USE OF MANAGEMENT INFORMATION SYSTEMS IN STRATEGIC PLANNING

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Abstract

This study examines managerial views on management information systems in strategic planning process. A survey conducted with top managers revealed that most managers are using MIS in the development and implementation of corporate strategies. The findings also show that the use of MIS in strategic planning, does not differentiate significantly according to type of industry, size of company budget, or the company's MIS budget allocations. Furthermore, problems associated with use of MIS are discussed, and suggestions are made to narrow the gap between MIS developers and users.

Management Information Systems (MIS) is considered a useful instrument for generating and using information for various managerial activities. However, despite the growing popularity of MIS, there are some serious obstacles to its greater use in the context of strategic management. In this regard, one of the major limitations is top management's lack of appreciation for the capabilities of MIS. Another is the inability of the system staff to provide timely and relevant information for top decision-makers. Additionally, MIS is one of the less clearly-conceived concepts in the field of management. In this paper, an attempt is made to examine, analyze, and evaluate the present use of MIS in strategic planning.

The purposes of this paper are threefold: The first is to define managerial acceptance of MIS and to explore the extent to which top-level managers use computer-based information systems in strategic planning. A second purpose is to investigate the degree of utilization of MIS in different organizations including banks, utility, transportation, and manufacturing companies and to determine the extent to which these companies differ in their involve

ment in MIS applications. Finally, the paper attempts to assess the potential for, or limitations to, the greater use of MIS by top-level managers in strategic decision making.

For this paper, MIS is a computer-based information system generating information from both external and internal sources. It supports managerial functions such as planning, control, and operations by providing uniform information for use in decision-making process. Strategic planning refers to the development of long-range corporate goals and means including market development, product development, cost saving measures, acquisition, diversification, integration, turn-around, divestiture and liquidation decisions and implementation.

The development of, and increase in use of, computer-based information systems in organizations, has been the subject of various investigations (Alter, 1976; Brady, 1967; King and Rodrigues, 1981; Lucas 1978; Schewe, 1976; Schultz and Slevin, 1975). Conceptually, there appear to be two principal elements which arise repeatedly in the literature: MIS and decision making. A survey

was conducted in order to explore the relationship between MIS and strategic decision making. This paper discusses the findings of this survey. Furthermore, it addresses the question of whether there is misunderstanding and underutilization of MIS.

PREVIOUS RESEARCH

Some of the early reactions to MIS reflect a sense of skepticism about its overstated mission. Anthony (1965) expresses his despairing view with respect to use of computer-based information systems by executives. He believes that the strategic decisions require data that are so unpredictable and diverse in nature that developing integrated and comprehensive information systems would be impossible. Along the same lines, Milano (1970) claims that there is a great deal of user disillusion with computer-based information systems. He states that most systems provide data that are outdated and/or provide too much to be useful. With the recent developments in the field of computers, these assertions need to be revised.

On the positive side, there are many who advocate the effective utilization of computer-based information systems.

Khosrowpour's (1983) study defines the role of MIS in assisting top executives in strategic planning by examining the relationship between those executives and MIS specialists. The study notes that, although the use of MIS as a tool in strategic planning is helpful, there is potential for major problems caused by lack of confidence in MIS, breakdown in communication between top management and the MIS center, and deficiencies in executive training in how to use MIS to its fullest extent. "Perhaps no one can tell which of three problems weights more heavily than others, but it is obvious that strong relationships exist among them, and they are the major factors in the diffi-

culty of using MIS for strategic planning purposes" (Khosrowpour, 1983, p. 29). By identifying some of the major obstacles to effective use of MIS, Khosrowpour delineates an important issue which requires further investigation.

Based on characteristics of the information, accessibility of information, and actual use of information, Senn's study (1980) tested users' satisfaction with their systems. The findings were: Users are satisfied with precision, accuracy, and relevancy of information produced. However, Senn recommends improvements in key areas, especially implementation of data base management systems (DBMS), as important provisions prior to an organization's move into development of decision support systems.

This review of MIS literature indicates a need for further empirical research to determine the current state of MIS and its relationship to strategic decision-making. We arrive at this conclusion because of two reasons. First is the most of previous MIS studies are outdated considering the rapid changes taking place in computer technology. Second is less attention paid to specifically top level managerial use of MIS in strategic planning.

In exploring the use of MIS in strategic planning, we consider that the following dimensions should be investigated: attitudes of top executives toward MIS, the use of MIS in different industries against the MIS budget allocations, and budget size of companies vis-a-vis their MIS allocations. In this vein, the following hypotheses are developed:

- H₁: Most executives presently have not used MIS in strategic planning.
- H₂: There is no relationship between type of industry and the use of MIS in strategic planning.
- H₃: Annual MIS allocations are independent from company budget size.

- H₄: There is independence between company budget size and the use of MIS in strategic planning.
- H₅: There is also independence between MIS budget allocations and the use of MIS in strategic planning.

METHOD

The survey included four industries—manufacturing, utilities, banking, and transportation, because these industries represent a large segment of American industry as a whole. The list of these companies was selected randomly from three different sources: Standard and Poors Register of Corporations, Directors and Executives; Directorate of Corporate Affiliation; and Reference Book of Corporate Managements.

A questionnaire was designed to find out perceptions and attitudes of top management people about the role of MIS in the strategic planning process. The first part of the questionnaire included questions about the company; the second part sought information on the company's annual budget and the percentage of this budget allotted for the MIS center; finally, the last part contained questions about the MIS center and its role in the strategic planning process.

Top managers were defined as presidents, vice presidents, and chief executive officers, and the questionnaires were directed only to those holding such positions. In the management literature, there is sufficient evidence to support our premise that such top managers are directly involved in the strategic planning process (Mitzberg, 1979, Pearce and Robinson, 1985).

The questionnaires were mailed to 400 companies and 190 companies responded, but 184 of them were usable responses. Thus, the respond rate was 46 percent. Out of 184 companies which participated in the study, 43

were from banking, 55 from manufacturing, 40 from transportation, and 46 from utility industries. All had annual sales of \$20 million or more.

To test the hypothesis, except the first one, chi-square statistical test was used.

In the survey, certain open-ended questions were included to define expectations from and problems associated with use of MIS. Consequently, a content analysis and evaluation of the responses given and remarks made by top executives were also made.

RESULTS

The majority (65.2%) of executives surveyed in this study reported that their firms utilized Management Information Systems during the development and implementation of corporate strategic plans. See Table 1. This finding is contrary to arguments of Anthony (1965), Milano (1970), and Ziegler (1970). The majority of executives responding to the questionnaire expressed satisfaction with, and optimistic feelings about MIS applications. To the contrary, our findings are parallel to those of Senn (1980) which assert that MIS has been used in managerial decision making. However, it must be noted that MIS use in strategic planning is neither absolutely extensive nor problem-free. Nevertheless, there is a greater potential of MIS use in decision-making than its present use. As Ferreira and Collins, Jr. (1979) pointed out, the use of MIS is an evolutionary development.

A chi-square test was conducted of $p < .05$ significant level to explore the relationships between type of industry (more specifically banking, utility, manufacturing, and transportation companies) and the use of MIS in strategic planning. The results suggest that the differences between industries do not have any direct bearing on the use of

MIS in a given industry. Table 1 summarizes these results.

TABLE 1
Use of MIS in Strategic Planning
of Different Industries
(Figures in parenthesis are percentages)

Industry	Currently using MIS	Considering MIS for future	Not using MIS: do not plan to do so	Total
Banking	25 (58.1)	8 (18.6)	10 (23.3)	43 (23.4)
Utility	29 (63.0)	10 (21.7)	7 (15.2)	46 (25.0)
Manufacturing	35 (63.6)	7 (12.7)	13 (23.6)	55 (29.9)
Transportation	31 (77.5)	4 (10.0)	5 (12.5)	40 (21.7)
Total	120 (65.2)	29 (15.8)	35 (19.0)	184 (100.0)

Chi-square = 6.002 with 6DF.

p < .05

TABLE 2
MIS Budget
(Figures in the parenthesis are percentages)

Company Annual Budget	1 - 2% of Ann. Bgt.	3 - 4% of Ann. Bgt.	5 - 6% of Ann. Bgt.	More than 6% of Ann. Bgt.	Total
Less than 500 million	44 (52.4)	14 (16.7)	13 (15.5)	13 (15.5)	84 (48.8)
500 million - 1 billion	12 (48.0)	2 (8.0)	5 (20.0)	6 (24.0)	25 (14.5)
1 - 1.5 billion	10 (33.3)	5 (16.7)	5 (16.7)	10 (33.3)	30 (17.4)
More than 1.5 billion	15 (45.5)	5 (15.2)	5 (15.2)	8 (24.2)	33 (19.2)
Total	81 (47.1)	26 (15.1)	28 (16.3)	37 (21.5)	172 (100.0)

Chi-square = 6.579 with 9DF

p < .05

Consequently, hypothesis 2, which states that there is no relationship between type of industry and the use MIS in strategic planning is supported. In other words, the MIS utilization does not differentiate considerably from one industry to another.

The companies studied range in annual budget from \$20 million to \$6.7 billion. In order to study the relationship between the company's annual budget and its top management's use of MIS, the annual budget was considered in four different categories: less than \$500 million, including 84 companies; \$500 million to 1 billion, including 25 companies; 1 to 1.5 billion, containing 33 companies; and more than 1.5 billion, containing 33 companies.

The next step was to find what percentage of the annual budget was apportioned for the MIS Center. The first category less than 2 percent included 81 companies, second group between 3 and 4 percent included 26

companies, third group between 5 and 6 percent included 28 companies, and the last category more than 6 percent of annual budget contained 37 companies. See Table 2.

The mean average of the annual budget allowed for the MIS Center was 5.1 percent, with a standard deviation of 3.6 percent.

The relationship between company annual budget and MIS expenditures was tested at $p < .05$ with a null hypothesis indicating that there is no direct relationship between company budget size and annual MIS budget allocations in percentages. The result of the tests led to accept the hypothesis that the companies with various sizes make relatively comparable MIS budget allocations. In other words, smaller companies spend a comparable percentage of their annual budgets for their MIS departments as larger companies do. See Table 2.

TABLE 3
Use of MIS in Strategic Planning
(Figures in parenthesis are percentages)

Annual Budget	Currently using MIS	Considering MIS for future	Not using MIS: do not plan to do so	Total
Less than 500 million	53 (60.9)	17 (19.5)	17 (19.5)	87 (49.7)
500 million - 1 billion	20 (80.0)	3 (12.0)	2 (8.0)	25 (14.3)
1 - 1.5 billion	24 (80.0)	3 (10.0)	3 (10.0)	30 (17.1)
More than 1.5 billion	18 (54.5)	5 (15.2)	10 (30.3)	33 (18.9)
Total	115 (65.7)	28 (16.0)	32 (18.3)	175 (100.0)

Chi-square = 9.514 with 6DF.

$p < .05$

TABLE 4
Use of MIS in Strategic Planning
(Figures in parenthesis are percentages)

MIS Budget	Currently using MIS	Considering MIS for future	Not using MIS: do not plan to do so	Total
1 - 2% of annual budget	50 (50.0)	14 (17.1)	18 (22.0)	82 (46.9)
3 - 4% of annual budget	17 (63.0)	4 (14.8)	6 (22.2)	(15.4)
5 - 6% of annual budget	21 (71.4)	5 (17.2)	3 (16.2)	29 (16.6)
More than 6%	28 (75.7)	3 (8.1)	6 (16.2)	37 (21.1)
Total	116 (66.3)	26 (14.9)	33 (18.9)	175 (100.0)
Chi-square = 4.396 with 6DF.			p < .05	

The next test was employed at significant level of $p < .05$ to disclose the relationship of the annual budget size and the use of MIS in strategic planning with a null hypothesis that there is no relationship between company budget size and the use of MIS in strategic planning. The result of the test showed that there is no evidence of such relationship and demonstrated that the differences in annual budgets do not have any direct bearing on the status of MIS use in the strategic planning process. Table 3 denotes this relationship.

Another test was conducted at significant level of $p < .05$ to determine the relationship between the use of MIS by companies, and the percentage of budget allotted for the MIS Center. The hypothesis implies that those companies which are currently using MIS in their strategic planning make similar budget commitments in comparison to those companies not using MIS in their strategic planning. The result of the test was positive, stating that MIS

budget size varies little among those companies, whether or not they are currently using MIS in their strategic planning. See Table 4.

The preceding test clearly demonstrates that those companies currently using MIS in their strategic planning do not have greater allocations for their MIS Centers. One could conclude that use of MIS in strategic planning does not necessarily require greater budgetary commitments.

DISCUSSION AND CONCLUSION

Traditionally computers have been perceived by managers as "number crunchers," capable of performing vast calculations faster and more accurate than humans. Society is in the process of moving from this narrow perception of computer application into an era of seeing computers as devices which can provide top management with meaningful information and decision models. The survey findings support this notion.

The most notable was the acceptance and utilization of MIS as a tool in strategic planning. This is demonstrated by the finding that 65.2 percent of top executives who participated in the survey indicated that they are currently using MIS in their strategic planning processes, and additionally, 15.8 percent executives considering MIS use in that capacity in the future.

Another important conclusion is that there is no significant relationship between the use of MIS in strategic planning and the type of industry. Additionally, it became clear that companies are making budgetary commitments to MIS programs and units, regardless of their budget sizes.

Although the use of MIS as a tool in strategic planning is accepted, there are still certain limitations to its greater use. These limitations which were drawn from the comments and remarks made by executives can be summarized as follows: (a) Lack of credibility: A number of executives still believe that computer-based information systems are not capable of making plans or helping top managers in the strategic planning process. (b) Lack of communication: There is a lack of communication and interaction between MIS users and MIS developers. There appears to be a need for further study of this particular aspect of MIS applications. (c) Abundance of amount of information: In strategic planning the richness of information poses a problem. A balance between the amount of information available and the need for producing feasible and fast decisions is essential. In other words, the integration and comprehensiveness of data more often conflict with the time pressure to make a decision.

In respond to the limitations mentioned above, the following suggestions can be made:

Top management people should involve in and support to the design of

MIS so that they can become familiar with the potentials of the information system. From the beginning, they will have an opportunity to give direction to designing the system to meet their needs.

In order to build an effective rapport between top managers and MIS experts, training programs are needed. They should be designed to orient the information system specialists to avoid using technical jargon and to become acquainted with the company mission and strategic requirements including company profile and external environmental posture. Creation of a position of MIS director reporting to one of the top executives will enhance the dialogue between the top management and MIS department.

Additionally, an important measure would be identification of factors that are crucial for strategic decisions and collection of information regarding only these key factors. In fact there might be hundreds of different factors affecting the strategic decisions but only few will be most influential. Thus, MIS should be built in such a way that it will allow processing these selected strategic factors.

While MIS's significant role as a decision-making tool is noted, it is also evident that its credibility will be distinctly affected by the current status of information technology. In addition, the behavioral aspects such as organizational changes which are generated by MIS introduction and managerial attitudes toward these changes should be studied carefully. Problems associated with organizational changes are certainly nothing new (Carter, 1984; Hedberg et al., 1975), but they seem to be accentuated whenever an advanced technology, such as MIS, is introduced to the organizational environment (Pfeffer and Leblebici, 1977; Robey, 1977).

In sum, revolutions in technology and decreasing prices have placed com-

puter power in the hands of the user via terminals and desktop computers. With this easy accessibility to information-perhaps one of the most critical resources of any organization, and certainly one of the most fundamental--executives could make greater use of the computer in the decision-making process. However, they must become involved with various stages of information system development to ensure that it is designed to meet their needs.

At the same time, the system staff should be trained to comprehend the organizational functioning and strategic decision-making process to the extent that they realize and appreciate the role of strategists. In doing so, the gap between the computer-based information system users and developers will be narrowed. Consequently, the top managers can appreciate the use of MIS when making decisions.

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