (ed. Nolan, R.L.), West Publishing Co., St.Paul, 1983.

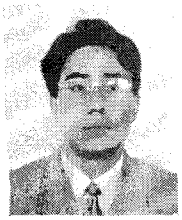
30. Remus, W.E. "An Empirical Test of the Use of Graduate Students as Surrogates for Managers in Experiments on Business Decision Making," Journal of Business Research, 14, 1986, pp. 19-25.

31. Santhanam, R., Muralidhar, K., and Schneiderjans,. 'A Zero-One Goal Programming Approach for Information System Project Selection," OMEGA, 17, 1989, pp.583-593.

32. Shoval, P. and Lugasi, Y. "Models for Computer Systems Evaluation and Selection," Information and Management, 12, 1987, pp.117-129.

33. Zmud, R.W. Information Systems in Organizations, Scott, Foresman and Company, Glenview, Illinois, 1983.

◇ 저자소개 ◇



저자 홍성완은 연세대학교 정치외교학과를 졸업하고 미국 오하이오주의 Miami University에서 경영학 석사학위를 취득하고 Florida International University에서 MIS 박사과정을 수료했다. 현재는 주식회사 STM에서 컨설턴트로 재직하고 있다. 주요 관심분야는 Project Selection Process와 Business Process Reengineering이며 역서로 "JIT를 잡아라," "경영멘탈리티 혁명" 등이 있다.