# MANAGEMENT INFORMATION SYSTEMS: WHY THEY FAIL, AND POSSIBLE SOLUTIONS

by 1050 710

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B. S., Kansas State University, 1969

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A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

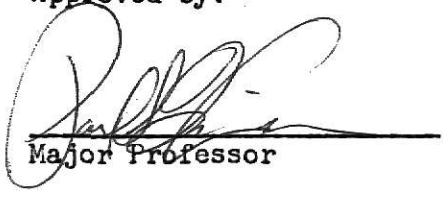
MASTER OF SCIENCE

Department of Computer Science

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1974

Approved by:



Major Professor

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ACKNOWLEDGEMENTS

I wish to express my appreciation to Dr. Paul Fisher, Head of the Department of Computer Science, Kansas State University. Dr. Fisher rendered invaluable guidance, direction, and assistance in the preparation of this paper. I especially wish to express my deepest thanks to my wife, Patricia, for her help and understanding throughout all phases of the preparation of this paper.

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# CHAPTER I

## Introduction

Even during the time of first generation computers, man was using them to improve his life by relieving him from the tedium of routine, repetitive tasks. As man learned and technology provided more powerful computers, their applications have broadened, until today few areas remain untouched. One of the newer, and more difficult, areas of application is the utilization of computers in the management environment. The ability of the computer to store, process, and retrieve large quantities of information about costs, populations, inventories, people, etc. has brought with it the desire to computerize management's information system. Unfortunately, desire is not enough. The purpose of this paper is to present some methods by which the desire for management information can be converted into a workable, effective computerized information system. Some of the reasons for the lack of success of early systems will also be discussed to provide guidelines for improvements.

## Early Development of Management Information Systems

The third generation of computers brought, with its larger storage capabilities and faster processing times, promises of a "total information system,"--a system that would provide to management any and all information needed at the push of a button. In 1963 "Business Week" reported (4) that Lockheed would have a complete information system within three years. The information system would contain all of the information that management might need to make any type of decision. The theory and equipment necessary to build a complete management information system (MIS) was available then. Yet today Lockheed has no such workable system. Rather than being commonplace, effective workable computerized management systems are hard to find.

Computers have paid off handsomely in keeping track of fine details of production, orders, and payments. When used as production machines the rewards have been great. These were not, however, management information systems. Instead of simplifying the management process as was expected, the computer added complexities and imposed a constantly changing set of demands on the managers it was supposed to help. Integrating computer functions into a smooth-running system (1) has turned out to be more difficult than expected.

Reasons for Failure

The road to a totally integrated MIS, which computer salesmen and data processing managers keep insisting is just around the corner, has been hard hit by washouts and abrupt detours. The computer industry is partially to blame for the failure of the MIS. In the past it followed a more or less random path, investigating anything that looked interesting, always confident that whatever it found would be salable to the business world. The business world also is not without its share of blame. Computers and their managers, the computer scientists, do not speak the same language as the business manager. The business manager (5) often will not, if for no other reason than pride, learn the language of the computer. The same man who would never turn a plumber loose to "fix the plumbing" in his home without further description of what was needed, will tell a computer scientist or a data processing manager to "build an information system" The results are what should be expected when not enough guidance is given to the designer. He builds the system to his understood specifications which may not merge with the desires of management.

In many cases the organization of the company itself has kept the computer from being utilized fully. Since computers were first used in the accounting department of most companies, their growth and use has

remained under the aegis of the accounting department. This has hampered their development in three ways (17):

1. By nature accounting is an after-the-fact, postscriptive operation. On the other hand information systems, to be effective, must be prescriptive in nature. They must be able to tell what is going to happen and plan ahead.
2. Operational information systems represent a service type of activity. They call for close inter-relationships between departments and groups in every section of the organization. The auditing and record-keeping functions which comprise the chief functions of the conventional accounting department do not tend to be compatible with the active relationships necessary to systems development and operation.
3. Accounting and control groups tend to be too far removed from decision-level management to function effectively in the development of information designed for management use.

The early managers tended to restrict the use of computers to bookkeeping type functions. This was natural, because it was the only type of work that they knew. However, to be effective, the department that manages the information system must have access to all segments of the company.

What is it about the traditional MIS development pattern which dooms it to failure? Usually a survey is undertaken to determine the job requirements for a new information system. The project is launched. After a period of time the systems analysts return to the manager with the requested system. Unfortunately it is no longer what the manager needs, but it is what he needed three years ago when the project started. Even if he had had it when he needed it, the system would be of little use to him, now. As he learned more about his job and the information needed to

control the operation, little changes would have to be made in the system, until the needed system has evolved into something quite unlike the developed system. Because of lack of communication the system is now practically worthless. The system analyst goes off to re-program while the the manager goes off frustrated.

Much of the trouble with management information systems can be traced to a lack of communication between managers and system designers, with neither side apparently willing to take the time to study what the other has to say or to learn more about how they work. The communication barriers are caused by the language with which each group insulates itself. They develop their own jargon and buzz-words (12) to insure the importance of their own group. This is ridiculous. Computer scientists and management must learn to respect and understand each other for a management information system to have any useful basis.

John Dearden (10) suggests that there are four reasons why a total management information system will not work:

1. A true MIS expert does not exist (and cannot). No one person can possess a broad enough set of special skills.
2. A coordinated system for functional areas can be built without using the "total system approach." This can be done by good planning of individual systems to produce efficient interfaces between functional areas.
3. The systems approach is merely an elaborate name for good management.
4. Centralized control of a company's information system and staff group creates problems that are unsolvable; therefore, the approach is essentially not feasible.

As indicated above no one would seriously suggest that one person is capable of designing and implementing a MIS for a company. However, a well

organized system design group with specialists from the necessary areas of management and computer science has the capability to implement such a system. Likewise, no manager, no matter how good at managing, can know all of the intricacies of the management process. He must have a system of getting the proper information. This is the purpose of the MIS. A "total system" is nothing more than several small systems integrated into a larger one. These should be planned, from the beginning, as systems that will eventually interface with each other when the final design is implemented. Centralized control of the information system by an independent staff group is the only feasible way to insure that the lines of communication are kept open. This group should report directly to upper management to insure good communication.

Specialists are beginning to realize (6) that an automated computerized system may not be the whole answer to the handling and distribution of technological information. Some claim that the computer's usefulness to top management, as a management tool, has not been clearly demonstrated. For the computer to be useful to management a long evolutionary process must be followed. This process depends primarily upon politics and human factors, not technology. The available hardware is sufficient for the MIS-business requirement. What is needed now are people who are qualified to deal with both the technical and the human problems. Management and education have noticed this and begun to react in that more people familiar with computer technology are getting into management, and the business schools are beginning to offer courses teaching computer techniques. However, the computer in general and the MIS in particular have only partially responded to the management needs of business. Computers <u>can</u> do enormously complex calculation; deliver and manipulate data; tabulate, index and reproduce citations and documents; they can store the product of the human intellect, but they cannot participate in the management function.

When a management information system fails (9) it is not the fault of the computer or the system. The failure can be caused by the assembly of incorrect hardware for what needs to be done. The technicians and staff which operate the system may be poorly trained. The full potential of the computer may not have been reached. There may have been a failure to superimpose human judgment on basically inflexible, mathematically based data, and many more equally good reasons. Basically, the fault is not with the MIS, but with the people associated with it. The error is not in the system, it is not the "hammer and chisel, but the sculptor"--the system design group, technicians and staff. Computers--and the things they do--are relatively new: they are powerful, expensive, and remorseless. They respond blindly and inevitably to the instructions given them. Give them a wrong instruction, or point a system in the wrong direction, and the results are wasteful experiences and sometimes catastrophies.

Control and operation problems (11) after the implementation are directly related to the system's design. The system may do a great job of sales forecasting and trend analysis, but miss every turn in the line. The fault lies in the lack of information that the designers built into the system not with the system. If sufficient parameters were included in the original design the MIS would be able to forecast the upturns or downturns in sales as well as the normal trends. A poorly designed system will have inherent control problems.

The Present

Where does all of this leave us? As bad as the past has been, we have gained insight into the problems of management information systems. The foundations for rapid advancements have been exposed by our past blunders. The advent of remote access terminals will prove to be a boon to the manager as soon as the necessary software can be developed for easy communication with the system.

The current delays in implementation of a workable MIS have been due to three factors: 1) the lack of trained, qualified managers, 2) lack of executives educated in the capabilities and use of computers, and 3) the lack of an available program.

Top management has grown to distrust the computer largely because they have been oversold on its capabilities, or at least those of the data processing department. Management's romance with computers for their own sakes, is over. Now a system must be able to justify its cost with performance. It is being analyzed like any other part of the company to determine its cost effectiveness. If is doesn't measure up, the system is discarded or rebuilt. With the more mature and knowing attitude toward computers that business now possesses, it is moving out of the era of fascination with speed and complexity.

Another factor in today's business is the cost of implementing an information system. It is generally viewed as high and has been a major barrier to implementation. However, management is beginning to realize that this is only a short-term cost, much like the initial investment in any piece of machinery.

The routine tasks will be handled by computers, but the true management tasks must still be handled by men. A good manager (22) doesn't need a printout to tell him where a problem is. However, a good MIS can show him that he may be <u>going</u> to have a problem and enable him to avoid it. The more information that a manager has available, the better his decision will be.

# CHAPTER II

## What is a MIS

Before this discussion of computerized management informations systems goes much farther, it is important that a workable definition of a MIS be found. One of the problems in this area is that everyone has their own idea of what a MIS is, but no two people have the same idea. A management information system has been described (11) as "a management oriented system characterized by information elements structured into a data base serving the information required of policy and operating management." Walter Kennervan (10) describes MIS thusly:

> "A management information system is an organized method of providing past, present, and projection information relating to internal operation and external intelligence. It supports the planning, control, and operational functions of an organization by furnishing uniform information in the proper time frame to assist the decision making process."

These are both definitions of the system functions. Basically the system (18) provides the right amount of the right information to the right control point at the right time.

Within the operational definition of MIS given above, one typically finds eleven elements in the information system. These are: 1) people, 2) equipment, 3) procedures, 4) a unified purpose or objective, 5) a communication medium, 6) a dynamic control function , 7) a data base, 8) input, 9) output, 10) limitation and 11) control.

People are the most important characteristic of any system. People are the ones that recognize the need for a system and develop it. People provide, in one way or another, most of the raw data used by the system. And finally, people should be the ones that use and benefit from it.

Another obvious part of any computerized management system is the equipment: the computer and associated mechanical devices that are used to

collect, store, and process the data. Certain basic procedures are also a necessary part of any system. These are the methods necessary to accomplish the objectives of the system. This purpose or objective, while another part of a total system, must be clearly defined.

A system must have some means of communication. It is useless if the raw data cannot get into the system (input), or, if being processed, the data is not made readily available to the manager (output). A data base must be formed within the framework of the system from the input. This data base will then be used to produce the eventual output of the system.

Any MIS must be dynamic in nature. It must be able to adapt to planned or predicted changes. These changes may come from either internal organization factors or from external enviromental factors. In addition it must have some self-imposed limitation in that there must be some control of the system,--a means of detecting errors, auditing the system, and providing security of the data base.

Why is a MIS Needed

There are several reasons for the use of a computerized management information system:

1. It is a tool for the manager to use. A good manager doesn't need a fancy computer printout to tell him where his problem is. He doesn't manage by shuffling papers. He manages people (2) so that they correct the situation and get the job done correctly. A good MIS will make his work much easier and better. Instead of having to react to an already disastrous situation with incomplete data, the manager can by proper use of the MIS see the trouble areas ahead, gather all available data and plot a course that avoids or eliminates the adverse situation.
2. A management information system can help to avoid obsolescence. Prediction of future trends may indicate that a certain product will not be necessary in the future because of new developments.

The economic environment, as changeable and unpredictable as it is today, requires that the manager have accurate information available instantly. Scientific and technological innovation may open new areas of exploration that need to be tapped quickly.

3. Competition from similar industries makes the use of MIS almost imperative. For instance, the use of mathematical models that simulate a market or that duplicate a marketing situation can lead to better knowledge of product acceptance and thus higher profits. It can also provide answers to management about the effect of dropping a particular product line without causing rumors to be generated throughout the organization. The use of a market simulation model can save a great deal of money for a company and also keep its plans hidden from its competition. As another example (17) the use of a computer for inventory control may speed up the order shipping--invoice cycle. This enables the company's customers to carry less inventory, thus saving them money, promoting good relations and increases in the company's sales.

4. Organization planning can be improved by the use of a management information system. The inept manager (3) who does not plan well will be exposed radiply if he is in the habit of fiddling with lower level decision rather than the long range planning that he should be doing.

5. Legal consideration must be weighed also. The current tax laws and social security laws make the use of a computerized information system, at some level almost mandatory. In fact, the first computer ordered for commercial use (17) was used to compute the company's payroll.

# CHAPTER III

## How to Design a Successful Management Information System

A management information system doesn't just happen. It must be uniquely constructed to fit the enterprise that it is to serve. Traditionally, a management information system was not designed at all, it was spun-off as a by-product of the process of automating or improving existing systems within the company. When the company's information system comes into existence in this second-hand manner, it is indeed fortuitous when the information the system produces is exactly the sort of information that managers in the company need to help them make their decisions. An effective system (24), under normal circumstances, can only be obtained from carefully planned rational design that looks down from the top, the natural vantage point of the managers who use it. Modern management information systems are supposed to help the manager make better decisions. Few, however, are true management systems; they have been shaped by improvements in existing data processing functions, and do not significantly increase the decision making effectiveness of managers. The 20/20 hindsight which we all possess in abundance reveals that this is the natural result of leaving the information system design to technicians. Systems analysts (16) are generally unaware of the myriad complexities of management decisions. Therefore, the system does not account for subtleties and are often no more helpful to the manager than his previous reports.

A modern sophisticated MIS should allow for all varieties of model utilization from the most formal to the most subjective and informal. This can be done by using a flexible information system with five separate sections: a data source, a data base, a predictive model, an optimization model, and an action. (See Figure 1.)

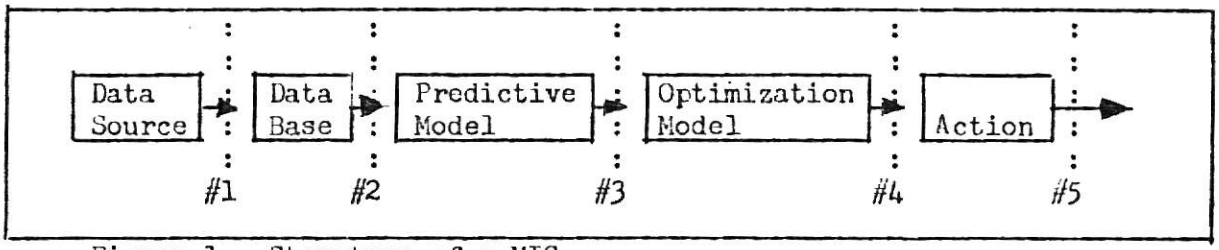


Figure 1. Structure of a MIS

A data source provides information to a data base, a storehouse for data. The data are then used in predictive models and optimization models before the action is taken. Predictive models predict future events; optimization models evaluate and select a best course of action on the basis of the predictions.

Many of the problems with MIS definitions and operations rest on the communication difficulties concerning the man-machine interface in the information-decision process. If the man-machine system interface is at the point labeled 1, the MIS is simply an information collection system. The man remembers all of the information and uses it to make his decision. At point 2 the data base becomes part of the machine system rather than being in the mind of the manager. All real decision making mechanisms are handled by the manager. At interface 3 the manager is provided predictive information, such as sales forecasts. This is obviously a better situation. At point 4 the manager is given a recommended course of action as determined by the optimization models. In the last situation, point 5, we have automated decision making.

Most commonly the term MIS describes a system that has its sole or major portion to the left of points 2, 3, 4 or sometimes 5. Two people may be talking about a MIS and each will be thinking of a man-machine interface at different points in the structure of the MIS as shown in Figure 1. The definition of a modern management information system should include <u>all</u> of the interfaces. The collection of information for unique, high-level subjective decisions where the manager must use the basic

information as far as is feasible, but also his contacts, knowledge and experience should be possible. At the other extreme a modern MIS should include the capability of automated routine decision making such as maintaining stock levels and placing orders.

The System Design Group

No one person can be expected to know enough about the organization and the capabilities of the computer to design and implement a management information system himself. A team of qualified individuals must be used for this task. The careful organization of this design team (12) and close coordination with management are vital from the design phase to implementation. The group must be a multi-level organization with representatives from top management to file clerks. The design group should work in the following phases: 1) definition of the problem, 2) analysis of the problem, 3) selection of a solution to the problem, 4) testing of that solution and finally, 5) implementation of the problem. (11)

There are several factors that must be kept in mind by the design group during all of these phases.

1. Changes should be expected.--The system must be designed to accept change as a part of the system, not something that the system rejects. It must be able to evolve as the requirements of management change. To do this, modern programming techniques, such as top-down coding and structured programming must be used. This stipulation of an expectation of change is vital. As the manager (12) begins to find the information available, and begins to trust it, he will find a need for more and different information.

   The designers should resist the temptation to react to a new situation by changing the basis of a report. If

management requests somewhat different information or in a slightly different format, the system should maintain the previous basis of figuring data. Otherwise there will be no information in the reports on which to form historical comparisons. New reports should include the elements that existed in the old ones. Also a report presented at one level must reflect a pattern of reporting throughout the various management levels. Any statement made in a report to top management must be justified by reports in lower levels of management. For example, if top management receives a report that says that sales are down, there should be a report at a lower level that lists the areas in which sales are down.

The system designers need to include provisions for adding new information. The prime user of this information should be the person responsible for its updating. There should be a disciplined body of controlled elements of data, each the responsibility of a clearly defined updating authority. The system designers need to also consider the opposite factor. Any time there is a process of updating information by adding more information, there is a need for a process of "downdating" information that is no longer needed. If this is not done the data base grows...and grows...and grows. The logical person to have this authority is the person with updating authority.

2. Models--One of the major causes of frustration is the uselessness of computerized information that comes from a poorly planned system. In the past (14) it may have taken a month to get a report that the computer will produce in

two days. However, if it takes two months to read and understand the report, only the frustration of the executive is increased, not his productivity. A vehicle for understanding between the manager and the system's analyst is needed. This vehicle is the decision model. The manager and the analyst (16) must work together to develop the model or it will be inefficient, at best,and useless at worst. If, in working together, they can come up with a good model for planning, they have accomplished their goal; for planning (5) is the chief concern of management. The MIS must be thought of as a tool that can be used rather than as a machine that will do the entire job.

A useful MIS must be built in small modules to insure the completeness and accuracy of each module. An overall scheme (8) must be developed for the entire system so that each model and module can be thoroughly tested before it is combined with the other modules of the system.

Top management (24) must participate extensively in the design of the model. They must delineate the organization strategy, structure, and decision-making process. The definition and solution to the problem of the business system can in itself be a systematic process. This process is called modeling. Modeling (9) takes "tangible organized inter-relationships and transfers them symbolically into a logic that is expressed by a set of algebraic equations." Output from these models is in the form of operating reports designed around the format desired by management. The system should respond to the executive--to the questions and the alternatives which he raises for evaluation. At the

same time, the process of developing the models is an educational one for all concerned, in that it affords a deeper understanding of the operation of the organization. After very little experience, the executive will begin to ask, "What if ....?" At this point the model reaches its full potential as a management tool. (It should be remembered that small models are less expensive to build than large models and they can be used more frequently than large models. For these reasons the investment can be more easily justified.) (15)

3. Management must take an active role.--To work effectively, the design of a system must start with top management. They should define the objectives of the system thoroughly. These objectives should be communicated to the system's staff. A meaningful dialogue between top management and the system's people must occur. For this to happen, (21) management must learn more about the process of system analysis and the analysts must learn more about the management process. The development of the system must be based on the premise of providing meaningful information to management. The design should not be predicated on the needs of the computer, but rather on the needs of those who are to be served by it. The design group must never forget who is working for whom. (11)

James B. Boulden and Elwood S. Buffa (9) note: "Experience has shown that managers will eagerly use a computer in decision making if it is fast, economical and easy to work with." To accomplish this the system that is finally designed should include provisions for file creation and maintenance, input editing and translation, file searching

and analysis, output generation, and on-line interrogation. Any on-line system must meet the following requirements:

1. simplicity
2. secrecy
3. conversational
4. fast response
5. management controllable
6. accessable
7. data availability
8. flexible
9. economically feasible

4. Research the needs of management for data.--The design of an information system requires adequate research prior to implementing the system, and a complete understanding by the users of the system of what is required by them. How much data are really needed by the manager and how often this data areneeded are vital concerns. There is a point of dimishing returns (5) with respect to the accumulation of data. The data that are collected must be accurate and relevant. A thorough study of the data required for the system is necessary in the implementation of any MIS. The relevance of information is far more crucial than speed.

Organizations frequently spend large sums of money, generating more and more information (13) about the organization's performance. They seldom consider whether or not the information is actually used or needed. There should be a corporate information policy as well as a corporate data policy. The proper person to underwrite information (12) is the one who is responsible for that information. It should not be generated by a group of people who generate information or design systems to present to senior management without reference to the manager of the function, to

which the information refers. There must be accurate input to the system. Bad data is worse than none. The best thing that can be done with bad data (20)are to recognize it as bad, and throw them away.

5. Quality of information.--Generally speaking, the MIS of the past did not provide any reliable qualitative information. Better communication between system designers and managers should alleviate this problem. A well designed system should take those factors which measure quality into account. Without a well organized design group a system can become one that is designed by specialists. This specialist group is usually responsible for implementing only the part of the system which interfaces directly with the computer. The well organized design group will have sufficient expertise in all areas to plan and implement the complete system.
6. Differentiate between the rule and its value.--The system designers need to be careful not to confuse a rule with the value of the rule. For example, while designing the inventory control phase a manager may mention that there is usually a one week delay between the time the order is placed and when the goods are received. This may lead the designers to include a one-week time lag in the inventory model. If that happens they are doomed to eventual failure. That lag will surely change over time. They mistakenly confused the rule of having a lag time with the present value of that rule, one week.
7. The system must be able to respond to external queries.--There must be designed into the system the capability for detailed queries. If this portion of the system is not flexible

enough, the managers will soon quit using the system, except for very mundane requests.

8. The system must be controlable.-- There must be a design initiated effort to develop controls for the computer system, especially with the use of remote on-line system terminals. These controls are necessary for the following four reasons:

    a. The growing size and complexity of MIS systems which makes errors more costly and difficult to detect.

    b. The sophistication of third generation equipment, where original documents may exist only in the form of magnetic records within the computer, placed there directly by remote terminal. (The remote on-line terminal has produced many new problems, such as security of data, and it increases the number of sources where incorrect inputs can be generated.)

    c. The growing reliance of management on information generated by computer systems, not only for financial data, but also in such areas as marketing, production, engineering, and forecasting.

    d. A continuous shortage of skilled computing personnel, which leads to rapid turnover and the hiring of marginal workers. (23)

The best way to solve their problems is to have a qualified executive at the top level of management. With this technical know-how at the executive level, the company can have

a firm grasp on a control philosophy. They can establish meaningful procedures to protect computer programs and data against error, malice, fraud, disaster, or system breakdown.

The control philosophy should be built into the system by the MIS design group. It should include provisions for:

a. Parallel testing of new and old systems
b. Canvassing of data to insure that all useful data is converted from the old to the new system
c. Quality controls
d. Input, output, and errors--must have positive control over these transactions. This can be done by using the system to limit who may read data, write data, transfer data, etc.
e. Downtime--can you go back to the old system or another system in case of a computer failure.
f. Program changes--must be regulated. This can be done by requiring extensive program and system documentation. These precautions will help to find any errors in the system.
g. External security--unauthorized access can be prevented by special locks on terminals, tape storage cabinets, etc. The computer should not be a public showplace of the company. Since it is the heart of the MIS and the company, it must be protected.
h. Natural disasters--there must be protection against fires, floods, and other natural

disasters. Normally this would include sufficient back-up information to restore the system. This information should be kept in a separate location.

i. Adequate insurance--How much money would be lost if something were to happen to the system? (23)

These security procedures should prevent an unauthorized individual from accessing and changing or copying from a data base. Unfortunately they do not prevent an authorized person from doing these things when he has a criminal intent. A person who has the authority and the knowledge of the entire system or a large part of it can still change the data base or get information from it for dissemination to unauthorized persons.

9. People.--In all but the most abstract application, the success of any MIS depends upon people--the individual's understanding of the system and the interaction among the people involved in the system. A gulf still exists between people and computers; between those who make the computer work: the technicians, the programmers, the systems analysts; and those who the computer should serve: the manager, the clerk, the civil servant, the public. (12)

There are four main factors that need to be considered to close this gulf:

a. The degree of stability of the user system. By this is meant the extent to which the organization of the user's department meets the personal needs and aspirations of the people employed

by that department.

b. User's perception of change; how the staff of a user's department believe that the new computer system is going to effect them and their interests. Their perception will not necessarily bear any relation to what is going to happen.

c. Strategy for change; the means used by the computer innovator group to change the department from a manual to an automated system. This change will involve altering employee attitudes and behavior as well as departmental technology.

d. Role perception of the computer innovator group; how the system analysts responsible for introducing the new technology perceive their roles and how these perceptions affect their attitudes toward user personnel and the strategies they adopt to get the change implemented. (19)

The interaction of people with the system is very important to its success. For instance one of the first breakthroughs in management information systems occurred with the development of the "exceptions report." Instead of a manager spending most of him time searching through reports to find what was going wrong only the trouble sports were reported. This made the job of analyzing the situation much easier, but it had a bad psychological effect (7) on the manager who saw nothing but

bad news everyday. A system with exceptions reporting as the only output should be avoided because of its affect on the people.

However, people should realize that they are the element that make the information system perform as it is expected to, or cause it to fail. The ultimate recipient of a MIS (12) is usually aware that what he is receiving is generated by the computer. If this information is wrong he will blame the computer system's manager. The manager will usually hide behind the line--"I'm sorry. Our computer made a mistake." Rather he should lay the blame where it belongs--at the feet of the user who supplied the mis-information or at the feet of the system's designers who did not plan the system correctly. Unfortunately the computer has become a scapegoat. It is easier to blame it than to find the human who is at fault. If a bill is sent out incorrectly, the fault does not lie with the computer, which receives data and processes it in the exact way it has been instructed. Some person, some human being, somewhere along the line has made a mistake. Let us hear no more of this--"I'm sorry, our computer made a mistake."!

# CHAPTER IV

## Summary

The value of any management information system depends upon the degree of understanding and confidence that management has in the information that it provides. The relevance of the information is far more important than the speed with which it is delivered. The confidence and understanding of the system is enhanced whenever management takes an active part in the design and implementation of the system. As they see the small model developed and learn more about their own functions they will become more confident when the modules of the well designed system begin to fit together and operate smoothly. The pride that the company takes in the system will begin to show in more and more usage of the system. Management will begin to rely more on the system and help to keep improving the design as they improve their own management techniques.

Management must go through a learning process. As they do, the MIS staff will also be learning. Initially, the manager should be provided with the entire printout of the information system that is relative to his function. This will build his confidence in the data base and staff. He feels that his responsibility of managing the function is being done, and he understands the entire system. After a while, he will tire of seeing everything that is happening. At this point the reports should be switched to exception: only reporting those things which require his attention. After awhile the executive should be able to notice certain events that cause the exceptions. At this point he is ready to move on to the use of the predictive model of the ideal management information system. He is now in the "What if...?" stage. From here he can move on and find the optimum solution from all of the possible events and take positive action. His education into the management information

system is now complete. The executive has become knowledgeable in all of the functions of his area to the best advantage of the company.

By using an integrated system design group, one including top management, computer system analysts, and personnel from intermediate levels of the company; a comprehensive, effective, efficient management information system can be designed and built. Models are used that represent all of the management functions. The people who are served by the system and their reactions must be taken into account. Management should be able to establish a control policy that takes into consideration the need for computer security. The design group needs to consider the flexibility of the system so that the manager can interface with the system at any of several points depending upon his requirements for information and the level of complexity of the problem. When the MIS design group has done all of this, they have finished their task. They have designed and implemented a management information system that provides the right amount of the right information to the right people at the right time.

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# MANAGEMENT INFORMATION SYSTEMS: WHY THEY FAIL, AND POSSIBLE SOLUTIONS

by

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AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Computer Science

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1974

Even during the time of first generation computers, man was using them to improve his life by relieving him from the tedium of routine, repetitive tasks. As man learned and technology provided more powerful computers, their applications have broadened, until today few areas remain untouched. One of the newer, and more difficult, areas of application is the utilization of computers in the management environment. The ability of the computer to store, process, and retrieve large quantities of information about costs, populations, inventories, people, etc. has brought with it the desire to computerize management's information system. Unfortunately, desire is not enough. The purpose of this paper is to present some methods by which the desire for management information can be converted into a workable, effective computerized information system. Some of the reasons for the lack of success of early systems will also be discussed to provide guidelines for improvements.

The computer industry and management have impeded the development of management systems. The computer industry has made few efforts to organize its development, being confident that it could sell whatever was discovered. Management made few attempts to understand the systems analysts who design and implement their information systems. Because of their lack of knowledge, management has repeatedly been oversold on the capabilities of computers and data processing. Recently, they have become more experienced, and are now taking a long hard look at their management information systems to determine their worth.

There are two keys to building a good MIS: there must be active communication between management and the system designers; and the system must be planned to be dynamic and flexible. These two factors are co-equal; one without the other will doom any system to failure. A well formed system design group enables all levels of management to communicate with the data

processing personnel. Top management must be an active participant to provide overall control and long-range planning information to the designers. Management and analysts must communicate freely, so that accurate models of the management functions can be built. The system group needs to consider the additional problems of: people--how they react to the new system and how can the system serve them best; and security--does the system have controls to prevent or detect errors in the data supplied and the unauthorized use of the information.

The final system design should be flexible enough to adapt to the changes in management's information requirements. Each decision that needs to be made requires different information from the system. Some decisions, such as inventory control and ordering, can be done almost completely by the MIS; while those involving long-range planning must be done by top mangement using data that has been gathered by the system. A well designed system should have five separate parts: a data source, a data base, a predictive mode, an optimization model, and an action. Management must be able to interact with the system at any of these points.

Some failures of management information systems have been caused by poor design of the system as a whole. Whether or not this was a direct results of lack of communication between top management and the design group, or if it was caused by designing a system that was too restrictive, is of little consequence. If the MIS has been designed to be flexible, dynamic, and accurate, and with the needs of management in mind, then the MIS design group has accomplished its goal. They have designed and implemented a management information system that provides the right amount of the right information to the right people at the right time.