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LaVerne G. Milunovich

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*Here's the story of what one organization has done—
and is doing—to provide itself with a workable and
still an all-encompassing—*

MANAGEMENT INFORMATION SYSTEM

by LaVerne G. Milunovich

First Wisconsin National Bank of Milwaukee

MANAGEMENT information systems have been alternately criticized and praised in recent years, with much of the praise coming from academicians and much of the condemnation from business people who had experimented with them and found them far short of their expectations.

We think this is largely true because of confusion on the part of both groups as to what a management information system actually is, what is involved in developing it, and what its true benefits are.

In the first place, let's define our terms. There is a broad hierarchy

of information systems that can exist in any organization. They range from detailed, highly structured production systems to broad, poorly defined environmental study systems.

It is not easy to classify such a spectrum of information systems. One approach to such classification, beginning with the highest level and working down to the lowest, is as follows:

1. Long-range, future, external, environmental analysis "systems." This could involve a study of fundamental forces—technological, sociological, demographic, political, economic, and philosophical—out, for example, to the year 2000.

2. Long-range, strategic, directional study "systems." Based on analyses of the fundamental direc-

tion of environmental forces, a pattern of strategic maneuvers can be developed so that the enterprise can capitalize on the trend of those forces. This system—if, in fact, it can truly be termed a system—is very broad and ill-structured in nature, as is the first system.

3. Intermediate-range cyclical planning systems. This is a rhythmic process, such as the five-year plan so frequently employed, whereby areas of an enterprise plan their growth into the future in a fairly coarse manner.

4. Short-term, external, environmental forecasting and monitoring systems. This involves a study of economic factors and trends in considerable detail and projections about one year into the future. The one-year economic forecast that

This article is adapted from a speech given by the author late last year before a meeting of the Bank Administrative Institute in Cleveland.

The key concepts toward which any good management information system . . .

precedes sales forecasting and budgeting in manufacturing is an example of this. In addition, it can involve competitor surveillance.

5. Program systems. These are special development programs, such as construction of a new building or development of a comprehensive Management Information System. This basically refers to capital expenditure and research and development programs. Such programs can require as much as five years, or so, for completion.

6. One-year cyclical or rhythmic planning and control systems. Income, expense, and various resources are budgeted, on a month-by-month basis, by all areas of the business for the coming calendar or fiscal year.

7. Day-to-day tactical decision systems, such as bond trade analysis or investment selection programs.

8. Historical, corporate-level, custodial reporting systems. This involves reporting of the corporate income statement and balance sheet.

9. Special subsidiary systems, such as personnel and customer information systems. These systems provide detail by individual employee and customer. Considerable descriptive, as well as quantitative, data are included in these systems.

10. Daily production, posting, and proof systems, such as demand deposit accounting, transit, and installment loan processing systems.

Many of these are basically general ledger subsidiary systems.

Now in several of these systems simulation and optimization models and many of the newer quantitative techniques can be employed profitably. This does not give them the characteristics of a management information system; these are simply tools that can be utilized successfully at any level of planning.

What is an MIS system? An MIS system, fundamentally, is a financial control system, which is the principal basis of a good planning system. The key concepts toward which any good management information system must be geared, then, are planning and control over the enterprise as a whole, not just one aspect of it. This is certainly not a new idea; many of the key concepts were formulated by DuPont and refined at General Motors many years ago. It is an idea that is not completely understood or implemented by too many businesses, however.

The planning and control system must be based on the principles of responsibility accounting.

This relates primarily to point six in the list of information systems, although it generally includes several of the other categories, too, such as points four, five, and eight. The resources: people, machines, earning assets, deposits, etc., under the control of each manager are planned, on a month-by-month basis, one year into the future. Actual performance, periodically, is measured against goals, and accountability, or control, is provided by monthly variance reporting. It is a system for measuring the performance of management at all levels of an organization. It basically measures administrative effectiveness. This is why it logically can be called a Management Information System.

To provide a better idea of what

MIS is, I would like to outline what we have been doing at the First Wisconsin National Bank of Milwaukee to achieve an MIS Program. The principal reason why the First Wisconsin embarked on a large-scale MIS development program was to improve its earning power by providing rather complete information to managers about many segments of the business. In particular, it was considered desirable to be able to measure profit contribution of different aspects or elements of the enterprise. The program is very comprehensive and will take four years, overall, to complete. A listing of the major concepts being employed is as follows:

1. The entire system begins with the corporate-level income statement and balance sheet—the general ledger—and is exploded down from that point. Everything must relate properly to, and integrate well with, the fundamental statements of the business.

2. The principal categories of coding are:

- a.) Responsibility area
- b.) Chart of accounts
- c.) Service line
- d.) Program and project.

Considerable effort was expended in developing sound, imaginative, and basic coding systems.

3. The organization structure was precisely defined, since the reporting system is to follow, or roll up, the "chain of command." This is a basic feature of the system. There must be sound control by responsibility, which means by manager.

4. Cost is to be measured in three fundamental, mutually exclusive segments:

- a.) Standards will be developed for production costs, employing work measurement techniques, and flexible budgeting will



LAVERNE G. MILUNOVICH, CPA, is vice president in charge of the corporate planning division of First Wisconsin National Bank of Milwaukee. He received his BS, BBA, and MBA from the University of Wisconsin. Mr. Milunovich has

published several articles in *Bankers Monthly*, including a five-part series on "The Case for a New Concept of Bank Reporting."

... must be geared, then, are planning and control over the enterprise as a whole ...

be used for controlling these costs.

b.) Program and project costs will be controlled as an integral segment of the reporting system. These costs will be controlled directly on an incurrence or responsibility basis as well as be summarized for evaluation on a program management basis.

c.) Administrative costs encompass those expenses not included in the other two major categories. These costs tend to have an overhead orientation. We are treating each of the various broad categories of cost in a different manner, based on significant differences in their behavioral characteristics.

5. Profit will be measured in several ways:

a.) By responsibility, or profit center (sales manager)

b.) By service line (product line manager)

c.) Eventually, by individual customer.

Profit centers will be stated on a contribution basis; that is, no higher-level overheads will be allocated to profit centers. There will be two profit levels reported in profit centers—marginal profit contribution and contribution to profit and higher-level overhead. We are making provision for incremental analysis. Service line income statements will have two levels of profit—marginal profit contribution and full absorption net profit (principally for major pricing decisions). In general, we will allocate costs only where absolutely necessary.

6. Standard costs, which are controlled for efficiency purposes by flexible budgeting in production areas, will be charged out at standard, on a service line basis, to profit centers and service lines to provide a better measure of profit contribution.

7. Transfer rates will be de-

veloped to apply to excesses and deficiencies of investable funds of all fund-oriented areas.

8. An automated variance reporting system will be developed which will highlight material variances requiring explanation. By this means, the management by exception principle will be incorporated into the system.

9. Balance sheet and a variety of statistical elements will be reported by responsibility, as well as income, cost, and profit.

10. The general ledger will be fully automated.

11. A bill of materials processor will be employed to assemble cost components by service line.

12. Not only will after-the-fact reporting of actual against plan data be fully automated, but also the assembly of the plan itself. This is a major task that is frequently overlooked.

13. The entire system will be fully integrated. All segments of the system will work from the same data base, and there will be no inconsistencies in the data.

14. Very attractive reports will be developed. Esthetics will be given considerable attention.

The program will be completed near the end of 1970 and is progressing quite well. This represents one of the largest and most comprehensive undertakings of this type being attempted by a bank in this country. A sizable staff has been committed to the effort.

Risks to watch

There are many risks involved in embarking on a large-scale information system of any kind. The major pitfall is that of suboptimization—development of a segment without possessing a good appreciation of the overall whole and of how the segment should relate to the whole.

This has been one of the principal mistakes made by many companies. Few organizations have devised a broad, high-level concept of the hierarchy of information needs, similar to that previously discussed, and the related systems required for an imaginative organization. It is very important to try to do so, difficult though it be. The whole must be well conceived before developing any of the components. The design of every segment must fit properly into a high-grade master plan. Many banks have failed to take a broad approach to the design of information systems. Random systems development sometimes has resulted from inadequate planning. Some of the major problems that have impeded banks seriously in their efforts are the following:

1. Top management may not have participated actively in the formulation, design, and control of implementation of information systems. There may be a lack of understanding in regard to the value and use of such systems and a lack of appreciation for employing computers in the process. In many cases, information development programs are sold from levels well down in the organization. Top management approval for initiation may be obtained, but utilization of the system after implementation may be somewhat ineffective.

2. Very few banks can muster a development group of sufficient breadth and conceptual power to do a truly effective job. Generally, systems are designed by computer specialists or systems analysts who know computer capabilities rather well. However, they may not have a broad knowledge of the business, may have not served in a line management or staff analytical role, and they may not have used information actively for making deci-

sions. They often may have highly specialized backgrounds and little corporate exposure. They have tended to view computers as production machines, rather than as engines of information analysis. Designing or creating a new decision making system is a much more difficult task than automating an existing processing system. The approach, many times, has been one of achieving cost savings in processing systems, rather than entrepreneurial in formulating analytical and decision systems. A demand deposit accounting system is a very low order of information system. Reports designed by computer staffs sometimes are cluttered and unreadable. Readability is as important as content. There may be a serious lack of appreciation for a sales or public relations attitude toward users and for display esthetics or good "packaging" in exhibiting information.

Many accountants have suffered from the same sort of myopia. They have been too concerned with handling of transactions and book-keeping entries, rather than with analyzing and interpreting decision information. There has prevailed a processing orientation, rather than a user orientation.

Finally, line people—the basic users of information—frequently have not provided a strong contribution, partially due to lack of interest and dedicated participation, but mostly because they have not taken the time to really *think deeply* about their aspects of the business in fundamental and conceptual terms. They, of necessity, perhaps, have a pronounced, day-to-day, current, problem-solving orientation. Some may view information systems as an impediment to their work, rather than as a favorable aid.

Thus, there is a great void in requisite capability to perform an exceedingly difficult task. The necessary attributes are a strong entrepreneurial posture, user attitude, and a high-level, deep, conceptual understanding of the business. Technical knowledge and

computer comprehension are secondary in importance. The "make or break" aspect does not lie mainly in the technical area. The information design group should be placed at a high level in the organization and be staffed with the best conceptual brains available. The members should have had broad and diverse experience in the business. Then they should read heavily in the literature to educate themselves in the new disciplines of managerial accounting, managerial economics, information theory, and information systems. There is little formal education or work experience that provides a respectable background in this field today.

Establishing a competent group of this sort is the most difficult aspect of the entire program. This design group should be fully segregated from the computer operations area, which represents a production function.

3. Many enterprises have the function of systems development fragmented throughout the organization in an array of staff groups, having ill defined and conflicting responsibilities. Conflict, lack of progress, and production of unrelated systems components can be the result.

4. The control of the entire staff and all the other resources required to develop the system should be fully centralized in one individual if effective performance is sought. Organizationally, this individual should report directly to executive management. The approach involving participation of members, from various areas, reporting to different superiors, and under the guidance of a "coordinator," can all too often be quite inefficient and costly and may result in poor-quality systems.

5. The successful development and implementation of information systems represents a gigantic, complex, and costly effort and is not to be undertaken lightly. Yet, dealing with lesser subsystems will not provide the real payoff to an organization. Many banks may not have

the caliber of talent to do the job. Competent individuals may have to be recruited from other more experienced industries, or a consulting firm may have to be retained. In dealing with a consulting firm, choosing the lead representative to be assigned to the job is at least as significant as selecting the firm itself.

The First Wisconsin National Bank of Milwaukee retained a prominent national public accounting firm to work with the bank staff on the MIS Program. The accounting background was considered to be quite important, since an MIS system is steeped in managerial accounting theory and is heavily founded on accounting systems. Banks, essentially, are large accounting machines.

Most banks are engaged in thinking about information systems, in one manner or another. Many, however, may be having difficulty in precisely defining problems and, specifically, what they want to do.

Perhaps a highly competent consulting firm could provide direction to general problem definition and planning, as well as guidance in systems design and implementation.

Possible future developments

Some of the developments which may occur in the near-term to intermediate-term future in the general field of information systems should be mentioned:

1. Control of information—basic coding, reporting, or other display methods, systems design, and very possibly analysis and interpretation of information—probably will be centralized in a highly placed staff group in organizations. The totally integrated systems of the future can be produced effectively only on a centralized basis. One cannot obtain integrated systems from fragmented systems groups. Each group will tend to go its own way. Information management, not equipment management, is the key to success.

Few people recognize that the computer is easily the most important invention of mankind

2. Information systems will become more sophisticated as business becomes more complex and the competitive pace quickens. There will be no return to simplicity, for the world inexorably is becoming more complex.

3. Banks will employ computers as an extension of the thinking process, rather than primarily as arithmetic posting and trial balance printing machines. In the past, banks have tended to concentrate their efforts on the more mundane applications and may not have recognized, adequately and imaginatively, the potential of high-order applications. The information retrieval capability of computers will become fully as important as their computational features.

4. A data librarian will be placed in charge of a single, centralized, corporate data bank, containing all internal and external data. Duplication and inconsistencies of data will be avoided. All data will be well classified, coded, and readily addressable. Today, each systems analyst, working with users, establishes his own data requirements and reports, but there may be insufficient control over achieving consistency, uniformity, and full integration among systems. Fragmented systems, inconsistent data, and nonuniform report format and content can be the result of this uncoordinated process.

5. Mass, on-line, storage capability soon will become quite economical and will tend to displace sequential storage. Transactions will be posted automatically as they occur, not only within an organization, but among organizations on a global basis. Computers will be interconnected completely among enterprises, as the telephone system is today. Paper will become less important as a medium for storing and transporting of in-

formation. Electronic transmission will tend to displace paper flow.

6. One person in an organization will be responsible for the format and structuring of all formal reporting and display of information. Centralized control provides full integration and a high level of consistency. The importance of esthetics and appearance in the display and comprehension of information will be recognized more fully. Total integration of all systems will be achieved.

7. Centralized, large-screen display and decentralized, tube, or other types of display units will be more heavily employed to access data and charts, in many areas of companies and for a great variety of purposes. The First Wisconsin National Bank has had an operational Management Information Center since the autumn of 1966.

8. Interaction of user—salesman, analyst, or anyone else—and the computer will become commonplace. Employing terminals, users can access an index of the complete data library, unrestricted data, and a great array of statistical and analytical programs. Information will be available precisely when it is needed. Alternative solutions to a variety of problems easily can be explored. Mathematical models will be used extensively. Users and computers will come closer together. More flexible machines and systems technology will tend to reduce the relative number of technical people required to develop information systems, in time. We must remember that computers are still in a relatively early, crude state of development.

9. Banks are basically giant information processing machines and will become very heavily automated. Few people recognize that the computer is easily the most important invention of man-

kind. The potential is unbelievable, and all projections in this field will represent vast underestimates. Fifty-year projections are virtually impossible to make and are incomprehensible, if made. Yet, we must attempt to make such projections. The computer will expand the use and efficiency of the mind, rather than serve merely as another piece of production equipment, as has been too frequently the situation in the past.

10. Organization structures will change significantly in many ways. For example, analytical staff—"think groups"—will become increasingly centralized. Much staff work is too fragmented and of relatively low quality today. It is easier to waste money in splintered, ineffective staff work than in nearly any other manner. The difficulty of fairly accurate measurement complicates the problem.

11. Knowledge will become our most important resource. We will sell an increasingly broad range of advice to customers, rather than mainly process their transactions. The word "bank" may become obsolete in two decades, as we become more deeply involved in consultative activities.

12. Enterprise and individual obsolescence rates may increase substantially, because competition will move increasingly into the arena of competing ideas and philosophies. Ideas can become obsolete quickly. The pace will be intense, and the rich innovational rewards will go to the swift and highly competent. The day of comfortable and complacent banking decidedly is over. The competition for high talent will become fierce, for such talent is quite rare in the population. But there will be considerable challenge available for those who actively seek it and have the courage to promote their beliefs and concepts.