THE ROLE OF INFORMATION SYSTEMS RESEARCH CENTERS

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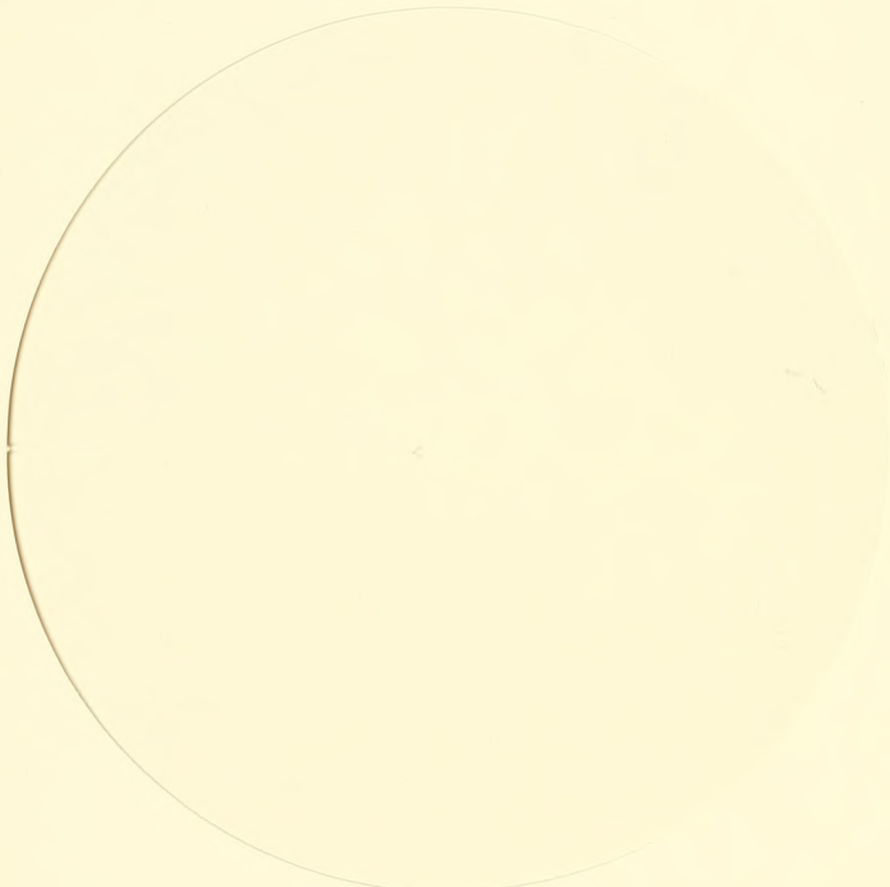

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I. The Need

There is little doubt of the need for Management School-based research in the information systems field today. The field is very young academically, needing clarification, strengthening, or refinement of almost all of its so recently established frameworks, concepts and techniques. It is also, however, a rapidly changing field. From an academic viewpoint, therefore, it demands constant updating, revision and, often, complete redesign of the often tenuous knowledge we currently have.

Significantly, from the viewpoint of the practicing manager, increased research in the field is also very desirable. The information systems function today is claiming a larger and larger share of corporate and non-profit organizational resources, both financial and managerial. Many believe that corporate bottom-line success will increasingly hinge upon effective use of information technology. Whether or not this is true is far from certain. What is certain, however, is that we must understand the managerial opportunities and problems which will develop with the new technology.

Traditionally, academic research has developed using two sharply different forms. In one, an individual researcher (often with graduate assistants, and sometimes with a faculty colleague or two) pursues a research topic of his own choosing. His primary source of support is a Federal grant or a single corporation's benefaction. Very often the work is done within the laboratory or office walls of academia. Although this model takes many diverse shapes, it can be viewed in its purest form (for purposes of contrast) primarily as a single person's

intellect, applied in a laboratory setting, to a single problem, encouraged and supported by a single sponsor.

Although there is a very evident role for the individual research model in the information systems field today, three major factors currently favor the growing incidence of establishment by management information systems groups of a quite different research organizational model -- the information systems research center. The three major factors are (1) a need for interaction with practitioners in the field, (2) the need for the advantages of large scale to carry out effective research, and (3) the need for visibility of the work performed by the MIS faculty. These three factors favoring the creation of center-based research will be introduced briefly here. We will return to them in more detail at the end of this article

One major reason for the development of research centers is the nature of the information systems field itself. It is very new and very fast moving and information systems faculty members are very few and very limited in research time. Thus assistance from those involved in the field on a day-to-day basis can be extremely helpful in aiding academics to define the right problem(s) to research, to understand the problem(s) in some depth, to gain access to the best research sites with the minimum of effort, and to evaluate the impact and usefulness of the research results. In short, interaction with information systems practitioners is necessary to find and work many of the significant research issues in the field today. This is especially true in areas where major research issues are relatively hidden -- e.g., issues involving the interaction of technology, organizations, and people.

Second, many research problems require the advantages of scale of several different types. Many require multiple disciplines (e.g., computer technology, operations research, and behavioral skills) to obtain a satisfactory research prospective on the problem. Multiple field research sites are required to do adequate research in many cases. And, for an increasing number of problems, large scale resources (both human and financial) are required to actually carry out an effective program of research.

Finally, there is an increased need today for the informatiton systems faculty to make information systems research capability and results visible both externally and within their own school. External visibility is necessary since the explosive growth of the information systems field has created the desire to fund research on the part of many people in many organizations. It is difficult, however, for a person with a problem and/or funding capability to search out individual faculty members who might be interested in the problem. A center, however, provides increased visibility and therefore a contact point. In addition, the center provides visibility not only for research capability, but also, equally important, of the research product through center-based seminars, working papers series, and so forth.

As important as external visibility is, internal visibility within the school of management and the university is perhaps even more important for the MIS faculty today. Working in a field which has no long traditions or established guidelines for research, the impact of the research output of the information systems group can easily not be recognized. Although it certainly does not assist with regard to

questions as to the academic respectability of the research performed, a center can provide visible evidence to other colleagues of the magnitude of acceptance of information systems research by the sponsor community through both their funding and their use of the research results.

The establishment of a research center with its interdisciplinary personnel, multiple sponsors, continuing contact with industry, and a track record for developing useful research results is a useful response to all three of these major environmental factors. Thus -- as opposed to the "individual researcher" model, a second major academic research paradigm (that of the "research center") is clearly gaining in favor with information systems groups in schools of management now. This article is aimed at drawing attention to the vastly increased use of centers as a focus for research in the information systems field and documenting the reasons for this growth. The pros and cons for the center mechanism for information systems research will be explored, using the two oldest and best established multi-project centers, those at Minnesota and MIT as examples. Having "been through the wars" as directors of these two centers for several years, we have tried to present as complete a picture as possible of these centers. We have tried to err (and undoubtedly, have) on the side of over-explanation to be of some possible assistance to those thinking of starting a new center.

II. Different Types of Centers

In this paper, we focus on multi-sponsor, multi-project centers. There are a growing number of this type of center today either nascent or operating (e.g., to name a few, the University of Colorado, Wharton, University of Houston, NYU, UCLA). And it appears that this number will grow. Most have been, or will be, founded for reasons similar to those motivating the creation of CISR and MISRC as noted in the following sections. Some of these centers have a national scope, some are more regional in nature.

There is, however, one other type of information systems research center located today in schools of management. This is the "dedicated" center which, while it may have multiple sponsors, is aimed at working a particular research problem. While these centers are important, they represent a more traditional academic organization, are somewhat less complex, and are better understood. We discuss in this article, therefore, multi-project centers.

In the two sections that follow, each of us outlines the history and current status of the center with which he is associated, the major categories of research being carried on by each center, their funding, and the services each center offers to to its sponsors. A key point to note is that, although the two centers were founded for essentially the same reasons (these noted in Section I of the paper) they are quite different. MISRC, following the thrust of its parent university, is oriented toward providing research and service to its regional sponsorship. CISR, again relating to its parent-university's focus, is heavily oriented toward research and education at a more national scale.

III. Management Information Systems Research Center

Brief History: In 1965, Gary Dickson joined Gordon Davis on the faculty at the University of Minnesota's College of Business Administration. They botht had considerable background in organizational computing given the limited business use of computers at that time. Davis had worked as a consultant for Touche Ross and while at Minnesota had authored a textbook on electronic data processing. Dickson had several years of experience at the Boeing Company whom he helped form a group which applied the large scale scientific computer to management problems. Upon completion of the Ph.D. degree (which was obtained while working at Boeing), Dickson chose to join the University of Minnesota faculty largely because of the opportunity to work with Davis and because, in contrast to many other business schools at that time, the Minnesota school had already incorporated the computer into its business curriculum (the school had its own Univac SS80).

It was not long before these two persons saw an opportunity to make the University of Minnesota a pioneer in teaching and research involving the organizational use of computers. Their backgrounds, the fact that their school had already established a track record in teaching business computing, and their location in a metropolitan area featuring a computer industry and a large number of corporate headquarters all influenced the idea that the University of Minnesota should assume a leadership role in the study of organizational computer use.

Another influence in starting a major effort in this area was the recognition of a need stemming from the level of organizational resources committed to computing coupled with general agreement that the university teaching and research programs were badly lagging industrial practice.

Davis and Dickson recognized that a program in "information systems" would involve: (1) defining a series of courses (curriculum); (2) obtaining proper computing resources; (3) finding qualified people to teach the courses identified; (4) obtaining students; and (5) getting "real world" input so that the program was not another ivory tower, theoretical program which would be of little immediate impact in improving practice.

1966 through 1967 were spent in a planning mode out of which came a plan for a complete program in "management information systems". The major components were:

1. A program of 14 courses in MIS focused at the graduate level (M.S. and Ph.D).

2. Acquisition of computing resorces which could be used for MIS teaching and research but which would be compatible with the University's centralized (CDC) computing system.

3. Integration of the local business community in teaching and curriculum development as well as in applied research.

4. Formation of a "research center" to house staff and faculty, to facilitate MIS research, and to link to the "practitioner community".

5. Raising of funds to support students, staff, faculty, and computing resources.

It was clear that many of the resources that were required (expert knowledge, funds) were to be found in the business community. Therefore, a strategy was developed based upon forming a partnership between the Minneapolis-St. Paul business community and the University of Minnesota to create a "center of excellence" in management information systems.

Davis, Dickson, and Paul Grambsch, the College's Dean at that time, visited firms headquartered near or in the Minneapolis-St. Paul metropolitan area and asked that they become "Associates" of the MIS Research Center. The arguments for joining were several:

1. To create a local "center of excellence" and to have a better business school.
2. To generally help the local university and to make it better and more resposive to business needs.
3. To benefit sponsors directly by getting access to: graduates from the teaching program, research outputs, and training programs.
4. To be able to have a direct hand in influencing the directions taken by a university program.

By this time, 1967, a series of courses had been approved by the faculty and an announcement published which was designed to attract students. Plans were also underway regarding the acquisition of appropriate computing equipment. These steps, plus the arguments listed above, convinced eighteen firms of the approximately thirty contacted to join the MISRC Associates Program.

Each Associate agreed to commit $10,000 a year for a three-year period to start the MIS program. At the time, several of the firms obtained the money from their "charitable" funds, whereas others took the funds from line item budgets.

The MISRC was formed in 1968 which was the same year the academic program in MIS began accepting students. The first three years were concentrated on getting the teaching program developed and in improving the quality of instructional material. One of the first "distributed" computer systems in the U.S. was utilized in the teaching and research programs. A CDC 3200 was linked to the University's CDC 6600 in a background/foreground mode. This allowed use of research/teaching CRT terminals on the CDC 3200 while batch jobs were being sent to the main computer. At this time, the University did not have a timesharing system. Approximately $400,000 of the funds raised were devoted to the computer acquisition.

The remainder of the funds went to support a small civil service staff, for support of graduate students, and for faculty summer stipends. Student enrollment in the MIS program was good the first year and became even stronger as the program became better known.

After about two years of operation, it became apparent that more needed to be done to strengthen the MISRC in terms of interaction with the business community and in doing research. To achieve the former objective, a person was hired that we met at the Founding Conference of the Society for Management Information Systems which was hosted by the MISRC. Given the job of Assistant Director, Robert M. Henry worked full time on solidifying the relationship with MISRC sponsors. Such a good job was performed that after three years of service, one of the Associate firms (3M Company) hired him away from us.

The important concept of an Assistant Director from industry was continued for the following six years. In these cases, personnel were given leave from Associate firms (Honeywell, General Mills) to serve in

this position. As of 1978, Ms. Naomi Estes, who had been on the MISRC staff since 1969, became the full time Assistant Director.

Having solidified the relationship with the sponsoring business community by about 1972, the next major push was to expand the center's research activity. Contracts from the Office of Naval Research in association with the "Minnesota Experiments" and from The Department of Commerce to support research on the development of a prototype regional energy information system are examples of funded research projects. Other major projects involved working with Associate firms on MIS personnel skills and on project success and failure determinents.

The period between 1968 and 1976 represented a startup stage for MISRC. Since 1976 the operation has been "mature" and the programs have undergone relatively little change. The Center can be said to have stabalized as is described below.

The Director of the MISRC reports to the Dean of the College of Business Administration. The Director receives a half-time reduction in teaching load (funded by the College). The full time staff of the MISRC consists of the Assistant Director responsible primarily for Associate relationships, an office supervisor, and a two-person clerical staff. In addition, there are two graduate assistant positions, one of which is related to supplying technical computer support and the other works on the Associate Program with the Assistant Director. Since 1977 the Center has housed the MIS Quarterly office, which is staffed by a coordinator/secretary and a part-time secretary.

The MISRC is physically located in the basement of the classroom building adjacent to the business administration building. It has two large single person offices, five smaller single person offices, four

large multi-person offices, and a conference room. Several of the offices are occupied by graduate assistants associated with various research projects. No regular faculty are housed in MISRC, but it is common to find visiting faculty in the Center from periods of weeks to a year or more.

There is a strong relationship between the MISRC and the College's Management Sciences Department (where the MIS academic program reports), but many faculty from outside the Department and the College may be associated with MISRC projects. The Department is the home of the seven full time MIS faculty, the approximately twenty-five MIS Masters, and ten Ph. D. students that are typically in residence. Finally, from an organizational point of view, there is a steering committee composed of Associate personnel and faculty members, which is advisory to the MISRC Director. Three other standing committees also exist -- a program committee, a curriculum committee, and a research commmittee.

Funding: The major source of funding of the MISRC is support provided by Associate firms. As was pointed out in the historical section, MISRC Associates pay a yearly fee to support the research center. Originally, it was $10,000 per year for three years. During the second three years of operation, it was $8,000, $7,000, and $6,000. Since then we have been on a flat $5,000 per year. There are currently sixteen Associate organizations.

Another source of funds for base support has been the College of Business Administration. In addition to covering the faculty director's salary (for 1/2 time), about $10,000 of support is given each year.

Specific contracts and grants are the third source of funds. These sources cover the projects costs, plus contribute to covering the salary costs of the clerical staff.

The MIS Quarterly also brings in revenue, but after typesetting costs, printing and mailing costs, and the cost of the production coordinator plus the secretary, it is a break-even operation. As circulation grows, it is hoped that the journal will be a source of income for MISRC.

As can be seen, the Associate firm funding provides for an Assistant Director, a clerical staff, the variable cost of operating a program for the Associate firms, and a basic level of operational support. All research projects must be self-funding. Thus, in total, funding for the MISRC annually amounts to approximately $300,000 with just about half the total being base support provided by the Associate firms and our college.

Research Portfolio: For about the first ten years of the MISRC's operation, a substantial amount of research has been performed, but it was diverse. The best way of summarizing MISRC research is by research method in contrast to the area in which the research was performed. This condition is due largely to two factors -- faculty interests and availability of funding.

The "Minnesota Experiments" for example, represent a series of ten experimental studies on the interaction of individual, situational, and information systems characteristics as they impact decision making. Several studies were also conducted by doing field research in organizations. Examples are:

- Factors associated with MIS project success and failure.
- The relationship between organizational characteristics and the structure of the information systems function.
- What makes a "successful" systems analyst.
- Skill requirements for MIS positions.
- Socio-technical approaches tot MIS implementation.
- Job satisfaction, organizational structure, and technological support.
- Analysis of the MIS life cycle.

Another area of substantial concentration was technical in nature, data base and data base management systems. The development and testing of a decision support system for use in the physical design of large data bases is an example of this type of work. Finally, MISRC personnel have been involved in applications such as prototyping a regional energy information system and specifying information systems requirements for higher educational institutions.

These projects have involved faculty and graduate students directly associated with the MIS education program but have also involved persons from other areas in the college and the university. The "multi-disciplinary" approach has been of particular use on the larger projects.

Beginning in 1979, the MISRC began to sharpen its focus as to the areas in which work will be conducted. The Associate firms suggested that a sharper image would be useful. As a result, the incoming MISRC Director, James C. Wetherbe, has recently completed interacting with Associate firm personnel and faculty on this issue. The result is that three areas of special concern have been selected for concentration in the future. These are:

- Management of MIS, especially regarding MIS personnel and planning.
- Systems Development with a focus on productivity and behavioral issues.
- Data base, especially design issues.

During the coming year and continuing in the future, major activities will be conducted by the MISRC in each of the above areas. It is felt that by conducting larger projects with better focus, we will sharpen the Center's image and at the same time be responsive to the desires of our sponsoring organizations.

Sponsor Interaction and Service: The MISRC has adopted the strategy of close interaction with a relatively small number of proximate organizations all headquartered in the Minneapolis-St. Paul area. Two "outstate" firms were part of the original associates group but dropped out partly because being 100 miles away was too far for the type of interaction which makes the program work. For becoming an "Associate" one receives the following package of benefits:

- An Associates Program: Approximately ten events are held each academic year. These events usually feature speakers from outside the area that are recognized experts on a subject. The MISRC provides the events free to Associate personnel except for any meals which may be involved.

- Special Interest Groups: The MISRC forms and coordinates groups of Associate personnel having common interests, e.g., site securitiy, MIS planning, distributed systems. Each group sets a charter and makes a year-end report. A significant amount of interaction and interchange takes place between personnel of firms having common problems.
- MBA Mini Consulting: Each MBA student is required to take a mini consulting course. Teams of four students work under faculty supervision on a specific problem for ten weeks. The output is both a written and an oral report. The firm receives about 2,000 hours of tetam time free of charge. The MISRC makes every effort to coordinate Associate firm needs and interests with available student teams.
- Access to Graduates: The MISRC attempts to do a special placement of MBA MIS Specialists in Associate firms. A resume collection, dissemination, and referral service is available.
- Working Paper Series: All Associate firms receive copies of all working papers produced by MISRC personnel. More than one hundred such papers have been published since the Center began.
- Information Request Service: The MISRC maintains a "hot line" to answer Associate firm requests for information. Typically reference to written material is provided, although identification of a key faculty member or another Associate firm person is frequently provided. The MIS faculty members are also available on a limited basis to act as a "sounding board" for Associate problems/plans.

- Discount Rates: Management training is provided in MIS through the College's Educational Development Center. For courses designated as MIS, Associate firm personnel receive discounted rates for as many people as they wish to send.
- Influence on Programs: The Associate firms can help determine the direction taken in both the teaching and research program. Through representation on commitees in these areas and through the Steering Committee, the nature of Center activities can be influenced.

Perhaps the greatest benefit of the MISRC and the MIS educational program is that it provides a focus for information systems activity in the Minneapolis-St. Paul area and a vehicle for interchange. The notion of a partnership between the university and the business community is frequently expressed.

IV. Center for Information Systems Research -- Sloan School MIT

Brief History: The Center for Information Systems Research (CISR) at the Sloan School of Management at MIT was established in 1974, in large part because of the three environmental factors discussed earlier in this paper. It was founded following a series of discussions by various Deans and faculty members to provide a center which would "work on major problem-centered research issues of interest to both faculty and practitioners in the field." Although numerous faculty members were involved in the creation of CISR, the two key people were undoubtedly William F. Pounds, then Dean of the School, and Michael S. Scott Morton, CISR's director from July 1974 to April 1976. Dean Pounds' role is clear. At approximately the same time, other centers

were established in the Sloan School in response to both the MIT tradition of performing problem-based, application-driven research and a felt need at Sloan in the early 70's, to establish better links to industry. Scott Morton and other faculty members felt an industry link would be especially appropriate and useful in the information systems area.

Four major objectives were established for CISR. They were (1) to perform high quality research which is relevant to and useful to practicing managers in the information systems field, (2) to increase contact with managers in the information systems function in industry and nonprofit organizations to ensure the relevancy of the research, (3) to allow students, at all levels, to have increased opportunities for real-world involvement during the course of their studies, and (4) expand financial support for research in MIS area at the Sloan School.

A major mechanism to carry out these objectives was felt to be the creation of a group of "sponsors" who would provide both funding for the research and also the necessary interaction between the center and their organizations. Sponsor funding was to come solely from the information systems area budget, not the "corporate gifts" department of the sponsor organization. This was done to insure continuing interaction with the information system personnel in each sponsoring organization.

The process of finding and selecting sponsor organizations is an interesting part of CISR's history. Since MIT is a national university, with widespread alumni, friends, and contacts, it was felt that sponsoring organizations could not, and should not, be limited to a particular geographic area. Secondly, it was decided <u>not</u> to

aggressively "market" CISR, but rather to react positively to the normal flow of managers who, having heard about a particular research project run by by a CISR faculty member (either through listening to a seminar given by that member or reading his publications), would inquire as to ways to gain improved understanding of the research and its implications. Many of those interested in a single project were even more interested in getting in close touch with a larger body of research -- and thus became CISR sponsors.

It was early felt that there was no optimum size for CISR, that the budget, thus CISR's research portfolio, could grow apace with the number of sponsors attracted. In any case, MIS research would continue since the faculty at that time was continuing to pursue the more usual contract, grant, etc. mechanisms to increase the MIS research performed. The additional funding CISR brought in would merely increase the ability to hire and fund additional faculty, research associates, and graduate students to increase the research portfolio.

This low key approach produced only four sponsors in the first two years. Yet some momentum was building. This momentum was greatly helped by the origination of a "CISR Summer Seminar", a one week conference open to all (for a fee) which displayed the research, and research results, of the CISR faculty and staff to seminarees who constituted a potential sponsor pool. This "educational" approach to marketing was also supplemented by an increased speaking agenda (at management-oriented information systems conferences and at individual companies) by members of a new CISR management team, with John F. Rockart as Director and Christine V. Bullen as Assistant Director, which took over in the Spring of 1976. Responding to this increased

exposure of CISR research results, seventeen additional companies became sponsors over the next two and a half year period.

The number of sponsoring organizations, starting at two in 1974, has thus increased to twenty-two today. At the current time the number of sponsors is being held at approximately twenty, in order to limit the sponsor group to an appropriate number to allow effective continuing interaction. As the number of sponsors have grown, so too has the size of the MIS faculty. Today, nine Sloan School faculty are full-time members of the MIS group. Almost all devote at least half-time to research, many as a result of CISR funding which allows them to "buy out" their time from teaching.

CISR is currently being operated primarily as vehicle to increase the amount of managerially-relevant information systems research produced at Sloan. Its chief asset is a bright, aggressive set of faculty members each of whom desires to follow his/her own research interests, but who have occasional openings to take on new research.

Significantly, in the past two years, CISR has been able to attract "affiliate" faculty members from both the Organization Studies and the Labor Relations group to research or aid in the research on information systems problems of interest to them. Thus, CISR funding and research site availability, have attracted faculty from other areas to strengthen the multi-disciplinary base of the existing MIS group. The core MIS faculty itself contains members with degrees in electrical engineering, computer science, law, planning and control, and organizational behavior as well as information systems itself. In short, it is a multi-disciplinary MIS faculty group assembled to research multi-disciplinary problems. Sponsor funding has facilitated

the hiring of some non-traditional skills into the faculty group.

In addition to the faculty, research at CISR is currently carried on by three full time research associates (usually people with masters degrees in management and some years of field experience in the MIS area), graduate students, and at the present time, three part-time experienced researchers. The latter are former faculty members or former students holding other positions but with the available time, expertise and desire to work a specific issue in conjunction with a CISR faculty member. An Assistant Director for Administration and two (often three) secretaries comprise the administrative staff responsible for organizing seminars, financial management, and supporting the research staff.

CISR reports to the Dean of the Sloan School and to the Management Science Group in a matrix fashion. A Steering Committee composed of the Director, an Assistant Director and three MIS faculty members provides policy direction.

Major contributors to CISR during the growth years were John J. Donovan and Stuart E. Madnick who served on an early steering committee and were participants in the early design of CISR. Other current and former faculty who were involved in the initial years of CISR are Jeffrey A. Meldman, Robert M. Alloway, Hoo-Min Toong, Peter Chen, and Michael Zisman. Recently Peter Keen and Lynne Markus have played very significant roles as, increasingly, has Ed Schein, Chairman of the Organization Studies Group at Sloan. Significant research and administrative contributions have been made by Sarah S. Fitzgerald, Lawrence Meader, Steven Humphrey, and Assistant Director Judith Quillard, who joined CISR in 1979.

Funding: CISR research is currently funded in several different ways. A primary source of funding is the sponsors who contribute approximately $500,000 per year. A second major source of funding is the traditional large research grant or contract mechanism, which in an average year will provide almost an equivalent amount to various MIS faculty members. Typical of this process is the NEEMIS project, the New England Energy Management Information Systems, which explored many systems concepts in an application setting.

In accordance with CISR's major purpose (research), only a small fraction of the total funding received from CISR sponsors and other sources is used to support the administrative staff and to support seminars. By far the majority of the money received is spent directly on research projects -- either to pay salaries of faculty, staff, students, etc. performing the research -- or to pay other research expenses.

Research Portfolio: With the diverse faculty noted above, it is logical that CISR research should also be diverse. It can, at some risk, be divided into four major categories. These are:

(1) Managerial use of computers and computer-based information;

(2) Improved information systems technology;

(3) Productivity and information systems; and

(4) The management of the information systems function.

With regard to the first area, the Managerial use of computers and computer based information, faculty at the Sloan School have long worked in the area of decision support systems. Continuing work in this area is being performed to develop an improved understanding of the way decision support systems are developed and implemented.

Research efforts are now underway to understand the way in which these decisions-aiding systems are justified. Graphic aids to managers are being researched. More recently, considerable work with regard to top management use of computer-based information has been initiated. In particular, the use of the "critical success factor" method as an aid in determining managerial information needs as part of the information systems planning process is being investigated.

Three or four diverse efforts are now being undertaken at CISR aimed at improved information systems technology. One major study, the subject of a large contract, is aimed at improved methods of allowing multiple processing units to communicate with multiple storage devices. New computer architectures to provide more efficient and effective processing in a heavily distributed world are also being studied. Work is also underway on data base design, including questions of the vallule of redundant data and the effects of different data base structures.

Work in the area of MIS productivity, has really just begun to be drawn together into a major field of research. Work is being done on the development of improved systems design processes, the evaluation of the benefits of structured systems analysis, and the evaluation of the productivity benefits of "end-user programming". Some of the newer productivity tools offered by various computer manufacturers are also being investigated, as are the pros and cons of "common systems". A major study is underway of the software industry which draws upon, and encompasses, much of the above.

Related closely to, and overlapping with, much of the above is the final area of major multi-faculty interest at CISR -- the management of

the information systems function. Here, studies are underway concerning "careers in data processing", the critical success factors of information systems executives, and the roles and organization structures of information systems departments. A major study of "end-user needs and view points" has cast much light on ways of thinking about managing the information systems function.

In one sense, each of these research thrusts -- viewed from one perspective -- looks very much like the "individual model" of research noted at the beginning of this paper. A faculty member is in charge of each research project. She/he has her/his own set of research associates and graduates working on the project. Yet, much funding as well as research ideas and research sites come through CISR. Discussions with sponsors in CISR seminars increases mutual understanding of both researchable fields and tentative or final research results. In addition, the center mechanism facilitates both good multi-view point conversation about each research project, and the drawing together of multi-disciplinary research teams to work on each project where appropriate. The CISR experience suggests that one can have both the benefits of the center and the benefits of individual-based research project responsibility.

Methods of Sponsor Interaction: CISR's sponsors work with the center in generating new knowledge concerning information systems through six basic CISR research oriented activities. In addition, they learn about the results of all research projects and have an opportunity for exchange of ideas through six disemination vehicles. These modes of interaction are noted below.

Sponsoring organizations may participate in CISR research efforts in the following ways:

1. By serving as a site for an on-going faculty or staff research project.

2. By developing and suggesting pilot research in a new field expected to be of generalized research interest to other sponsors and information systems managers or line executives in general.

3. By having a student team work on-site for a term or thesis project in an area of mutual interest to faculty and the sponsor where, although the research benefits to the field may not be absolutely certain, the educational benefits to the students are.

4. By sending a sponsor employee to MIT to take part in a research effort as a CISR fellow.

5. By having existing staff collaborate with CISR faculty on a research project. In this mode, the sponsor agrees to carry out particular aspects of the research himself.

6. By exchanging written materials representing (for the sponsor) proposed new information systems processes or structures and, (for CISR faculty) research or position papers -- for mutual commenting.

CISR's sponsors participate in the disemination of research findings in the following ways:

1. By attending the annual "research results" summer seminar run by the center which, although it is open to non-sponsor personnel, is available free for a limited number of sponsor personnel.

2. By attending other CISR single-subject seminars at which sponsors and CISR faculty gather to discuss a particular area of interest -- such as managing information systems in a distributed environment.

3. By attending one-day seminars, reserved for sponsors and others participating as research project sites, in which a single research project is reported upon by CISR faculty and staff.

4. By receiving CISR working papers which present research results, and faculty viewpoints.

5. By discussing relevant areas of interest with faculty and staff researchers through visits by sponsor personnel to MIT or by CISR staff visits to the sponsor.

6. By scheduling CISR faculty or staff to deliver a talk at the sponsor's premises on relevant research results and viewpoints.

V. Research Center Benefits

With information systems being an emerging area in which research is being performed, we think the concept of a "research center" is a significant means of facilitating research. Having given some detail as to the nature of our two information systems research centers, we now turn to a discussion of what we see as the advantages of such centers. They are:

Concentration of Resources: A primary benefit from having a "research center" for work in the information systems area is that capable resources are concentrated in a manner which allows the performance of large scale, high quality, visible projects. The New England (NEEMIS) and Upper Midwest (REIS) energy information systems projects, and the Minnesota Experiments are examples. The MIS field needs outputs of this type and having established, well staffed research centers allows this type of project to be undertaken.

The concentration of resources is important for another reason -- that of having a "critical mass". To do high quality research requires not only talent but also stimulation and a variety of viewpoints on a problem. Research centers with their faculty, staff, graduate

assistants, and frequent visitors (both practitioners and academics) create an exciting environment. Research meetings, presentations, thesis defenses, colloquia, and seminars are the order of the day in a research center.

Connection to the Real World: Having a collection of resources that are sufficient to take on large, difficult projects requiring a variety of talents makes possible the philosophy under which both centers operate -- a close interaction with the business/government community. Although our centers do some purely theoretical work, the bulk of our activity has an applied focus. Having the research center with formal links to the practitioner allows easy access to real problems and organizational data. There also is a carryover to a focus on real, in contrast to artificial, problems. A good research center tends to attract people with both problems and, sometimes, funding.

Carryover to Education: The fact that a research center exists which is working on theoretical and practical problems carries over into the educational program of the institution at which the center is located. Examples, case studies, and research results all find their way into the classroom. More importantly, the graduate students working in the research center learn a great deal, perhaps much more than in formal classes. Further, the research center is a perfect vehicle for bringing about faculty/student interaction.

Benefit to the Area: Perhaps the long-run, most important benefit from having information systems research centers is that they permit doing the type of work which is so vitally needed to enhance the image of the MIS area. By having a research center, properly equipped and staffed, significant work can be sought which otherwise would be too

large, have too many risks in its output, or be too multi-faceted for an individual to address. Obtaining these projects can provide visibility to the MIS area that otherwise would be unavailable. Performance on these significant projects feeds on itself in that, with a good reputation, more and more projects flow in.

Indirect IS Support: A final research center benefit is the ability to use the center to support activities for the common good or to fund "start-up" activities. For examples, since its inception in 1968, the MISRC has hosted literally hundreds of visitors from all over the world for short visits and longer stays. This past year there were six visiting faculty staying at least ten weeks. The MISRC has also played a major role in hosting conferences. Two national SMIS conferences and a national ACM conference are examples. Starting up the MIS Quarterly is a project partially supported by MISRC "risk capital". CISR "start-up" funding has been used primarily for research which might otherwise have been unfunded -- much of which has been exceptionally useful.

VI. Problems with IS Research Centers

The two information systems research centers discussed here are quite different. Through the experiences of each, a set of problems or difficulties can be identified. Some of these the centers have in common, while others are unique. This paper's two authors, as we wrote, found ourselves in almost complete agreement as to the reasons favoring the creation of centers (Section I.) and the benefits of these centers (Section V.) For the final two sections of the paper, however, our more different views suggested that individual sections

would be preferable to provide the reader with as much insight as possible. Thus:

MISRC (Dickson): One of the "problems" with having an information system research center is the fact that it takes several years of devotion, time, and effort to start up an undertaking of this sort. One frequently hears that another school would like to start a research center of some sort, and we are asked about funding, deliverables and so forth. Seldom heard is a level of commitment on the part of one or two persons that is needed to start and build a successful research center. Gordon Davis and Gary Dickson each devoted about five years of their lives to making the concept work.

A related problem occurs regarding devoting time to managing the relationship with sponsoring organizations. It takes a unique academic to want to do this and to do it well. Academics tend to be involved in teaching, research, and working with doctoral students. They do not necessarily function well serving sponsors. This is one reason why the position of Assistant Director responsible for industry interaction has worked well in the case of the MISRC.

Base level funding for the MISRC continues to be a problem because it is time consuming and continuous. We have to watch carefully how our sponsors are being served and see that a quid pro quo is given. The time spent on obtaining each firm's annual $5,000 is significant. It has helped that most sponsors now spend the money out of data processing budgets rather than seeking corporate contributions. Naturally, there is attrition in sponsors (for various reasons) and new sources of funds must continually be sought. We are fortunate that frequently potential sponsors come to us.

A bit of advice regarding sponsoring organizations is that a center have a fixed package of deliverables rather than making a series of individual promises. At the onset of the MISRC, many sponsors thought that if we did "research" it would be on a particular problem for them (what we call consulting). Consulting may be done for sponsors by individual faculty on a personal basis, but it took awhile to agree with the sponsors that MISRC "research" projects must have generality.

We, of course, suffer as a research center from peaks and valleys in the demand for projects and thus, resources. Exacerbating the problem is that it is difficult to quickly expand the research staff (faculty and graduate students). It also seems that just as soon as a graduate student is trained and proficient, they finish their degree and are gone. Thus, we must tolerate almost total turnover in student help about every two to three years. This factor makes project planning and management difficult but is common to virtually all university research centers.

Because information systems trained researchers are so few and far between, it is difficult to obtain quality personnel, especially given the variety in our projects. We have found that our senior Ph.D students are very good, but they take time to develop and are soon lost.

A particular problem is the interaction between the teaching and research mission. Even though a very worthwhile research project may come along, we may be forced to refuse it because key faculty resources are committed to teaching and cannot be released to work on the research project. The only alternative is to staff courses with

graduate students which can only go so far. We cannot staff graduate courses, in particular, with junior faculty, and thus are constrained in the number and type of projects which may be undertaken. Frequently, short lead times on starting projects makes this problem especially severe.

Finally, we find that frequently we are tempted to undertake research projects simply because funds are available rather than that the project fits our mission and talent. Chasing dollars means that our resources are funded and kept busy, but our products become fractionated and diverse. Further, the quality level of our output may slip because of moving away from our specialty. The best rule is to fund that which we want to do and are good at, but money sources frequently have priorities otherwise.

CISR (Rockart): The things that Gary says with regard to the need for continuing funds, the need to have sponsors understand that you are in the business of research and not consulting, and the significant commitment of time and energy necessary to give birth to a center and to make and keep it viable all sound very familiar. I can second each of them. However, there are three "problems" on which I would like to focus in this section.

The first is the problem of getting a bunch of highly independent, very able, very busy faculty to divert time from their current pursuits to work on sponsor-generated research problems. This is not an easy task. We have tried to deal with this problem in four ways. First, with "settled" faculty members, by carefully matching sponsor ideas to their current fields of research. Second, with younger faculty

members, by attempting to influence their choice of research themes with logic, money, available research sites, and research assistance. Third, by attempting to influence the faculty hiring process to bring on board the faculty mix to handle some of the significant research fields. Finally, where no other faculty member was interested, I have taken on important sponsor-suggested research projects myself with the aid of our full time research staff. This last approach is, I think, very important. There are key research projects which must be performed from time to time to have the Center's work be positioned in the mainstream of sponsor concerns. Obviously, we can not meet all sponsor research needs. But some of the key needs must be met to give the Center a positioning of being on the leading edge of real-world MIS concerns.

The second major problem, closely related to the first, is the problem of maintaining the right relationship between persuading faculty to take on sponsor-related research and not interfering with the junior faculty's need to dictate their own path to tenure. It is very, very easy to convince oneself that a particular project would be a marvelous stepstone to tenure for a particular faculty member and to do more than one's share of persuasion to ensure that the project gets worked. Yet the whole academic tenure process suggests a less aggressive posture. In general, we have tried to stay on the side of merely "making available" ideas, funds and assistance and letting a faculty member build his own enthusiasm for the project.

Finally, most University salary structures and administrative procedures (including those at MIT) make it difficult to obtain and keep the calibre of person one needs in a sponsor-oriented center. The

center atmosphere has to be somewhat more businesslike -- and often more hardworking -- than in much of the rest of the University. The calibre of people one needs, their motivation to perform well, etc. must be high. Salary structures, in particular, at most universities are not oriented toward this type of person below the faculty level. The result is the expenditure of significant effort to attract and retain good people.

VII. Lessons Learned

MISRC (Dickson): It is no doubt that being associated with an established information systems research center is a very large plus for an academic in the area. One has access to a support staff, colleagues, students, and an exciting, stimulating environment. Especially attractive is the link our center has to the local business community and to national professional associations. We have a "critical mass" of resources which facilitates productivity. A significant amount of my time has been spent evolving the research center concept and making it work. I often ask myself, "Would I do it again?" My answer is, "Absolutely not, the personal cost is too high." I would join an established group which someone else managed, but I'd not try to start from scratch.

My attitude does not mean that someone else should not try to create a research center in information systems. I've learned from my experience, though, that whoever chooses to do so had better have a lot of dedication. Further, they had better be in the proper location and time the effort just right. Finally, a well thought out product must

be identified and delivered. No center should try to copy another; each should be somewhat unique.

In summary, the lesson I learned was that to succeed with an information systems research center one must: (1) plan carefully; (2) work awfully hard; (3) get a great deal of help from colleagues and supporters, and (4) be a little bit lucky.

CISR (Rockart): Perhaps the key question here is Gary's "Would I do it again?" In my case, the answer is "Yes, absolutely." Despite all the problems (and perhaps because our centers are quite different, or that individually we are motivated by different things), I would certainly do it again....for the following reasons:

(1) There is the almost daily contact with one or another of a set of highly able, pragmatic yet insightful information systems managers and key staff personnel who are sponsors. I have learned a tremendous amount from them concerning informations systems use and management, and have had many insights into the field which I would not otherwise have had.

(2) The applied focus of the center's operation, and the depth and range of the work possible with a center, provides a sense (rightly or wrongly) of being on top of the field, working the key issues in the field, and perhaps even helping to shape the field to a much greater extent than one could do as an individual.

(3) Finally, all the Center benefits of interaction, scale, and visibility have led to me personally being able to find several interesting research topics, and to have the resources and sites to work them. If it were not for CISR, I strongly suspect (although one

never knows) that I would not have had the same personal research experience. And I certainly would not have had the very able assistance in that research from the members of our research staff whose names are noted earlier in this paper.

Yes, as of October, 1980, at least, I would certainly do it again.