Management Adviser

Volume 9 | Number 2 Article 3

3-1972

Step-by-Step Management Integration

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A slow process of deliberate management "innovation," in which each move is made only after it can be shown that it will result in a savings, may be better than an elaborate, expensive program of revision—

STEP-BY-STEP MANAGEMENT INNOVATION

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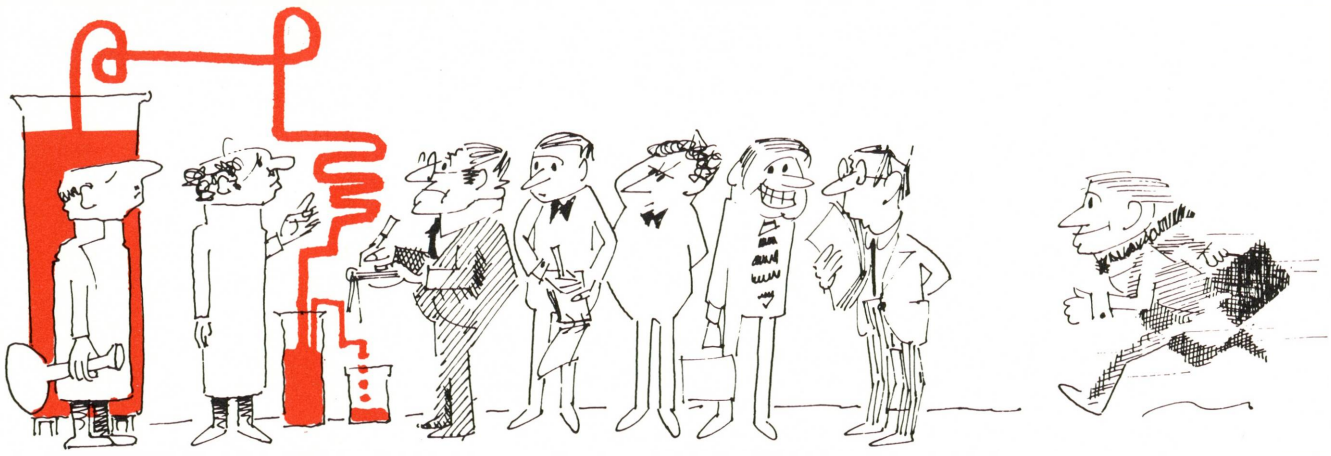
OFTEN controllers are the primary source of information used in the management of corporations. For some reason, perhaps because controllers have the responsibility of producing balance sheets and income statements, controllers frequently have a narrow view of information. *Management* information is frequently very different from the *accounting* reports produced by the corporate controllers; thus, line executives are frequently dissatisfied with these accounting reports.

Surveys by the National Industrial Conference Board and the Financial Executives Institute[1] indicate that many corporations have created management information systems (MIS) functions which are independent of the controller in the organization structure. The ability of a new MIS function to increase the management competence in one firm is described in this article. This company's experience illustrates the exciting potential for increasing corporate effectiveness through better use of management information systems. The challenge for management in the 1970's will be to unlock the potential for increased efficiency that can be achieved through the kind of innovations described in this case study.

In a large chemical company headquartered in New York, the appointment of a new president (who had been vice president of R&D) was followed by rapid improvement in the management

[1] See Stieglitz, M., and C. D. Wilkerson, *Corporate Organization Structure, Studies in Personnel Policy*, No. 10, New York, National Industrial Conference Board, 1968; and Kennedy, D. W., "What a President Needs to Know about MIS," *Financial Executive*, December, 1970, pp. 55-57ff.



Experienced line management was willing to work closely with the director of MIS because he had been a competent chemist, and understood many problems because of this experience, and also because he was willing to give enough time for necessary "interfaces."

capability. Sales forecasts were developed and used to schedule production and to motivate the sales force. Marketing costs were related to sales in order to test for the usefulness of alternative sources of sales growth. A computer-based corporate long-range planning system was initiated in order to provide a basis for the development of corporate strategies. Communication patterns were monitored, and problem-solving groups were created to bring together managers from different functional areas who could contribute to the solution of problems that crossed functional areas.

This company continued to grow rapidly and profitably, even during the 1970 recession. The sharp increase in management competence achieved from 1968 to 1971 left the company in a very favorable position relative to its competition. Managers at several levels in the hierarchy of the firm were aware of the significant management improvements that had been achieved in a short period of time. Company executives believed that they were winners and displayed a willingness to innovate and to work harder.

All of this was accomplished in an orderly way. This was not a crisis drive to cut costs. Very few people were fired. Significant improvement in the management capability of this firm occurred because the new president was committed to the process of "management innovation." He began to allocate resources to improve the process of management in a way very similar to that in which new products and processes are developed in R&D. He had inherited a traditional corporate management that was spending almost all of its time on maintenance activities. As the former vice president of R&D, he was aware that new products are not invented unless someone is given the responsibility for inventing them. Accordingly, he set up a management innovation group to improve the management capability.

The following case study is an evaluation of the management innovations achieved by this new company president.

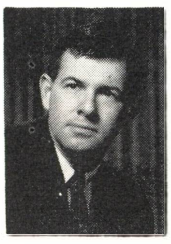
A case study

There have been case studies of how new products are developed in R&D. Some case studies of major management decisions, such as the GE move to decentralization, are available. Progress in developing a new management competence, however, has rarely been reported in the literature. How does a firm begin to use a computer-based long-range planning model? What is so difficult about a sales forecasting model that a large firm with a strong computer capability should not begin to use one until 1970, rather than five years earlier?

The objectives of this case study are:

1. Examine conditions favorable to innovation in management;
2. Report on technical capabilities needed for such innovations;
3. Provide an analysis of difficulties and risks involved; and,
4. Provide a basis for estimating costs/benefits and required time to achieve important progress in management capabilities and performance.

The new president had no concrete understanding of what could be achieved when he initiated the effort to improve the management capability of his corporation. Although he had very little formal management education, he had been an experienced research chemist and had achieved an effective research division during his tenure as vice president of research. He was very young compared to the company presidents



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of the major firms in this industry. In one of his first administrative decisions, this young president initiated a new capability. He created a management information system (MIS) function and appointed as its director a Ph.D. chemist who had been his administrative officer in the research division. Both the new company president and the director of MIS had had relatively little experience in marketing, production, and finance. They did not have a formal educational background in these fields equal to what might be expected from a young M.S. or M.B.A. from a graduate school of business. In one respect, however, this lack of academic preparation was an asset; experience-based line management was willing to work with the director of MIS because he had been a competent chemist and understood many problems as a result of this experience.

That the director of MIS and the new company president were able and experienced managers was clearly helpful in the effort to improve the management competence of their firm. They had very few theoretical insights about what had to be done, and much of their progress was a result of problem-solving behavior quite in harmony with what might be expected of research chemists. They did not accept management practice as they found it, nor did they have a preconceived vision of what could be accomplished. But if answers were to become available to the logical and proper questions they asked, then a stronger management information capability would inevitably be required.

Strategy

Many decisions were made in implementing this management innovation effort. The management improvement projects had a common set of characteristics that provided a strategy for management innovation. These common characteristics for management innovation projects were:

1. *Low risks*: All the initial management improvement projects were specified in such a way that there was a high probability of success. No project that involved a large expenditure of funds was initiated. All projects that involved computers were well within the technical frontier. Computer programing was done on service bureau terminals in order not to disrupt the operations of the corporate computer facility.

2. *Low technical complexity*: The models of market activity used to forecast sales, plan production, and motivate the sales force were relatively simple. The director of MIS had access to very sophisticated university consultants, and he was aware of several large and complex management science models that were being tried in his industry. Such models at the frontier of management science were rejected by this director of MIS, who correctly perceived that a traditionally managed company could not cope with sophisticated models even if such techniques could be developed at a reasonable cost.

3. *Tight funding*: This MIS function started with a director and one staff professional. By the end of the first year there were three staff professionals, and this increased to nine by the end of the second year and 15 by the end of the third year. Staff were added to this MIS capability only when a line executive who would be served with a new MIS reporting capability agreed to reduce his staff.[2] Thus, the increase in the MIS staff did not cause an expansion in the total support staff of this firm.

4. *Fast payback*: Each management innovation project was evaluated for its contribution to reductions in direct costs. Credit was not given for intangible benefits. There had to be reductions in employees, inventory levels, or some other tangible resource on which a cost could be estimated. It was calculated, in an analysis of com-

[2] Or a member of the professional staff of the controller could be eliminated.

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Line executives were encouraged to work directly with the computer-based MIS; software was developed to permit executives to achieve useful outputs while spending relatively little time in learning how to ask the computer questions.

pleted management innovation projects, that cost reductions from each project paid for the innovation costs within eight months after the costs had been incurred.

5. *Acceptance by line executives*: Projects were not initiated unless the line executives involved were willing to use the expected results of a management innovation effort.

This was not a crash program of management improvement. The management innovation operations were increased in scope in a way similar to that in which a good R&D effort for new products and processes is expanded. The professional staff was carefully selected and was hired slowly. Although there were a very large number of possible management improvement projects visible at the time the new company president took charge, systems analysts were assigned to projects with great care in order to prevent the problems often created when there are too many balls up in the air at the same time. It should be recalled that this was a profitable, rapidly growing company, and top management was of the opinion that it would be incorrect to risk upsetting the corporate management by abrupt or high-pressure efforts to achieve very rapid progress in the development of an improved management capability.

Major accomplishments

Although there were a large number of management innovations during the first three years of this effort, only eight will be described. These examples were selected to illustrate the breadth of management activity that was improved.

1. *Computer-based corporate planning capability* provided a basis for evaluating future activity (e.g., sales by product line) under various assumptions. This capability made planning easier, and it increased the commitment to planning of a large number of the corporate executives. In addition, the budgeting for the next year was made more efficient because this new computer capability produced alternative budgets quickly with relatively little clerical effort. One result of this increase in the utilization of information for planning was the questioning of previously accepted expense/sales ratios. This computer-based planning capability facilitated analyses of the effect on corporate sales and profits of changes in discretionary expenses such as advertising and sales force levels.

2. *Monthly sales forecasts by product line* adjusted longer-run trends by seasonal and cyclical factors. These forecasts were used for sales quotas, marketing strategies, and production scheduling. Responsibility for profit center management by product line became a reality when sales performance was evaluated against expectations calculated with trend, seasonal, and cyclical effects identified.

The old easy excuses to explain poor performance, such as, "July is always a bad month," were tested against historical experience as calculated by the computer sales forecasting system.

3. *Product cost control system* identified expenses which could be controlled at the product line level. Allocated costs to product lines which could not be controlled by product line were separated from the controllable costs, thereby increasing the visibility of the product line performance effect on corporate profitability.

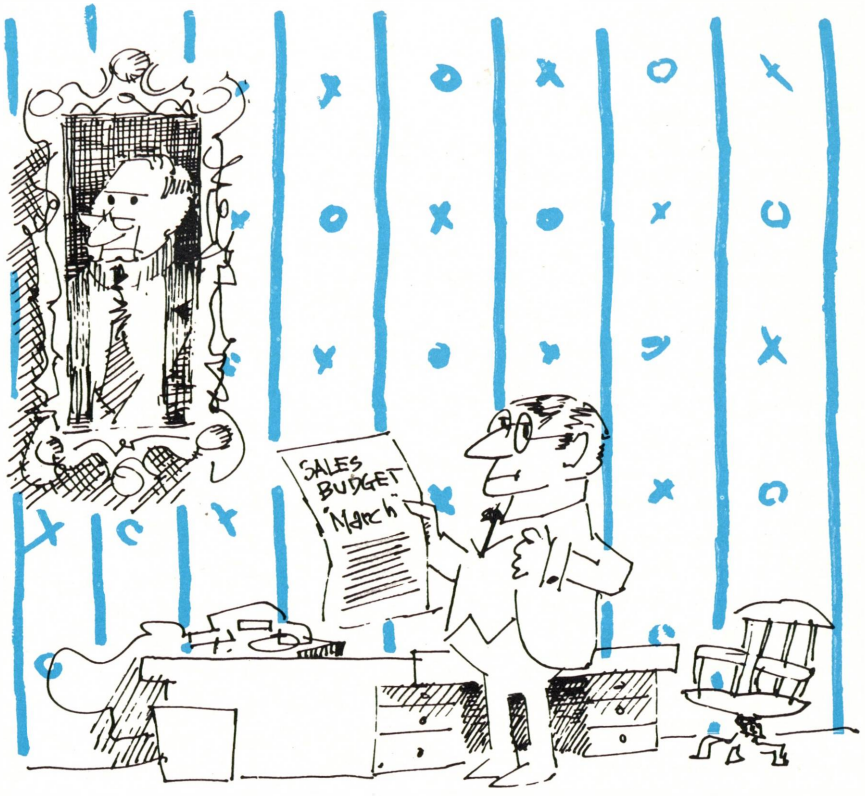
4. *Marketing customer control system* identified and maintained a record of activity for each customer. Salesmen were given instructions for each customer, and better communication to and from salesmen was achieved. Systems analysis of the marketing information used prior to this new capability discovered that salesmen were reporting customer activity which was incorrect. A huge marketing information system had been in use which did not have an interactive capability. Salesmen had been flooded with useless informa-

tion. Sales reports were completed but never used. This large mass of information which had been passing back and forth between marketing management and the sales force was terminated, and the new system which created a dialogue between the marketing data base and the sales force substituted in its place. Thus a little-used static system was replaced by a dynamic information system which created a capability to absorb new information and enriched the customer data base as a result of the experience reported by the sales force.

5. *Programing software capability* allowed managers who were inexperienced with computers to ask questions of the system. The involvement of line management with the new computer-based management information system was an objective given high priority by the director of management information systems. His staff were instructed to encourage line executives to work directly with the computer-based MIS that had been developed. Software was developed permitting executives who were inexperienced in the use of computers to achieve useful MIS outputs with a relatively small investment in time allocated to learn how to ask questions of the computer system. Terminals were located close to the offices of the line executives.

6. *Share of market budgeting system* provided a more realistic set of objectives for product line managers. It had been the practice to calculate a year's budget in November and December of the previous year. Seasonal and cyclical factors soon made this budget irrelevant, and yet each month variances from this static budget were calculated and "explained." Under the new system, product line managers were held responsible for a share of market, and actual performance was compared with a sales budget calculated each month from estimates of total market activity by product line.

7. *Variance budgeting systems* predicted year-end variance based on year-to-date results compared with budget. Total market volume estimates were calculated for the year on a monthly basis. Thus all levels of management received a report of the potential by product on an estimated basis. The actual year-to-date performance was compared with estimated yearly performance on a monthly basis in order to give management an approximation of what had to be achieved in order to fulfill the contribution of each product line to budgeted corporate performance.



It had been the practice to calculate a year's budget in November and December; under the new system actual performance was compared with a sales budget calculated each month.

8. *On-line production and inventory planning system* replaced a slow and labor-intensive system. This gave more detailed information by kind of item within a product line and provided an estimate of production costs under various volumes and product mixes (e.g., forecasted cost of goods sold).

All of the progress described here involved management innovations in the utilization of information. Is that all there is to progress in a management capability? Obviously not! Information must be processed by line management into decisions, into actions. There were many related organizational changes but it seems that the development of an MIS capability does appear to be the leading edge in the management innovation effort of many companies.

Involvement of line management

This brief overview of the major systems innovations which had been implemented in just a few years indicates what can be accomplished with a small MIS staff that understands the information needs of management. The information required as data inputs to the new systems was readily available. The computer programing was not difficult. These new MIS capabilities were developed quickly because of the quality of the MIS-line management relationships and the high quality of the MIS director and his staff.

The budgets of the line executives were charged for the ex-

penses incurred during a management innovation effort related to a given line manager's activities. When a manager funds a systems project, he has a feeling of control. He is more involved in what results from the project, and he deserves significant credit if the project succeeds because he is the one who took risks with his own funds. The practice of having a user pay for the systems that are developed has still a further advantage: it increases the probability of relevance of the work done by the MIS staff.

Involvement of line management with the development of the MIS capability was critical in the progress that was achieved. To achieve this involvement required several years of learning experience. The support by the company president, of course, was an additional motivating force. However, a new company president can dictate only to a limited degree if he inherits a strong management. The utilization of new management techniques is a difficult kind of problem to manage by fiat. It seems fair to say that the involvement of line management in the application of the new MIS capability resulted from the performance of the MIS staff in producing several very useful new systems.

A second factor leading to the involvement of the line managers was the educational effort of the director of MIS. An MIS manager with long experience in the technology of his industry is a very rare combination. His talents for instruction and persuasion, previously exercised in the administration of R&D, were put to good use in his new position. This director of MIS had the happy faculty of being a good listener. He knew that he could not force line executives to accept new techniques in management. Recognizing the limitations of his power, he allocated a large proportion of his time to the interface between the MIS function and the line executives. This selling of MIS and the related educational effort were very low pressure activities. The line managers — who had to cooperate, get involved, pick up a suggestion—were primarily competent, experienced executives. The suggestions of the director of MIS were very new to the background of these men. Thus, this very gradual evolution toward increasing the ability of these line executives to work with new information concepts appears to have been exactly what was required.

Two men responsible

That only two men—the company president and the director of MIS—created this rapid increase in management capability should be emphasized. The progress described required less than three years to achieve. The number of executives and professional staff personnel involved in the management innovation has been increasing each year. Credit is given, however, to the company president and his director of MIS. The management innovations achieved in this chemical company are the result of their skill and commitment, just as the success of ITT belongs to one man, Harold S. Geneen. The cooperation and dedication of many executives and staff members were necessary. However, the company president and director of MIS secured this involvement.

An image exists of the dynamic leader who accepts large risks in order to achieve huge rewards. The emphasis in this case report on the role of the company president and director of MIS as guiding forces in the process of change provides some cause to question the stereotype of dynamic leaders as great risk-takers. Although this is a firm that invests over $30 million a year in high-risk R&D for new products and processes, the growth in the MIS capability and the significant management innovations that resulted were accomplished at a very low risk. There were no big investments in complicated models. Computer equipment investments were very modest.

The management of this firm might be criticized for such a low-risk posture for its investment in management innovation. One might wonder about this unwillingness to take risks for improved management capabilities, given the investment of millions of dollars in high-risk research for new products and even larger amounts allocated to scale up inventions in attempts to penetrate new markets.

This relative unwillingness to risk for new management innovation may be explained by the fact that failure to achieve a management innovation would have reflected more directly on the reputation of management than would failure of an investment in R&D for new products or processes. Failures are expected in the research laboratory; they are more difficult to explain when they occur within corporate headquarters.

A second reason for the cautious introduction of this management innovation effort is that it was important to win the confidence and cooperation of line executives; this required time, experience, and education. One of the most serious criticisms of the McNamara effort to bring systems analysis into the Pentagon was that he did not give enough attention to the interface problem between the staff professionals responsible for systems analysis and the high-ranking military officers. The McNamara experience, as well as reports from a large number of other efforts to introduce new management techniques,[3] suggests that the cautious strategy used in this chemical company was a major reason for the success of the management innovation effort.

This strategy which appears so sensible in hindsight may have been caused, in part, by circumstances unique to the personnel involved. The director of MIS was

[3] For an overview of this management science utilization problem, see reference 4. One finding presented by Gruber and Niles is that the presidents of the Institute of Management Science and the Operations Research Society of America used the utilization problem as a major theme of three out of six recent presidential addresses in the 1960's. See references 2, 3, 6, 7, 8, and 9.

the only management scientist (and this was primarily a capability gained from on-the-job experiences) in the group. All other new hires for the professional staff had little experience in the development of management information systems. Each new project required a large amount of the director's time. He had to deal with the line management to obtain cooperation. He had to educate his staff about how the systems effort to be programed would be used. He was given many special projects by the company president. He was involved with the problems of recruiting for his rapidly expanding staff of information specialists. The director of MIS was a bottleneck through which all MIS inputs, outputs, and decisions had to pass. Here is a company that gave less attention to the initiation of an R&D project with an expected cost of hundreds of thousands of dollars than to an MIS project that might involve an investment of less than $20,000.

Executives in this company recognized the bottleneck problem and the low-risk posture for the MIS effort that may have been excessively cautious. The director of MIS has developed a stronger management team and now has a backlog of projects that will involve changes in the way over $100 million are spent each year. There is reason to believe that further significant increases in efficiency will be possible as a result of these proposed MIS projects.

The management innovation capability in this firm has matured from fledgling operation with a director and one assistant to a staff of 16 professionals. New problems are to be expected in this new stage of the management innovation effort. Greater risks have been accepted. A significant increase in the computer facility has been budgeted. Problems which had been resistant to corrective action are now under analysis. The low-risk nature of the management innovation effort reported in this case study represents a stage in the life cycle of the innovation effort. It is not yet possible to report on the progress that will be achieved during the more mature stage of the management innovation effort into which the activities of this corporation have evolved. The experience and the progress achieved during the early stages of the management innovation effort increase the probability of success for the more difficult projects which have recently been initiated. Good working relationships with line management have been established. The professional staff has been trained on the easier projects. The director of MIS is aware of the capabilities of each professional staff member. The cautious strategy for the development of a management innovation capability has facilitated the transition from easy to more difficult problems which must now be overcome.

Conclusion

Most large United States corporations are now experimenting with efforts to improve the quality of management. Little is known about the process by which management competence is increased. It may be that a slow and cautious strategy for implementing the MIS capability will prove more effective than a crash program. Unlike crisis actions to meet competition with a product improvement, innovations in management require a new way of thinking.

The acceptance of responsibility for increasing corporate efficiency through management innovations requires the involvement of top management. Resources must be allocated for management innovation just as investments are made for the R&D that produces new products. Few corporations have achieved results equal to what has been reported in this case study. Our experience with the management capabilities of several hundred firms indicates that the senior executives of most companies are not sufficiently committed to the process of management innovation. Crisis management appears to dominate. Senior executives of companies are so busy fighting fires that they have little time to do the work required to achieve the management innovations which would reduce the frequency of fires. The experience of management innovation in this chemical company indicates that this fire-fighting syndrome need not prevent progress in management innovation. It may be expected that the failure of most corporate executives to be involved with management innovations will be cured after a few corporations have achieved similar increases in management competence. Corporations which accept competition through product innovation will soon be competing through management innovations. This case study provides an example of what can be achieved by corporate executives who elect to accept the challenge of management innovation.

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