

# A MARKET RESEARCH STUDY FOR GRADUATE EDUCATION IN MANAGEMENT INFORMATION SYSTEMS

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***ABSTRACT:** The purpose of this study was to determine the motivations for graduate study in information systems and to assess the importance of developing managerial competencies, technical competencies, and management of information systems skills as a part of a graduate program. A sample of MIS professionals and a sample of functional area managers was selected for the study.*

*The findings showed that both the MIS professionals and functional area managers are interested in managerial competencies. In terms of managerial skills, the top-ranked competency was "managing and motivating personnel." The MIS professionals also emphasized the importance of "project budgeting and control." Both the MIS professionals and the functional area managers agreed that knowledge of "information systems design" was the most important technical competency. In terms of competencies associated with the management of MIS, the top-ranked item was "strategic management," or the process of identifying information technology plans which support organizational plans.*

*The market research study has led to the development of an MIS specialization within the MBA degree in response to the growing interest of functional area managers. The MIS and Computer Science faculties have also developed a joint Master of Science in Computing and Information Systems to provide a comprehensive graduate program with areas of technical and managerial emphasis.*

**KEYWORDS:** Market Research, Master's Program, Technical and Management Competency

## BACKGROUND

The MIS curriculum is in a constant state of change. The changing needs of students, the changing expectations of industry, and the changing nature of the MIS profession itself are factors which dictate a continuing review of the focus of MIS curricula. One of the challenges of curriculum development is defining the market for a particular program and developing competencies which support the objectives of that market.

At the graduate level, two different markets exist for graduate education in Management Information Systems within the Business curriculum at Southern Illinois University at Edwardsville. The first of these markets consists of information systems professionals seeking advanced degree opportunities. The second market consists of functional area managers who are assuming responsibilities for information systems planning and development and who seek a graduate

program with a strong emphasis in information technology planning and management.

The Master of Science in Management Information Systems serves both of these markets. In Spring 1990, the Management Information Systems faculty decided to conduct a market research study to determine the needs of both markets and to identify curriculum competencies in a more focused manner.

## OBJECTIVES OF THE STUDY

The major objective of the market research study for graduate education in information systems was to answer several questions:

1. What are the motivations for graduate study in information systems?
2. Are MIS professionals and functional area professionals interested in a graduate program with a business emphasis, a technical emphasis, or both?
3. What are the managerial competencies, technical competencies, and management of information systems skills desired by MIS professionals and by functional area managers in a program of graduate study?
4. What factors influence the choice of a graduate program?

## BACKGROUND LITERATURE ON MANAGERIAL COMPETENCIES IN MIS

Since the Master's program in Management Information Systems is designed to prepare its graduates to assume roles as information systems analysts and managers of information systems development, it is useful to briefly review other studies about important competencies for systems analysts, designers, and project managers.

Most studies of systems analysts' skills report that behavioral skills are more important than technical skills. In a study by Cheney and Lyons (1980), several of the highest-ranked skills for systems analysts were information gathering, systems design, project planning and control, and human relations. Technical skills, such as knowledge of operating systems, job control languages, and programming techniques, were considered much less important.

In his study of the skills needed to determine information requirements, Vitalari (1985) sought to distinguish between the knowledge categories used by high-rated vs. low-rated systems analysts.

Both the high-rated and low-rated systems analysts were more concerned with understanding functional requirements, business procedures, and reporting needs than with organizational issues. This is consistent with a focus on behavioral issues, since the process of understanding user requirements involves effective communications.

In Green's study of the differences of perceptions of systems analysts and users with respect to the importance of job skills and job roles, the analysts recognized the importance of behavioral skills more than the users (Green, 1989). Some of the most critical skill variables reported by the systems analysts were interviewing, listening, cooperation, application knowledge, and the ability to translate user requirements into functional systems design specifications. The most significant role variables identified by the analysts were Designer, Communicator, and Consultant.

***Most studies of systems analysts' skills report that behavioral skills are more important than technical skills.***

Although the users ranked skill variables such as interviewing, listening, and the ability to understand user information requirements high, they also expected analysts to exhibit technical skills such as programming, directing, and training. If both the perceptions of systems analysts and users are taken into account, then competencies for effective systems development include both technical skills and behavioral skills.

User involvement is a critical success factor in information systems design. In a study by Kaiser and Srinivasan (1982), both users and systems analysts viewed effective communications as critical. In another study, higher quality designs were developed when users were closely involved, largely because the designers were able to understand the underlying

problems in the current system (Boland, 1978).

The results of these and other studies of important skill variables in information systems design all stress the importance of effective communications between the user and systems analyst and the value of behavioral skills. The manager of information systems must be both a technical and a managerial expert. On the technical side, the manager must be literate across many information systems areas. On the managerial side, the MIS manager must be skilled in planning, organizing and directing personnel (Cheney and Lyons, 1980).

Studies of information systems management in the future point to the increasing importance of an understanding of business priorities, so that information technology plans can be designed to support business plans. The MIS executive of the future must understand the competitive strategy of the organization and be able to use computer-based information systems to achieve such goals as increased market share, product success, and better customer service.

## METHODS FOR CONDUCTING THE STUDY

The population for this study included graduates of Business programs at Southern Illinois University at Edwardsville with three to five years of experience. A sample of 50 respondents was selected from this population. Of these respondents, 25 held positions in the information systems field, and the other 25 worked in functional areas, such as Accounting, Marketing, Finance, and Personnel Administration. The 25 respondents who were information systems professionals reported a variety of position titles as shown in Table 1. The functional area managers had a wide variety of job titles as shown in Table 2.

Each of the respondents participated in a telephone interview which covered the market research questions in approximately eight to ten minutes. The telephone interviews were conducted by a market research analyst and a graduate assistant.

**Table 1: POSITION TITLES OF MIS RESPONDENTS**

<u>Position Title</u>	<u>Percentage</u>
Programmer/Analyst	35%
Manager, Information Systems Development	24%
Senior Systems Analyst	15%
Systems Administration (incl. Security)	8%
Manager, PC Systems	4%
Other	14%

**Table 2: JOB TITLES OF FUNCTIONAL AREA MANAGERS**

<u>Position Title</u>	<u>Percentage</u>
Area Manager	20.3%
Sales Manager	8.4%
Senior Cost Analyst	8.4%
Administrative Asst.	8.4%
Admin. Manager	8.4%
Finance Manager/Analyst	8.4%
Contracts Admin.	4.2%
Account Manager	4.2%
Other	29.3%

**Table 3: MASTER'S DEGREE ESSENTIAL FOR CAREER ADVANCEMENT BY FUNCTIONAL STATUS**

	MIS		FUNCTIONAL		TOTAL	
	#	%	#	%	#	%
1 Strongly Agree	10	38.5	7	29.2	17	34.0
2 Agree	7	26.9	7	29.2	14	28.0
3 Neither	3	11.5	5	20.8	8	16.0
4 Disagree	6	23.1	3	12.5	9	18.0
5 Strongly Disagree	0	0.0	2	8.3	2	4.0
TOTAL	26	100	24	100	50	100

**Table 4: PRIMARY REASON FOR MASTER'S DEGREE-BUSINESS BACKGROUND BY FUNCTIONAL STATUS**

	MIS		FUNCTIONAL		TOTAL	
	#	%	#	%	#	%
1 Strongly Agree	5	19.2	4	16.7	9	18.0
2 Agree	9	34.6	12	50.0	21	42.0
3 Neither	8	30.8	6	25.0	14	28.0
4 Disagree	4	15.4	1	4.2	5	10.0
5 Strongly Disagree	0	0.0	1	4.2	1	2.0
TOTAL	26	100	24	100	50	100
MEAN	2.42		2.29		2.36	

## FINDINGS OF THE STUDY

A number of interesting issues emerged from the results. These issues included the importance of an advanced degree, the motivations for pursuing a Master's program, the most preferable type of degree (MBA vs. M.S degree), the importance of technical vs. managerial skills, and the major technical and managerial competencies to be developed in an MIS program.

### Importance of the Master's Degree

Many of the respondents felt that a Master's degree was essential for career advancement. This was true of both the MIS professionals and functional area professionals. As you can see in Table 3, about 65 percent of the MIS professionals viewed a Master's as essential for career advancement. Work experience is also essential. Further data illustrated that 75 percent of the members of both groups (MIS and functional) viewed work experience as even more important than graduate study.

### Motivations for Graduate Study

With regard to the question of motivation, about two-thirds of the functional area professionals and slightly over half of the MIS professionals cited acquiring a better business background as a primary reason for pursuing a Master's degree. (See Table 4)

Once technical professionals have gained three to five years' experience in programming and analysis, they may aspire to positions as project managers and supervisors. They need a better business background in order to understand users' requirements and in order to manage people, time, and resources to accomplish design projects.

Technical knowledge is a lesser reason for pursuing graduate study, although almost half of the functional area managers pointed to the need to acquire technical knowledge. Managers with an accounting, marketing, or sales background may want to improve their technical knowledge when they find themselves in the position of making decisions on local

area networks, software packages, and microcomputers. (See Table 5)

As you can see from these data, the MIS professionals placed less emphasis on technical skills. Only 30 percent noted that technical skills are a motivation for a Master's degree, and about half "disagreed" that technical knowledge was a reason for graduate study. This can be explained by the fact that many MIS professionals already have a technical background and wish to acquire a business background to assume managerial responsibilities in the future.

Because of the emphasis on attaining a "business" background, as opposed to a "technical" background, the MIS professionals preferred an MBA degree with an MIS specialization to an M.S. in Management Information Systems or a general MBA degree. While about one-third of the functional area professionals preferred an MBA with an MIS specialization, most of them sought a general MBA degree. (See Table 6)

It seems that some functional managers want to acquire technical knowledge in the context of an MBA degree, while others prefer a generalist degree. MIS professionals definitely sought the MBA degree as a strategy for gaining managerial skills.

#### Competencies within a Master's Program

The respondents were asked to identify and to rank managerial skills, technical skills, and management of MIS skills which they wanted to acquire as part of a Master's program. The listings of competencies in each of these three areas was developed from pilot open-ended interviews. The most-frequently mentioned competencies in each of the three categories were included in the telephone interview.

In terms of managerial skills, the top ranked competency was "managing and motivating personnel." While the MIS professionals ranked "project budgeting and control" second, the functional managers felt that "goal setting and

**Table 5: PRIMARY REASON FOR MASTER'S DEGREE-TECHNICAL KNOWLEDGE BY FUNCTIONAL STATUS**

	MIS		FUNCTIONAL		TOTAL	
	#	%	#	%	#	%
1 Strongly Agree	2	7.7	3	12.5	5	10.0
2 Agree	6	23.1	8	33.3	14	28.0
3 Neither	5	19.2	3	12.5	8	16.0
4 Disagree	10	38.	9	37.5	19	38.0
5 Strongly Disagree	3	11.5	1	4.2	4	8.0
TOTAL	26	100	24	100	50	100
MEAN	3.23		2.88		3.06	

**Table 6: MOST BENEFICIAL DEGREE BY FUNCTIONAL STATUS**

	MIS		FUNCTIONAL		TOTAL	
	#	%	#	%	#	%
MS MIS	6	23.1	1	4.2	7	14.0
MBA General	9	34.6	16	66.7	25	50.0
MBA Spec. MIS	11	42.3	7	29.2	18	36.0
TOTAL	26	100	24	100	50	100

**Table 7: RANKING OF MANAGERIAL SKILLS BY FUNCTIONAL STATUS**

	MIS		FUNCTIONAL		TOTAL	
	Rank	#	Rank	#	Rank	#
Goal Setting & Strategy Dev.	3	38	2	46	2	84
Project Budgeting & Control	2	41	4	21	3	62
Making Org. & Human Resource Decision	4	23	3	27	4	50
Managing/Motivating Personnel	1	54	1	50	1	104

**Table 8: RANKING OF TECHNICAL SKILLS BY FUNCTIONAL STATUS**

	MIS		FUNCTIONAL		TOTAL	
	Rank	#	Rank	#	Rank	#
Advanced Development Tools	2	44	2	33	2	77
Programming	4	15	4	13	4	28
Technical Knowledge Hardware/Software	3	30	3	29	3	59
Information System Design	1	61	1	51	1	112



strategy development" was second in importance. The emphasis on project budgeting and control on the part of the MIS professionals can be explained by their responsibility for controlling systems development projects. (See Table 7)

The first-ranked technical skill was "information systems design," followed by "advanced development tools." This was true for both the MIS professionals and the functional managers. These rankings are consistent with the centrality of information systems design and the focus on improving application development productivity. The use of an effective design methodology, along with rapid prototyping and application development techniques, can address the productivity issue. This issue is clearly of great concern to the owners, who need information systems to support business functions, and to the designers and builders, who are responsible for accomplishing the results.

As you can see from Table 8, the technical skills, including knowledge of hardware/software and programming, were considered less important. In fact, programming was of relatively minor importance. This is consistent with the expressed need for a "managerial" rather than "technical" focus within an advanced degree.

In terms of the competencies associated with management of MIS, the top-ranked item was "strategic management," or the process of identifying information technology plans which support organizational plans. This was foremost in the minds of the MIS professionals. The second-ranked competency was "managing the systems development life cycle," and the third was "evaluating alternative development methods." (See Table 9)

These issues are clearly in the minds of both functional managers and MIS professionals, because of the overwhelming need to improve systems development productivity. This improvement can be facilitated by better management of the life cycle and by use of alternative development strategies, such as software packages, prototyping with 4GL's, and contracting

**Table 9: RANKING OF MANAGEMENT OF MIS SKILLS  
BY FUNCTIONAL STATUS N=44**

	MIS		FUNCTIONAL		TOTAL	
	Rank	#	Rank	#	Rank	#
Managing Systems						
Dev. Life Cycle	2	39	2	31	2	70
Organizing MIS	4	28	4	17	4	45
Evaluating Alternative Dev. Methods	3	29	3	23	3	52
Strategic Management for MIS	1	60	1	37	1	97

**Table 10: DOLLARS ALLOCATED FOR TECHNICAL SKILLS  
BY FUNCTIONAL STATUS**

	MIS		FUNCTIONAL		TOTAL	
	#	%	#	%	#	%
0	2	7.7	3	12.5	5	10.0
1-1000	4	15.4	0	0.0	4	8.0
1001-2000	6	23.1	9	37.5	15	30.0
2001-3000	7	26.9	7	29.2	14	28.0
3001-4000	3.8	2	8.3	3	6.0	
4001-89995	19.2	3	12.5	8	16.0	
9000	1	3.8	0	0.0	1	2.0
TOTAL	26	100	24	100	50	100
MEAN	2950.96		2366.67		2670.50	
PERCENTAGE	32.8		26.3		29.7	

for software development services. One of the objectives of the graduate program should be to examine the characteristics of applications which create cost-effective opportunities for the use of alternative application development approaches.

#### **The Relative Importance of Technical, Managerial, and Management of MIS**

The relative importance of the various types of competencies was considered by asking respondents to allocate dollars, in increments of \$1000 and not exceeding \$9000, to these categories.

The overall percentage of dollars allocated for technical skills varied. The MIS professionals allocated 33 percent of the total \$9000 for technical skills, whereas the functional managers allocated about 26 percent of the total. This finding is consistent with earlier results showing that some technical component should be

maintained within the graduate program. (See Table 10)

In terms of the allocation of dollars for managerial skills, the functional managers allocated almost 44 percent of their dollars, as compared to the MIS professionals, who allocated about 35 percent. Both groups were clearly interested in a strong managerial component to the curriculum. (See Table 11 on the following page)

Both the functional area managers and the MIS professionals were also interested in acquiring skills in the "management of MIS." Both groups allocated approximately one-third of their dollars in the management of MIS category. This is consistent with the overwhelming importance of managing and improving the productivity of systems development projects. (See Table 12 on the following page)

**Table 11: DOLLARS ALLOCATED FOR MANAGERIAL SKILLS BY FUNCTIONAL STATUS**

	MIS		FUNCTIONAL		TOTAL	
	#	%	#	%	#	%
0	2	7.7	1	4.2	3	6.0
1-1000	1	3.8	0	0.0	1	2.0
1001-2000	5	19.2	3	12.5	8	16.0
2001-3000	8	30.8	5	20.8	13	26.0
3001-4000	4	15.4	6	25.0	10	20.0
4001-8999	6	23.1	7	29.2	13	26.0
9000	0	0.0	2	8.3	2	4.0
TOTAL	26	100	24	100	50	100
MEAN	3124.04		3925.00		3508.50	
PERCENTAGE	34.7		43.6		38.9	

The data on dollars allocated for various types of competencies in a graduate program indicate that technical skills, managerial skills, and skills in the management of information systems are all important components of a graduate program. Greater emphasis should be placed on the managerial component, as compared with the technical component.

### **Important Factors in a Master's Program**

Finally, the respondents were asked to rank-order a number of factors which are associated with program quality. The most important factor was "quality of program faculty," followed by the opportunity to gain "hands-on experience." "AACSB accreditation" and "convenience" were lesser concerns. (See Table 13)

### **CURRICULUM RECOMMENDATIONS**

The Master's Market Research study has led to the development of two directions for graduate study. The first of these directions is the design of an MBA specialization emphasizing managerial competencies. The second curriculum initiative is the design of a joint Master of Science in Computing and Information Systems with the Department of Computer Science.

### **The MBA Specialization in MIS**

The MBA specialization was developed with several markets in mind. The first of these markets consists of functional area managers who are preparing for responsibilities in the development of information systems supporting functional areas of the business. The second market consists of MIS professionals who plan to assume responsibilities in project management, new technology planning, and information systems design. Another market includes managers of information systems development within the contract software development and "Big 6" accounting firms.

The MBA specialization is designed to prepare students in the management of

**Table 12: DOLLARS ALLOCATED FOR MANAGEMENT OF MIS SKILLS BY FUNCTIONAL STATUS**

	MIS		FUNCTIONAL		TOTAL	
	#	%	#	%	#	%
0	2	7.7	4	16.7	6	12.0
1-1000	0	0.0	0	0.0	0	0.0
1001-2000	8	30.8	5	20.8	13	26.0
2001-3000	7	26.9	9	37.5	16	32.0
3001-4000	4	15.4	2	8.3	6	12.0
4001-8999	5	19.2	3	12.5	8	16.0
9000	0	0.0	1	4.2	1	2.0
TOTAL	26	100	24	100	50	100
MEAN	2923.08		2708.33		2820.00	
PERCENTAGE	32.5		30.1		31.3	

**Table 13: RANKING OF "IDEAL" MASTER'S PROGRAM FACTORS BY FUNCTIONAL STATUS**

	MIS		FUNCTIONAL		TOTAL	
	Rank	#	Rank	#	Rank	#
Quality of Program Faculty	1	52	1	54	1	106
Hands-On Experience	1	52	2	47	2	99
AACSB Accreditation	3	28	3	26	3	54
Convenience of Location	4	24	4	17	4	41

new information technology and the management of information systems design projects. The four courses in the MBA specialization include:

**MIS 570: Information Systems Analysis**

This course enables students to learn the tools and techniques of requirements analysis, using process-oriented and data-oriented techniques. These methodologies focus on re-engineering, re-structuring, and simplifying work methods and procedures.

**MIS 572: Information Systems Design**

This course provides background in the design of information systems, including the development of requirements specifications using the prototyping approach. Issues include: the evaluation of alternative design options, cost-benefit analysis, quality assurance, documentation, and systems implementation. Rapid prototyping and computer-assisted software engineering approaches are also examined.

**MIS 564: Database Design**

This course provides knowledge of enterprise-wide data modeling, logical database design, and the management of data resources to support multiple business functions. Students construct logical data models, logical data structures, and implement a physical database design in order to generate management reports.

**MIS 540: The Management of Information Systems Development**

This course is designed to focus on planning strategies and the management and control of information systems development projects. The course compares the traditional systems development life cycle with alternative approaches, such as rapid prototyping, use of software packages, and information engineering with data-driven techniques.

The MBA specialization will provide thorough knowledge of information systems development within the context of a general management degree. The other alternative will be the Master of Science

**The Master of Science in Computing and Information Systems**

The second option for graduate study in information systems is a new program entitled the Master of Science in Computing and Information Systems. This program is a joint program of the Department of Management Information Systems within the School of Business and the Department of Computer Science within the School of Science. The program provides both a "technical" and a "managerial" focus.

The program was originally developed in response to the need to coordinate faculty resources in the computing and information systems discipline across the campus. The MIS faculty in the School of Business had such teaching areas as information systems design, database design, and decision support systems, but did not have adequate expertise to teach operating systems, programming languages, and data communications and networking. In contrast, the Computer Science faculty had technical expertise in data communications, artificial intelligence, and languages, but did not have the breadth to provide courses in the business applications of computing technology.

The new M.S. in Computing and Information Systems program is designed to prepare systems professionals who can apply their knowledge of computing technology and its applications to the regional economy. The program has a technical and a managerial focus, so that students can pursue a specialization which is consistent with their needs and interests.

**The Program of Study**

The program of study consists of a Computing and Information Systems core which provides a foundation in both technical concepts and systems design: The six-course core includes:

- MIS 564: Database Management Techniques
- MIS 570: Structured Analysis Techniques
- MIS 572: Structured Design Techniques

- CS 514: Operating Systems
- CS 516: Computer Architecture
- CS 520: Data Communications and Networks

In addition to the core, the program provides students with an opportunity to take four electives from one of two groups. One of these groups emphasizes software engineering techniques, and the other focuses on computing technologies. Examples of courses from each of these groups include:

**Software Engineering Elective Group**

- MIS 588a: Software Engineering
- MIS 588b: Advanced Database and Information Engineering
- MIS 540: Management of Information Systems Development
- CS 425: Software Project Development
- CS 537: Expert Systems

**Computer Technology Elective Group**

- CS 416: High Performance Computer Systems
- CS 438: Introduction to Artificial Intelligence
- CS 482: Computer Graphics The M.S. in Computing and Information Systems will have a culminating project which will involve the analysis, design, and implementation of a system using technologies and methodologies which are covered in the program.

Studies of student demand and occupational demand for the proposed program indicate that the program will address the recurring need for systems analysts, software engineers, technical support specialists, and data communications professionals. Interpersonal and communications skills sought by employers are integrated throughout the proposed M.S. in Computing and Information Systems program and will receive special emphasis in the software development and systems design courses.

The program will also afford students the opportunity to select electives which will enable them to develop proficiency in such areas as network design, graphics, software engineering, expert systems development, and the management of information systems development. This combination of general knowledge of software development and specialized knowledge of computing technologies will provide graduates with optimum flexibility with respect to meeting the computing needs of the future.

### CONCLUSIONS

The market research study for the Master's program in Management Information Systems provided a number of effective insights. The department faculty developed an MIS specialization within the MBA degree in response to the increasing interest of functional area managers in information systems development. The MBA specialization was also well-suited to the needs of MIS professionals who were planning to move into roles as project managers, consultants, and technology planners.

In contrast, the plans for the new M.S. in Computing in Information Systems address a different need. This program provides a technical and a managerial focus for those who are interested in a comprehensive set of courses in computing technology and its applications. Graduates of this program will be able to serve as agents of "technology transfer" in the regional market. Their skills will be particularly useful in the context of small and mid-sized businesses which are beginning to take advantage of the uses of information technology.

The changing market for graduates of information systems academic programs is creating new opportunities for MIS faculty to assess needs and to develop program options and specializations to address these needs. In some cases, MIS faculty members may need to collaborate with faculty in other disciplines to provide quality programs. The collaboration between MIS and Computer Science faculty in developing a joint Master of Science program is one example of the type of work that can be done to provide greater flexibility for students.

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