OVERVIEW OF THE

USER NEEDS SURVEY RESEARCH PROJECT

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INTRODUCTION

The User Needs Survey is a major research project that has been underway at the Center for Information Systems Research since 1978. The study was motivated by the desire to better understand the managers who are the end-users of computer-based information systems and the issues involved in fulfilling their information needs.

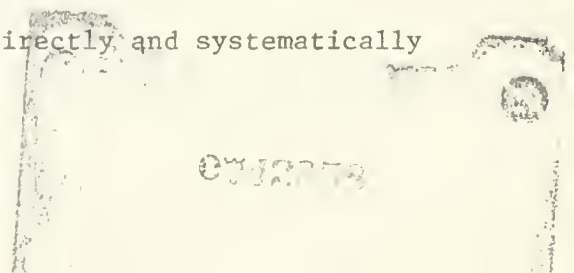
We wanted to know what user managers considered the strengths and weaknesses of the information systems (I/S) departments in their companies. We wanted to find out what types of systems user managers had currently, which of their tasks were suitable for computer support, what types of systems they were currently demanding, and what they would be requiring in the future.

In addition, we were looking for a profile of user managers -- their capabilities vis-a-vis information systems -- in order to better understand what role users should play in developing information systems and establishing policies for their firms' I/S departments.

We also sought to understand the I/S department's view of itself, of its user managers and their needs, and of the factors contributing to the satisfaction of those needs.

The understanding thus gained has enabled us to develop practical recommendations that can aid both I/S and user management in fulfilling users' information needs.

Essential to the development of these recommendations has been the nature of the survey itself, which directly and systematically



queried user as well as I/S managers on information systems needs.

Over one thousand managers from the information systems, financial, and manufacturing departments of nineteen companies participated in the survey. The quality and usefulness of the data collected are excellent. Results from the data already analyzed appear in the papers listed in Appendix A. Analysis continues, and further results will appear in forthcoming papers.

TOPICS INVESTIGATED

The topics investigated in the survey fall into three categories -- the information systems department viewed from within, the user managers' information systems needs and experience, and planning for the I/S department. The topics are listed below:

The Information Systems Department Viewed from Within

Staff education, training, and experience

Perception of users' attitudes toward computers

Perception of factors which frustrate users

Systems Analysts' skill development

Job satisfaction and personnel evaluation standards

Career paths and management support

Relationships among groups within the I/S department and their mutually perceived quality level

Users' Information Systems Needs and Experience

Education, training, and experience

Attitudes toward computers

Usage of terminals and computer-generated reports

Users' capabilities -- How well can user managers participate with the I/S department in systems development and in ongoing operations?

User job characteristics and corresponding systems needs

Actual and desired levels of user influence in structuring the systems development process

Sources of user frustration with the I/S department

Users' preferences for various supplemental services from the I/S department

Information Systems Planning and Systems Development

Defining success for the I/S department -- Including a method for measuring success, for diagnosing problems, prioritizing improvements, and allocating resources.

Proposal preparation support provided by I/S department to users

Proposal contents and the criteria used to approve proposals for new projects

Actual and desired levels of user and I/S participation throughout the systems development life cycle

Project budget, schedule, and benefits -- I/S and user expectations

Role of the I/S Steering Committee and user managers in project approval process

Centralization/Decentralization -- User and I/S department preferences concerning 'distributed processing' and how users intend to realize them.

Direct marketing by vendors to users -- I/S and user preferences

Users' alternatives to the I/S department -- Outside vendors, prepared packages, and user-developed systems

RESEARCH METHODOLOGY

Introduction

We decided that a questionnaire was the most practical mechanism for surveying a large number of managers. The design of the questionnaire, the process of sample selection, and the procedures for questionnaire

administration were carefully developed. We wanted the data collected to be of high quality, to be relevant to the study, and to yield practical recommendations.

We first had to construct a conceptual model for our research, a basis for defining the variables to be measured. This model determined the composition of the survey questionnaire -- the types of questions asked about the I/S department, user needs, and their mutual relationships.

Having developed the survey questionnaire, it was necessary to design a survey sample in such a way that we could generalize from the responses beyond the participating companies. This was achieved by choosing as participants a representative group of industrial companies.

To cover the range of responses and attitudes that might exist within any company we chose to survey financial departments (as the users having the longest experience with information systems) and manufacturing departments (as newer, rapidly growing, and important users of information systems).

To understand these departments thoroughly and to arrive at general conclusions about the I/S experience and needs of user managers, we chose as respondents managers representing both the levels of each department's hierarchy and the range of functions within each department.

We carefully planned the administration of the questionnaire so as to obtain the confidence and commitment of the respondents. These conditions contributed to our success in collecting high quality data.

Conceptual Model

The conceptual model provided a clear cut research plan that limited and defined what we would study. The model focuses on how, why, and under what conditions a user manager recognizes his needs for information systems; which processes are most appropriate for fulfilling various information systems needs; and what factors inhibit or facilitate the merger of needs recognition and needs fulfillment processes. The model directed attention to the inhibiting and facilitating factors within user and I/S departments and to the relationship between the departments.

Companies Surveyed

The nineteen participating companies were chosen to be representative of the entire industrial sector. They differed in industrial classification, size in terms of revenues, and I/S department budget in relation to total revenues.

Refer to Figure 1 for a profile of the nineteen companies studied. They included manufacturers of motor vehicles, food processors, and electronics firms. Their revenues ranged from under $100 million to over $5 billion. In several instances the parent corporation was too large to be considered one company in our sample so a major division was used. The I/S department budgets of the various companies ranged from .25% to 3% of their total revenues.

The companies also differed in geographic location; in corporate structure -- centralized or decentralized; in the size and structure of their I/S departments; in the reporting relationship of the I/S

Figure 1

PROFILE OF FIRMS SURVEYED

INDUSTRY CLASSIFICATION FOR THE 19 FIRMS

- o Paper, fiber and wood products
- o Rubber, plastics products
- o Chemicals
- o Aerospace
- o Communications
- o Food processing
- o Tobacco products
- o Textiles
- o Motor vehicles
- o Office equipment
- o Measuring, analyzing, and control equipment
- o Electronics

SIZE

Revenues	No. of Firms in this Range	No. of Firms with Parent Organizations in this Range
Over $10 billion	-	4
$5 - $10 billion	2	3
$1 - $5 billion	6	6
$500 million - $1 billion	4	2
$100 - $500 million	4	2
Under $100 million	3	2
	19	19

DP BUDGET AS A PERCENT OF REVENUES

Percentage Range	Number of Firms
2% - 3%	4
1% - 2%	5
0.5% - 1%	4
0.25% - 0.5%	6

department within the company; and in the amounts and kinds of hardware the companies had.

Departments Surveyed

We selected only I/S departments and corresponding user communities whose mutual relationship was clear -- the I/S department was responsible for providing services to the user community, and the user departments recognized the I/S department as their primary I/S supplier.

We chose to study the finance and manufacturing departments because of the significant contrast between them. They span the breadth of user experiences and hence are representative of the entire user community. Typically, Finance has used information systems support longer, has a larger installed base of applications systems, and uses a larger proportion of information systems services in relation to its size within the company than the manufacturing department. Manufacturing plays a more central role in the success of an industrial company but fewer of its information systems needs are supported by computers than are those of Finance.

Stratified Sample

We selected participating managers so as to form a representative sample of all managers within the Finance, Manufacturing and I/S departments. Participants included all ranks, from department head to junior manager, and all areas of responsibility within a department -- cost accountants, financial analysts, and other specialties in Finance, for example. Representation of ranks and areas of responsibility

was proportionate to their numbers within each department. Thus, the data obtained represented the whole range of managers within each department.

As shown in Figure 2, the distribution of participants was congruent with the hierarchy; respondents from Level 1 (heads of departments) constituted the smallest percentage, 5.9% of the sample, and respondents from Level 4 (first-line managers with an average salary of $25,000) composed the largest percentage, 55.6%. Because we were studying I/S and user managers, we did not include in the survey personnel below first-line managers. In addition, both Manufacturing and Finance were well represented -- the former contributing 31.4% of the respondents; the latter, 26.3%.

Participant Selection and Questionnaire Administration

The process of participant selection and questionnaire administration was carefully followed in each of the nineteen companies.

A researcher first interviewed the heads of each of the participating departments to determine the scope of their responsibilities and to indentify each department's managers by level, function, and name. Identifying the managers enabled us to choose participants to constitute a representative sample. Selection by the researcher rather than by the department heads prevented bias.

An equally important purpose of the initial interview was to explain the project in detail and to reconfirm the department heads' support for the research effort. Each department head then wrote the chosen participants inviting them to a meeting for the administration of the questionnaire, thus legitimizing the project with their own authority.

Figure 2

NUMBER OF RESPONDENTS

*LEVELS	I/P	MFG	FINANCE	TOTALS
1	26	18	18	62 (5.9%)
2	37	40	35	112 (10.6%)
3	96	115	84	295 (27.9%)
4	289	159	141	589 (55.6%)
TOTALS	448 (42.3%)	332 (31.4%)	278 (26.3%)	1058 (100%)

* Level 1 = Department head

Level 4 = First-line manager; average salary: $25,000

To ensure uniform understanding and a yield of consistent data, all participants, department by department, met with the researcher. In these meetings the questionnaire was explained and company-specific examples were provided for terms used in the questionnaire. The researcher also assured the participants of the confidentiality of their responses and the anonymity of their corporations.

In order to aid in data analysis we coded each participant by company, function, department to which he or she reported, and role within that department. 'Function' refers to whether the respondent's primary job responsibilities were in the functional area of I/S, finance, or manufacturing. Thus, a systems analyst would be coded as I/S whether he reported to the Information Systems, Finance, or Manufacturing department. 'Role' refers to category of expertise -- a cost or tax accountant, for example. This coding allowed us to better understand the differences between different categories of respondents and to analyze their responses -- for example, a junior manager in the I/S department would be expected to have a different opinion of the performance of the I/S department in systems development than the head of a user department.

The voluntary nature of company participation and the excellence of response contributed to the quality of the data gathered. The voluntary and joint participation of the heads of Information Systems, Finance, and Manufacturing demonstrated the importance they ascribed to the research project and their expectations to benefit from it. They and their subordinates were willing to devote one to one-and-a-half

hours to filling out the questionnaire. Figure 3 shows that eighty-eight percent of all the managers selected completed the questionnaire. The response rate by company ranged from 83% to 97%. The response rate by department was 84% for Manufacturing, 86% for Finance, and 92% for Information Systems.

The fact that we were able to use 98% of the questionnaires completed demonstrates that the questions were highly relevant to the managers' work and insures the integrity of the representative sample.

The responses of the user managers showed sophisticated discrimination; where they had negative opinions of one aspect of the I/S department, they did not allow that to cast a shadow over other aspects where the I/S department was doing comparatively well. Moreover, user managers did not overrate aspects where the I/S department performed comparatively well but could improve.

Initial and subsequent data analysis revealed that the user managers not only took the questionnaire seriously but had sufficient I/S experience to evaluate the managerial issues studied.

HISTORY OF THE PROJECT

The questionnaire itself was carefully tested at each stage of its development. We did a pilot test of the original version on a small group of practitioners. Phase I of the questionnaire, which resulted from the pilot test, was given to 114 respondents from six companies in the fall of 1978. The quality of the data yielded was high -- the data was statistically well behaved, and the answers were

Figure 3

OVERALL RESPONSE RATE

Function	Response Rate
Finance	86%
Manufacturing	84%
Total Users	85%
DP	92%
Total Sample	88%

Response rate by firm ranged from 83% to 97%.

internally consistent. Interviews with participants after they completed the questionnaire confirmed that they had understood the questions and thus gave further evidence of the quality of the data. Statistically significant patterns of I/S and user manager responses emerged that contributed materially to the understanding of the topics the Survey was designed to investigate. Furthermore, these results had practical significance for management.

Because of the quality and usefulness of the response, we expanded the research project to include thirteen additional companies; we also obtained a larger sample of managers from each department. Whereas Phase I averaged nineteen respondents per company, Phase II's expanded sample averaged seventy-three respondents per company.

On the basis of the results of Phase I, we were able to improve the questionnaire incrementally, however, still retaining over 90% of the original questionnaire. In order to handle the increased volume we streamlined the questionnaire into two sections, one given to the I/S managers and the other to the user managers.

CONCLUSION

The purpose of the User Needs Survey is straightforward -- to better understand user managers' information systems needs in order to recommend improved information systems policies and procedures. The User Needs Survey methodology was carefully designed and well implemented to ensure relevant, high quality data for analysis.

A conceptual model of factors affecting users' needs recognition and fulfillment was developed to specify the relevant variables. The questionnaire was pilot tested and refined several times (based on actual

results) to ensure that the specified variables were properly measured. The nineteen industrial companies were selected for diversity to increase the generalizability of the results to other companies. The finance and manufacturing departments were chosen to span the user groups served by typical information systems departments. The respondent sample, representative of both hierarchical level and function within department, was selected to be an unbiased sample of that department's management. And the questionnaire administration procedure was designed to ensure a high response rate and respondents' recognition of the serious nature of the study.

The data analysis done thus far has yielded research results on which we can base practical recommendations for managerial action. Further analysis is continuing and more papers will be added to the list in Appendix A as they are made available.

APPENDIX A

Papers presenting results of the User Needs Survey are:

"User Needs Survey: Preliminary Results", Sloan Working Paper # 1096-79

"Planning Skill Development for Systems Analysts", CISR Working Paper #51

"Defining Success for Data Processing", CISR Working Paper #52

"User Managers' Systems Needs", CISR Working Paper #56