ANNUAL PLANNING REPORT 1982

INPUT

About INPUT

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communic[...] and services.

The company carries [...] research. Working cl[...] tant issues, INPUT's [...] interpret the resear[...] mendations and inn[...]

needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years' experience in their areas of [...]on. Most have held senior management [...] operations, marketing, or planning. [...]enables INPUT to supply practical [...]plex business problems.

[...], INPUT has become a leading [...]nning services firm. Clients include [...]world's largest and most techni-[...]mpanies.

OFFICES

Headquarters
1943 Landings Drive
Mountain View, CA
(415) 960-3990
Telex 171407

New York
Park 80 Plaza West-
Saddle Brook, New
(201) 368-9471
Telex 134630

United Kingdom
INPUT, Ltd.
Airwork House
35 Piccadilly
London, W1V 9PB
England
01-439-8985
Telex 23116

Japan
Overseas Data Service Company, Ltd.
Shugetsu Building
No 12 – 7 Kita Aoyama
3-Chome Minato-ku
Tokyo, 107
Japan
(03) 400–7090
Telex 26487

Sweden
Athena Konsult
P.O. Persson & Co AB
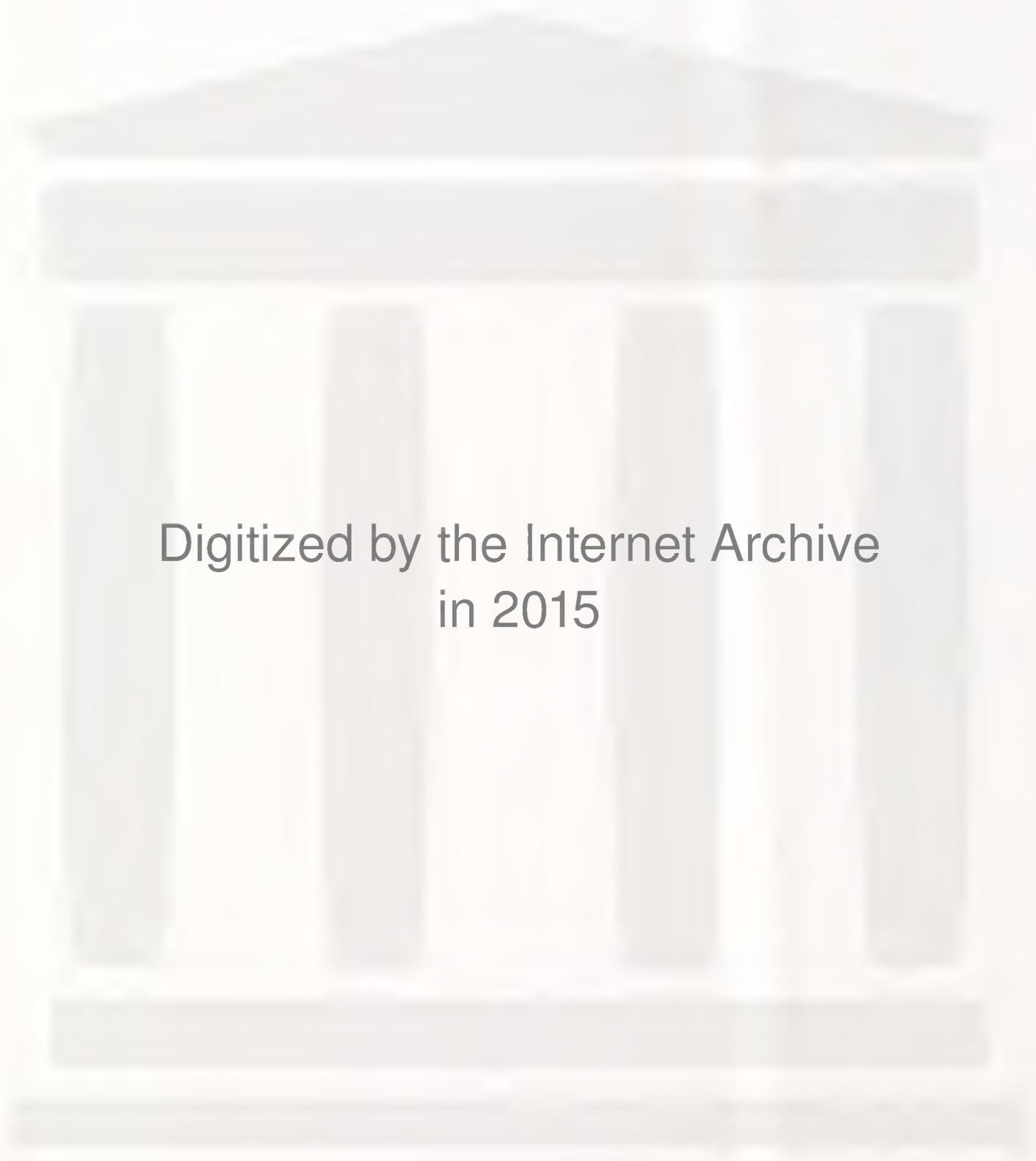Box 22114
S-104 22 Stockholm
Sweden
08-52 07 20
Telex 17041

INPUT
Planning Services for Management

ANNUAL PLANNING REPORT 1982

DECEMBER 1982

Digitized by the Internet Archive
in 2015

ANNUAL PLANNING REPORT 1982

CONTENTS

INPUT
U-A82-100

INPUT

ANNUAL PLANNING REPORT 1982

EXHIBITS

INPUT

INPUT

INPUT

INPUT

INPUT

INPUT

INPUT

INPUT

INPUT

INPUT

I INFORMATION SYSTEMS ISSUES AND
DEVELOPMENTS

I INFORMATION SYSTEMS ISSUES AND DEVELOPMENTS

A. INTRODUCTION

- This annual report for 1982 is divided into three parts.

    - In this chapter, the most important developments which have occurred in the past year are analyzed from the standpoint of their effects, current and future, on information systems (IS) departments.

    - Chapter II examines general cross-industry findings from INPUT's research on such important issues as:

        - Anticipated 1983 IS budget changes.

        - Expected IS staffing changes in 1983.

        - IS budget as a percentage of total revenues.

        - IS spending per employee.

        - IS personnel turnover.

        - Difficulty in recruiting IS staff.

- 1 -

INPUT

- New program development versus maintenance.

- IS problems, planning objectives, and planned initiatives.

- Personal computer use and plans.

- Chapter III takes up the same issues as Chapter II, but on an industry-by-industry basis.

B. ISSUES AND DEVELOPMENTS AFFECTING INFORMATION SYSTEMS: SUMMARY

- The past year has witnessed a number of developments affecting IS departments. These are summarized below and discussed at greater length in Sections C and D of this chapter.

  - The foremost short-term development has been the economic downturn, which will reduce 1983 budget growth to the lowest level in many years, as shown in Exhibit I-1.

    - As Chapter II discusses, this relative decline is not totally across the board but varies by industry and individual firms.

    - Not all activities should be equally affected. This is especially true of personal computers. For reasons discussed later in this chapter, the impact of personal computers in the next few years will be great for most organizations. Consequently, considerable industry and cross-industry personal computer data is presented in this report. (For additional analysis on Personal Computers in the IS Strategy, please see INPUT's report of that title dated December 1982).

- 2 -

INPUT

EXHIBIT I-1

INFORMATION SYSTEMS BUDGETS:
EXPECTED INCREASES, 1980–1983

INDUSTRY SECTOR	A EXPECTED INCREASE FOR 1981	B EXPECTED INCREASE FOR 1982	C EXPECTED INCREASE FOR 1983
Discrete Manufacturing	+13.2%	+16.9%	+ 6.7%
Process Manufacturing	+11.1	+14.5	+ 5.9
Transportation	+16.1	+ 9.2	+12.3
Utilities	+12.7	+15.8	+ 6.9
Banking/Finance	+ 9.2	+17.0	+14.6
Insurance	+ 7.9	+11.8	+ 8.2
Distribution	+10.2	+12.3	+ 8.5
Education	+ 4.4	+ 6.4	+11.7
Government	+ 7.4	+11.3	
Service and Other	+11.0	+11.9	+15.6
Averages for all Services	+11.8%	+14.8%	+ 9.1%

INPUT
UA82

. The economic issues will be discussed in Chapters II and III.

- Budget pressures are just one of the factors leading companies to consider the increased use of outside software and services.

- The IBM and AT&T antitrust settlements will have both immediate and longer term impacts.

- Technology will continue to supply solutions; for example, the computer "horsepower race" is on, with IBM, Univac, and Honeywell all having brought out high MIP models in 1982. This raises the issue of the future of traditional non-IBM mainframe companies.

- There are some really big events beginning to occur. These can be called the "external revolution." They are taking place outside the confines of IS as traditionally defined and, to varying extents, away from the control and, often, knowledge of IS departments. These are discussed in Section D of this chapter and include:

 - Changes in the location and use of computing resources within the organization.

 - Data processing networks between different corporations.

C. INTERNAL EVOLUTION

1. USE OF COMMERCIAL COMPUTER SERVICE FIRMS

- Computer service firms offer processing services, packaged software, professional services, and integrated (turnkey) systems. Many IS managers are unaware of the full magnitude of the use of outside computer services by the typical and, sometimes, their own corporations.

- 4 -

- This is partly because some types of outside services (such as processing services and turnkey systems) are often purchased without the knowledge of IS and almost always from a different budget.

- The cost of software purchases may be shared with user departments (for applications) or buried in equipment budgets (for systems software), blurring the size of the transaction.

- In addition, some IS personnel are philosophically opposed to using outside services and avoid involvement.

- However, the fact is that commercial computer services are growing extremely rapidly and are expected to continue to do so, as shown in Exhibits I-2 through I-5. This growth is fueled from two sources:

  - The products and services themselves.

  - The motivations of the purchasers.

- Computer service companies are continually refining and expanding their products.

  - As the timesharing companies meet increasing competition from in-house timesharing and personal computers, they are expanding into associated microcomputer-based systems (e.g., MCAUTO) or software services (e.g., Comshare).

  - A few software companies (e.g., Cullinane) have moved into processing. Many more are seeking to expand their offerings so that they can provide an integrated set of systems and applications software (e.g., Cullinane and Cincom using their DBMS as a foundation for applications; MSA integrating personal computer and mainframe financial software).

- 5 -

INPUT

EXHIBIT 1-2

SOFTWARE PRODUCTS GROWTH

1982
$5.7 billion

Systems
$2.7

Applications
$3.0

$0.3

$0.3

1987
$28.4 billion
38% AAGR

Systems
$12.0
35% AAGR

Applications
$16.4
40% AAGR

$1.5
38% AAGR

$2.2

47% AAGR
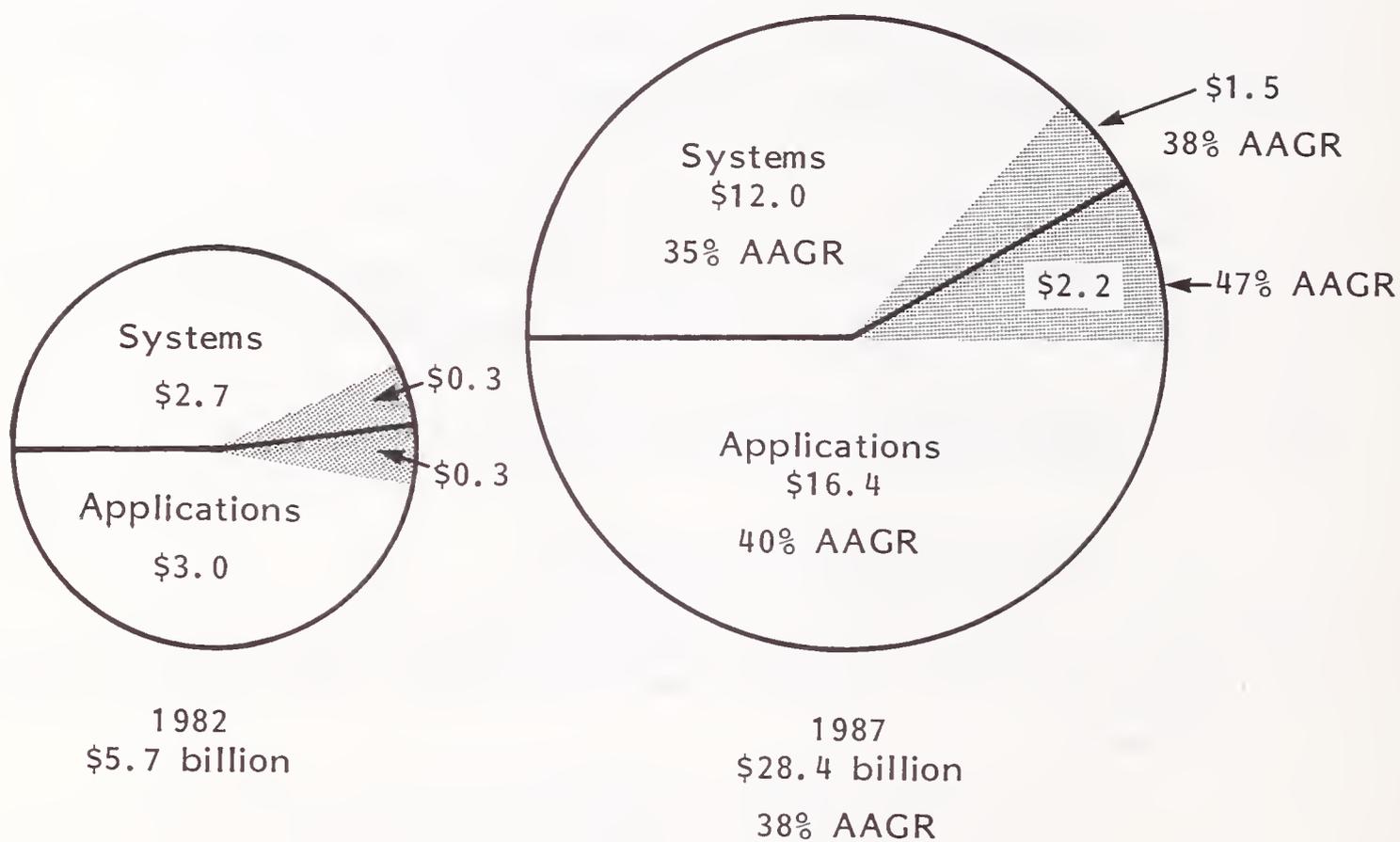
☐ Personal Computers

INPUT
UA82

EXHIBIT I-3

PROFESSIONAL SERVICES GROWTH

Consulting

Education

FM
10% AAGR

$1.8

$1.5

23%
AAGR

33%
AAGR

$0.8

Consulting

Education
$0.4

$0.6

FM
$0.5

Programming
and Analysis
$11.9

22% AAGR

Programming
and Analysis

$4.4

1982
$5.9 billion

1987
$16.0 billion

22% AAGR
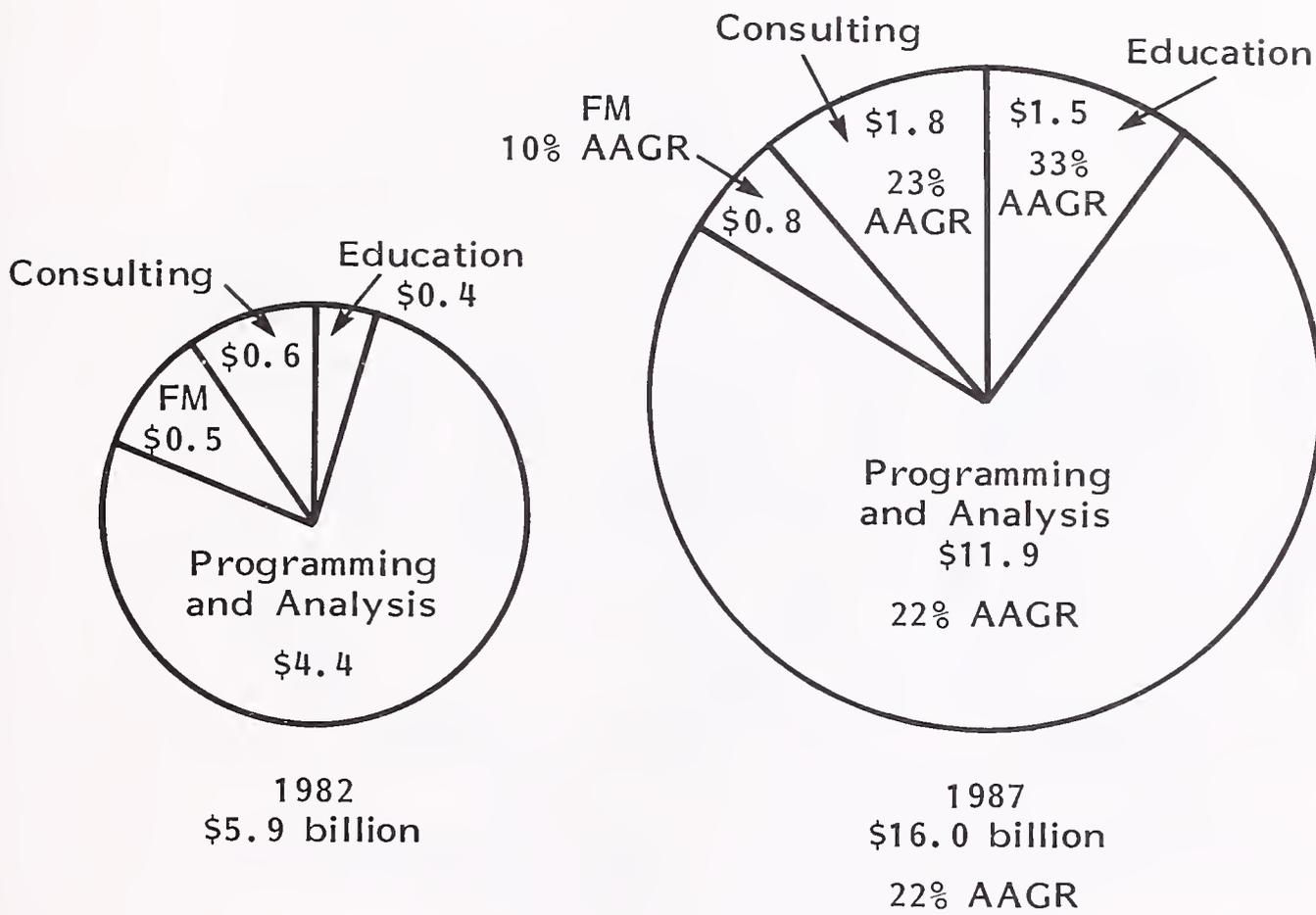
INPUT
UA82

EXHIBIT I-4

PROCESSING SERVICES GROWTH

1982
$11.7 billion

1987
$24.0 billion

16% AAGR

SOURCE: INPUT Forecasts

- 8 -
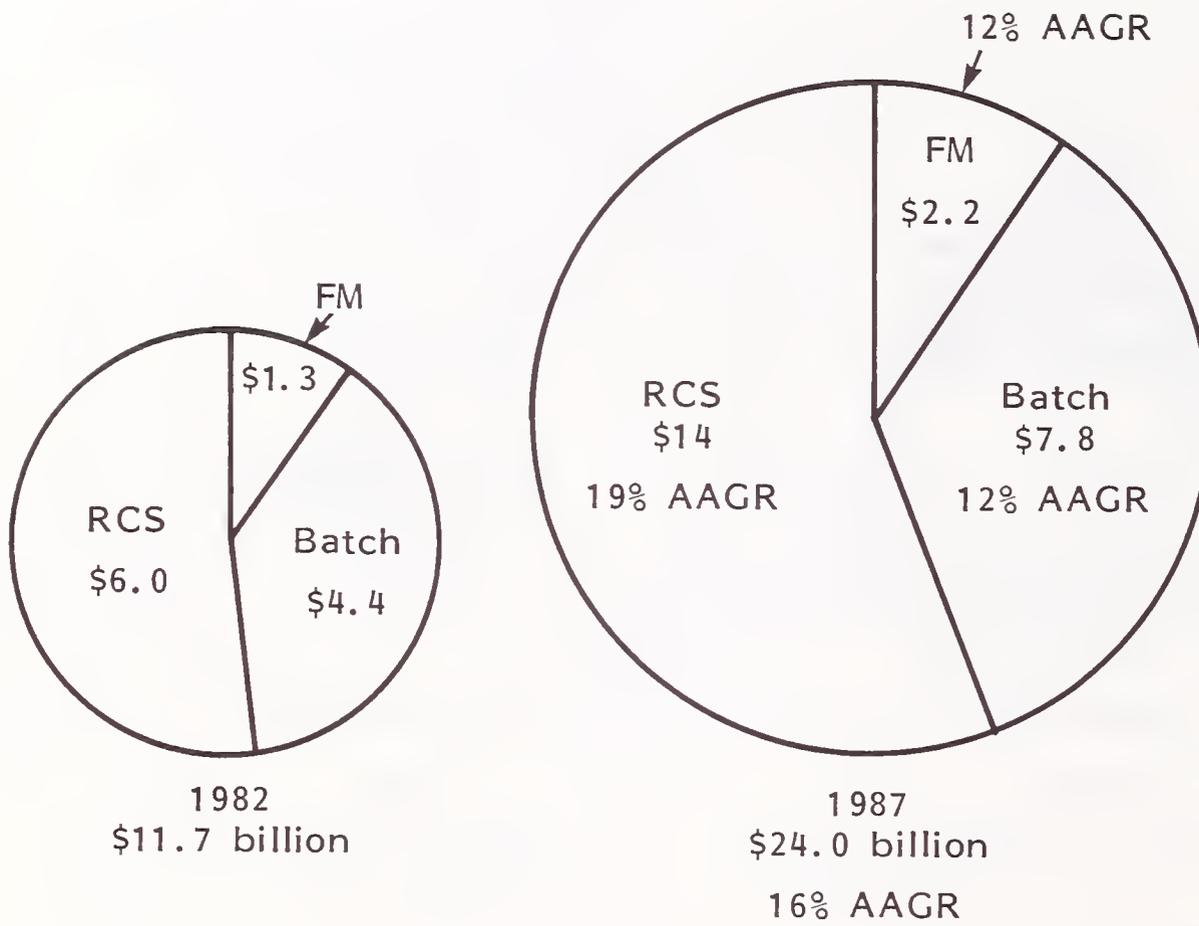
INPUT
UA82

EXHIBIT I-5

INTEGRATED SYSTEMS GROWTH

CAD/
CAM
$0.9

Other
$2.9

1982
$3.8 billion

CAD/CAM
$3.4
30% AAGR

Other
$10.9
30% AAGR

1987
$14.3 billion

30% AAGR

SOURCE: INPUT Forecasts

- 9 -
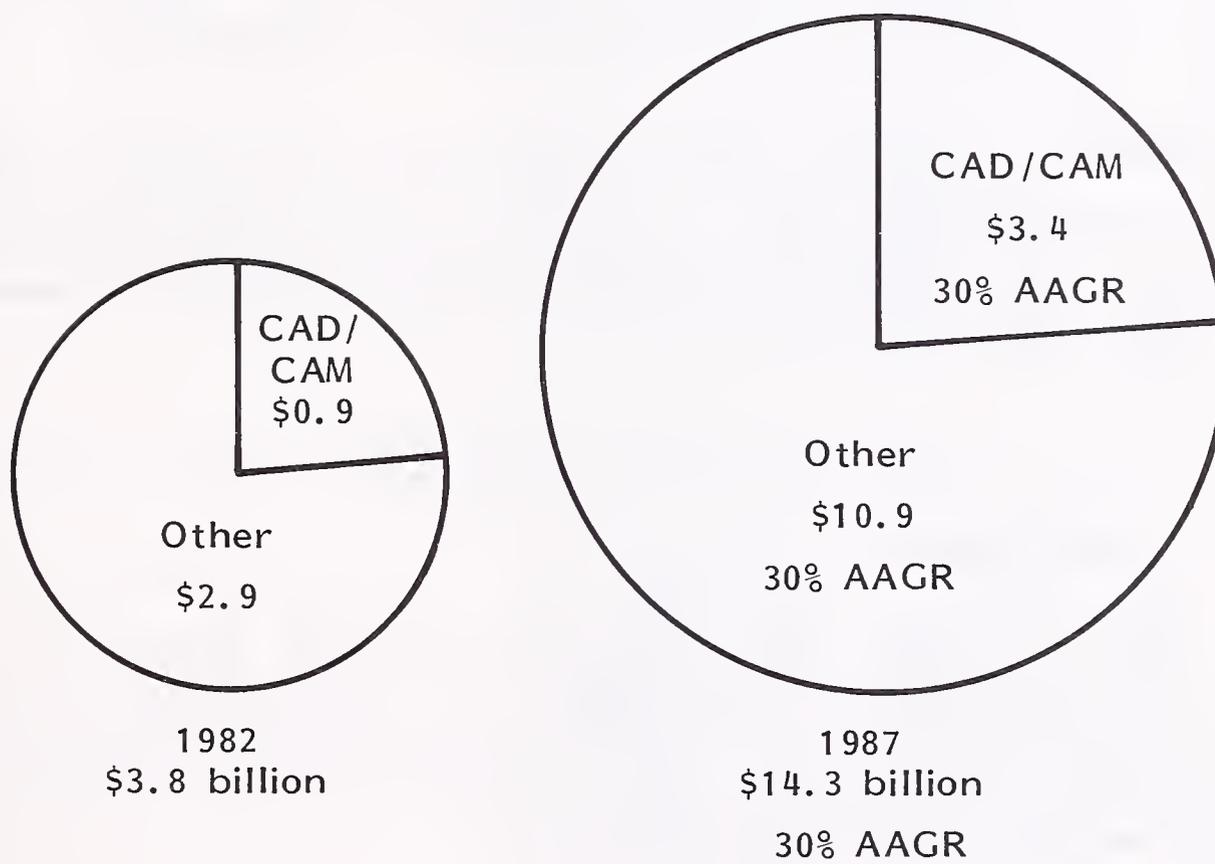
INPUT
UA82

- It is a virtual cliche for many service companies to say that they are trying to offer "solutions, not products."

    . However, this is increasingly a conscious effort. IBM, after all, has shown the way for many years. The most useful (and most successful) computer service companies will be those that offer a "supermarket" of services, as shown in Exhibit I-6.

    . The supermarkets will offer a choice of different kinds of processing, consulting, bodies, software, and hardware.

- It is unlikely that many computer service vendors will make any significant break with the past, except for personal computer related services. The intellectual and financial investments in established patterns of business are too great for that.

    - The vendor focus will instead be on product refinement, integration, and efficiency.

    - In this context, products on the horizon like relational data bases (either software or hardware/software implementations) do not represent a drastic break with the past but are a means of filling a known need more cheaply or effectively.

        . Downloading of specialized data bases and/or programs on a microprocessor (either yours or theirs) is another example of this flexibility.

- One area of refinement, where alert vendors and IS departments are both reaping rewards is in using vendor software as modules or skeletons for in-house systems. Exhibit I-7 shows three approaches to module use.

INPUT

EXHIBIT I-6

THE COMPUTER SERVICES SUPERMARKET

| Contract Personnel |
| Software – Personal Computers |
| Facilities Management |

| Software – Mainframe |
| Software Development |
| User Site Hardware |

| Batch Processing |
| Utility Timesharing |
| Targeted Timesharing |

| Turnkey Systems |
| Consulting |
| Education |

INPUT
UA82
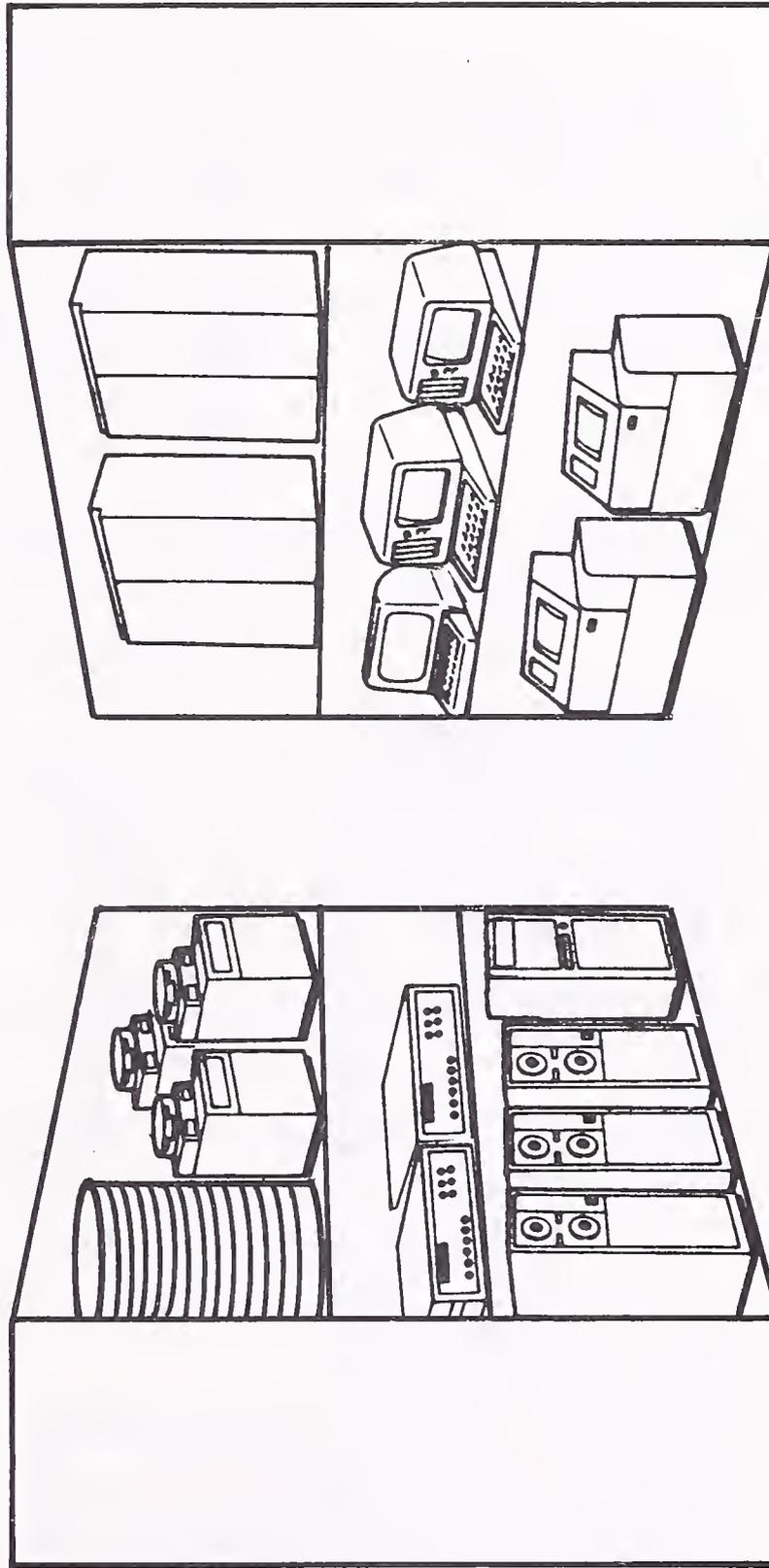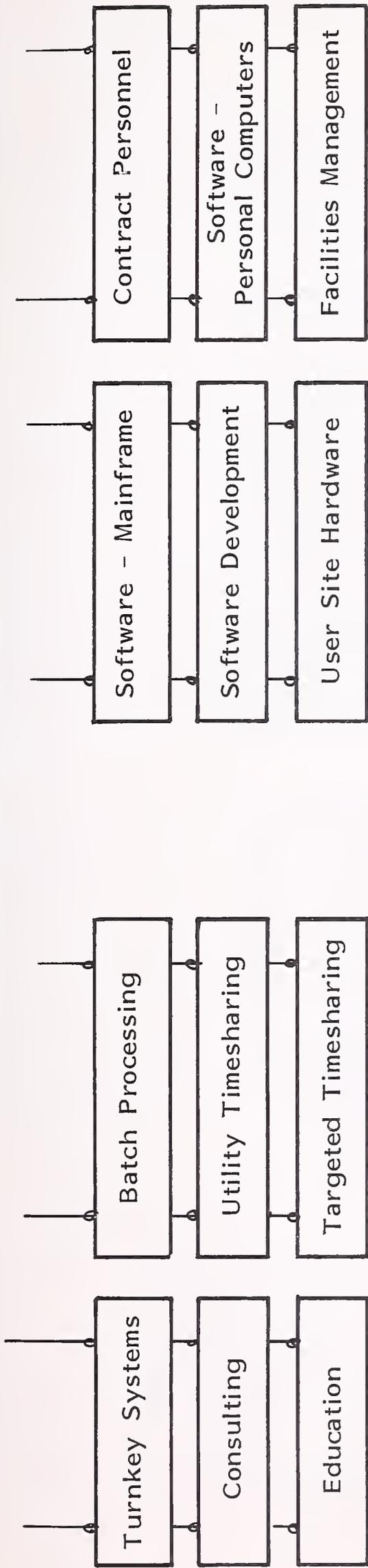
EXHIBIT I-7

DIFFERENT APPROACHES TO MODULE USE

Linked Module:

In-house System ⟷ Purchased Module

Standalone Module:

Standalone Module ⟷ Main System

Software Framework:

Purchased Module/ System

In-house System

INPUT
UA82
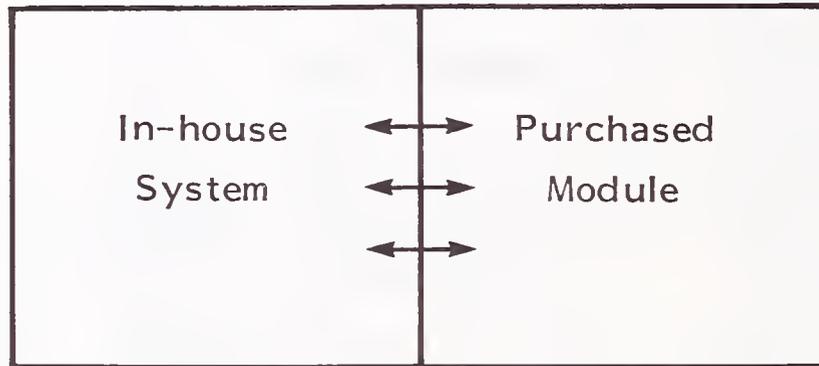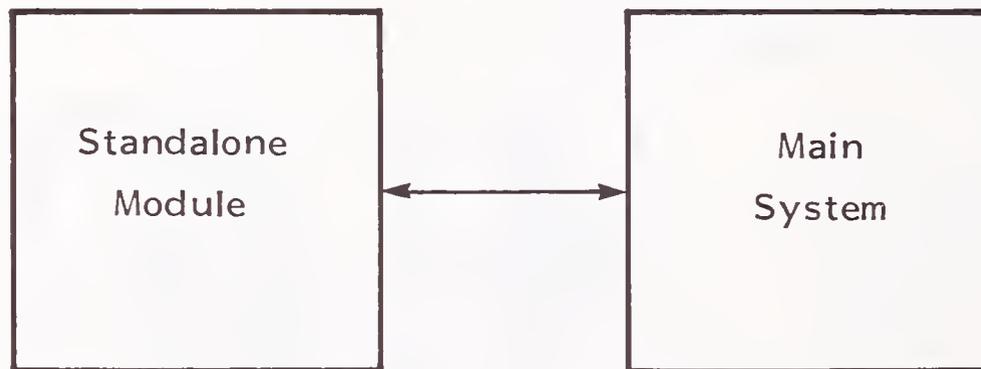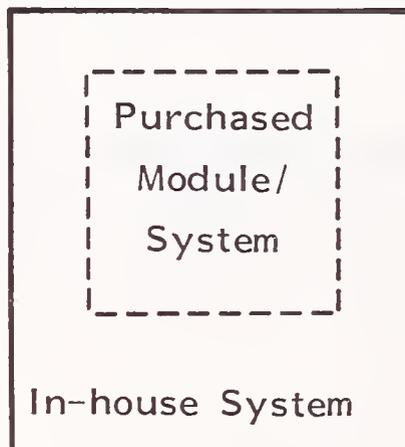
- Linked modules are often used. Here an external module is linked tightly to an existing system, either as a replacement for an outmoded function or as a new add-on.

- Standalone modules are used where comprehensive systems have not proved practical to design, implement, or operate. Many banks, for example, are looking very closely at dispersing significant amounts of processing to major operational units within the bank. Packaged software can be a very attractive means of accomplishing this. Obviously, vendor software is often more likely to be used where the user department has taken the initiative.

- Software frameworks are from one standpoint a wasteful way of using software packages: the package is purchased, but the code is extensively changed to meet local needs.

  - On the one hand, a great deal of additional corporate investment is required, while at the same time giving up the opportunity of being able to use relatively low-cost vendor maintenance.

  - On the other hand, there are some industries, like insurance, where many companies do represent unique operational environments. The only other alternative would be to write the entire application from scratch. The framework approach can provide significant dollar savings, speed up implementation by a year or more, and provide a higher quality product.

- These kinds of flexibility on the part of both vendors and their customers will be more common in the future. In the short run this flexibility will be dictated by economics. Deciding on the best choice will become more difficult as the alternatives become more complex.

- IS departments will have their own motivations for using outside services.

INPUT

- In the past, using outside consultants either on an individual basis or to perform a turnkey programming job has helped to mitigate quantitative and qualitative staff deficiencies.

- The same approach can be used to get around body-count ceilings (but not, of course, budget ceilings).

- These are both largely negative reasons for using outside services, as is the software module skeleton in many instances.

● The increased use of packaged software has a much larger positive component, however.

- In most cases a better, more complete product can be obtained in a shorter period of time.

- In this context, outside software is increasingly viewed as the most effective productivity tool now available to IS management.

2.   IBM AND AT&T ANTITRUST SETTLEMENTS

● In the short run these settlements have proven to be almost anticlimactic, largely because the two companies themselves are only now beginning to take their first steps in the new climate.

● There will be few immediate effects on IBM's actual products; there will be a great deal of change on its market behavior.

- In the past IBM had to take a very cautious view of the effects its actions would have on its competitors. IBM could not afford to be overly innovative in marketing techniques: if it were _too_ successful it could be accused of predatory actions.

INPUT

- IBM will become much more experimental and aggressive in its use of different distribution channels, pricing and discounting, servicing, etc. These will largely work to the benefit of customers. Much of the action will take place in the small-computer end of the market where IBM has been comparatively weak. However, IS management should look for many more innovative moves by IBM in all parts of its business.

- AT&T, on the other hand, has awakened from a long sleep. It has always been able to take a very leisurely approach to mobilizing its strongest components: the Bell Labs intellectual and Western Electric manufacturing bases. Deprived of most of its monopoly power, the new creation, American Bell, will have to learn how to compete.

    - Obvious areas for AT&T to enter are communications, software, and microprocessors. These do not lack for competition (Bell has been losing ground for some time to outside PABX suppliers in noncaptive environments).

    - Bell's Advanced Information Service Net 1000 lost out to IBM in being selected for the insurance industry's value-added network (see Section D of the chapter for additional discussion). Since Net 1000, under different guises (e.g., ACS), has been under development for many years, its defeat by IBM's new Information Network on essentially its home turf is a real setback.

- An unchained Bell must, unlike IBM, put both its product and marketing houses in order. Customers should be prepared for numerous false starts in both areas.

    - American Bell offerings should be examined carefully against the competition. All of the old product, price, and service rules are no longer operative. AT&T for a while may itself not always realize this.

INPUT

- Some of the "orphaned" telephone companies may be quite shaky for some time to come. They have been left in the unenviable position where being allowed to keep control of the Yellow Pages is judged a business victory. It is not at all clear whether they will be able to offer the sophisticated support needed for complex data networks. Fortunately, there will soon be technical alternatives for their local services (as shown below and discussed at greater length in <u>The Changing Economics of Telecommunications</u>, December 1982).

3. TECHNOLOGY

- Some of the most interesting recent advances have been in local communications. Direct satellite transmission and cellular radio are being developed with entertainment and mobile phones, respectively, in mind.

   - However, each can have important impacts on providing alternatives to the telephone company's (perhaps inadequate) local loops for data transmission.

   - These will both be volume operations aimed at a consumer base. The vendors will be "chasing the learning curve" as in integrated circuits, to the benefit of the business user.

- The MIPS race is heating up. Both Honeywell and Univac have announced new large processors, in what might be their last stand (see Subsection 4, following).

   - Part of the acceleration has been due to advances in electronic packaging that allows components to be smaller, hence, closer together. At the higher processor speeds, the effect of the limitation of the speed of light along relatively long circuit paths becomes a significant factor.

INPUT

- As MIPS have become more widely known and used as a benchmark (however imperfect), having a high MIP machine has become a matter of prestige also.

- However, large single processors can have distinct advantages over coupled smaller processors: coupling to communications networks and mass storage can be less complex and more secure.

- The entire MIPS question takes on a new meaning, however, when viewed against the very fast (one MIP or more) 16 or 32-bit microprocessors now being offered (Charles River Systems, Stratus, Three Rivers).

    - To a certain extent these are solutions looking for a problem. However, with an expected 1983 price of $10,000 for a CPU, operating system, and 100 megabytes of storage, this kind of machine will soon find many suitable problems (e.g., CAD/CAM, mainframe-based modeling).

    - This kind of ultrapower micro (at a micro price) will force many IS departments to rethink their application strategies.

- Tape refuses to die.

    - IBM reactivated its tape drive development and will be offering a new drive.

    - At the other extreme, personal computer vendors first "reinvented" the Winchester disk and then found they had to supply tape drives to back up their mass storage.

- While tape keeps rising from its deathbed, videodisk keeps postponing its data processing birth.

INPUT

- New recording techniques (e.g., vertical recording) promise at least another generation of magnetic disk storage.

- However, more and more manufacturers are queuing in the wings to bring out videodisk products. Their prospects are improved by the experience gained in manufacturing videodisks for the consumer market (even though consumer response has fallen short of that originally expected).

- Breakthroughs in the ability to erase and rerecord on videodisks will greatly add to the acceptance of this technology for conventional (e.g., backup) applications.

4.   WHITHER THE BUNCH?

- The question might also be phrased: "Wither the BUNCH (Burroughs, Univac, NCR, Control Data, Honeywell)?" The financial position of many of IBM's traditional competitors is not healthy, as shown in Exhibit I-8.

    - The BUNCH's debt-to-equity ratio is at near the danger line (commonly held to be 25%-30%).

    - IBM's R&D spending was four times as great as that of the number two firm, Honeywell. Can anyone except IBM maintain separate development across the board?

- What particular advantages does BUNCH hardware or software offer against the de facto IBM standard? The answer is, unfortunately, less and less. The BUNCH rarely conquer a new, nongovernment site; instead, there is a slow erosion of their customer base. If, hypothetically, someone were to invent a BUNCH-to-IBM translator, the desertion rate would be extraordinary.

INPUT

EXHIBIT I-8

SELECTED 1981 FINANCIAL INFORMATION FOR MAJOR COMPUTER MANUFACTURERS

($ millions)

	BURROUGHS	CONTROL DATA*	DIGITAL EQUIPMENT[†]	HONEYWELL	IBM	SPERRY UNIVAC[‡]
Revenue	$3,318.5	$4,162.6	$3,586.6	$5,351.2	$29,070	$5,571.4
Net Income	148.9	170.6	405.0	259.3	3,308	221.8
Interest Expense	145.1	492.3	11.8	150.2	407	294.1
Interest Income	86.9	701.2	87.5	99.0	368	47.1
Net Interest Expense (Income)	58.2	76.5	(75.7)	51.2	39	247.0
Short Term Debt	428.7	189.2	9.1	115.0	773	527.6
Long Term Debt	804.3	380.4	87.9	605.8	2,669	716.8
Total Debt	1,233.0	569.6	97.0	720.8	3,442	1,244.4
Shareholders' Equity	2,180.1	1,577.6	2,899.6	2,098.0	18,161	2,384.4
Debt/Equity Ratio	36.9%	24.1%	3.0%	28.9%	14.7%	30.1%

* Net interest expense shown is for Control Data's computer operation only. The bulk of interest expense and interest income is attributable to Commercial Credit Corp.

† For the twelve month period ended December 1981 (DEC's fiscal year ends in June).

‡ For the fiscal year ended March 31, 1982.

SOURCE: Financial Statements

INPUT
UA82

- Mainframes, even, to a degree, IBM-compatible mainframes are not where the action is.

    - NCR has already effectively dropped out of the mainframe race; Control Data has a specialized niche.

    - Honeywell has been successful with its own small machines. However, Burroughs has been much less successful, and Univac's purchase of Varian did not help Univac, while it practically eliminated Varian as a serious mini company.

- What the BUNCH does have is size, recognized names, contacts and established sales and service organizations. Recognizing this, both Burroughs and NCR have become OEMs for the very attractive Convergent Technologies micro.

    - This can give the BUNCH good, "instant" products at a low investment. There is no lack of potential micro vendors.

    - The micro vendors benefit by staying independent and light on their feet while at the same time receiving a respectable cash flow.

- It is too early to say if the BUNCH can actually pull off what should be a feasible strategy. However, if they succeed they can provide customers a "third way" between IBM and small vendors with technically attractive products but uncertain staying power.

    - The "third way" also means that there is automatic second sourcing for customers, assuming that the large firm does not make the error of absorbing the smaller firm.

INPUT

5.   INACTIVE AREAS

    a.   Software Productivity

- Software productivity has, unfortunately, been a relatively inactive area for
  many organizations. This inactivity has occurred because of the very difficult
  requirement to bring together three key elements:

    - Tools.

    - An understanding of the environment.

    - The human element.

- Productivity tools have suffered above all by being offered by small com-
  panies and not by IBM, as shown in Exhibit I-9. In addition, the tools are not
  complete.

    - No single tool or set of tools provides a comprehensive environment
      from feasibility study to maintenance, as shown in Exhibit I-10.

    - Most tools fit in poorly or not at all with existing procedures.

- In addition, all too often software productivity tools must be taken on faith:
  demonstrating their effectiveness and pay-off has proven difficult, although
  not primarily because of the tools themselves:

    - Obtaining reliable, consistent facts for a selection of full-sized
      development projects has proven very difficult; this is often because
      the added overhead is not considered worth the burden.

    - An associated problem is that much of the benefit from an effective
      development tool will come about during the maintenance phase.

INPUT

EXHIBIT 1-9

CLASSIC AND EMERGING PRODUCTIVITY TOOLS

CLASSIC PRODUCTIVITY TOOLS	EMERGING PRODUCTIVITY TOOLS
• Data base management system (e.g., ADABAS, TOTAL, IMS)	• System design methodologies (e.g., PRIDE, SDM/70)
• Modern high-level languages (e.g., "C," Pascal)	• Requirements languages (e.g., PSL/PSA)
• Library system (e.g., Panvalet, Librarian)	• Organizational techniques (e.g., Chief Programmer Team, Matrix Organization)
• Preprocessors (e.g., Metacobol, S-FORTRAN)	• Programmer's workbench (e.g., MAESTRO, UNIX/PWB)
• Performance measurement aids (e.g., SMF, RMF, LOOK)	• Structured analysis (e.g., Jackson, SADT, Yourdon)
• Word processing and text management systems (e.g., ATMS, SCRIPT)	• Menu-driven programming (e.g., DMS, ADF)
• Automatic flow charters (e.g., AUTOFLOW)	• Reusable Code Systems (e.g., Raytheon's UPP)
• On-line program development aids (e.g., TSO, CMS)	• Verification and validation systems
• Project control systems (e.g., Nichols, PAC II, PC/70)	

INPUT
UA82

EXHIBIT I-10
APPLICABILITY OF SELECTED TOOLS

TOOL \ LIFE-CYCLE PHASE	REQUIRE-MENTS	SPECIFI-CATIONS	DETAIL DESIGN	CODE	TEST	MAIN-TENANCE
On-Line Systems						
• CMS, TSO				├─────────┼──────────┤		
DBMS and Query Languages						
• IMS, 204, etc.			├─────────┼──────────┤			
System Design Methodologies						
• Pride, SDM/70	├──────────┼──────────	- - - - - - - - - - - -	- - - - - - -	- - - - - - -	──────────┤	
Requirements Languages						
• PSL/PSA	├──────────┼──────────┤					
Organizational Technique						
• Chief Programmer Team			├─────────┼──────────┤			
Programmer's Workbench						
• Maestro, PWB/UNIX			├─────────┼──────────┼──────────┼──────── - - - - - ┤			
Structured Analysis						
• Jackson			├─────────┤			
• SADT	├──────────┤					
• Structured Tableau	├──────────┼─────┤					
• Warner-Orr	├──────────┼─────┤					
Menu-Driven Program						
• DMS, TAPS		├ - - - - - - ┼──────────┼──────────┤			
Verification and Validation						
• Static and Dynamic					├────┤	
• Structured Walk-Through			├─────────┤			
Miscellaneous						
• PDL		├─────┤				
• Reusable Code		├ - - - - - ┼──────────┼──────────┼──────────┤			

- - - - - - Primary Coverage
──────── Partial Coverage

- 23 -

INPUT
UA82

However, the time horizon this implies is much longer than that used by most organizations.

- While tools themselves have their shortcomings, a larger problem is that productivity tools have been designed for use in constructing new systems; in addition, many people's view of software productivity does not extend much past the coding phase of a project.

    - In fact, for most organizations, mainteance activities account for as many software resources as new development.

    - "New" development itself does often not involve building brand new systems but reworking existing software or blending purchased modules into an in-house system.

    - In these environments, many productivity tools do not function at optimum levels. In general, maintenance productivity is at about the same place where new systems productivity was 15 years ago; i.e., the issues are only now being thought through. Tools are yet to come. (See INPUT's Report Software Maintenance: The Uninvited Guest, November 1982.)

- Above all, software productivity is about people much more than tools. Ironically, a partial awareness of this may be delaying the acquisition of software tools that will, in fact, pay for their use many times over.

    b.   Local Area Networks

- Local Area Networks (LANs) have not taken off for several reasons:

    - There are over two dozen different products to choose from now, most of them technically incompatible. No one wants to be left with one of the losers. Everyone is awaiting a clear de facto or de jure standard.

INPUT

- More basically, though, this is an example of a solution being fully ready before the problem has been defined.

- The contrast to personal computers is illustrative and striking:

  - Personal computers suffer from about the same amount of nonstandardization and overabundance of vendors.

  - However, personal computers have filled a definite need and, in spite of their imperfections, have taken the business world by storm.

- LANs will not be another Picturephone (technically functional but never commercially accepted). However, there will be few risks in letting potential users set the pace for installation.

D.   THE EXTERNAL REVOLUTION

- INPUT expects that processing power will continue to increase for the remainder of this decade at the same or a somewhat higher rate than since the early 1970s.

  - This historic rate of increase has averaged 29% per year. This rate may become as much as 37% from now to 1990.

  - This means that installed processing power will be approximately 10 times greater in 1990 than it was in 1982. Exhibit I-11 illustrates these growth trends.

  - Mass storage will be increasing at least as fast as processing power. The increase in mass storage may well be even higher as optical storage is introduced.

- 25 -

INPUT

EXHIBIT I-11

INSTALLED MIP GROWTH TO 1990
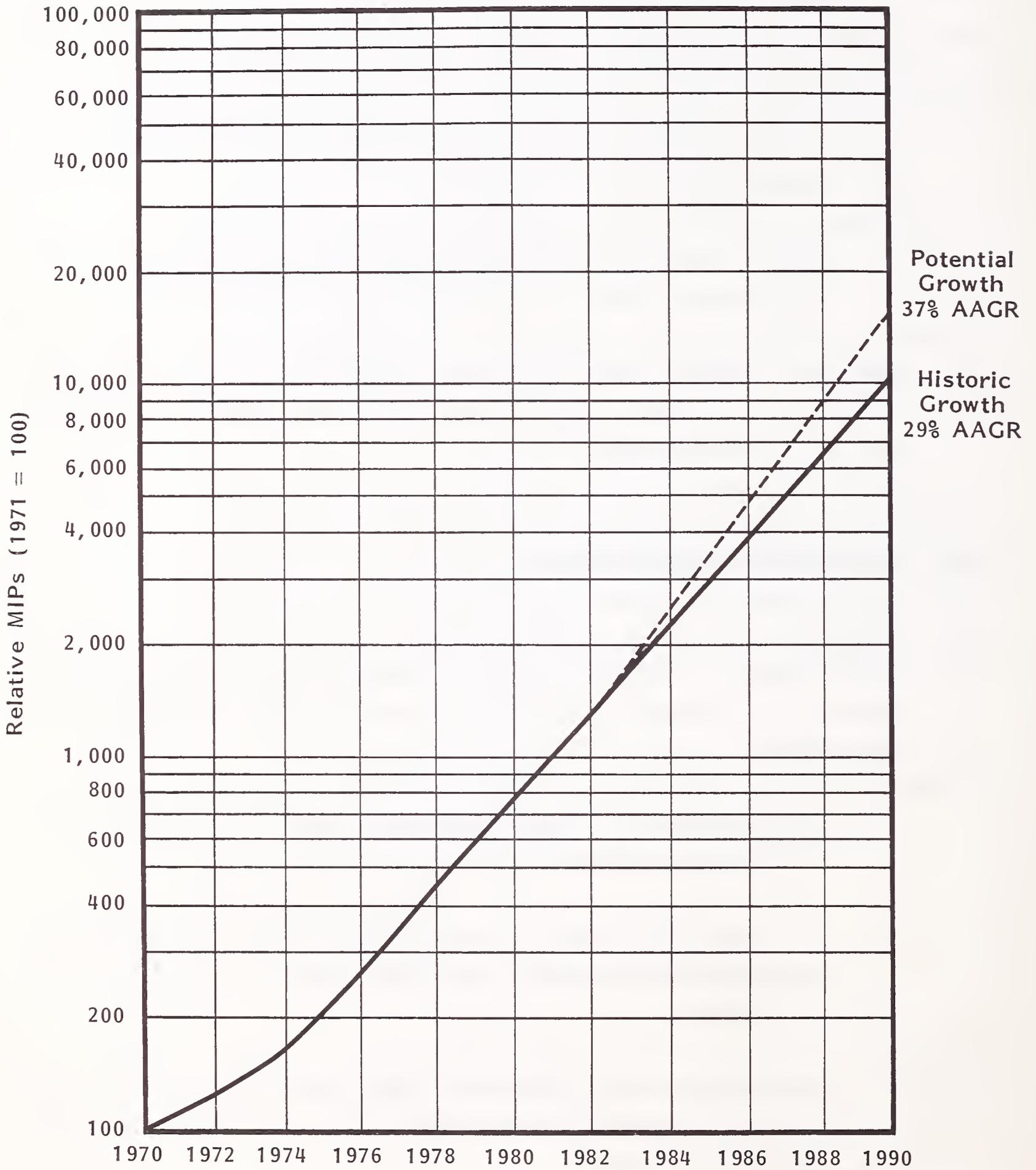
INPUT
UA82

- The processing environment of the mid and later 1980s will not be in the traditional mold, however. Currently, centralized processing, usually transaction-oriented, accounts for the great majority of processing. Through the rest of the 1980s this will be changing until by 1990 dispersed processing and decision support processing will account for a majority of processing activities.

I.   DISPERSED PROCESSING

- Dispersed processing contains all the processing activities that take place away from the traditional central data center.

    - These activities include:

        . Personal computers.

        . Word processing.

        . Turnkey systems.

        . Commercial timesharing.

        . "True" distributed data processing.

    - There will always be some grey areas between dispersed and centralized processing.

        . The amount of local intelligence and local processing required for "true" DDP will vary according to local circumstances.

        . In principle, the information center approach can provide a "virtual" dispersal of computing power to users. It is, however,

INPUT

still a centrally supplied service and, more important, in prac-
tice is centrally administered timesharing.

- The acid test of dispersed processing is whether the preponderance of control over the use of resources is exerted on the local, almost always, end-user level.

● There are many factors encouraging the use of dispersed processing, the most important of which are personal computers and users' perceived needs (i.e., demands) for additional control over data processing.

- Almost as important is the need to deal with central systems data.

    . Local preprocessing of data will greatly improve its quality and will often decrease the amount of "massaging" needed to pre-pare it for the central system.

    . Postprocessing of mainline data is needed to tailor uniform data to the needs of a particular unit.

- Specialized turnkey systems (e.g., in banking) will meet the processing needs of individual operations that can be at least partially segmented from mainline systems.

- The increasing costs and, especially, the increasing complexities and uncertainties of telecommunications will place a premium on being as self-sufficient as possible.

- Somewhat less important but still propelling forces are the following:

    . The information center concept is important. The idea of making computing easily accessible to end users is a powerful one.

INPUT

- Commercial timesharing services have historically brought computing to end users. They still have considerable attraction in the speed, ease of use, specialized products, and knowledge available. However, the expense can be considerable. Here again, it is the idea of end-user computing that is important.

- Finally, local systems can add to overall security and backup by allowing individual nodes to take over in the case of a central problem (and vice versa). This would be a more important factor if security issues were themselves accorded higher priority.

- Exhibit I-12 categorizes these factors by their strength, i.e., importance.

2. DECISION SUPPORT PROCESSING

- Decision support processing consists of a number of nontraditional uses of data processing including, among others:

  - Financial modeling and forecasting. (See INPUT's multiclient study, Opportunities in Financial Planning Systems Markets: 1982-1987, December 1982.)

  - Design (e.g., CAD/CAM).

  - Product and market analysis.

  - Operations research.

- Besides using specialized Decision Support System (DSS) software, these functions will also require increasing amounts of DBMS and graphics capability. (See INPUT's management brief, Business Graphics: Boon or Boondoggle, August 1982.)

- 29 -

INPUT

EXHIBIT I-12

FACTORS INCREASING USE OF DISPERSED PROCESSING

Strength of Factor

Low		Medium		High

- Information Center Concept

- Specialized Turn-key Systems (especially micro-based)

- Better Data for Central Systems (local pre/post-processing)

- Personal Computers (ease, speed, increasing power, cheap)

- Timesharing Services (ease, speed, specialized products, but costly)

- Telecommunications Avoidance (complexity, cost uncertainties)

- User Demands for Control

- Security

- Decision support processing will certainly be driven forward by technical advances in software and the means of delivery.

  - Software advances:

    - The number of software packages aimed at this market, especially for personal computers, is increasing rapidly.

    - Equally important, prices are falling while features and functionality are improving.

    - Graphics capabilities will be an important driving force.

  - Delivery advances.

    - Commercial and in-house timesharing have been the usual means of delivering decision support services. The interaction and speed necessary for users (typically well-paid analysts) have made timesharing obligatory.

    - The advent of the personal computer in the corporate environment has added an extremely important new delivery system.

    - INPUT expects the personal computer to have a very large, relatively quick impact on many organizations. (See INPUT's report, Personal Computers in the Information Systems Strategy, December 1982, and detailed data in Chapters II and III of this report.)

- Increasingly inexpensive means of delivering graphics will also spur decision support use. INPUT's management brief, Business Graphics: Boon or Boondoggle, August 1982, discusses the advances in CRTs (especially color), plotters, slidemakers, etc.

INPUT

- Important as the technical incentives are to use decision support processing, the overall business and management setting may be even more important.

    - The current era of financial stringency requires more analysis and backup for investment and budget decisions. Fighting for market share places a high premium on market, product, and sales analyses. Squeezing costs through greater operating efficiencies increasingly calls for close quantitative analysis of alternatives.

    - Many executives, especially in large companies, expect that decisions will be predicated on quantitative analyses. MBA training has increasingly stressed this approach.

    - Finally, there is the bandwagon effect. Companies and individuals believe that they must "keep up with the Joneses" by using decision support tools.

- This impressive list of factors leading to increased DSS use is summarized in Exhibit I-13.

    - Much activity in the IS area (especially among vendors) is aimed at decision support. It is only a partial exaggeration to say that the availability of these kinds of computer tools leads to their use.

    - There is an interplay among these factors: better software leads to easier delivery. Easier delivery makes decision support tools more important in management decision making. Increased use in decision making leads to more powerful software, etc.

- 32 -

INPUT

EXHIBIT I-13

FACTORS INCREASING USE OF DECISION SUPPORT
IN PROCESSING

- Software
  - Larger choice
  - Increased capabilities
  - A range of price levels

- More delivery alternatives
  - Commercial timesharing (early 1970s)
  - In-house timesharing (late 1970s)
  - Personal computers (1980s)
  - Inexpensive graphics output

- Financial stringency
  - Investment and budget decisions
  - Market/sales segmentation
  - Operating efficiencies

- Management expectations
  - Increased quantification
  - MBA training

- Bandwagon effect

INPUT
UA82

E.   IMPACT OF DISPERSED AND DECISION SUPPORT PROCESSING

- The forces favoring dispersed and DSS processing will create significant changes by 1990. INPUT forecasts that:

    - Centralized processing will decline from 80% of total processing in 1982 to 45% in 1990.

    - DSS processing will increase from 35% of total processing in 1982 to 60% in 1990.

- Exhibit I-14 illustrates these changes in processing focus.

    - Dispersed DSS processing will account for over half of all processing by 1990.

    - Traditional centralized transaction processing will have shrunk from 55% of all processing to 20%.

- It should be remembered that the overall "pie" will have grown by a factor of 10 in the same period. All segments of processing will have grown, although at much different rates, as shown in Exhibit I-15.

- Using all processing in 1982 as a baseline of 1.0, Exhibit I-16 shows what the relative amount of processing will be in 1990 for each segment and by what factor the processing workload will have increased.

    - The lowest, centralized transaction processing, will have increased by a factor of four (with all centralized processing increasing by a factor of six).

- 34 -

INPUT

EXHIBIT I-14

CHANGES IN PROCESSING FOCUS: 1982-1990

Dispersed →

10%   55%

10%

25%

1982

20%

20%   25%

35%

Dispersed ↗
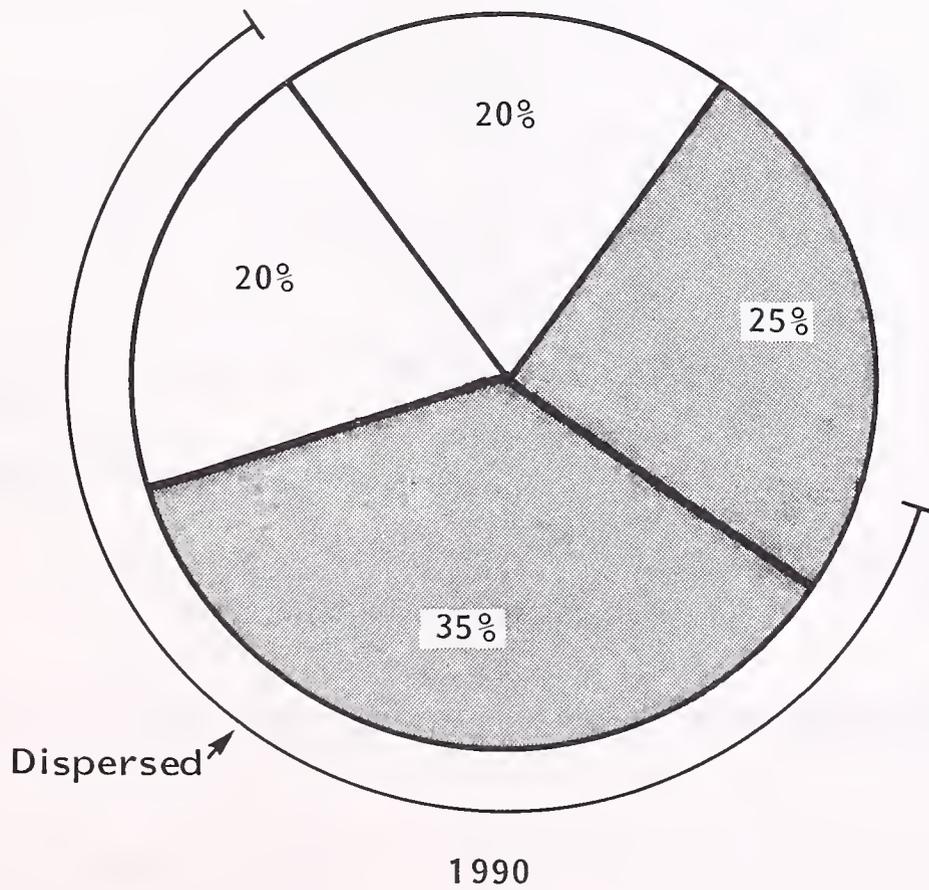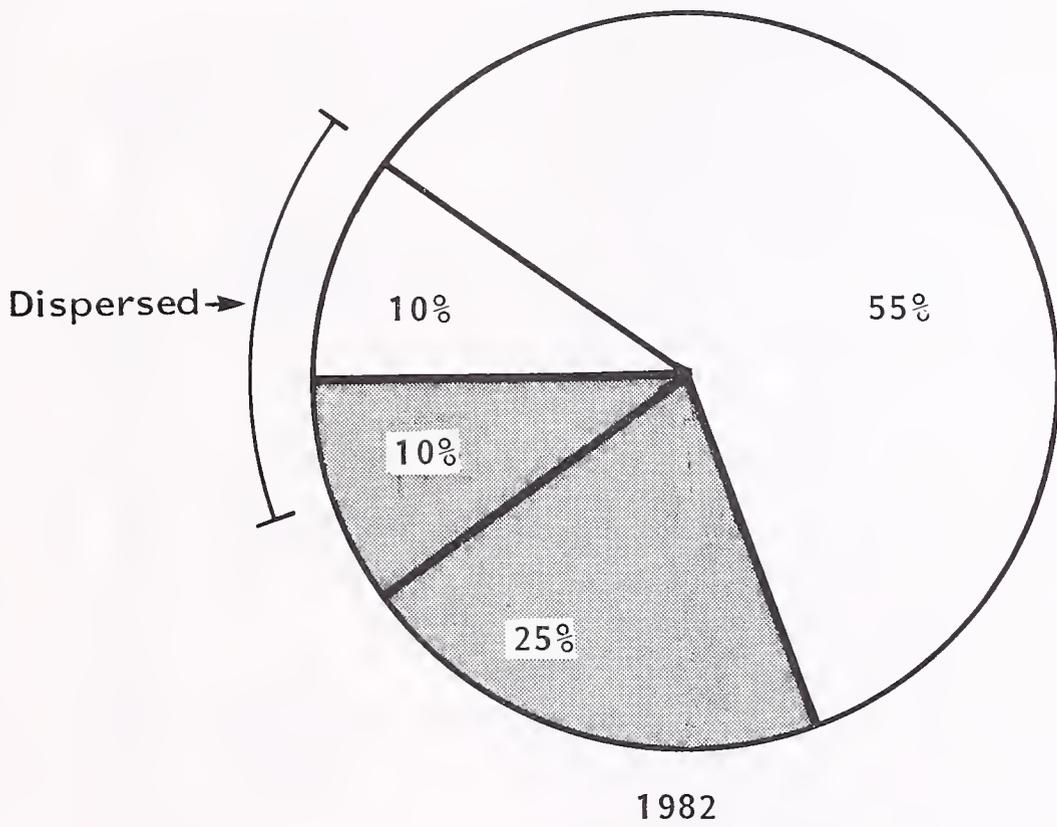
1990

Decision Support
Processing
Transaction
Processing

SOURCE: INPUT Forecasts

- 35 -

INPUT
UA82

EXHIBIT I-15

INCREASE IN PROCESSING
BY PROCESSING TYPE: 1982-1990

56% AAGR

Dispersed - Decision
Support

45% AAGR

Dispersed -
Transactions

32% AAGR

Centralized - Decision Support

18% AAGR

Centralized - Transaction
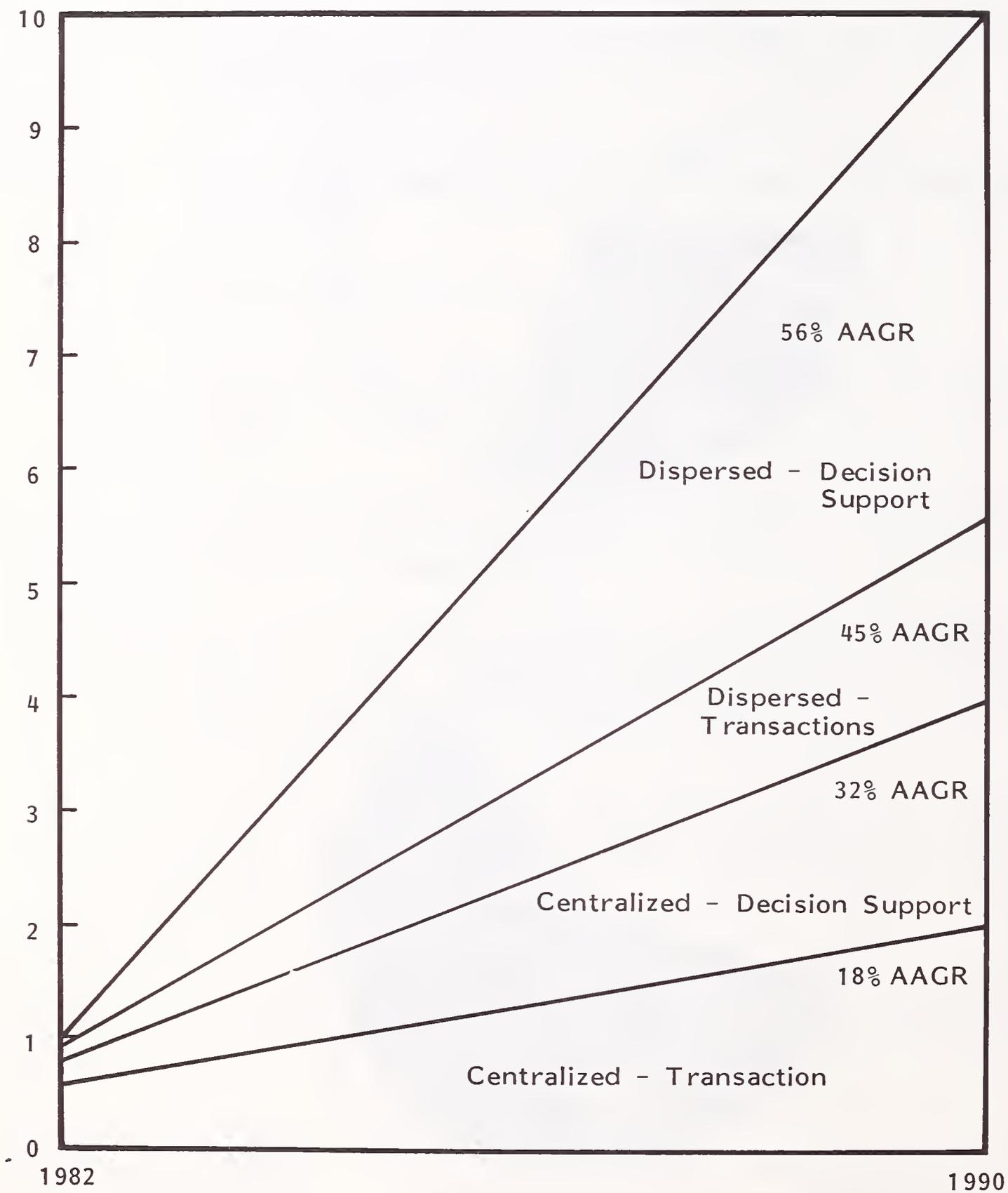
1982

1990

INPUT
UA82

EXHIBIT I-16

DISTRIBUTION OF PROCESSING
BY PROCESSING TYPE: 1982-1990

TYPE OF PROCESSING	RELATIVE AMOUNT OF PROCESSING*		FACTOR INCREASE
	1982	1990	
Centralized	0.80	4.5	X 6
Transaction	0.55	2.0	X 4
Decision Support	0.25	2.5	X 10
Dispersed	0.20	5.5	X 28
Transaction	0.10	2.0	X 20
Decision Support	0.10	3.5	X 35
Total Transaction	0.65	4.0	X 6
Total Decision Support	0.35	6.0	X 17
GRAND TOTAL	1.0	10.0	X 10

* Total processing in 1982 = 1.0

SOURCE: INPUT Forecasts

INPUT
UA82

- Dispersed decision support processing will have increased by a factor of 35 (not unreasonable, given the expected penetration of personal computers alone in large organizations in the next few years).

- By this analysis, the data processing world will be turned upside down for many organizations in the next decade. This revolution will happen gradually, though. Many organizations will not be fully cognizent of its effects (both good and bad) until it is too late to greatly influence matters.

    - Personal computers will be a significant component of this change. INPUT's report, Personal Computers in the Information Systems Strategy, December 1982, describes the steps that IS management ought to take to help their organization harness the good in personal computers and avoid much of the bad.

- At the same time that the relative (not absolute) position of centralized transaction processing is changing, the focus of many of its key aspects will also be changing. The property insurance industry initially will be taken as an example, since several special characteristics place it somewhat in front of other industries; however, several other industries should not be too far behind for reasons explained at the end of this chapter.

- The traditional property/casualty insurance industry has relied upon independent insurance agents to serve as their primary distribution system. Agents typically do business with several, sometimes many, companies. This traditional arrangement is often called the "American Agency" system.

- For years, the American Agency system prospered. Recently, though, so-called "direct writer" companies have begun taking away considerable amounts of business from the American Agency companies. The direct writers (e.g., Allstate, State Farm) have their own, tied groups of agents who handle each company's business. Before the era of effective tele-communications, this was a marketing arrangement that gave the direct writers only a marginal economic advantage.

- 38 -

INPUT

- However, the larger direct writers are now putting into place comprehensive on-line systems which cover most of their agents. These systems give them a real edge over their American Agency rivals:

    - Quotes and policies can be provided more quickly and completely.

    - Agents do not have to keep up with rapidly changing details.

    - Paper handling and administrative overhead can be reduced.

    - Customers can be serviced more quickly and satisfactorily.

    - Company management can be informed of underwriting trends much sooner (perhaps months sooner than even highly automated American Agency companies).

- The American Agency companies have watched these advances with almost helpless fascination.

    - American Agency companies do not "own" agents, so they cannot merely copy their competitors' on-line systems.

    - Companies that have tried putting their own terminals into agent offices discover that many agents do not want to write most of their business with a single company. Agents are, after all, the customer's agent; the agents' strength against direct writer agents is the ability to offer a selection of coverages.

    - Neither companies nor agents can afford the complexity and expenses involved in installing a terminal in an agent's office for each company an agent does business with.

INPUT

- Another complicating factor is that many agents have purchased one of several dozen different turnkey systems aimed at agents. A few are sponsored by insurance companies, and some companies have established interface arrangements with some of the turnkeys with higher market share.

- The situation is quite complex. Exhibit 1-17 shows possible arrangements between companies and agents. (Exhibit 1-18 describes individual company and agent characteristics.)

  - The most common arrangements are those shown by company F and agent 7: strictly manual (i.e., paper or telephone) communication.

  - This is conservative, but not competitive.

- Several years ago major American Agency companies and agent associations formed a study organization (the Institute for Insurance Research) that focused on this and other industry problems.

  - A fairly obvious theoretical solution was to have an intelligent switching network to serve as an interface between companies and agents, as shown in Exhibit 1-19.

  - In practice, however, this has turned into a very large undertaking. A few of the roadblocks have been:

    - Hundreds of different companies and dozens of agent turnkey systems.

    - Differing data definition and formats (although earlier industry-wide forms and policies mitigate this problem).

    - Differing hardware.

    - Differing communication protocols.

- 40 -

INPUT

EXHIBIT I-17

CURRENT INSURANCE COMMUNICATION NETWORK EXAMPLES

(See Exhibit I-19 for description of company and agent characteristics.)
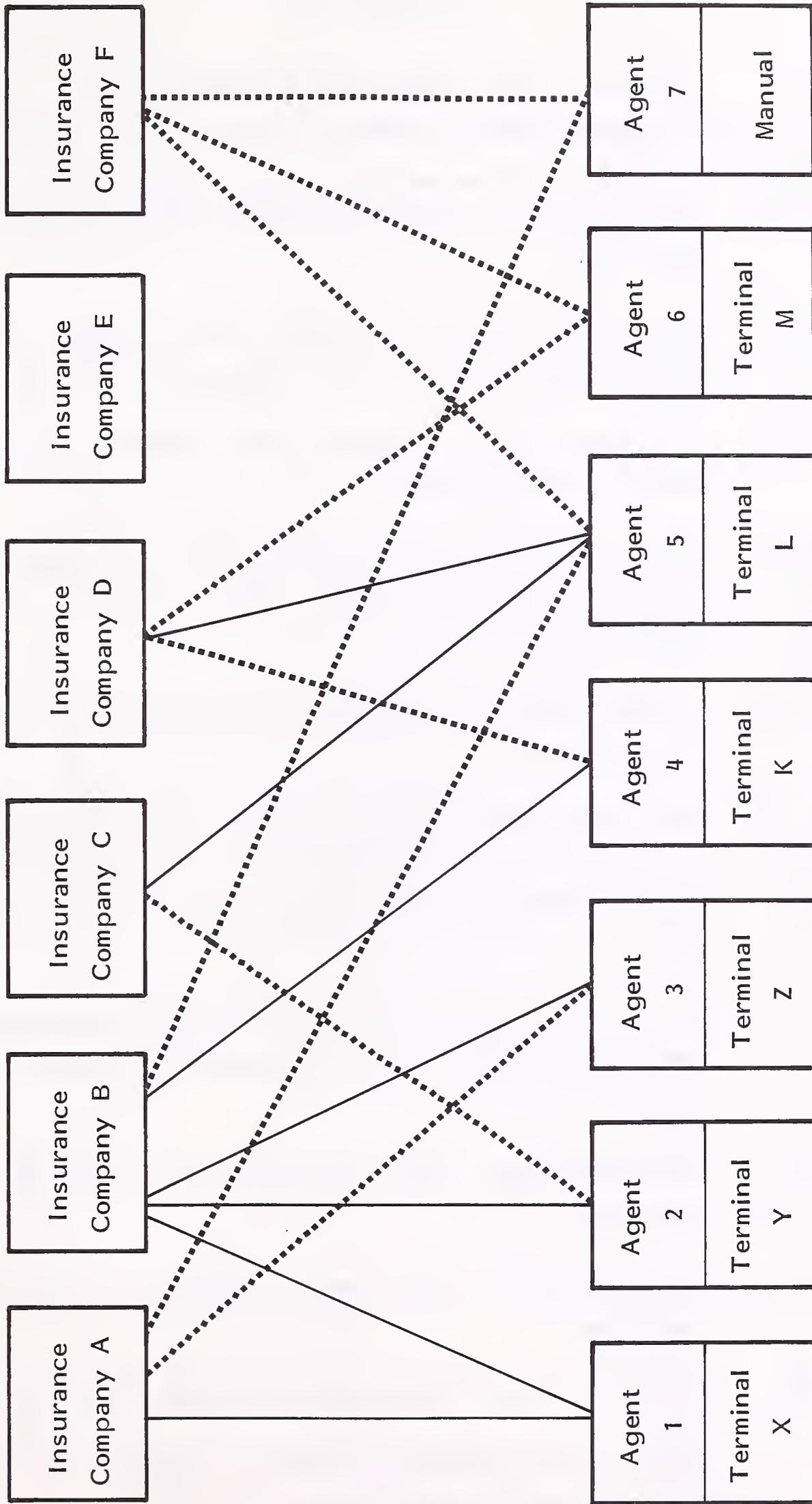
Legend:
— = Telecommunications Interface
⋯ = Manual Interface

INPUT
UA82

EXHIBIT I-18

COMPANY AND AGENT CHARACTERISTICS

(For insurance communications network, see example in Exhibit I-18.)

Company A: Only supports one kind of terminal; manual system with all others

Company B: Supports a variety of terminals and turnkeys; must still interface manually with nonautomated agents

Company C: Only supports one vendor's turnkey system; manual interface with all others

Company D: Has developed in-house turnkey; will not interface with any other automated system. Dropping small agent who will not convert

Company E: On-line system, but has never done business with any of these agents

Company F: Batch processing; manual interface with all agents

---

Agent 1: Does all business with companies supporting terminal X (rare)

Agents 2 & 3: Have a terminal for doing business with a particular company (generally with a key company); manual for remainder

Agent 4: Turnkey system is tied into one company; manual for remainder

Agent 5: Turnkey tied into more than one company; manual for remainder

Agent 6: Turnkey not tied into companies it does business with

Agent 7: Agent has no terminal or turnkey; probably uses a batch service bureau for accounting purposes

INPUT
UA82

EXHIBIT I-19

INSURANCE VALUE-ADDED NETWORK

(INSTITUTE FOR INSURANCE RESEARCH)

INPUT
UA82
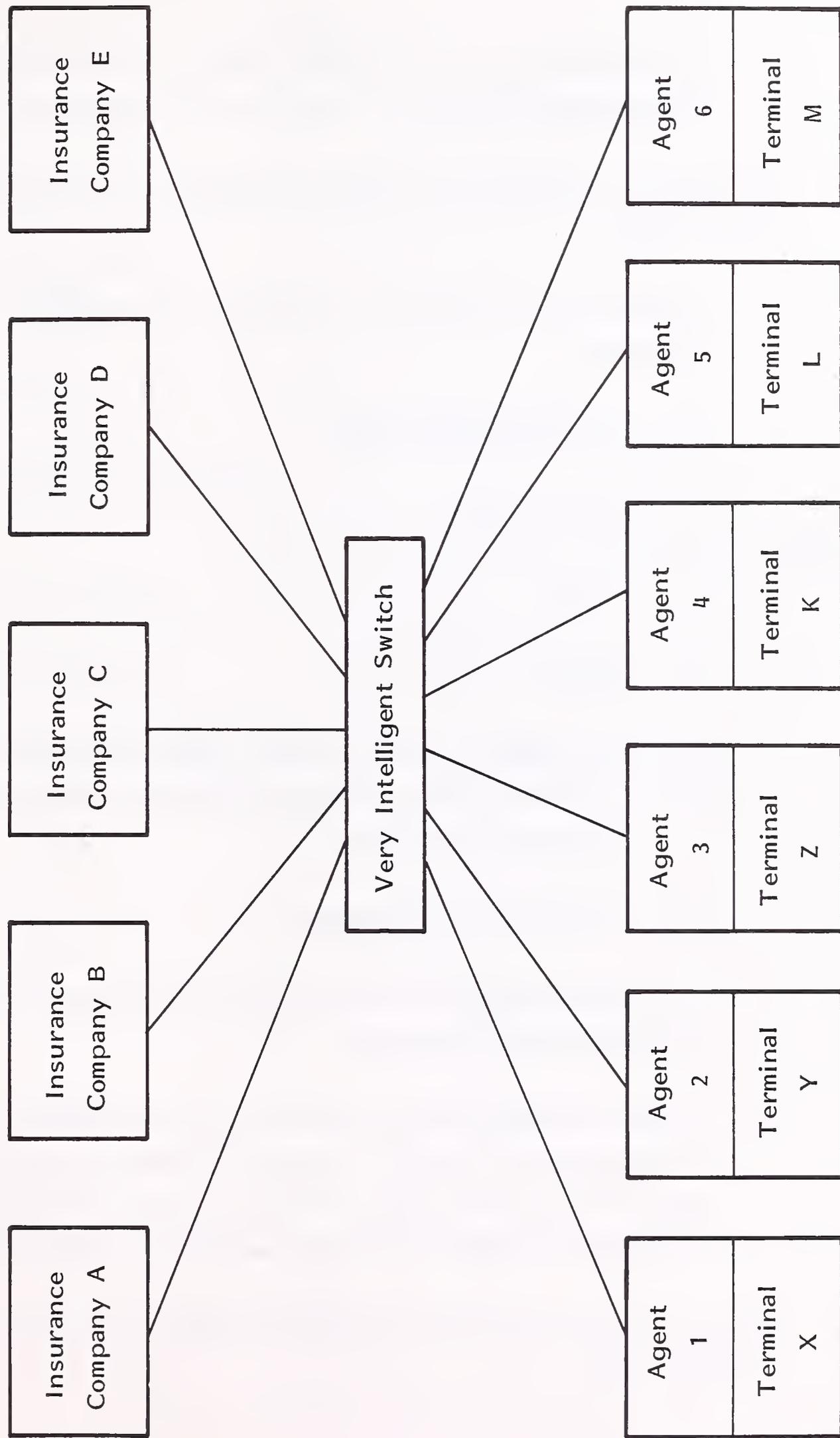
- The components of the "intelligent switch" or value-added network are shown in Exhibit I-20.

- After several false starts, the Institute for Insurance Research issued an RFP in early 1982.

    - There were six finalists for setting up and running the value-added network:

        . AT&T (American Bell).

        . Control Data.

        . EDS.

        . IBM.

        . ISACOMM (a new United Telecommunications subsidiary, formerly a part of Insurance Systems of America, also acquired by United Telecomm).

        . NCSS (Dun and Bradstreet).

    - All finalists brought varying degrees of expertise in insurance, communications and networking.

    - AT&T and ISACOMM must have been especially disappointed when IBM was awarded the contract in September 1982: this contract would have been a big boost to either of them, and both reasonably could have believed that the proposed system was closer to their core expertise.

- IBM's name, track record and, especially, its functioning information network, carried the day.

INPUT

EXHIBIT I-20

INSURANCE VALUE-ADDED NETWORK COMPONENTS

Insurance Company
Data

• Hardware Protocol Translation	Message Storage
• Communication Protocol Translation	Dynamic Specialization Tables
• Data Format Conversion	
• Logical Data Checking	Traffic Summaries
• Message Routing and Control	Statistic Summaries

Agent
Data

INPUT
UA82
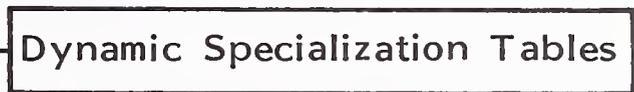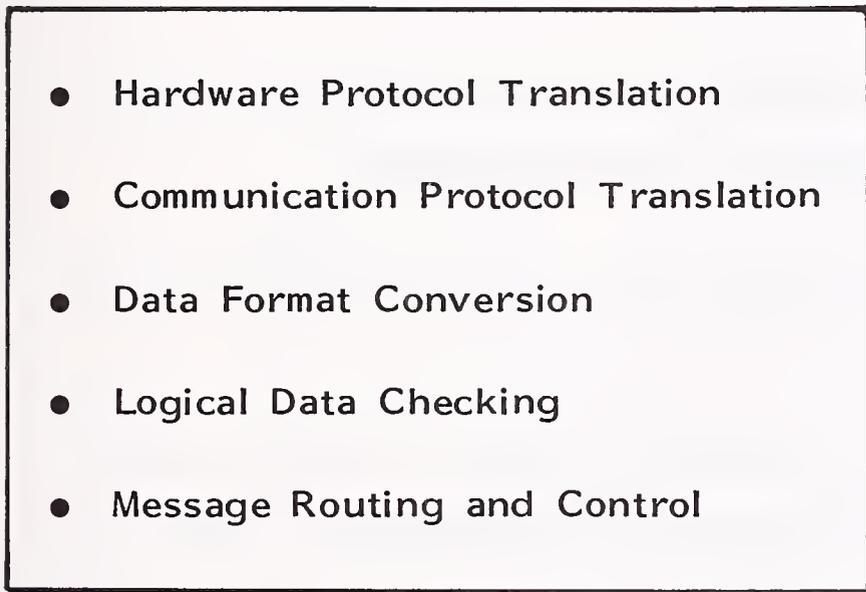
- Until this point, IBM's Information Network had not broken any new ground.

- Its main use by existing customers was to provide information center end-user support and program development tools. While useful, especially in a scattered, multiple-location environment, it had been a relatively expensive alternative that did not add a great deal more value than in-house solutions.

- However, the Information Network's entry into the multifirm universe, as shown in Exhibit I-21, changed the situation markedly.

- As Exhibit I-22 shows, supplying multifirm communications is a new ball game.

  - Costs may be high, but there is no real comparison to what has gone on before, an enviable position for any vendor, but especially for IBM.

  - Assuming that the system works (and there are few technical roadblocks that hard work and attention to detail will not solve), the value added will be high: it is no exaggeration to say that it could right the current competitive imbalance in the insurance industry.

- IBM will be in the catbird seat in all of this:

  - It will have triumphantly entered a new market area.

  - It will have stolen a march on its competition both from a technical and image standpoint.

  - It will have dealt American Bell a strategic blow.

  - It will be pursued by other industry segments.

INPUT

EXHIBIT I-21

IBM INFORMATION NETWORK

Multifirm Communications

Single Firm Communications

IBM Information Network and Processing Functions

Program Development Support

Information Center Products

Insurance Value-added Network

INPUT
UA82
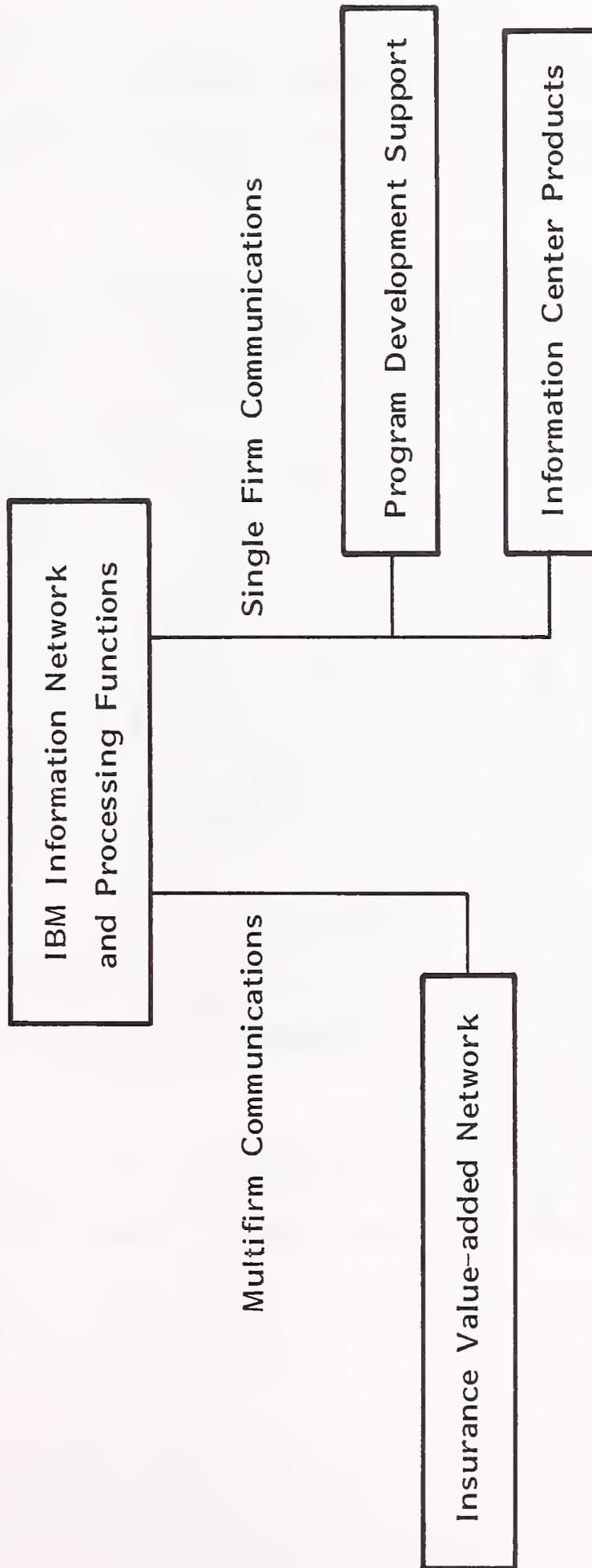
EXHIBIT I-22

IBM INFORMATION NETWORK -
DIFFERENCE IN SINGLE AND MULTIFIRM FOCUS

CHARACTERISTIC	MULTIFIRM COMMUNICATIONS	SINGLE FIRM COMMUNICATIONS
Type of Functions Supported	Direct, Mainline Business Function	Staff Functions (Analysis, System Development)
Novelty of Application	High	Low
Effect of Application	Discontinuing, Could be Large	Incremental, Usually Small
Risk to Vendor and Customer	Medium to High	Low
Expense (Compared to Alternatives)	Not Comparable	High
Value-added	Very High	Medium

INPUT
UA82

- Banking will soon be entering a similar crossroads to that of insurance:

    - Nonbanking financial institutions (e.g., American Express, Merrill-Lynch) are entering the banks' retail markets.

    - New kinds of banking products are changing relationships between banks.

    - The legal strictures preventing national retail banking are dissolving.

    - Individual banks are setting up their own teller, cash machine, and experimental home-banking networks.

- Few, if any, individual banks will be able to have complete regional, let alone national, terminal networks. The ideal would be competing consortiums of banks that share one another's networks (or share standalone terminals). This would be analogous to the way bank cards have evolved.

    - Exhibit I-23 sketches what a value-added banking network would consist of.

    - Already computer service vendors, the bank card processors and some of the leading banks are beginning to see themselves as playing the pivotal switch role.

- Health insurers and hospitals have experimented with similar systems using earlier technology.

    - The need is substantial, outside pressures are increasing, and there is a history of cooperative efforts.

    - However, there have been so many divergent political forces operating with changes in administrative direction that the time may not be ripe for interorganization communications for several more years.

INPUT

EXHIBIT I-23

VALUE-ADDED BANKING NETWORK

INPUT
UA82
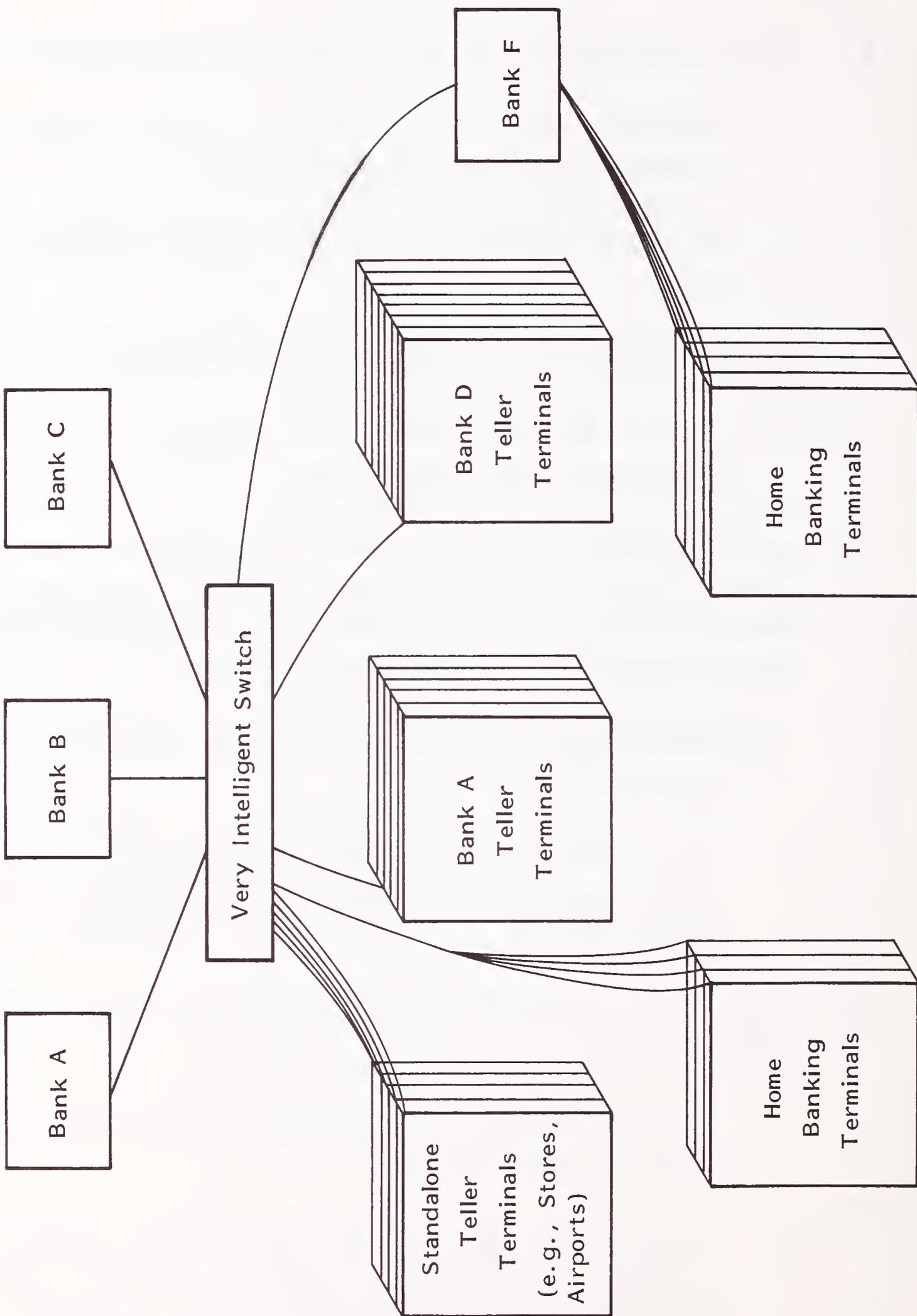
- Manufacturers and distributors could take advantage of the same sort of technology as schematicized in Exhibit I-24.

    - However, the outside pressures are not as great for the setting up of such a network.

    - Equally important, unlike insurance and banking, there is much less of a tradition of industry-wide cooperation in setting up joint projects and systems.

- IBM will be a powerful "sponsor" for intercorporate data processing. IBM's position may well become the catalyst in areas such as banking where most of the necessary preconditions for success are already in place.

INPUT

EXHIBIT I-24

VALUE-ADDED DISTRIBUTION NETWORK
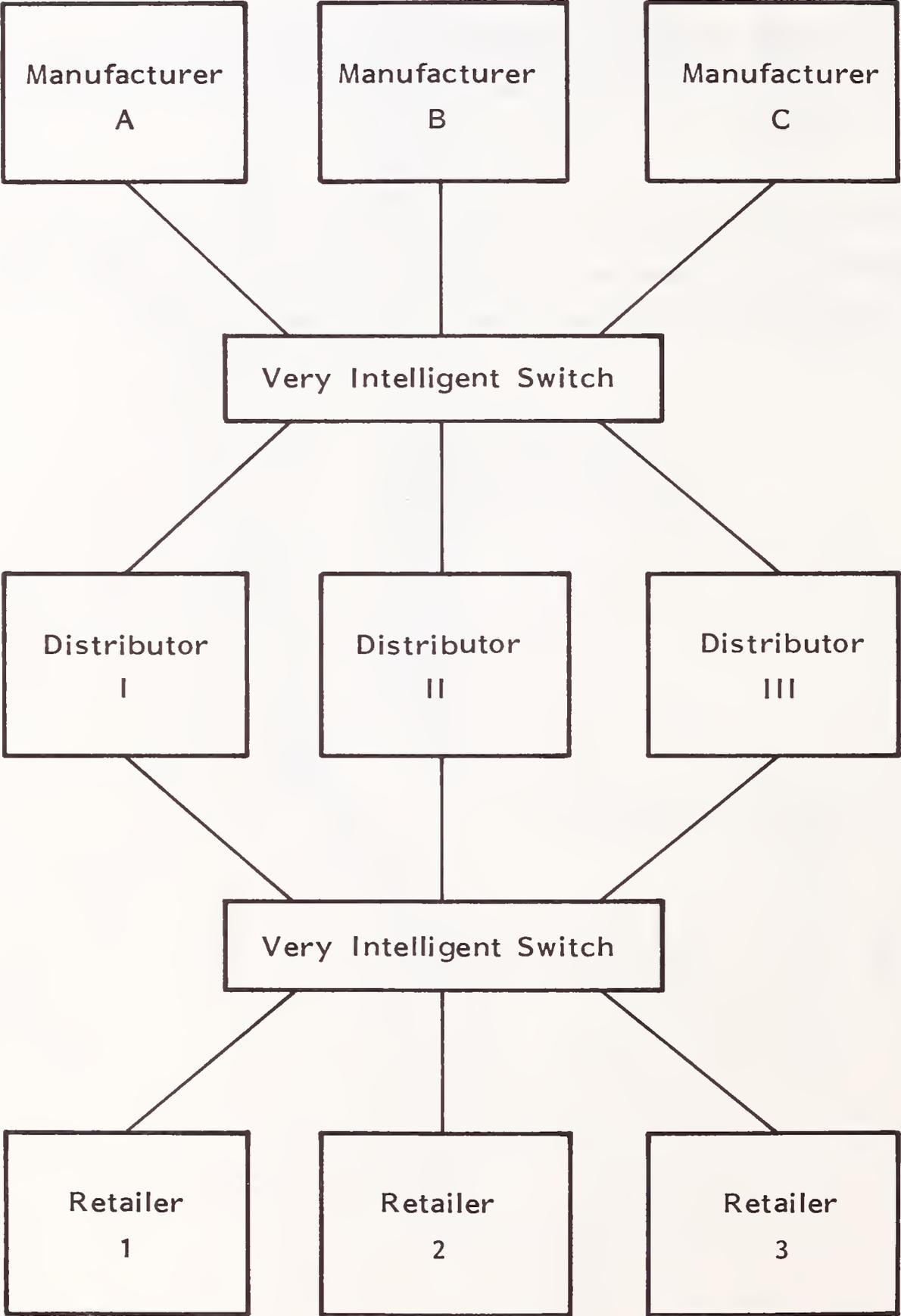
II CROSS INDUSTRY ANALYSIS

II CROSS-INDUSTRY ANALYSIS

A. INTRODUCTION

- This chapter summarizes the annual survey findings of 564 IS organizations. Where appropriate, information is broken down by company size groups or industry sectors. See Appendices A and B for a copy of the questionnaire and a breakdown of the sample by industry and organization size.

- This chapter is organized into the following sections:

    - IS budgets.

    - IS staffing.

    - IS planning issues.

    - Personal computers.

- Personal computers are addressed separately because they are the most dynamic example of end-user dispersed computing.

INPUT

B. INFORMATION SYSTEMS BUDGETS

- Only 61% of firms surveyed expected to see an increase in their IS budget in 1983, as shown in Exhibit II-1. Overall, the average change in IS budgets will be a 9% increase.

    - For most of the largest firms (i.e., those over $1 billion), the alternative to an increase is no change, i.e., keeping the same budget as in 1982.

    - However, for smaller firms (or corporate divisions with their own IS budget), about 10% expect an actual budget decrease.

- The average rates of budget change vary considerably by sector around the overall average of 9%, as shown in Column C in Exhibit II-2, from a low of under 6% for process manufacturing to almost 15% for banking and finance. This reflects events occurring in each sector:

    - Process manufacturing (e.g., chemicals, oil) has seen a signficant drop in their overall business in 1982 because of the oil glut.

    - Banking and finance, still relatively profitable, is faced with many new business pressures that will require expanded computer-based systems to remain competitive.

- All except the following three sectors expect a drop in the budget increase for 1983:

    - Transportation, whose rate of growth had already declined in 1982.

    - Services, much of whose growth is fueled by the computer service industry itself.

INPUT

EXHIBIT II-1

AVERAGE ANTICIPATED BUDGET CHANGE FOR 1983,
BY COMPANY SIZE

Type of Change
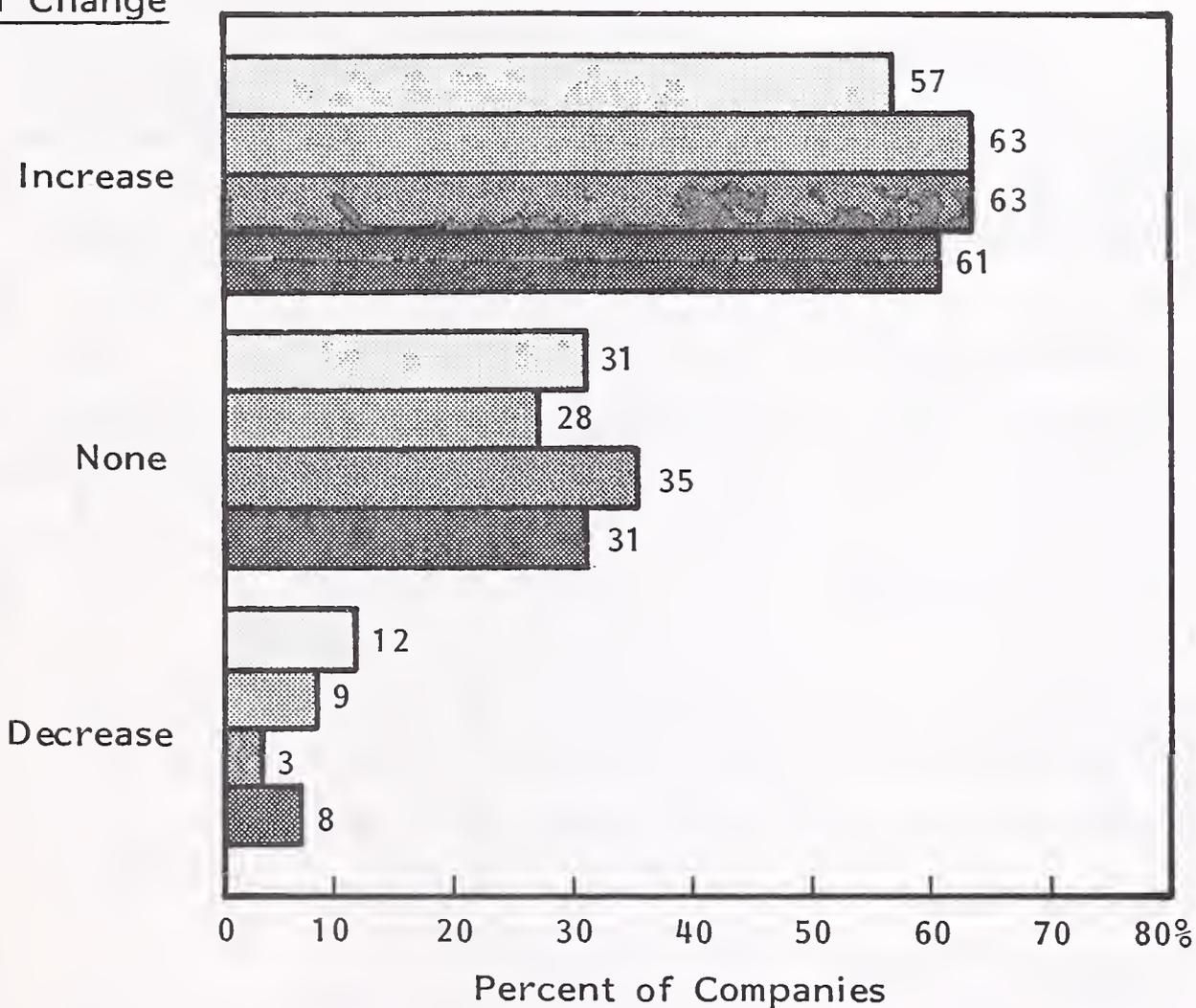
Percent of Companies

Key:

▢ Under $200 million

▨ $200 million to $1 billion

▨ Over $1 billion

▨ Total

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT II-2

INFORMATION SYSTEMS BUDGETS:
EXPECTED INCREASES, 1980-1983

INDUSTRY SECTOR	A EXPECTED INCREASE FOR 1981	B EXPECTED INCREASE FOR 1982	C EXPECTED INCREASE FOR 1983
Discrete Manufacturing	+13.2%	+16.9%	+ 6.7%
Process Manufacturing	+11.1	+14.5	+ 5.9
Transportation	+16.1	+ 9.2	+12.3
Utilities	+12.7	+15.8	+ 6.9
Banking/Finance	+ 9.2	+17.0	+14.6
Insurance	+ 7.9	+11.8	+ 8.2
Distribution	+10.2	+12.3	+ 8.5
Education	+ 4.4	+ 6.4	+11.7
Government	+ 7.4	+11.3	
Service and Other	+11.0	+11.9	+15.6
Averages for all Services	+11.8%	+14.8%	+ 9.1%

INPUT
UA82

- Education and government, which are shielded from the full rigors of the economy.

- Exhibit II-3 shows these comparative rates of change another way: the proportional increase or decrease in the budget from one year to the next (e.g., if the rate of increase was 10% in year one and 13% in year two, the change in the growth rate change would be +30%; if it were 7% in year 2, the growth rate change would be -30%).

    - The biggest losses by far for 1983 are in discrete manufacturing (-60%), process manufacturing (-59%), and utilities (-56%). This is a direct reflection of the financial difficulties and uncertainties now facing these industries.

- Not all budget categories will be growing at the same rate. Spending on personnel is expected to grow at 8%, while the rate of increase on mini and microcomputers will be more than three times as high, as shown in Exhibit II-4.

    - Microcomputer spending will, in fact, be growing at a much higher rate even than this since so much of the spending is taking place outside of the IS department. (Section F of this chapter will analyze these personal computer trends.)

    - Terminals, communications, and software are other areas expecting higher than average growth.

    - Outside processing services is the only area in which expenditures are expected to decline. Although the increased use of personal computers will affect timesharing, the forecast decline should be taken with a grain of salt for two reasons:

INPUT

EXHIBIT II-3

RATES OF CHANGE IN
BUDGET GROWTH BY INDUSTRY SECTOR

Percent Change in Growth Rate

☐ Change in budget growth rate from 1981 to 1982

▨ Change in budget growth rate from 1982 to 1983

SOURCE: INPUT Surveys

- 58 -

INPUT
UA82
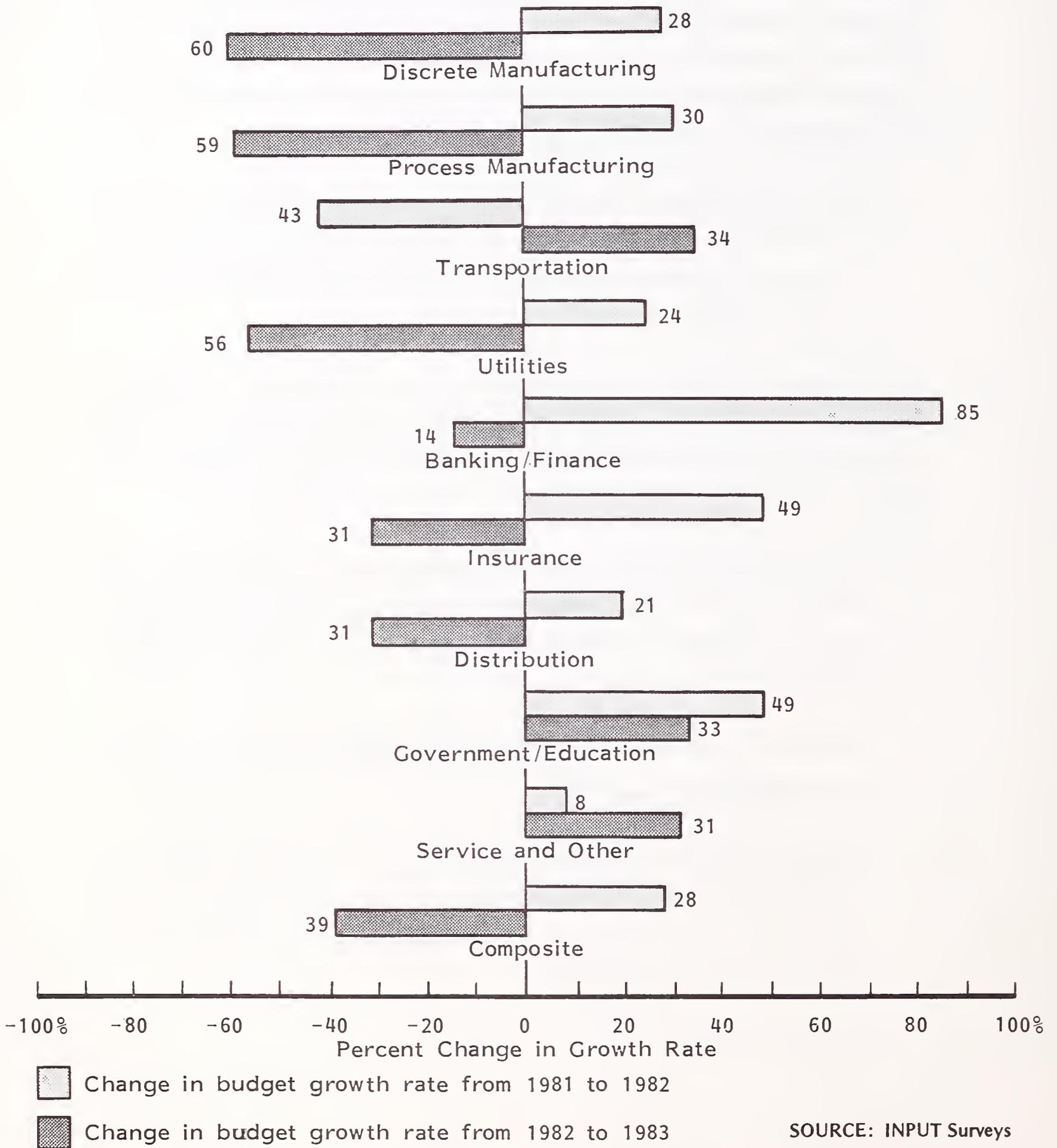
EXHIBIT II-4

1982 BUDGET DISTRIBUTION AND 1982/1983 CHANGES

BUDGET CATEGORY	PERCENT OF I.S. BUDGET (1982)	EXPECTED CHANGE 1982 to 1983
Personnel	46%	8%
Hardware		
Mainframe	17	7
Mini/Microcomputer	1	29
Terminals	3	14
Peripherals	5	6
Communications	6	14
Software and Services		
Software	3	19
Processing Services	1	– 10
Software Maintenance	2	9
Hardware Maintenance	4	8
Other	12	9
Total	100%	9%

SOURCE: INPUT Surveys

INPUT
UA82

- This has been expected by IS managment in prior years and has not occurred.

- Like personal computer spending, most timesharing spending takes place outside the control of (and often the knowledge of) IS departments.

● Exhibit II-5 shows the range of ratios between IS budgets and company revenues for commercial organizations by size of company (or independent division).

- The IS percentage of total revenues for the average company (as measured at the 50% mark) in each size group was:

- For large companies (i.e., over $1 billion in revenues): 0.55%.

- For medium-sized companies (i.e., between $200 million and $1 billion): 0.8%.

- For small companies (i.e., under $200 million): 1.2%. (Note: the banking and finance sector was omitted from this exhibit because their corporate base used for comparisons is assets, not revenues).

● However, averages do not tell the whole story.

- The lowest 10% of companies spend between 0.1% and 0.4%, depending on their size, while the top 10% spend 1.5% or more.

- This variation is due to a combination of the extent of automation, spending patterns (e.g., lease versus purchase), budgeting practices, and degree of centralization.

INPUT

EXHIBIT II-5

INFORMATION SYSTEMS BUDGET AS A PERCENT OF TOTAL REVENUES, BY COMPANY SIZE
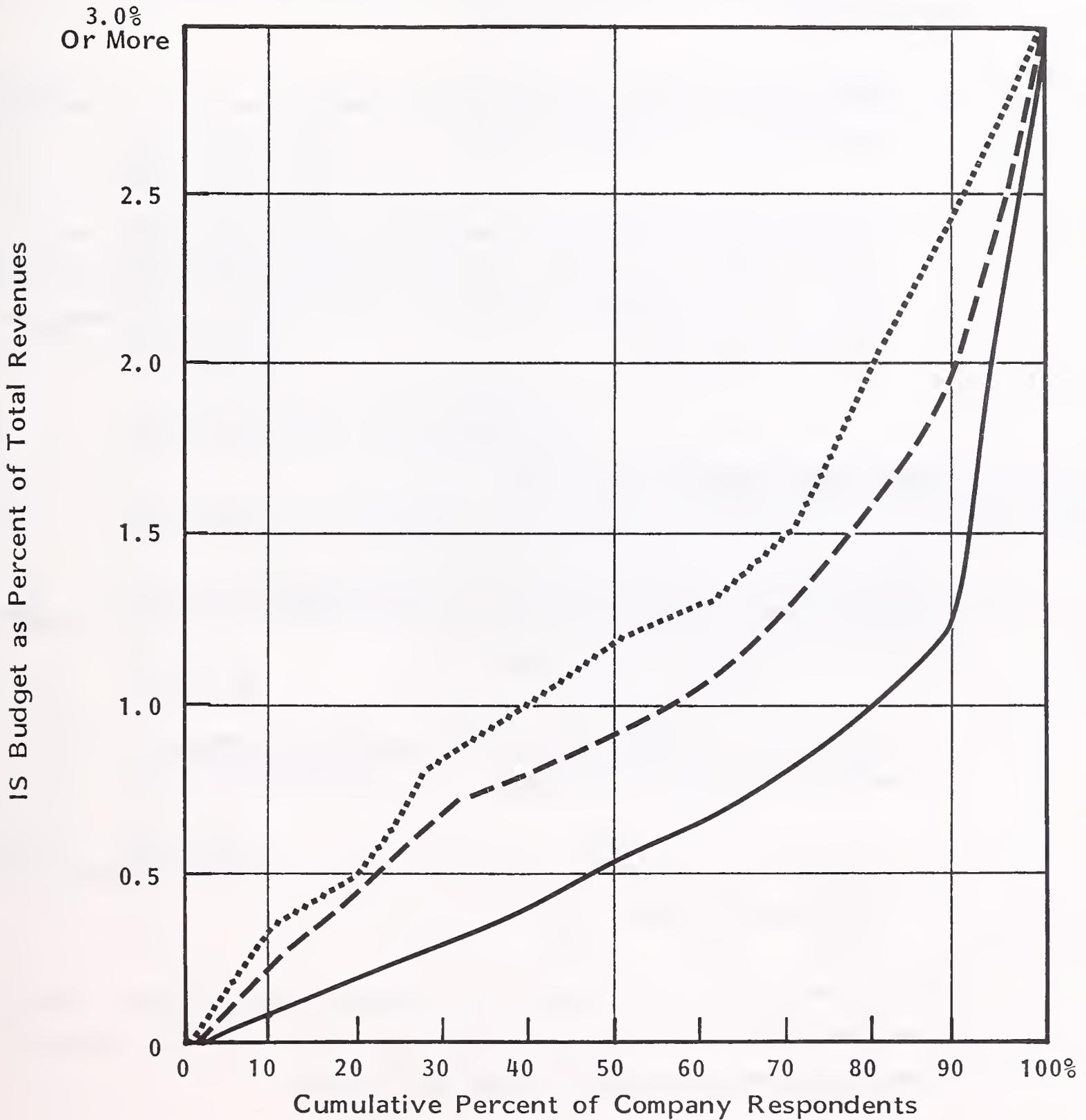
Note: Banking and Finance Sector Not Included

Key: Company Size = •••••• Under $200 million, ── ── $200 million to $1 billion, ──── Over $1 billion

SOURCE: INPUT Surveys

- 61 -

INPUT
UA82

- Budgeting conventions will become even more of an issue in future years as end-using computing increases in importance and users assume more direct control of computing budgets.

- Taking the median amount, firms spend about $900 on IS for every corporate employee, as shown in Exhibit II-6. There are wide variatons by industry sector, however.

  - Distribution and government/education spend appreciably less, reflecting their low levels of automation.

  - Insurance and banking/finance spend much more than average, reflecting both their long-standing automation as well as, in the case of insurance, the distribution network not being part of the corporate entity, in most cases.

C.   INFORMATION SYSTEMS STAFFING

- Expected changes in IS staffing to a large extent mirror the budget changes previously discussed, as shown in Exhibit II-7.

  - On the average, 58% of firms expect to add staff (compared to the 61% which see an increase in budget).

  - Large firms are somewhat more likely to decrease their IS staff than decrease their budget.

- Staff turnover is less of a problem than in previous years, largely because of the economy. The average turnover rate is now 12%, as shown in Exhibit II-8. Even programmer and analyst turnover is only 14%.

INPUT

EXHIBIT II-6

INFORMATION SYSTEMS SPENDING PER CORPORATE EMPLOYEE -

BY INDUSTRY SECTOR

Industry
Sector

Industry Sector	
Discrete Manufacturing	780
Process Manufacturing	880
Transportation	590
Utilities	1,540
Banking and Finance	3,400
Insurance	2,840
Distribution	480
Services	950
Government/ Education	360

← Median ($880)

0   500   1,000   1,500   2,000   2,500   3,000 $3,500
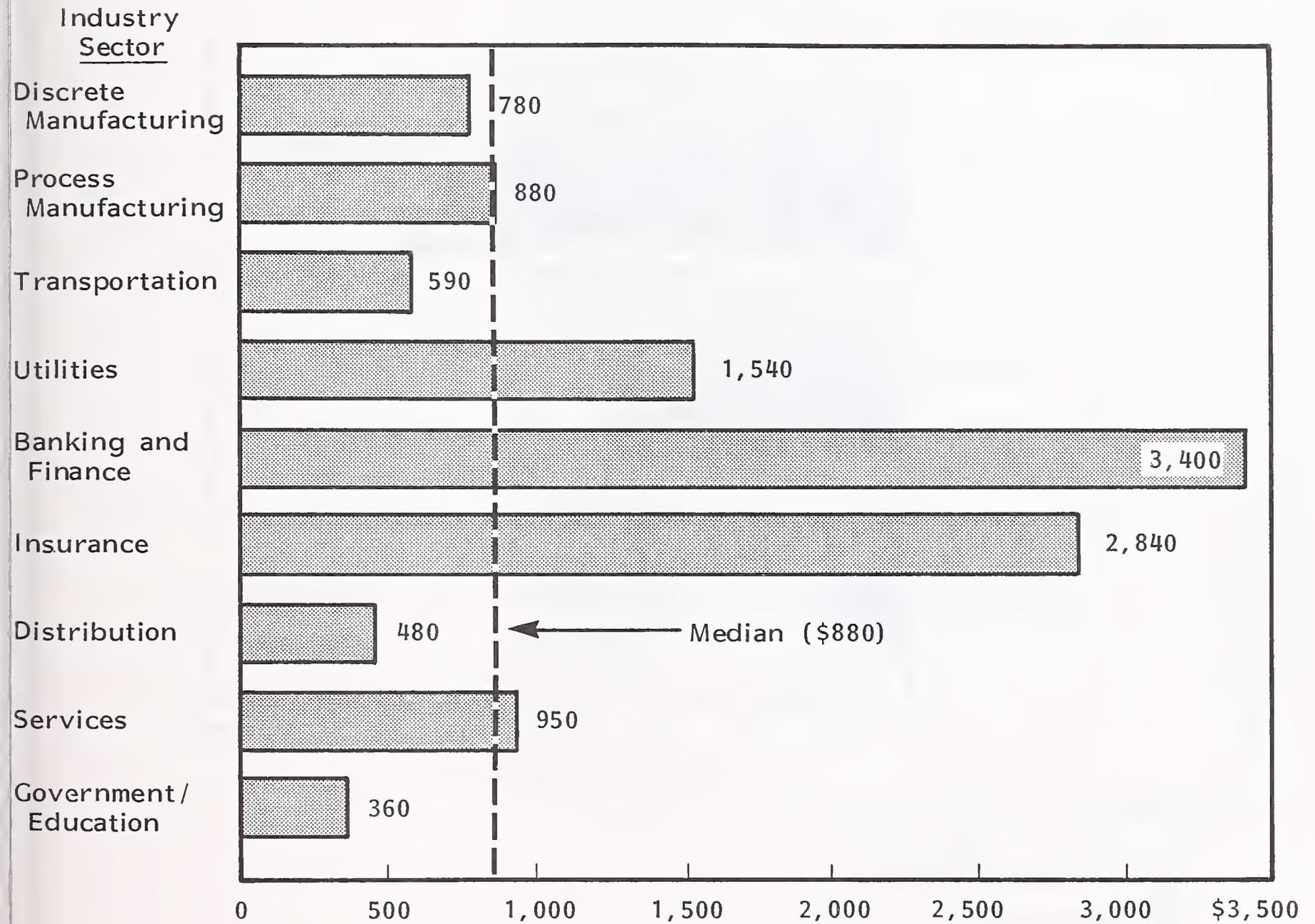
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT II-7

INFORMATION SYSTEMS STAFFING CHANGES EXPECTED
IN THE NEXT TWELVE MONTHS, BY COMPANY SIZE
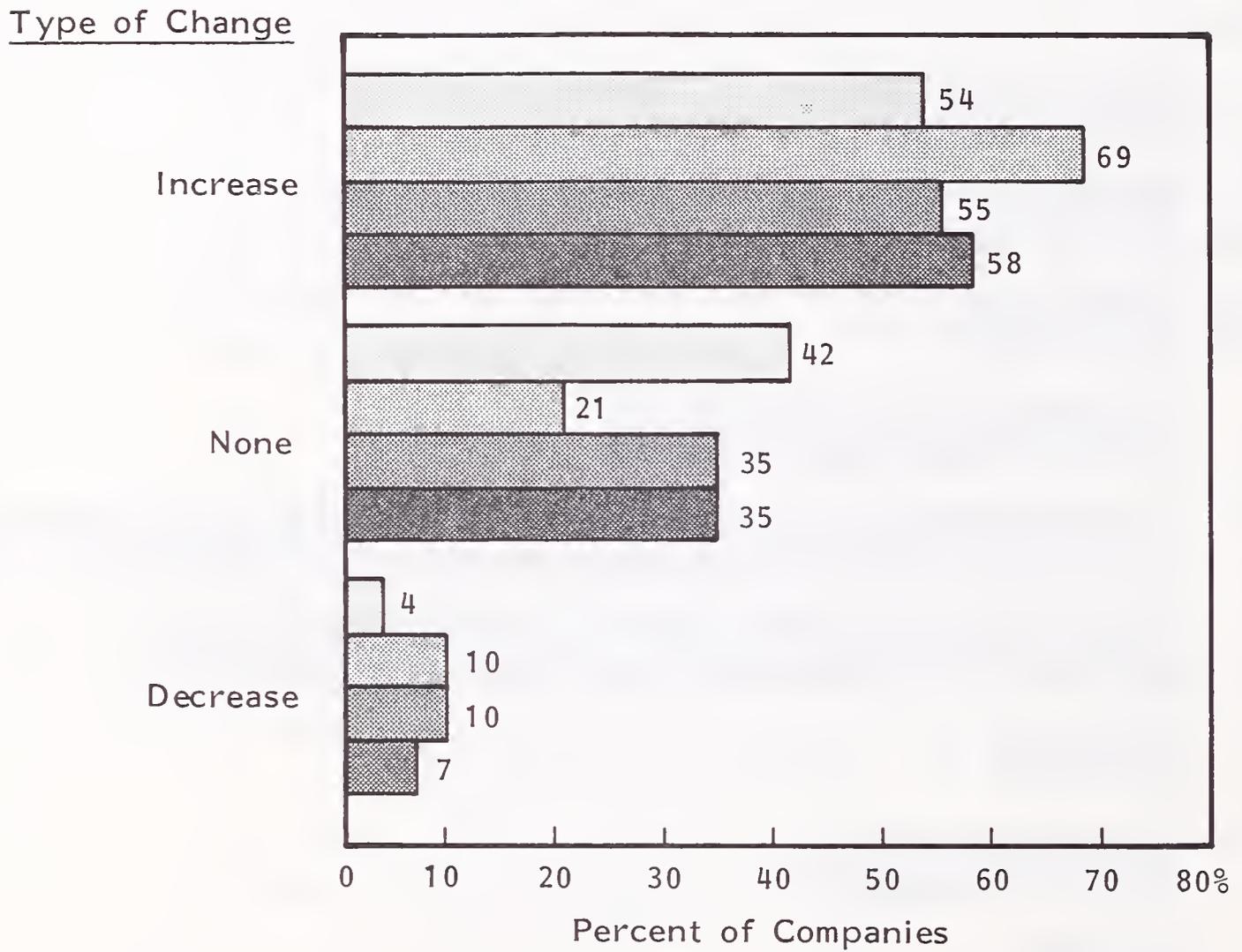
Type of Change

Percent of Companies

Key:

▢ Under $200 million

▨ $200 million to $1 billion

▨ Over $1 billion

■ Total

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT II-8

INFORMATION SYSTEMS TURNOVER BY POSITION

Position	Percent
Overall	12
Management/Supervisors	7
Planning and Administrative	4
Applications Programmers and Analysts	14
Telecommunications Specialists	7
Data Base Specialists	3
Other Technical Specialists	9
Operations Staff	12
Data Entry	9
Other (Clerical, etc.)	5

Percent of Annual Turnover
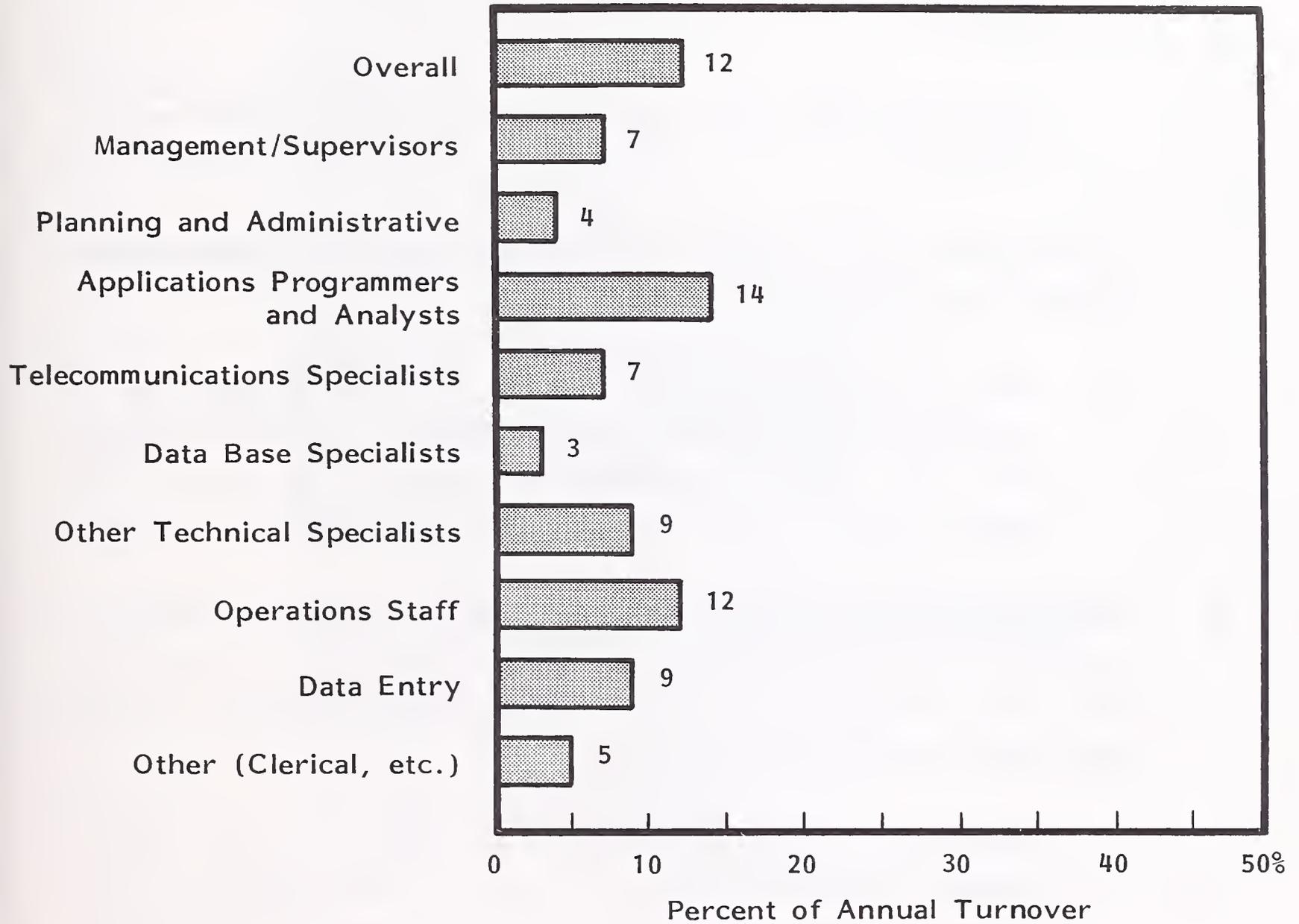
SOURCE: INPUT Surveys

INPUT
UA82

- Turnover varies by industry sector, as is shown in Exhibit II-9. Taking 100 as average turnover, utilities, banking/finance and distribution all expect to see significantly higher turnover than average in the future.

- Although turnover is down, IS departments still foresee a high degree of difficulty in recruiting specialized technical staff, as shown in Exhibit II-10.

  - Application programmer recruitment is expected to be almost as difficult.

  - Nontechnical staff recruitment is expected to be relatively easy by comparison.

- For the most part the difficulty in recruitment does not vary appreciably by company size, as shown in Exhibit II-11.

  - Note, though, the significant difficulties that large companies see in recruiting telecommunications and data base specialists. This reflects the very complex operating environments of these large organizations: they need very highly qualified specialists.

- There are industry differences in the difficulty of recruiting staff, as shown in Exhibit II-12. This is a result of a combination of factors, including local labor pools, company/sector financial condition, "leading edgeness," wage scales, department/company growth, etc.

  - Recruitment is significantly easier in the services and transportation industry. The services industry record is greatly influenced by the computer services component, which is both dynamic and technically attractive. Transportation offers some technical challenges also; equally important is the prospect of greatly reduced personal travel costs in the airline subsection.

INPUT

EXHIBIT II-9

INFORMATION SYSTEMS STAFF
RELATIVE TURNOVER, BY INDUSTRY SECTOR
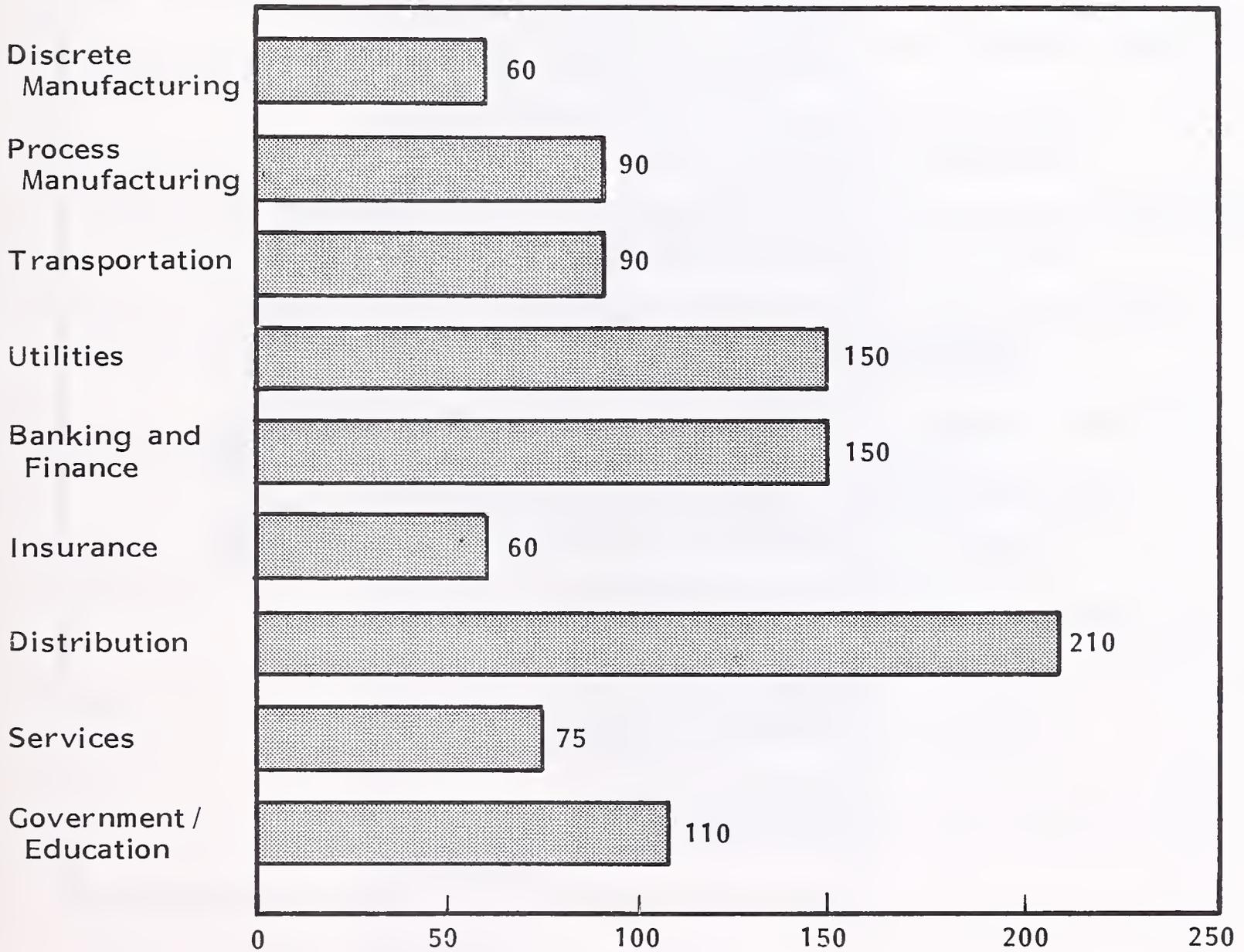
Average Turnover = 100

INPUT
UA82

EXHIBIT II-10

DIFFICULTY IN RECRUITING STAFF -
BY POSITION
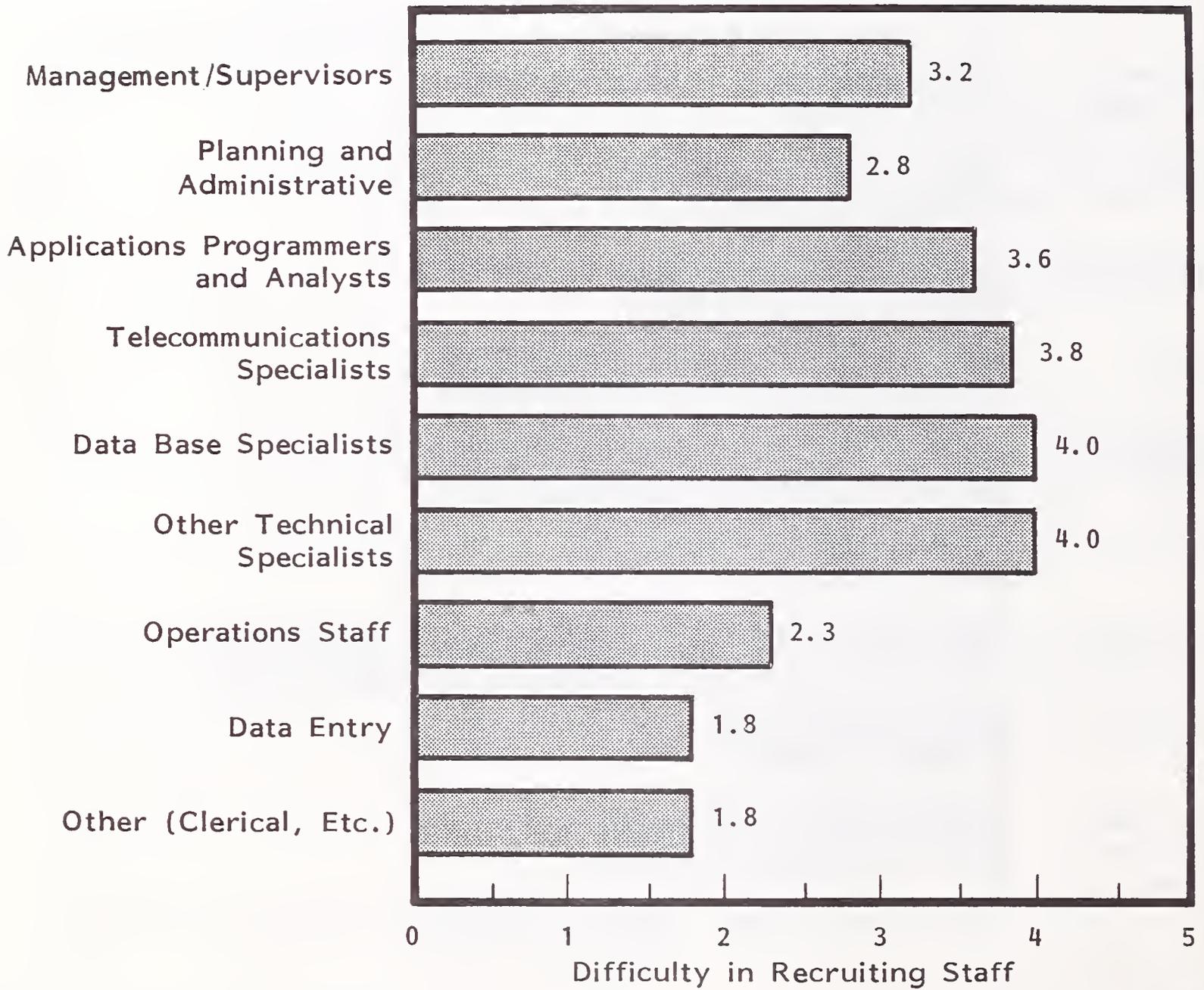
Scale: 1 = Low, 5 = High

INPUT
UA82

EXHIBIT II-11

DIFFICULTY IN RECRUITING STAFF,
BY POSITION TYPE AND COMPANY SIZE

Management/
Supervisors — 3.2 / 3.2 / 3.0

Planning and
Administration — 3.0 / 3.1 / 2.7

Application
Programmers and
Analysts — 3.8 / 3.4 / 3.6

Telecommunications
Specialists — 3.7 / 3.5 / 4.3

Data Base
Specialists — 3.9 / 4.0 / 4.3

Other Technical
Specialists — 4.2 / 3.8 / 4.0

Operations Staff — 2.4 / 2.2 / 2.4

Data Entry — 2.0 / 1.8 / 1.8

Other (Clerical,
etc.) — 1.7 / 1.5 / 1.7

1 (Low) 2 3 4 5 (High)

☐ Under $200 Million

▨ Between $200 Million and $1 Billion

▰ Over $1 Billion

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT II-12

RELATIVE DIFFICULTY IN RECRUITING STAFF,
BY INDUSTRY SECTOR
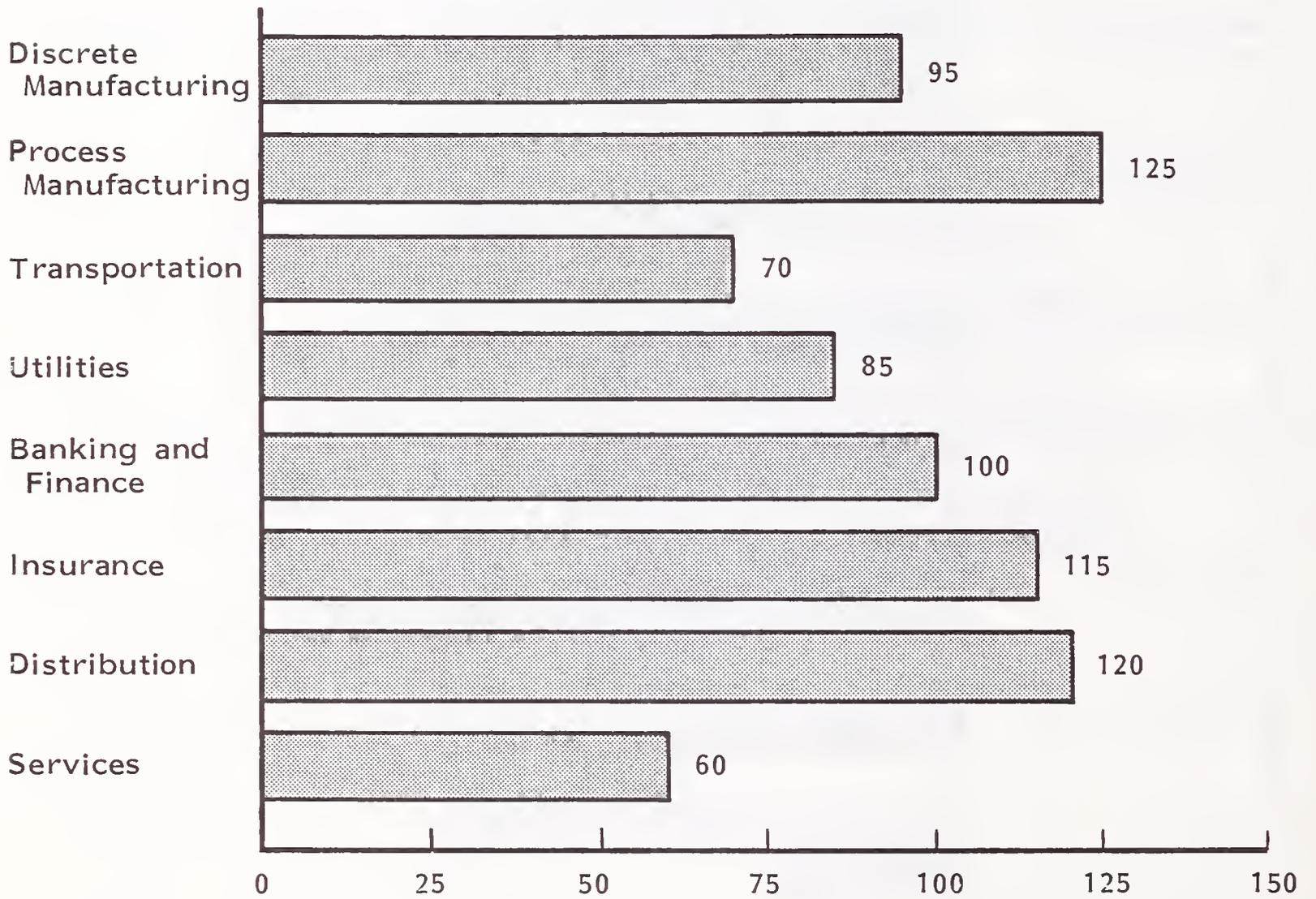
Average Difficulty = 100

SOURCE: INPUT Surveys

INPUT
UA82

- Certainly an influential factor in recruitment of applications staff is whether work will be on new developments or mainteance (see INPUT's Management Issue Report, <u>Software Maintenance: The Uninvited Guest</u>, November 1982). For better or worse, maintenance is expected to remain stable, at a little less than half the workload, for the 1981-1983 time period, as shown in Exhibit II-13.

D.   INFORMATION SYSTEMS PLANNING ISSUES

1.   ISSUE TYPES

- There are three types of issues which affect IS plans:

    - Problems.

    - Objectives.

    - Initiatives.

- "Problems" are self-explanatory; they may be internal or external, technical or managerial.

- "Objectives" are the goals that IS is heading toward. An objective may exist because of a problem (e.g., improve user relations) or may exist in the absence of a precipitating problem (e.g., develop an office automation plan).

- "Initiatives" are actions that will be taken. Initiatives may flow from problems and/or objectives.

- Exhibit II-14 shows the logical relationships which exist between problems, objectives, and initiatives.

INPUT

EXHIBIT II-13

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE,
1981-1983

Percent of Resources
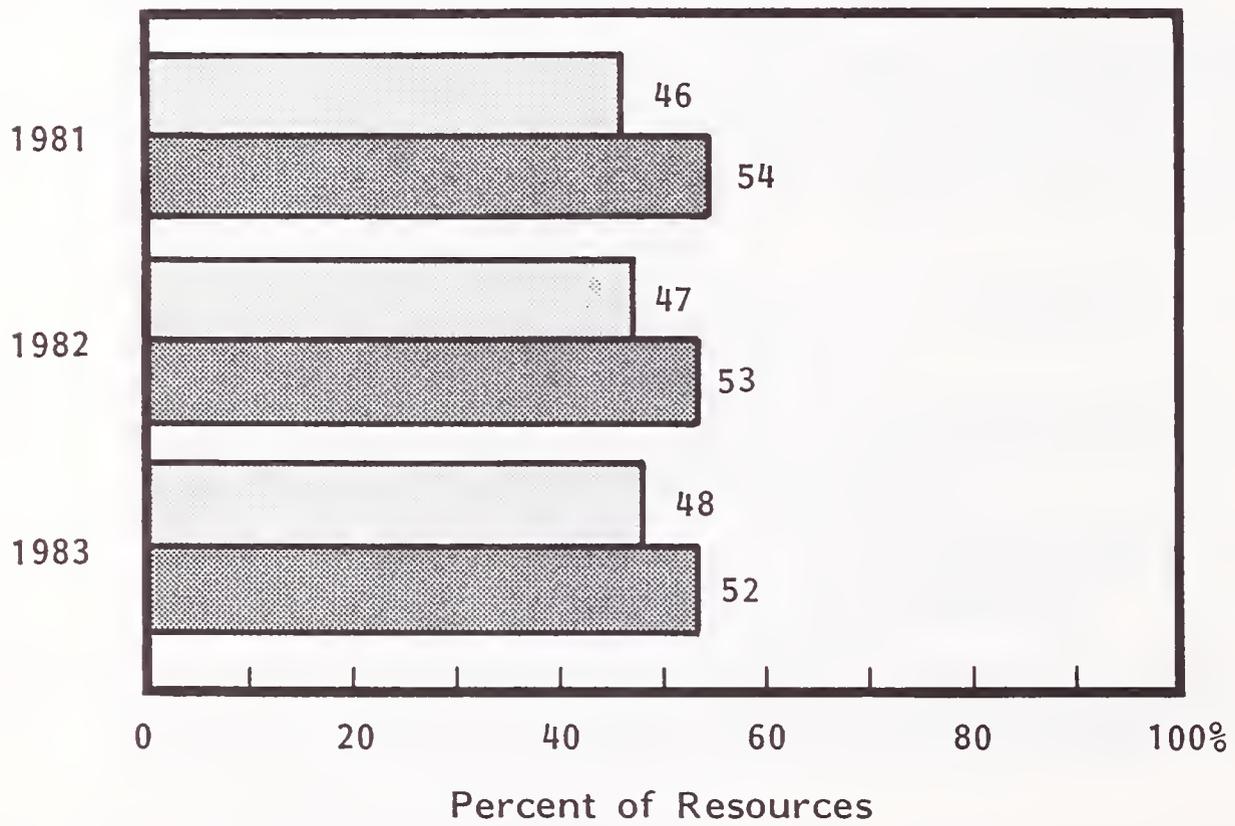
New Development

Maintenance

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT II-14

RELATIONSHIP OF INFORMATION SYSTEMS PROBLEMS,

OBJECTIVES, AND INITIATIVES

```
┌─────────────────────────────────────────┐
│        Corporate and/or IS Environment   │
└─────────────────────────────────────────┘
         │                        │
         ▼                        │
    ┌──────────┐                  │
    │ Problems │                  │
    └──────────┘                  ▼
         │      ╲           ┌────────────┐
         │        ╲         │ Objectives │
         │          ╲       └────────────┘
         │            ╲         │
         ▼              ▼       ▼
              ┌──────────────┐
              │  Initiatives │
              └──────────────┘
```

INPUT
UA82
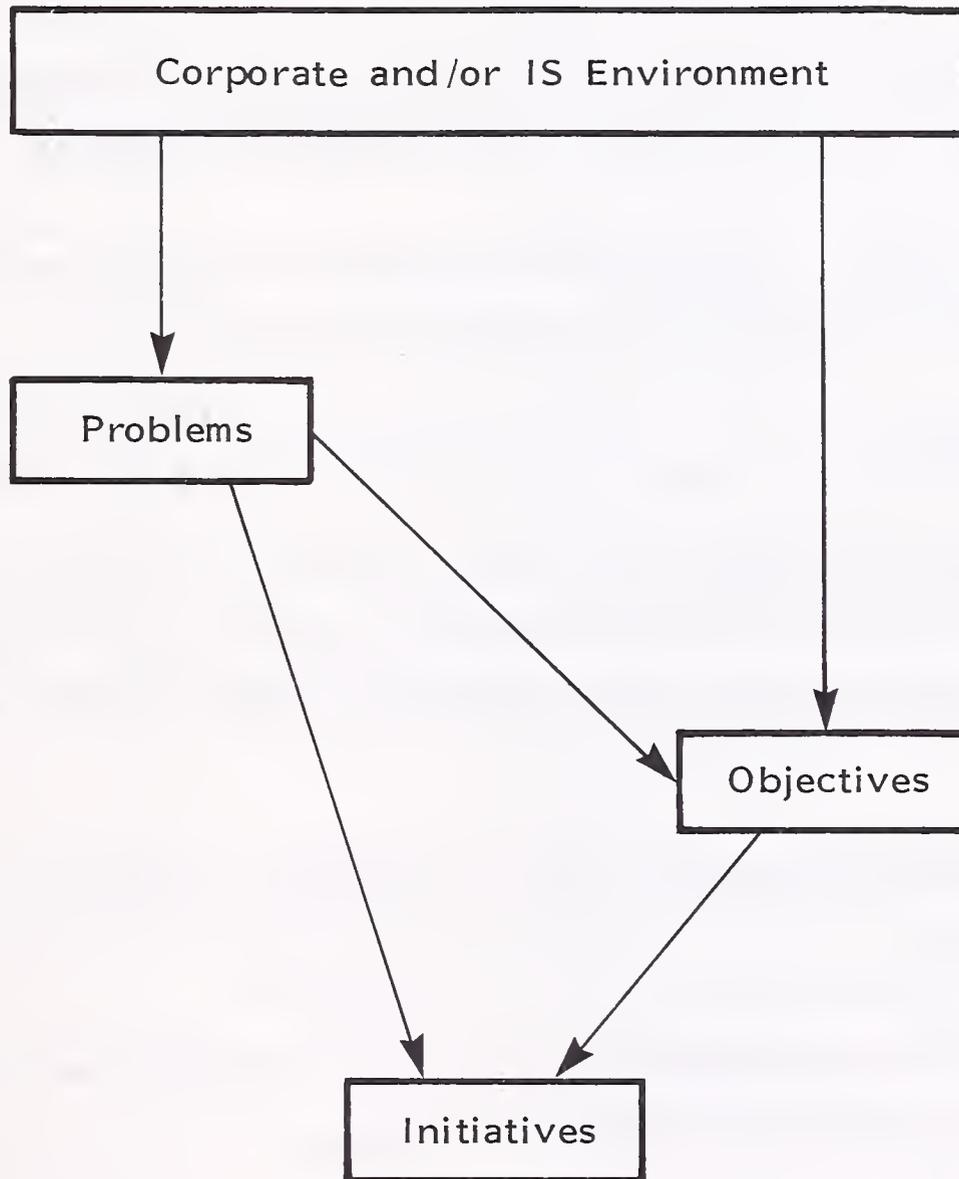
2. ISSUE GROUPS

- There are many IS issues. For purposes of analysis and presentation, they have been grouped into three issue areas and seven major issue groups. Exhibit II-15 shows these areas and groups, along with examples of the major subgroups.

- Costs and telecommunication/office automation will be specially focused on to see if their primacy in current news is reflected in IS planning.

- Several of the major subgroup issues are separately reported on and analyzed in the individual industry sector analyses in Chapter III.

3. METHODOLOGY

- Survey respondents supplied open-ended responses to questions about what they saw as the most important problems, objectives, and initiatives facing their organizations. Respondents could supply as many as three issues in each category.

    - The answers were later coded into groups and subgroups for further analysis.

- The number of subgroup responses in a particular industry sector was calculated as a percentage of all firms in the sector.

    - These subgroup percentages have been added together to obtain an index value for an issue group. For example:

        . Some IS departments have problems with both users and upper management; others have problems only with users.

INPUT

EXHIBIT II-15

INFORMATION SYSTEMS ISSUE AREAS AND GROUPS

ISSUE AREA	ISSUE GROUP	EXAMPLES OF SUBGROUPS
Corporate Relationships	Same	Relations with upper management, relations with users, company objectives, end-user computing, committees
IS Management	Planning and Control	Applications planning, project control, management techniques, organizational changes
	Personnel	Shortages, turnover, training, recruitment
	Costs	Budget cuts, budget justification
Technical	Hardware	Operation, capacity management, maintenance, DDP security,
	Software	Development, maintenance, productivity, quality, packages
	Telecommunications, Office Automation	Data and voice networks, equipment planning, office system organization

INPUT
UA82

.   If, for example, in the services sector, 12% of companies have
        problems in their relations with upper management and 20%
        have user relation problems, the resulting index value is 32.

4.   INFORMATION SYSTEMS PROBLEMS

•   The <u>median</u> importance of most of the problem groups is similar, as shown in
    Exhibit II-16.

    -       However, there are usually quite large variations from the highest to
            the lowest industry sector.

    -       Costs and telecommunications/office automation are <u>not</u> considered
            major problems. (Although, as will be seen, considerable importance is
            placed on telecommunications/office automation as an objective.)

•   Exhibit II-17 shows the actual index values for each industry sector.

•   Company/division size in some cases does have an impact on how important
    different kinds of problems are, as shown in Exhibit II-18.

    -       Large companies, not unexpectedly, have significant problems in cor-
            porate relationships and planning and control. They have fewer per-
            ceived problems in software.

    -       They also have relatively more problems in telecommunications/office
            automation; this is a function of both their organizational complexity
            and being on the leading edge.

    -       Medium-sized companies, in contrast, are caught in a bind on personnel
            issues.

INPUT

EXHIBIT II-16

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS

Issue Groups

Corporate Relationships	37 / 13 — 58
Personnel	36 / 18 — 50
Hardware	35 / 22 — 51
Planning and Control	33 / 17 — 66
Software	30 / 18 — 45
Costs	13 / 9 — 36
Telecommunications, Office Automation	6 / 4 — 24

0   10   20   30   40   50   60   70   80   90   100

Lowest   Index Values Range   Highest
                 of Industry Sectors

•••••••• = Median

SOURCE: INPUT Surveys

- 77 -
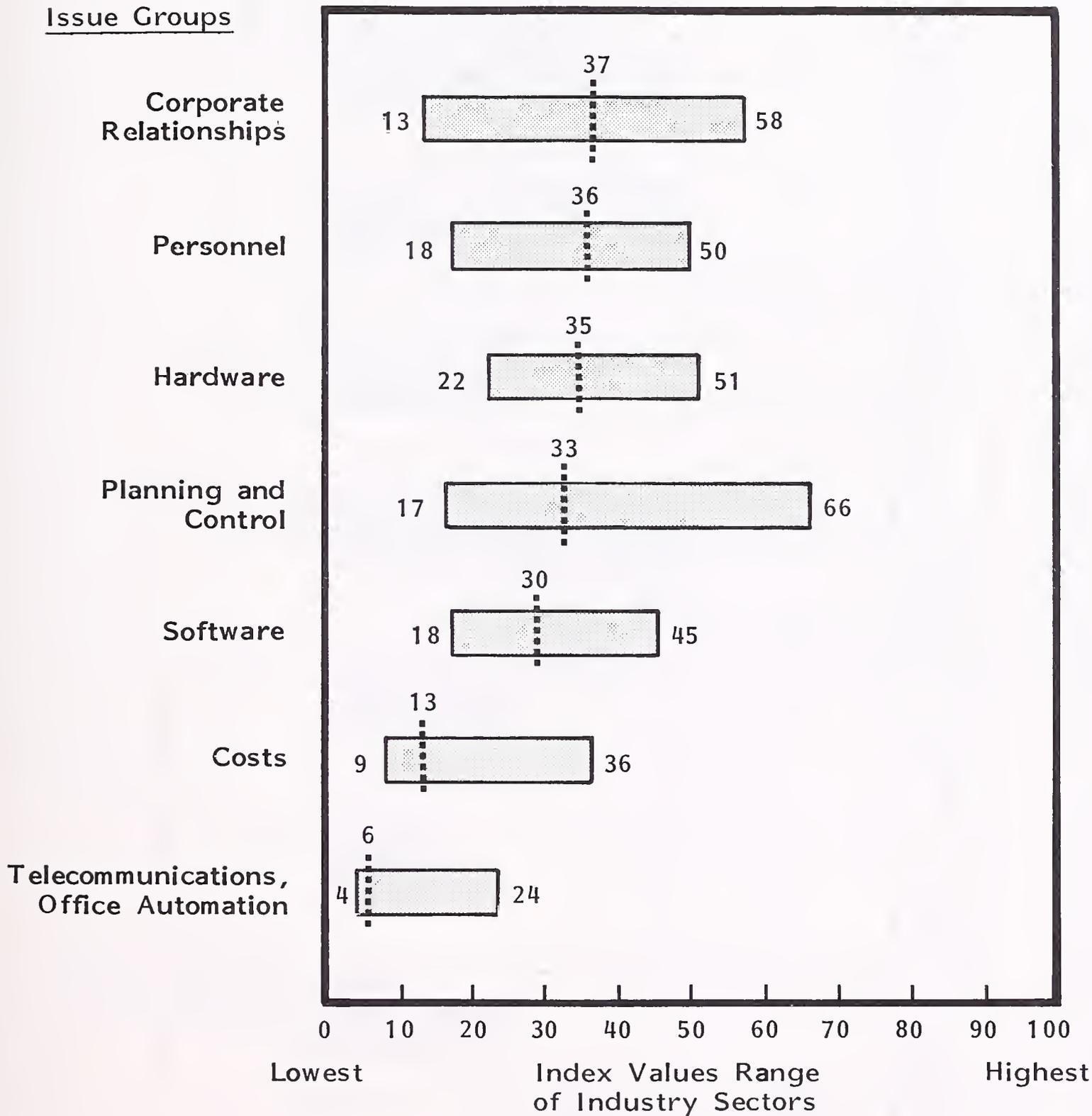
INPUT

EXHIBIT II-17

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS, BY INDUSTRY SECTOR

(Index Values)

ISSUE GROUPS	DISCRETE MFG	PROCESS MFG	TRANSPOR-TATION	UTILITIES	BANKING/FINANCE	INSURANCE	DISTRI-BUTION	SERVICES	GOVERNMENT, EDUCATION
Corporate Relationships	58	51	43	44	37	29	22	32	13
Personnel	41	18	26	50	28	36	44	34	41
Hardware	35	30	26	31	51	44	37	22	47
Planning and Control	42	29	17	41	66	62	33	20	20
Software	44	27	26	18	40	35	26	30	45
Costs	16	18	9	19	7	13	10	10	36
Telecommunications, Office Automation	11	24	9	12	6	6	4	6	5

NOTE: The larger the index values, the greater the importance.

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT II-18

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS,
BY COMPANY SIZE
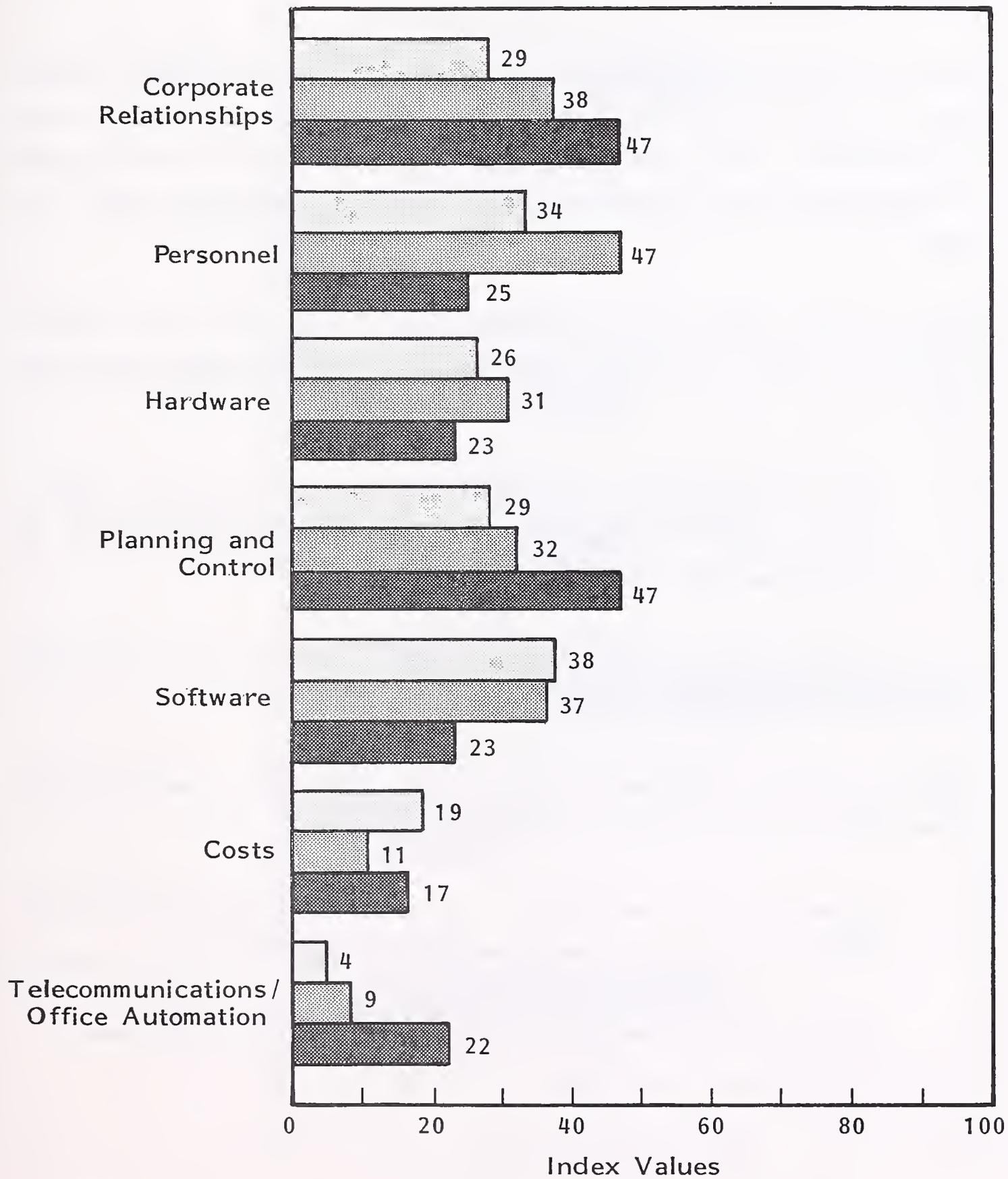
Index Values

Key: ☐ Under $200 million

▨ $200 million – $1 billion

▨ Over $1 billion

INPUT
UA82

5.   OBJECTIVES

● Objectives have a similar pattern to problems, with striking exceptions in the personnel, software, and telecommunications/office automation areas, as shown in Exhibit II-19.

● Personnel issues are important formal objectives in few companies. In part, this is due to the low priority given to human relations in many organizations. It also reflects the inability to come up with convincing ways to meet objectives (e.g., how can reduced turnover be achieved - easily or at all?).

● Software and telecommunications/office automation are in the opposite position of having objectives considered more important than related problems.

  - Software, of course, is an action area for most companies. Note in Exhibit II-20 how important software-related objectives are to the banking and utility sectors.

  - In telecommunications/office automation, companies are trying to get out in front of problems, before they become serious.

● There are several differences in the relative importance of company objectives linked to company size, as shown in Exhibit II-21.

  - Large companies place greater importance on corporate relationships, software, and telecommunications/office automation.

  - Medium-sized companies have fewer hardware-related objectives.

INPUT

EXHIBIT II-19

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS
PROBLEMS VERSUS OBJECTIVES

Issue Groups

Corporate Relationships
Personnel
Hardware
Planning and Control
Software
Costs
Telecommunications/ Office Automation

0 10 20 30 40 50 60 70 80 90 100

Lowest   Index Values Range   Highest
                of Industry Sectors
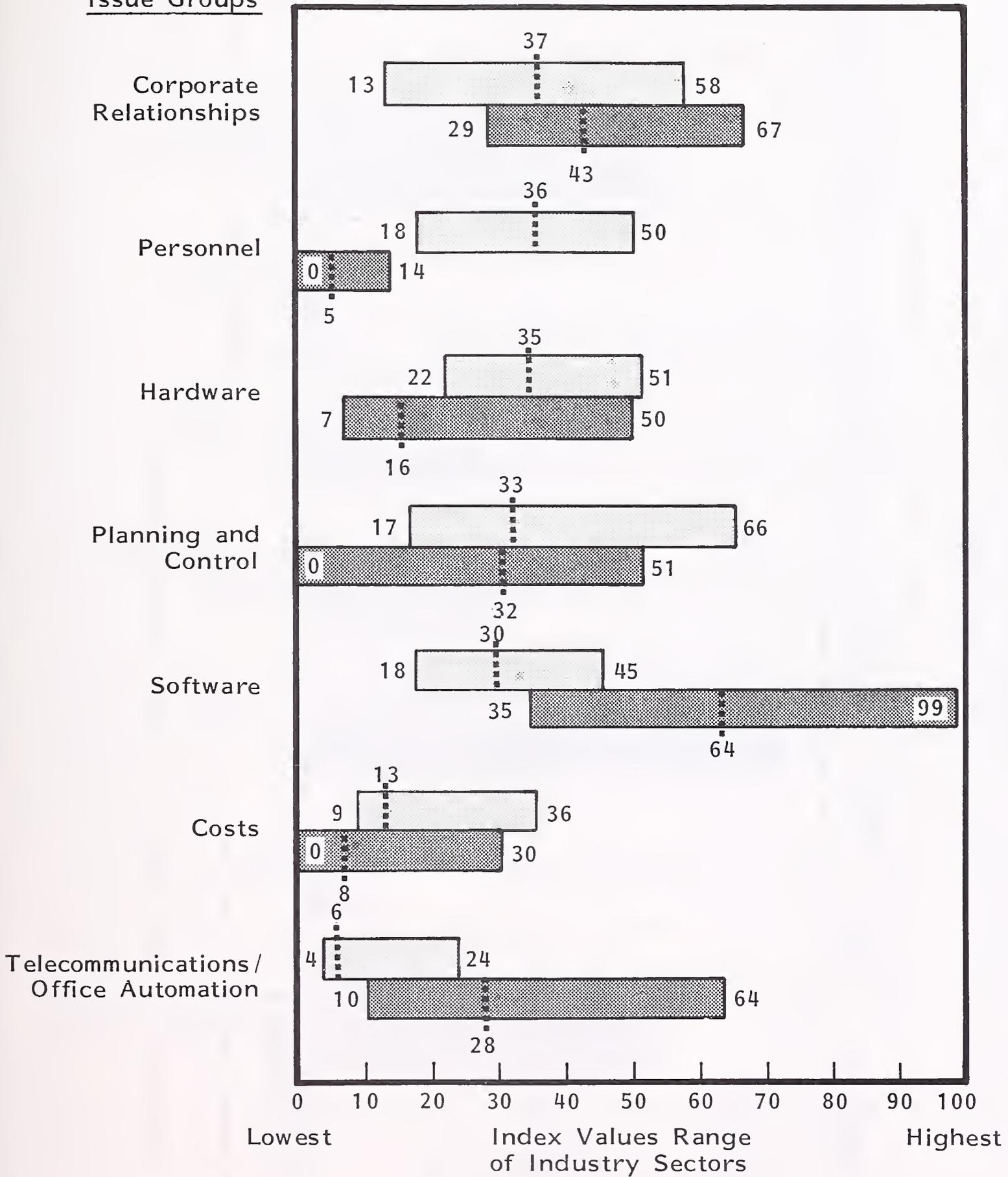
Key: ••••••• = Median   ☐ = Problem   ▨ = Objective

SOURCE: INPUT Surveys

- 81 -

INPUT
UA82

EXHIBIT II-20

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS OBJECTIVES, BY INDUSTRY SECTOR

(Index Values)

ISSUE GROUPS	DISCRETE MFG	PROCESS MFG	TRANSPOR-TATION	UTILITIES	BANKING/FINANCE	INSURANCE	DISTRI-BUTION	SERVICES	GOVERNMENT, EDUCATION
Corporate Relationships	43	57	67	50	25	64	37	34	29
Personnel	8	2	0	0	5	0	5	6	14
Hardware	25	11	33	50	35	16	11	14	7
Planning and Control	44	32	17	51	40	32	18	18	0
Software	68	66	100	64	100	63	56	52	35
Costs	8	14	0	9	30	21	0	6	0
Telecommunications, Office Automation	40	52	50	18	10	64	24	16	28

Note: The larger the index value, the greater the importance.

SOURCE: INPUT Surveys

- 82 -

INPUT
UA82

EXHIBIT II-21

RELATIVE IMPORTANCE OF COMPANY OBJECTIVES,
BY COMPANY SIZE
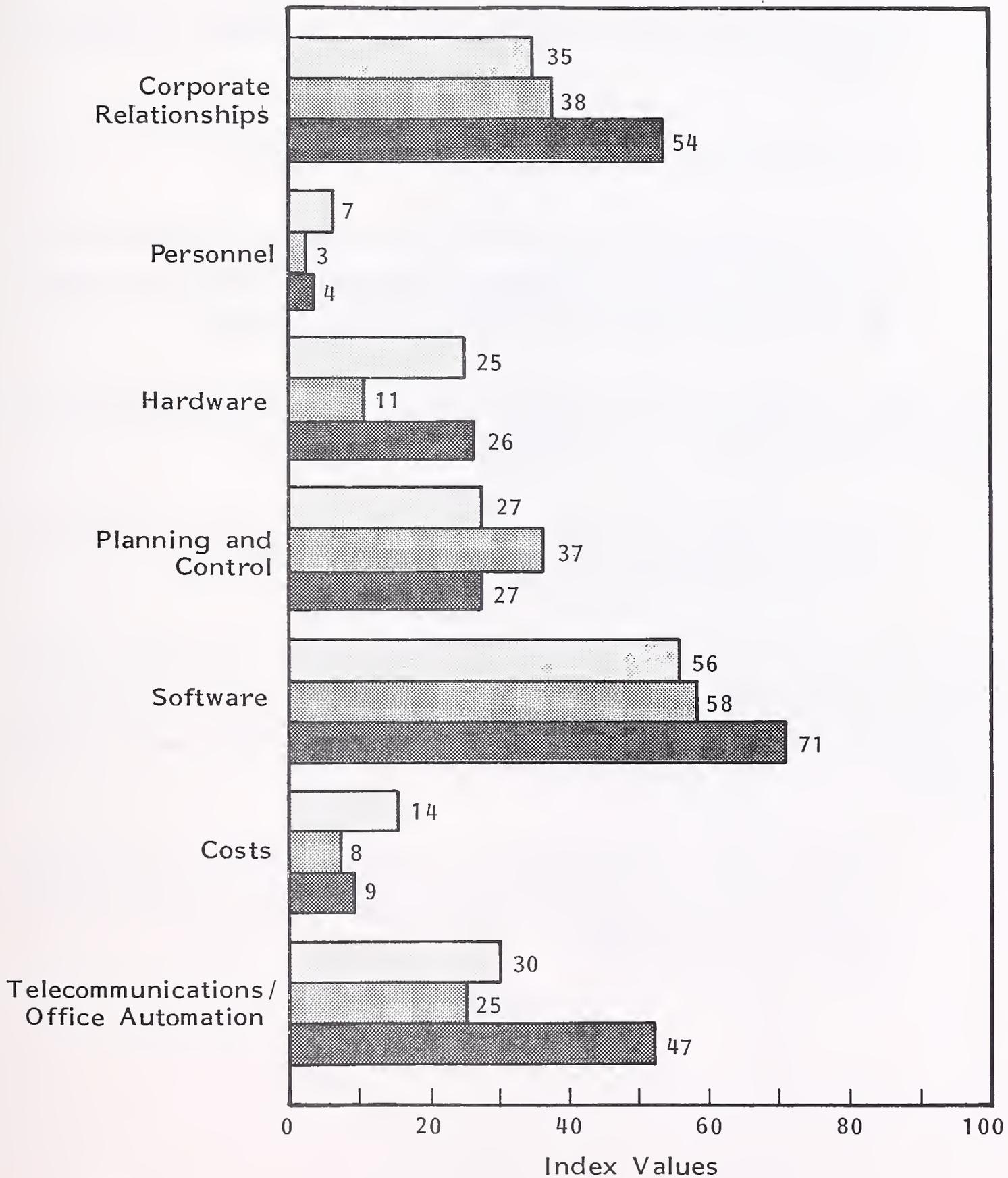
Key:
- ☐ Under $200 million
- ▨ $200 million – $1 billion
- ▓ Over $1 billion

SOURCE: INPUT Surveys

INPUT
UA82

6.   INITIATIVES

- Planned initiatives are on the average in line with problems, objectives, or both, as shown in Exhibit II-22.

    - Personnel and hardware initiatives are on a level with the perceived problems.

    - Software initiatives are commensurate with objectives.

    - It is interesting that the actual initiatives planned for telecommunications/office automation do not come close to the stated importance. Obviously, most efforts are still in the preplanning phase.

- Company size serves as a discriminant for only a few initiative groups, as shown in Exhibit II-23.

    - Both corporate relationships and planning and control increase in importance as company size increases.

- Note the very high importance given to software, shown previously in Exhibit II-20. An examination of individual industry sectors in Exhibit II-24 shows how important software-related initiatives will be in the banking and insurance areas.

    - Whether such a disproportionate emphasis is desirable in this group compared to the corporate relationships, personnel, and planning and control areas is debatable.

INPUT

EXHIBIT II-22

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS PROBLEMS,
OBJECTIVES, AND INITIATIVES

Issue Groups

Corporate Relationships
- Problem: 37
- Objective: 43
- Initiative: 39

Personnel
- Problem: 36
- Objective: 5
- Initiative: 41

Hardware
- Problem: 35
- Objective: 16
- Initiative: 40

Planning and Control
- Problem: 33
- Objective: 32
- Initiative: 28

Software
- Problem: 30
- Objective: 64
- Initiative: 69

Costs
- Problem: 13
- Objective: 8
- Initiative: 12

Telecommunications/Office Automation
- Problem: 6
- Objective: 28
- Initiative: 4

Mean Index of Importance

Key: □ Problem
      ▨ Objective
      ▩ Initiative

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT II-23

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS INITIATIVES, BY COMPANY SIZE
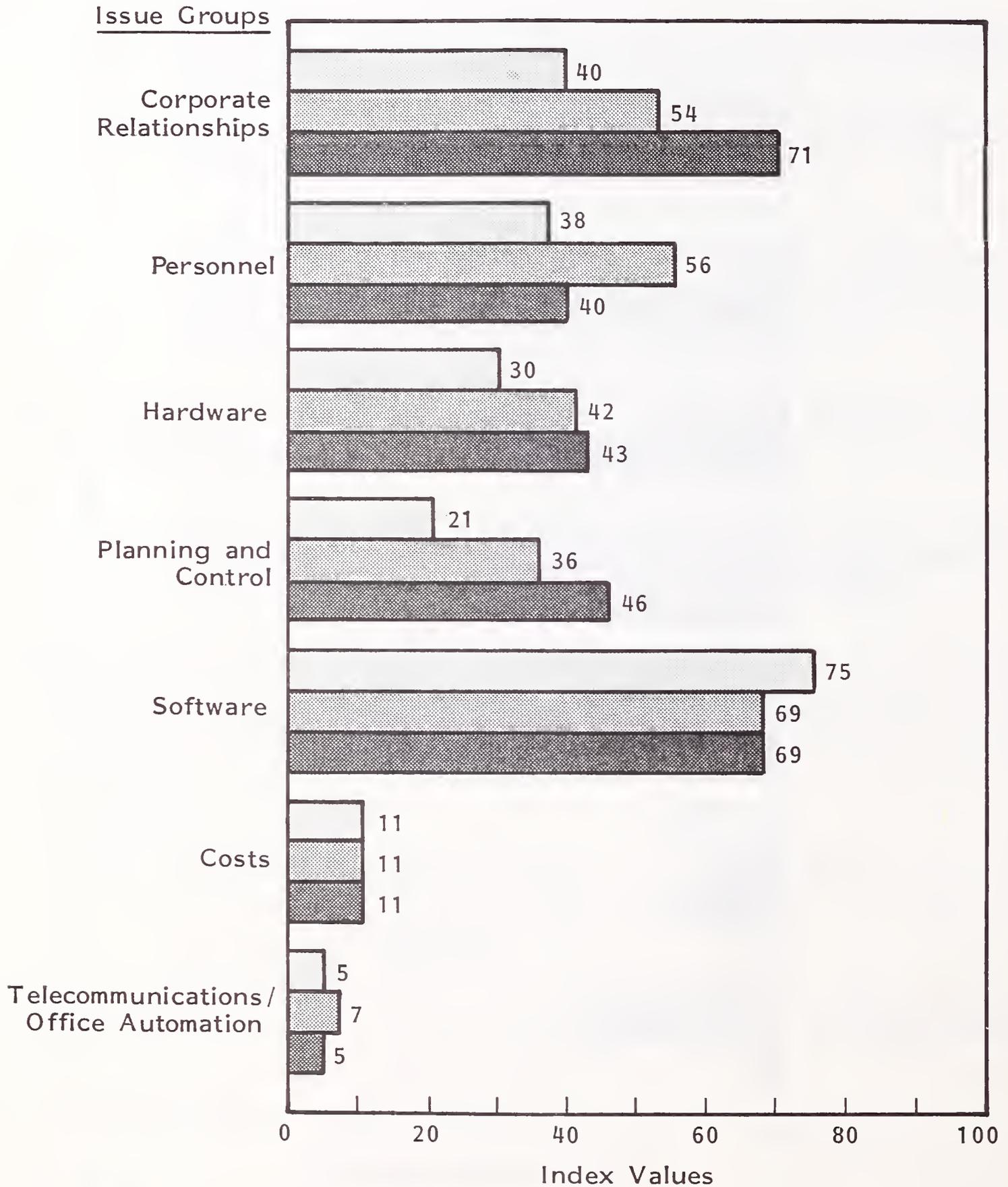
Issue Groups

Corporate Relationships — 40, 54, 71

Personnel — 38, 56, 40

Hardware — 30, 42, 43

Planning and Control — 21, 36, 46

Software — 75, 69, 69

Costs — 11, 11, 11

Telecommunications/ Office Automation — 5, 7, 5

Index Values (0, 20, 40, 60, 80, 100)

Key:
☐ Under $200 million
☐ $200 million – $1 billion
▓ Over $1 billion

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT II-24

RELATIVE IMPORTANCE OF INFORMATION SYSTEMS INITIATIVES, BY INDUSTRY SECTOR

(Index Values)

ISSUE GROUPS	DISCRETE MFG	PROCESS MFG	TRANSPOR- TATION	UTILITIES	BANKING/ FINANCE	INSURANCE	DISTRI- BUTION	SERVICES	GOVERNMENT, EDUCATION
Corporate Relationships	67	75	39	72	66	38	38	36	25
Personnel	64	41	15	43	45	29	45	36	36
Hardware	27	44	48	25	55	40	33	40	33
Planning and Control	39	35	5	91	28	45	26	14	23
Software	84	66	73	69	113	135	54	44	56
Costs	13	13	0	13	10	7	12	4	21
Telecommunications, Office Automation	5	7	5	0	3	0	4	4	18

NOTE: The larger the index values, the greater the importance.

SOURCE: INPUT Surveys

INPUT
UA82

E.   PERSONAL COMPUTERS

- INPUT's recent report, <u>Personal Computers in the Information System Strategy</u>, December 1982, describes the personal computer explosion now occurring in the corporate environment.

- Chapter III provides information on an industry-by-industry basis. This was not provided in the earlier study, which focused on overall trends and issues.

- As an aid to readers of this report, this section will summarize key personal computer data on a cross-industry basis. The underlying data appeared in the earlier report.

- A key fact about personal computers is that they have had a rapid takeoff: over three-quarters have been in place less than one year, as shown in Exhibit II-25.

- The most important personal computer issue facing IS departments is the amount of user independence that they represent.

    - IS funds are rarely used, as shown in Exhibit II-26.

    - The IS department is only looked to for assistance about one time in five, as shown in Exhibit II-27.

- Personal computers are used in a very wide area of applications, as shown in Exhibit II-28.

    - Even though "Calc" packages are the most widely used, many other packages are already being used, as shown in Exhibit II-29.

INPUT

EXHIBIT II-25

TIME SINCE FIRST PERSONAL COMPUTER INSTALLED IN DEPARTMENT

**Time Since
First Installation**

SOURCE: INPUT Surveys

INPUT
UPCS UA82

EXHIBIT II-26

- 90 -
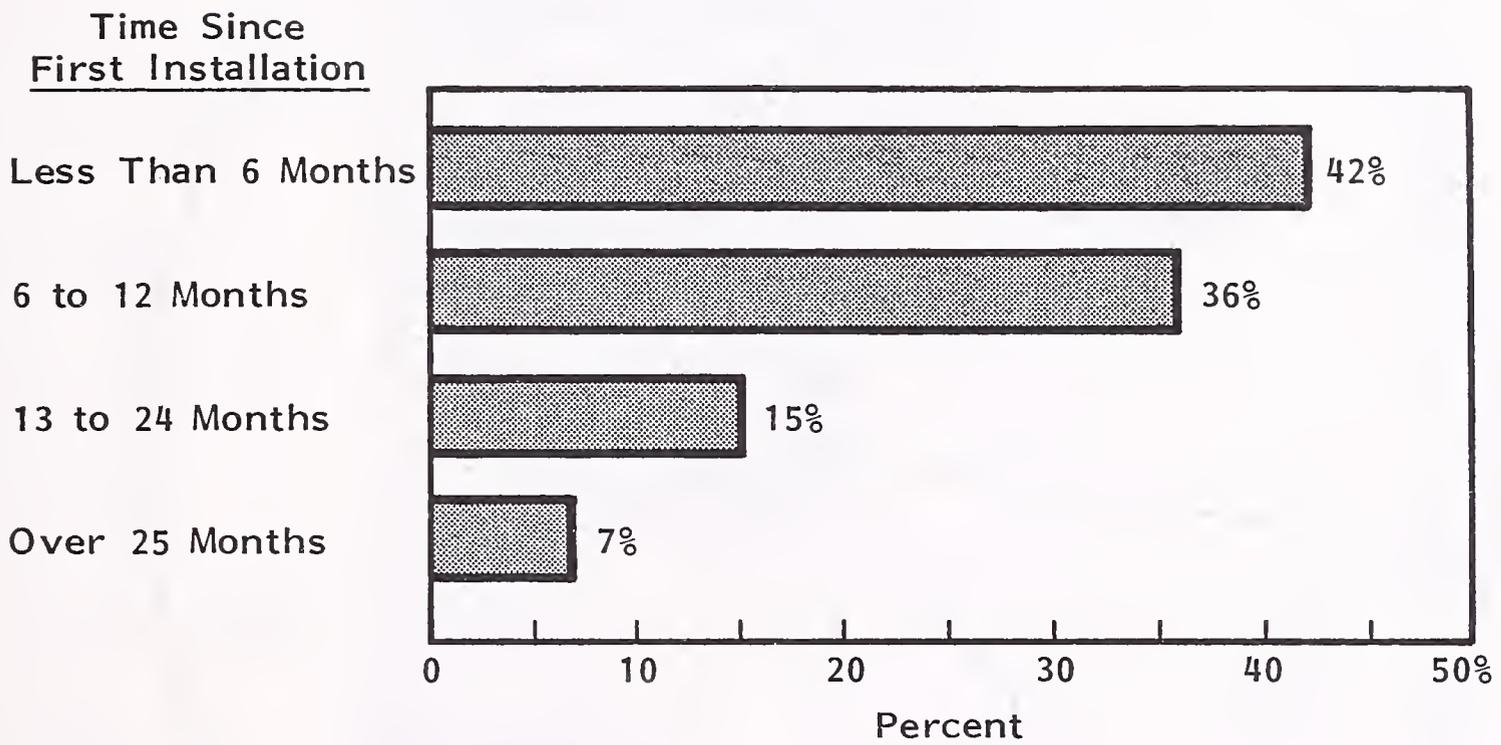
BUDGET SOURCES FOR PERSONAL COMPUTER FUNDS
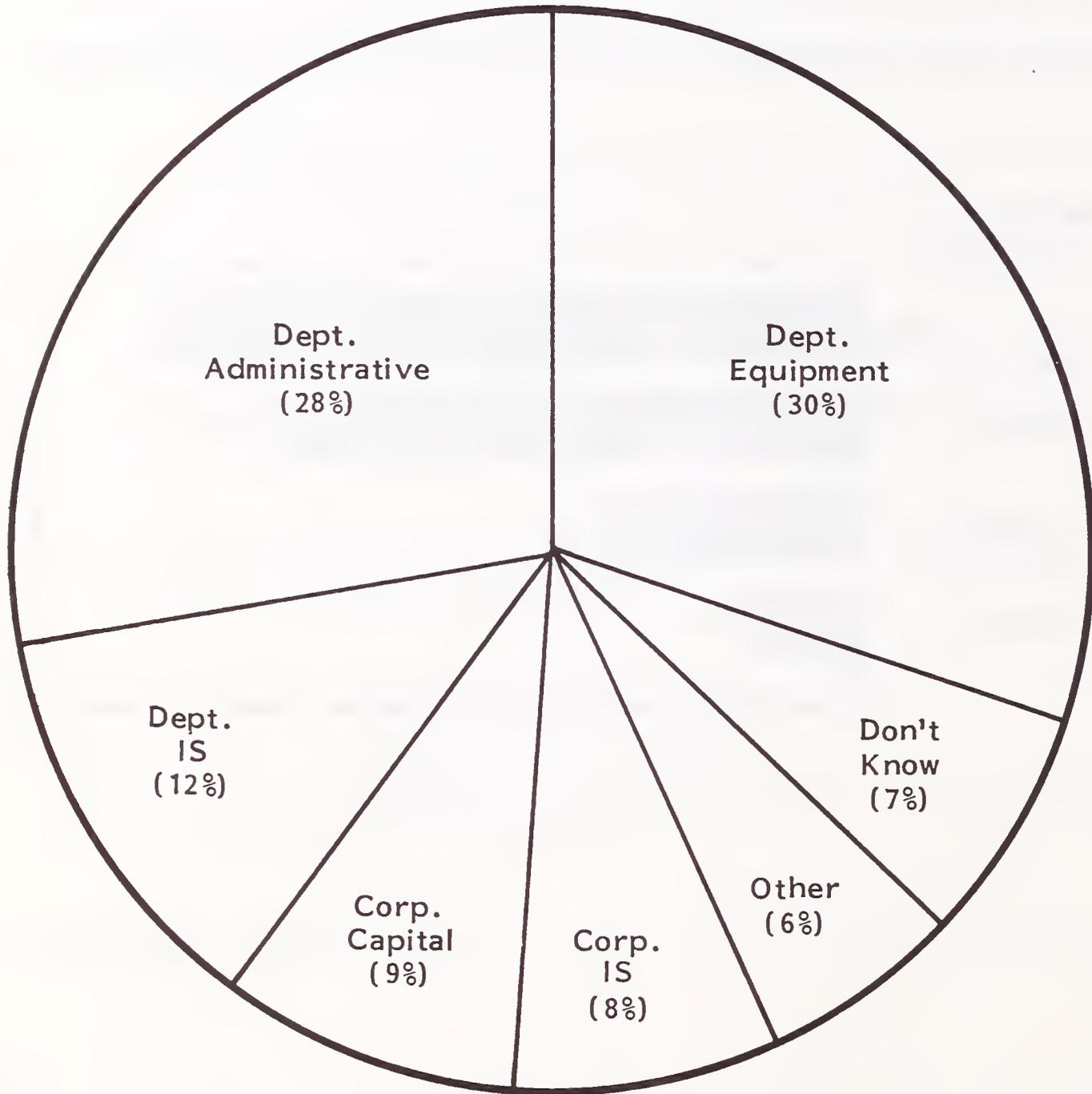
SOURCE: INPUT Surveys

INPUT
UPCS UA82

EXHIBIT II-27

SOURCES OF ASSISTANCE FOR
PERSONAL COMPUTER USERS
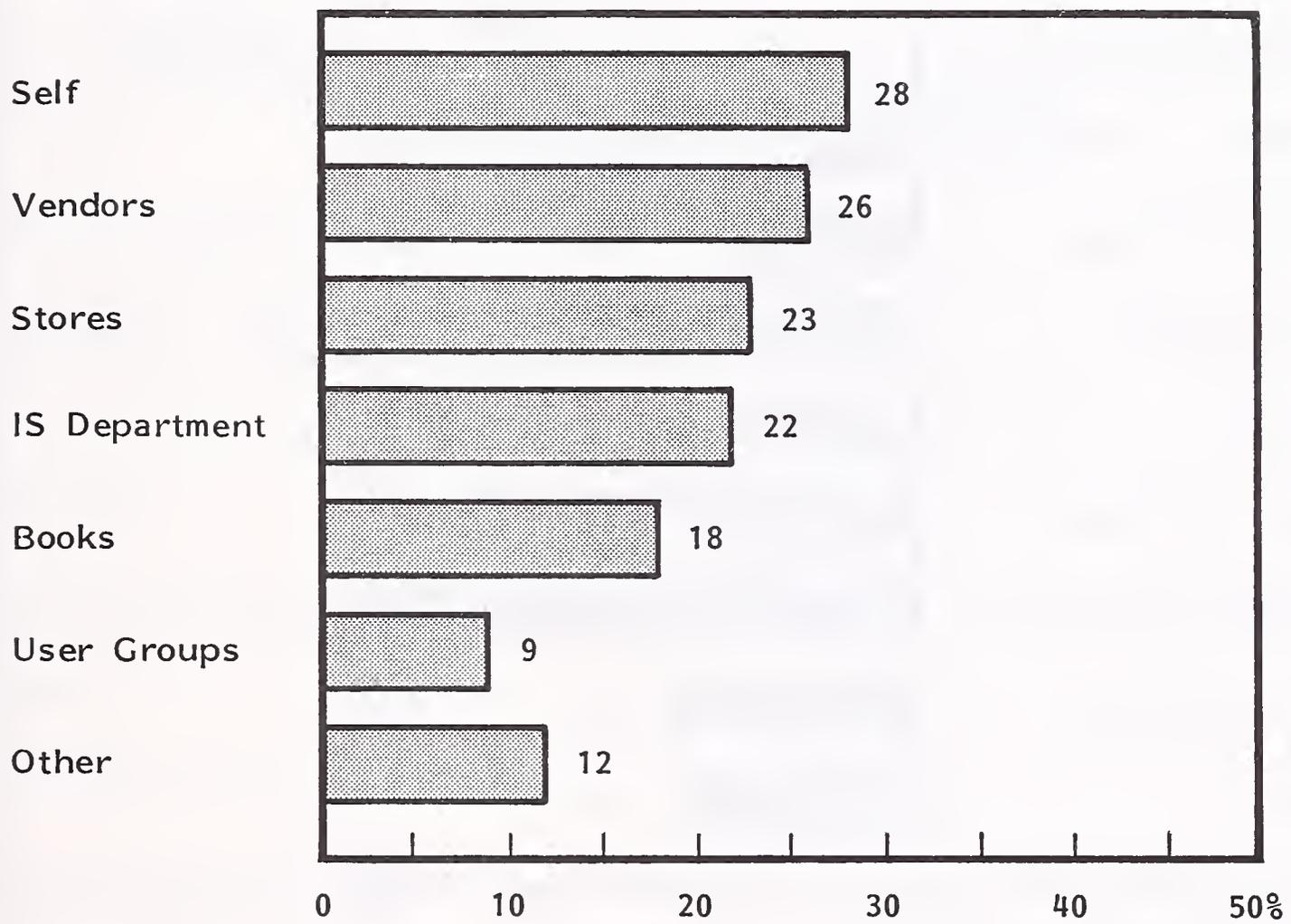
Note: Total is more than 100% because of multiple sources.

SOURCE: INPUT Surveys

INPUT
UPCS UA82

EXHIBIT II-28

- 92 -

PERSONAL COMPUTER APPLICATIONS

APPLICATION TYPE	PERCENT OF DEPARTMENTS USING APPLICATION
Budgeting/Accounting	23%
Modeling/Planning	11%
Other Financial	31%
Operations	30%
Operations Analysis	24%
Data Bases, Reporting	31%
Word Processing	14%
Other	13%

0   10   20   30   40   50%

SOURCE: INPUT Surveys

- 92 -
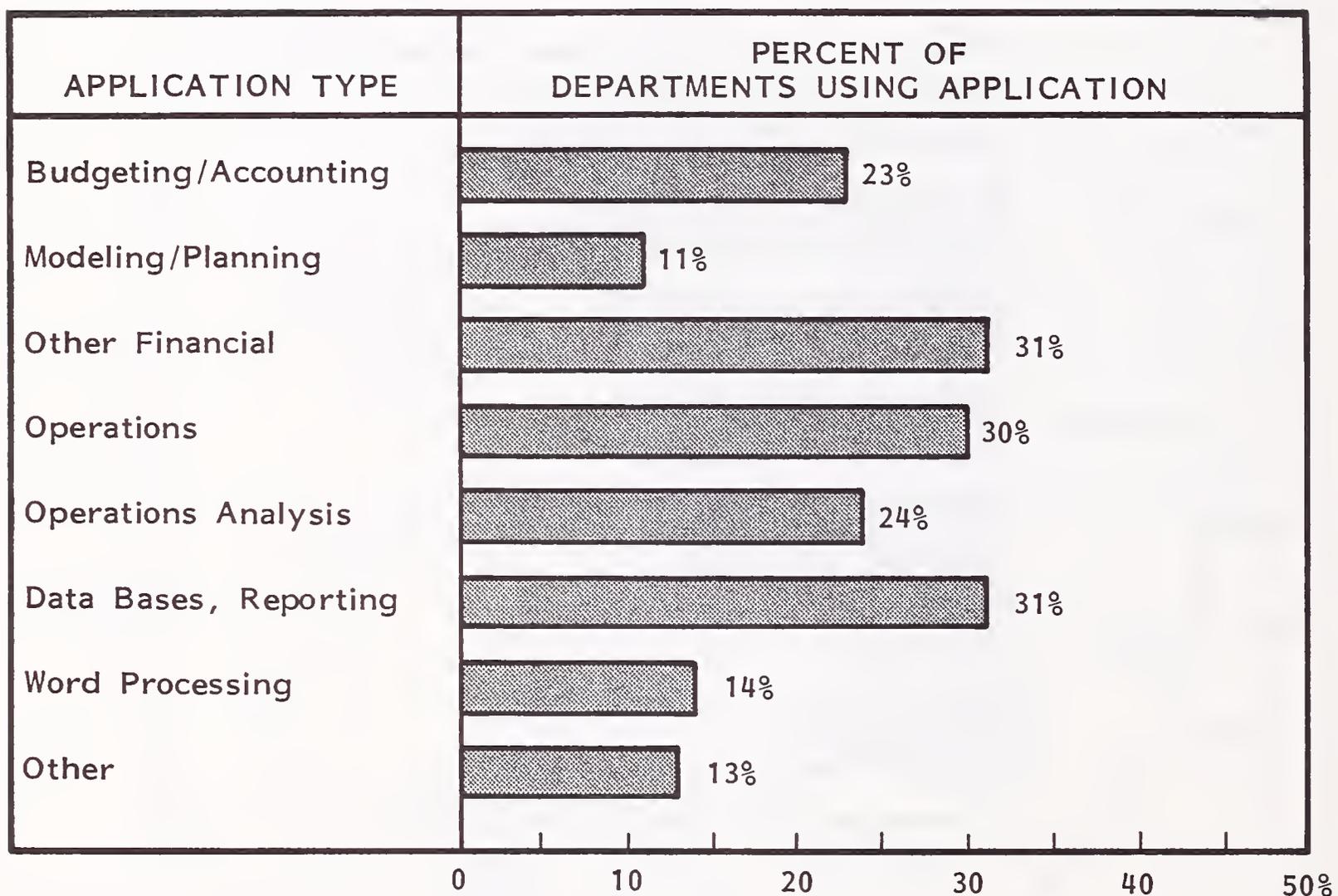
INPUT
UPCS UA82

EXHIBIT II-29

TYPES OF PERSONAL COMPUTER SOFTWARE PACKAGES USED

TYPE OF PACKAGE	PERCENT OF DEPARTMENTS USING
"Calcs"	76%
Word Processors	30%
Languages/System Support	26%
Business Planning	20%
Graphics	16%
Office Support	11%
DBMS	8%
Communications	2%
Other	6%
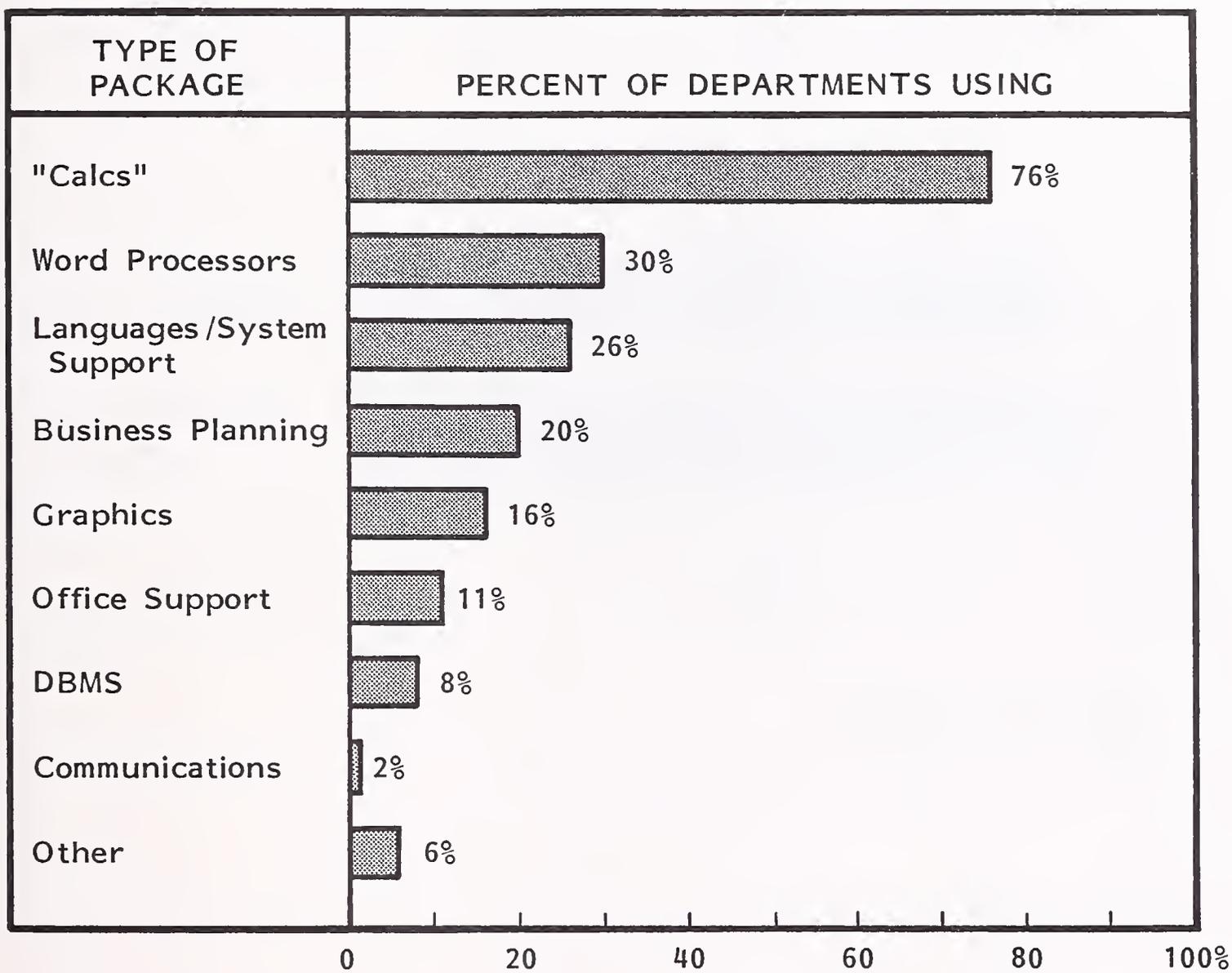
SOURCE: INPUT Survey

SOURCE: INPUT Surveys

INPUT
UPCS UA82

- Personal computer users are <u>very</u> pleased with their systems and with their reliability, as shown in Exhibit II-30.

  - Current users are already planning to obtain more software and hardware, as shown in Exhibits II-31 and 32.

EXHIBIT II-30

USER SATISFACTION AND PERSONAL COMPUTER RELIABILITY
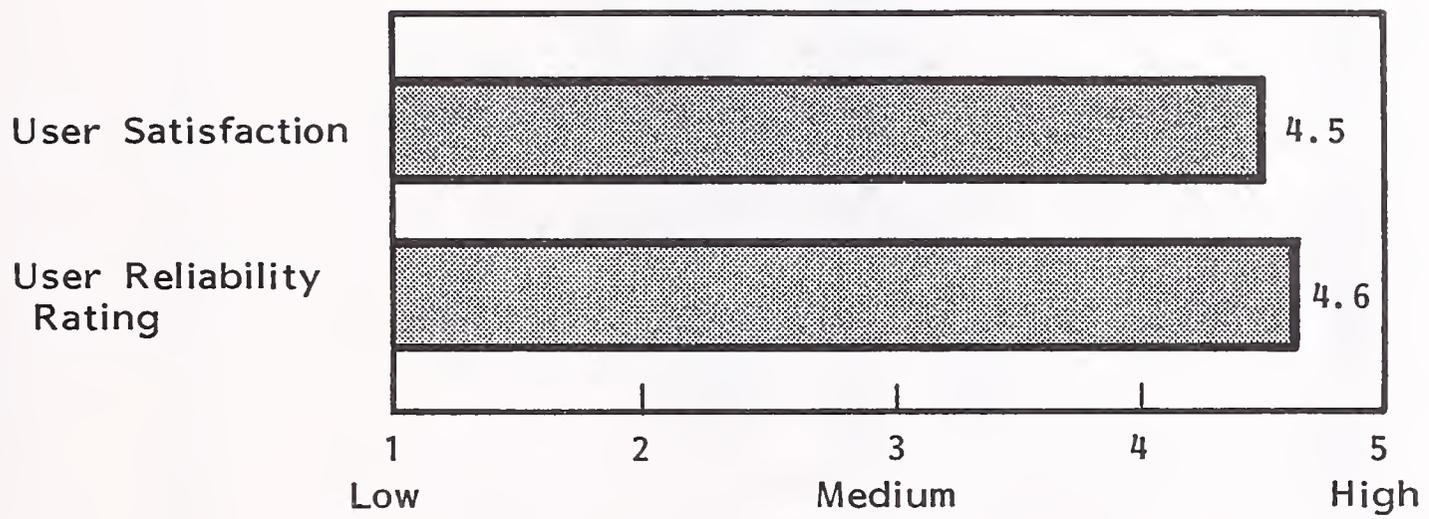
SOURCE: INPUT Surveys

INPUT
UPCS UA82

EXHIBIT II-31

USER PLANS FOR ADDITIONAL PERSONAL COMPUTER SOFTWARE

SOURCE: INPUT Surveys.
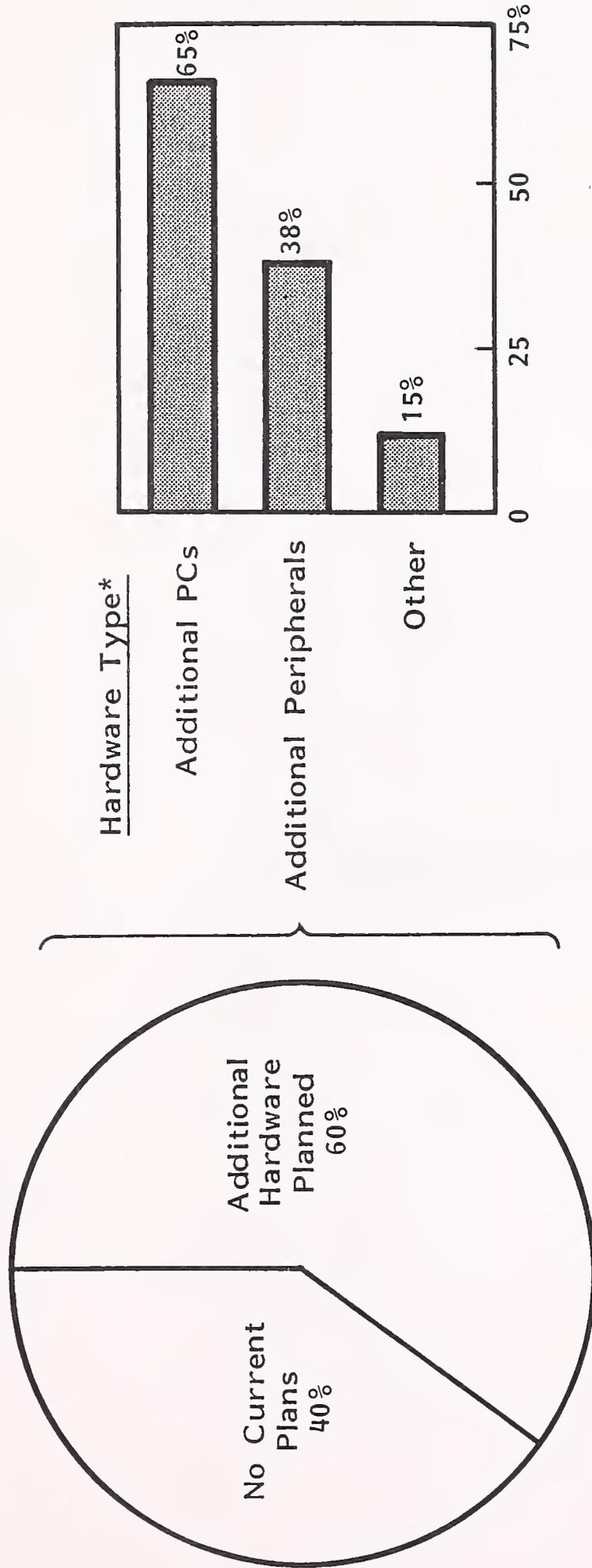
INPUT
UPCS UA82

EXHIBIT II-32

USER PLANS FOR ADDITIONAL PERSONAL COMPUTER HARDWARE

* Totals more than 100% because of multiple plans

SOURCE: INPUT Survey

SOURCE: INPUT Surveys

INPUT
UPCS UA82

III INDUSTRY SECTOR ANALYSIS

III   INDUSTRY SECTOR ANALYSIS

A.   INTRODUCTION

- The previous chapter looked at overall industry trends as well as comparing particular industry sectors in the aggregate.

- This chapter takes each individual industry sector and examines it in the same areas as Chapter II, but in more detail.

- For ease of reference, when referring to companies of different sizes, the following terminology is used:

  - "Small" applies to companies (and independent divisions) with revenue (or, in the case of banks, assets) under $200 million.

  - "Medium" applies to the size range between $200 million and $1 billion.

  - "Large" applies to those over $1 billion.

INPUT

B.   DISCRETE MANUFACTURING SECTOR

1.   BUDGETS

- In this sector 45% of the companies expect budget increases in 1983, compared to 61% generally. However, only 5% expect a decrease compared to 8% generally, as shown in Exhibit III-1.

    - Companies expecting to increase their budgets foresee an average rise of 15%.

    - Companies anticipating decreases expect their budgets to drop by 14%.

- The budget increases expected vary by company size.

    - Large companies: 52% expect increases in the discrete manufacturing sector, compared to 63% for large companies generally.

    - Medium companies: 47% expect increases, compared to 63% for medium companies generally.

    - Small companies: 35% expect increases, compared to 57% for small companies generally.

- The average budget growth expected for 1983 in discrete manufacturing is 7%, compared to 17% in 1982.

    - This represents a decline of 60%.

- The 1982 IS budget distribution is shown in Exhibit III-2.

INPUT

EXHIBIT III-1

ANTICIPATED BUDGET INCREASES FOR 1983 IN DISCRETE MANUFACTURING
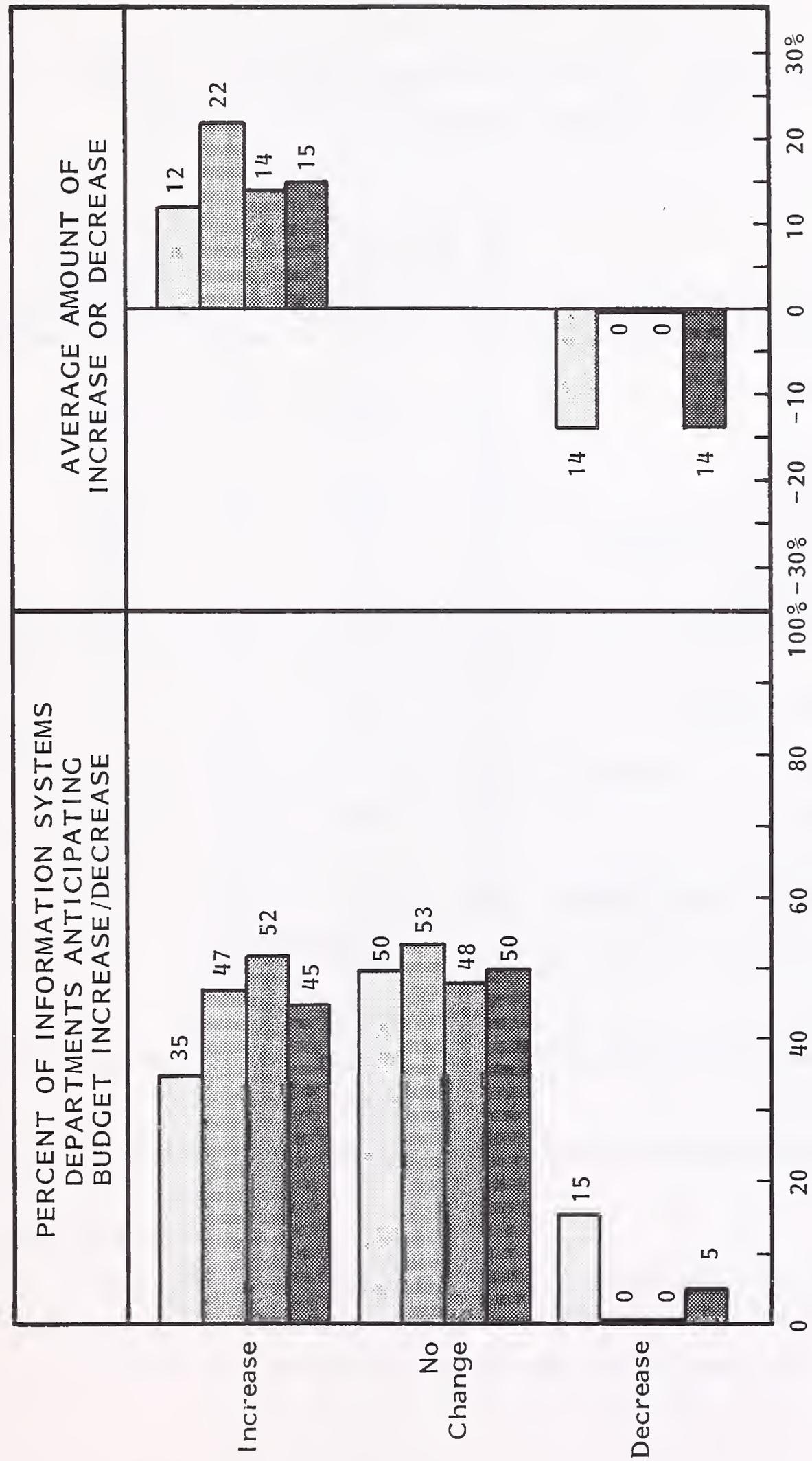
Key: (Company size; $ millions, annual revenue)

Under $200 Million

$200 Million - $1 Billion

Over $1 Billion

Total

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-2

1982 BUDGET DISTRIBUTION AND 1982/1983 CHANGES
IN THE DISCRETE MANUFACTURING SECTOR

BUDGET CATEGORY	PERCENT OF I.S. BUDGET (1982)	EXPECTED CHANGE 1982 to 1983
Personnel	48%	5%
Hardware		
Mainframe	17	4
Mini/Microcomputer	1	33
Terminals	3	11
Peripherals	4	12
Communications	10	12
Software and Services		
Software	2	19
Processing Services	1	-13
Software Maintenance	1	8
Hardware Maintenance	3	3
Other	10	5
Total	100%	7%

SOURCE: INPUT Surveys

INPUT
UA82

- Only mini/microcomputers and software expenditures are expected to increase significantly in 1983.

- Personnel budget growth is expected to be at or below the general inflation rate.

● The average budget growth expected for 1983 is 6.7%, compared to 16.9% in 1982.

  - This represents a decline of 60%.

  - This is the largest decline in the budget growth rate for any industry sector.

● Exhibit III-3 shows the range of the ratios in the discrete manufacturing sector between the IS budget and the company's total revenues.

  - The IS percentage of total revenues for the average company (i.e., at the 50th percentile) in each size group was:

    . For large companies: 0.8%, compared to 0.55% for this size company generally.

    . For medium companies: 0.7%, compared to 0.8% for this size company generally.

    . For small companies: 1.2%, compared to 1.2% for this size company generally.

  - The companies that spend least on data processing as a percentage of revenues are those at and below the 20th percentile. Taking the 10th percentile as representative IS spending, percentages were:

INPUT

EXHIBIT III-3

INFORMATION SYSTEMS BUDGET AS A PERCENT OF TOTAL REVENUES IN THE DISCRETE MANUFACTURING SECTOR
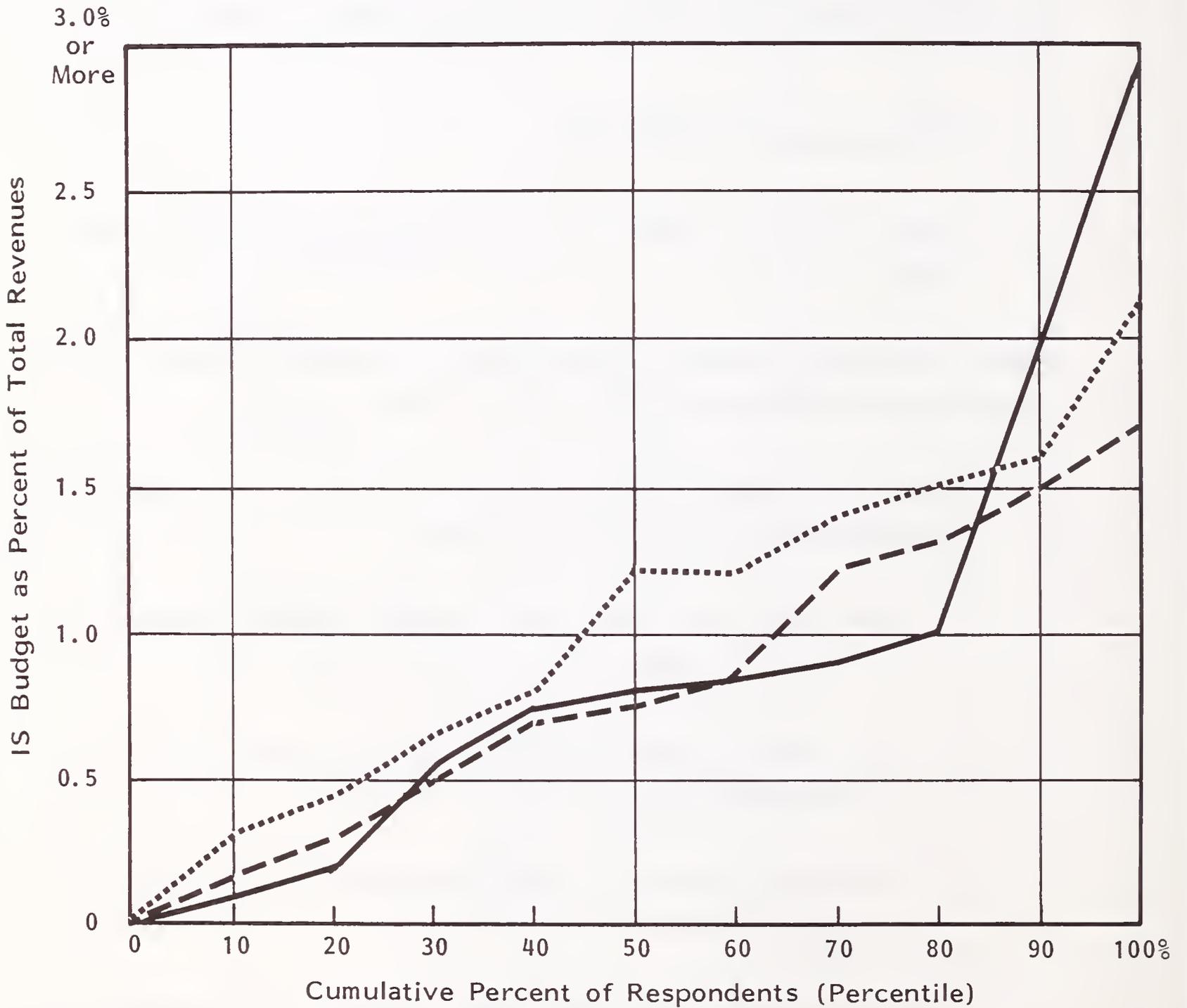
Key - Company Size:

.... $0 - $199 million

— — — — — $200 - $999 million

————— $1 billion and over

SOURCE: INPUT Surveys

INPUT
UA82

- Large companies: 0.1%.

- Medium companies: 0.15%.

- Small companies: 0.3%.

- The companies that spend the most on data processing as a percentage of revenues are those at and above the 80th percentile. Taking the 90th percentile as representative IS spending percentages were:

  - Large companies: 2.1%.

  - Medium companies: 1.5%.

  - Small companies: 1.6%.

- Many of the large manufacturing companies are now committed to ambitious and expensive CAD/CAM undertakings.

- Median spending on IS per corporate employee was $780. However, there was a broad range of spending ratios, as shown in the diagram in Exhibit III-4.

  - The reasons for this variation were discussed in Chapter II, Section B.

2. STAFFING

- In the discrete manufacturing sector, 49% of companies expect their IS staffs to increase in the next 12 months, compared to the industry average of 58%, as shown in Exhibit III-5.

  - The net increase in number of staff is expected to be 0.9%, compared to the all-industry average of 4%.

INPUT

EXHIBIT III-4

INFORMATION SYSTEMS SPENDING PER EMPLOYEE BY COMPANY SIZE
IN THE DISCRETE MANUFACTURING SECTOR

IS Spending per Employee

($ thousands)
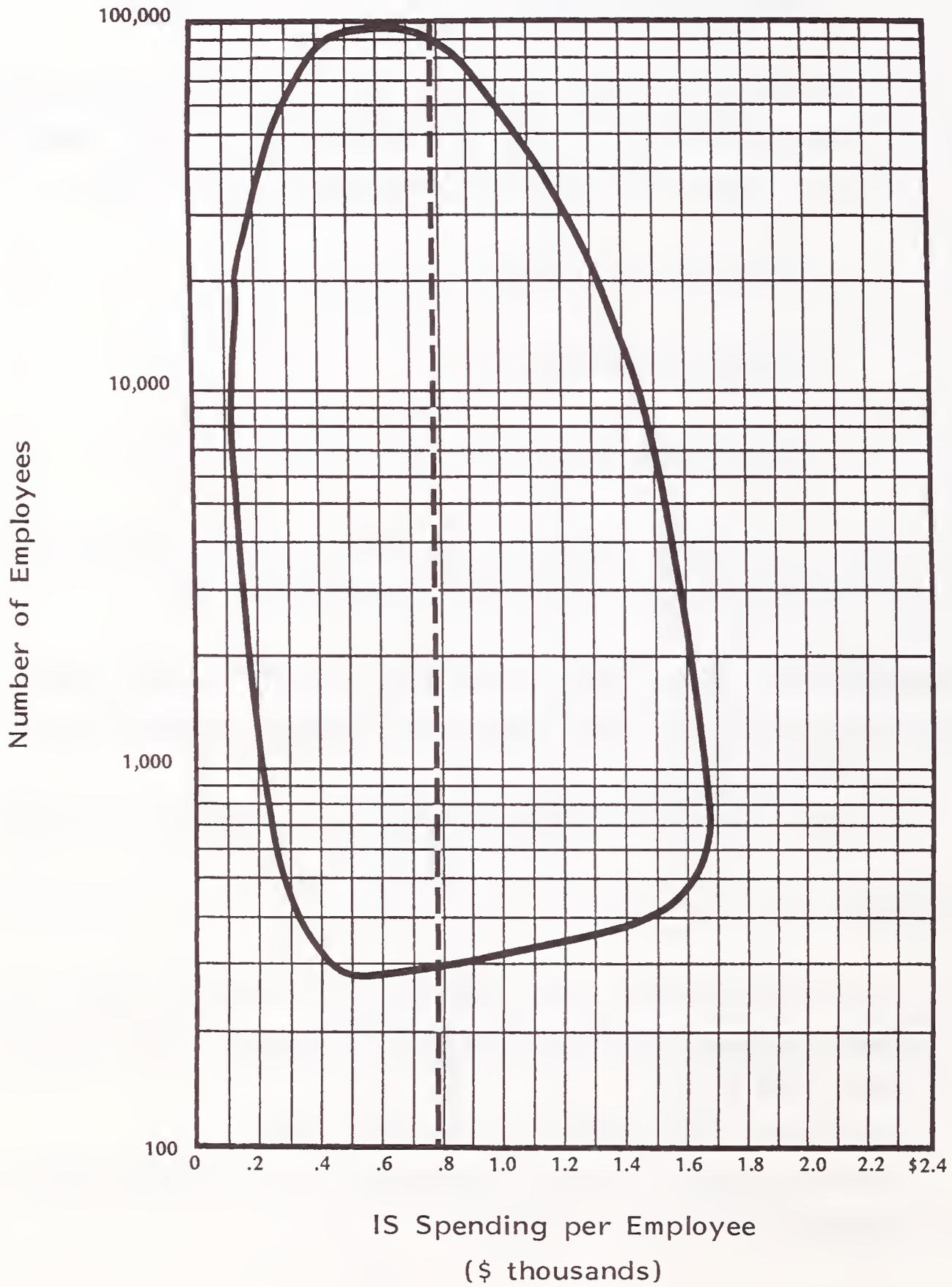
- - - - - = Median
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-5

INFORMATION SYSTEMS CHANGES EXPECTED IN THE
NEXT TWELVE MONTHS IN THE
DISCRETE MANUFACTURING SECTOR
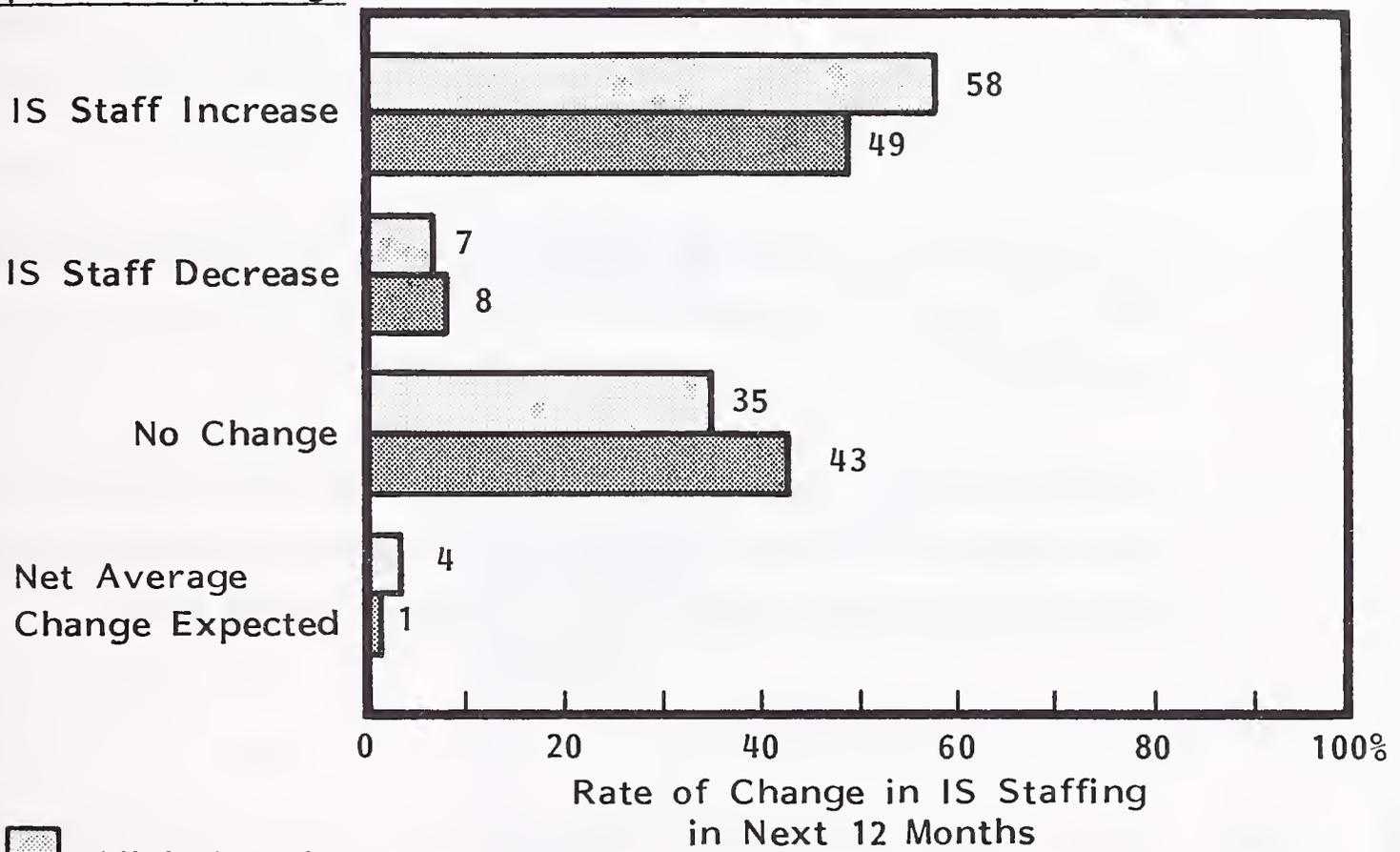
Percent of
Companies Expecting:

SOURCE: INPUT Surveys

INPUT
UA82

- Turnover in this sector is expected to be about 60% of the all-industry average.

    - Turnover rates for individual positions are shown in Exhibit III-6. For technical positions, turnover is quite similar to the all-industry profile.

- Difficulty in recruiting staff in this sector is broadly similar to the all-industry average, as shown in Exhibit III-7. Data base specialists are even more difficult to recruit than elsewhere (see Exhibit II-10).

- The number of programs to be maintained averages 1,200 in this sector, although the range, both in absolute numbers and based on a company size, is quite broad, as shown in Exhibit III-8.

    - Maintenance, as a proportion of total workload, is higher in this sector than it is generally, although it is expected to decline, as shown in Exhibit III-9.

    - Company size does have some effect on the maintenance factor, with more medium companies planning new development work and smaller companies doing more maintenance, as shown in Exhibit III-10.

3. INFORMATION SYSTEMS ISSUES

- Note: please refer to Chapter II, Section D for a general discussion of IS problems, objectives, and initiatives and their interrelationships.

- The discrete manufacturing sector sees itself with many more problems in corporate relationships and software than companies in general do, as shown in Exhibit III-11.

    - More detailed information about specific problem areas is contained in Exhibit III-12. This exhibit shows the percentage of companies in this sector which regard an issue as a major problem.

INPUT

EXHIBIT III-6

CURRENT ANNUAL TURNOVER IN THE
DISCRETE MANUFACTURING SECTOR

Annual Turnover Percentage
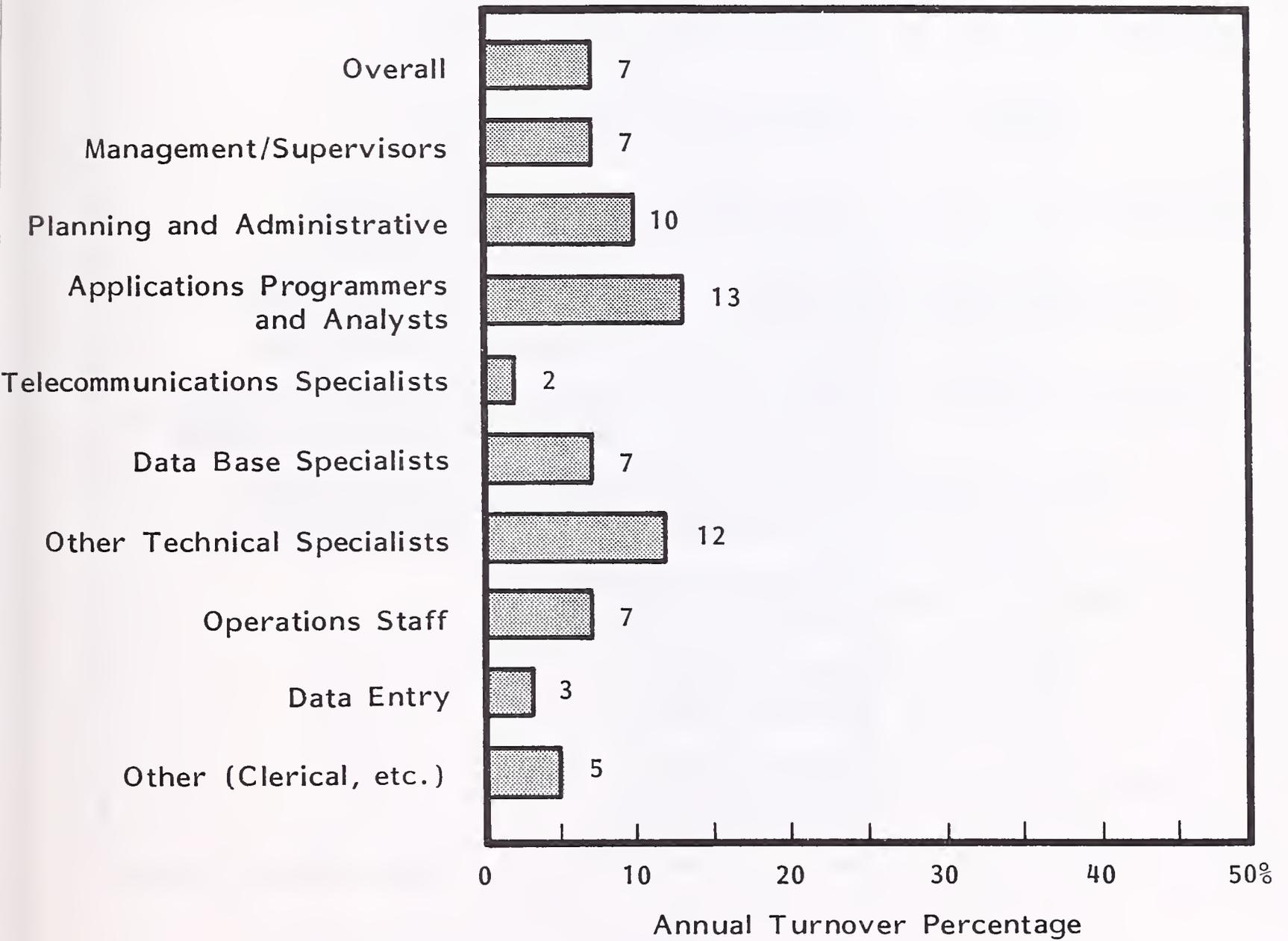
EXHIBIT III-7

DIFFICULTY IN RECRUITING STAFF IN THE DISCRETE MANUFACTURING SECTOR
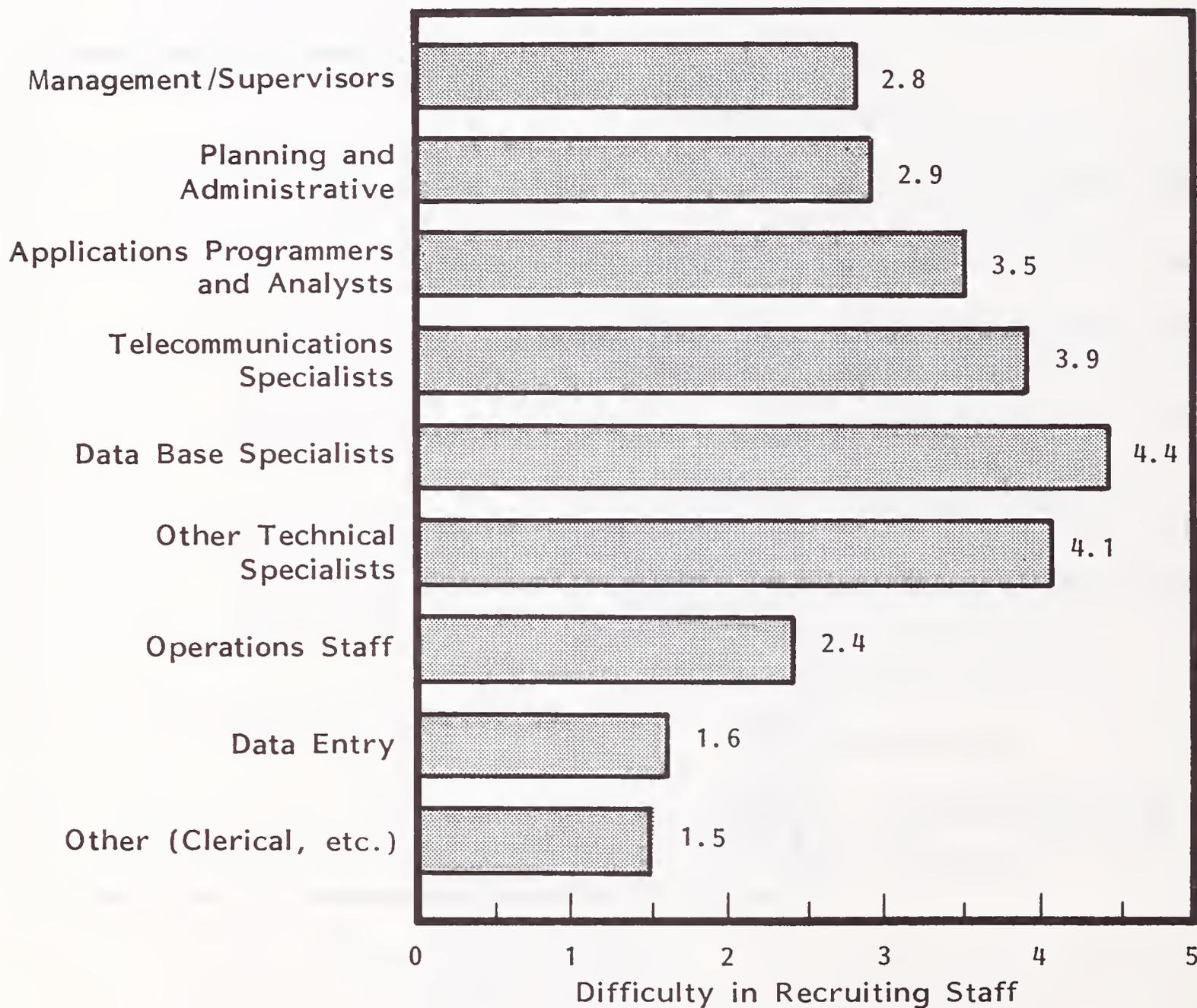
Scale: 1 = Low, 5 = High

SOURCE: INPUT Surveys

INPU
UA82

EXHIBIT III-8

NUMBER OF PROGRAMS BY COMPANY SIZE
IN THE DISTRETE MANUFACTURING SECTOR

Company Size ($ millions)

Number of Programs

(thousands)

SOURCE: INPUT Surveys

- III -

EXHIBIT III-9

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE IN THE
DISCRETE MANUFACTURING SECTOR,
1981-1983

Percent of Resources
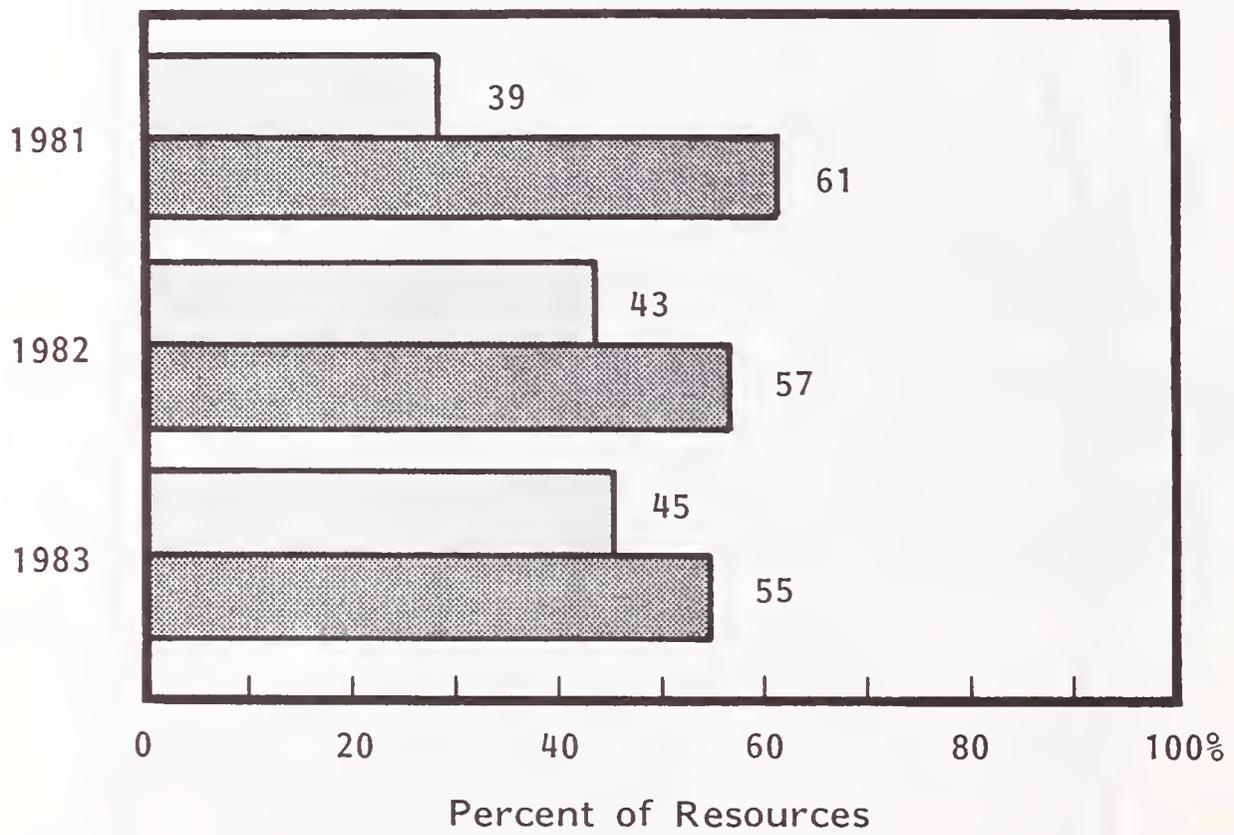
□ New Development

▦ Maintenance

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-10

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE IN THE
DISCRETE MANUFACTURING SECTOR, 1981-1983

Company Size

$0-199 Million
1981   35   65
1982   39   61
1983   41   60

$200-999 Million
1981   42   58
1982   51   49
1983   54   46

$1 Billion and Over
1981   41   59
1982   41   59
1983   42   58

Percent of Resources

0   20   40   60   80   100%

New Development

Maintenance

SOURCE: INPUT Surveys

- 113 -
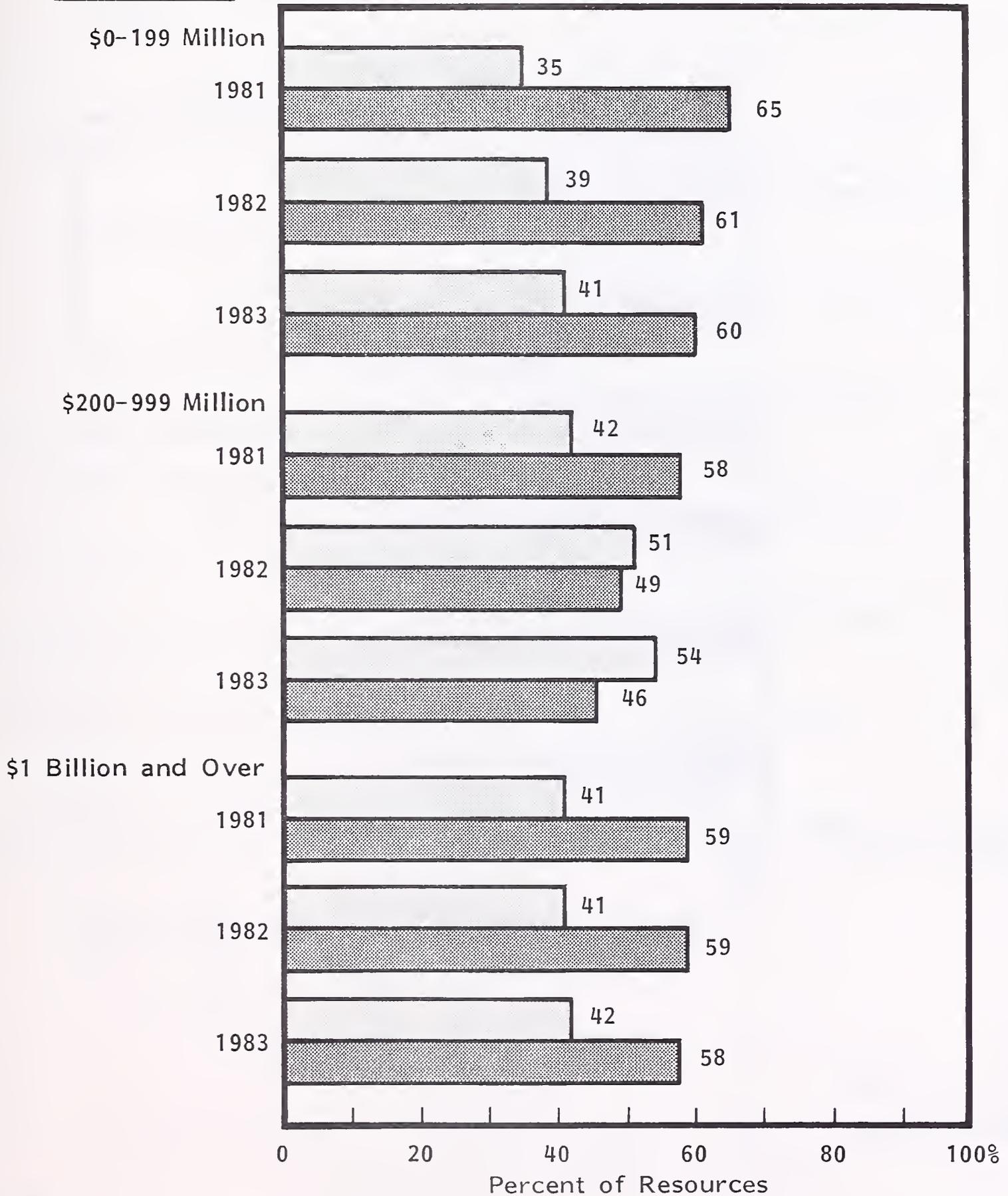
INPUT
UA82

EXHIBIT III-11

INFORMATION SYSTEMS PROBLEMS IN THE
DISCRETE MANUFACTURING SECTOR: SUMMARY

Problem

	Index Values
Corporate Relationships	58 / 37
Personnel	41 / 36
Hardware	35 / 35
Planning and Control	42 / 33
Software	44 / 30
Costs	16 / 13
Telecommunications / Office Automation	11 / 6

Index Values
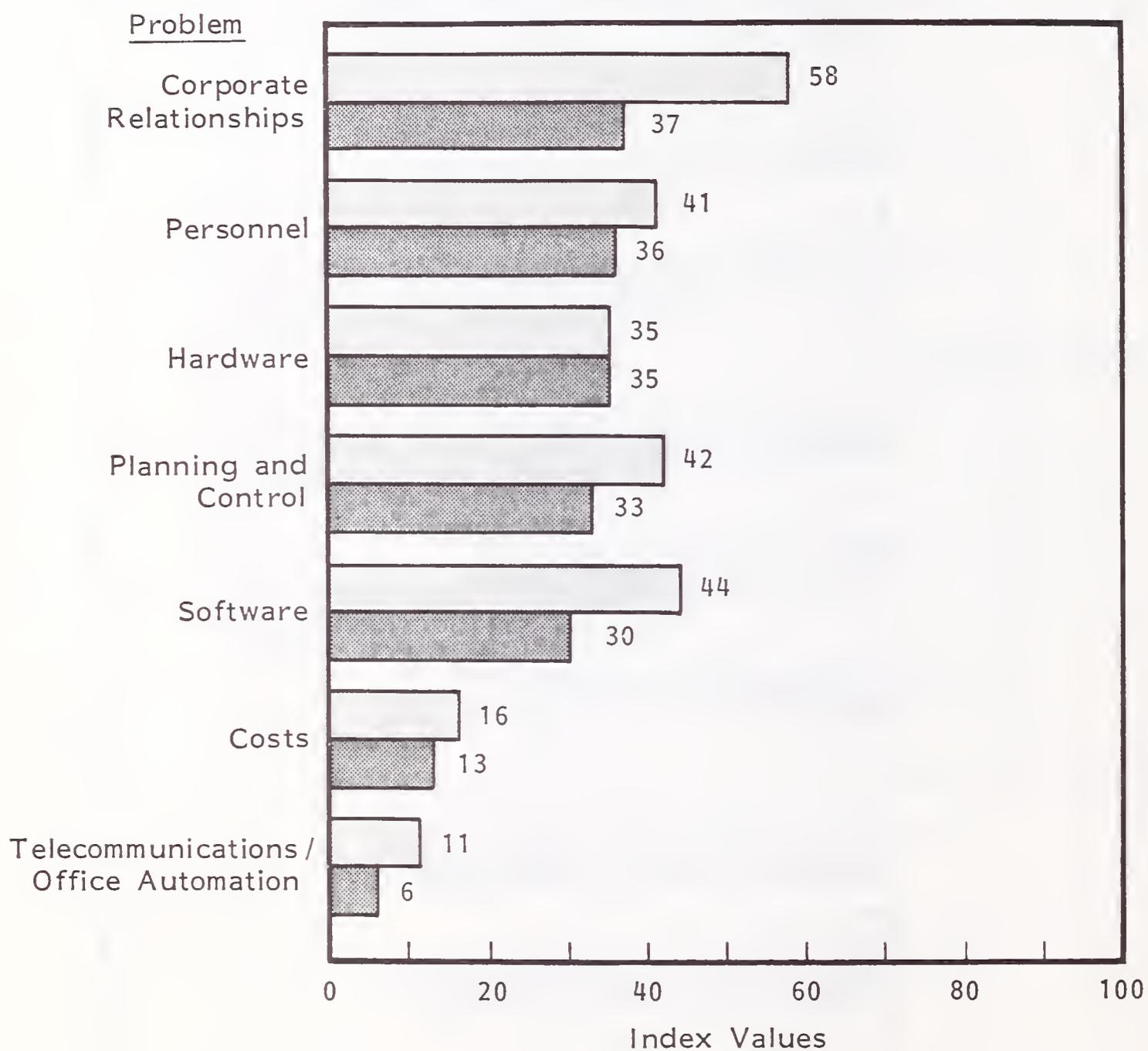
☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-12

INFORMATION SYSTEMS PROBLEMS IN THE
DISCRETE MANUFACTURING SECTOR: DETAIL

<u>Problem</u>

Problem	Percent
Relations with Management	30
Relations with Users	28
Backlog/Workload	12
Planning	21
Cost Constraints	16
Project Control/Management	10
IS Personnel Shortages/Turnovers	21
Other IS Personnel Issues	20
Application System Quality	26
Software Development, Maintenance, Productivity	18
Equipment/Capacity, Computer Operations	28
Network/Telecommunications	8
Hardware	7
Office Automation	3
Other	2

0   10   20   30   40   50%

Percent of Companies
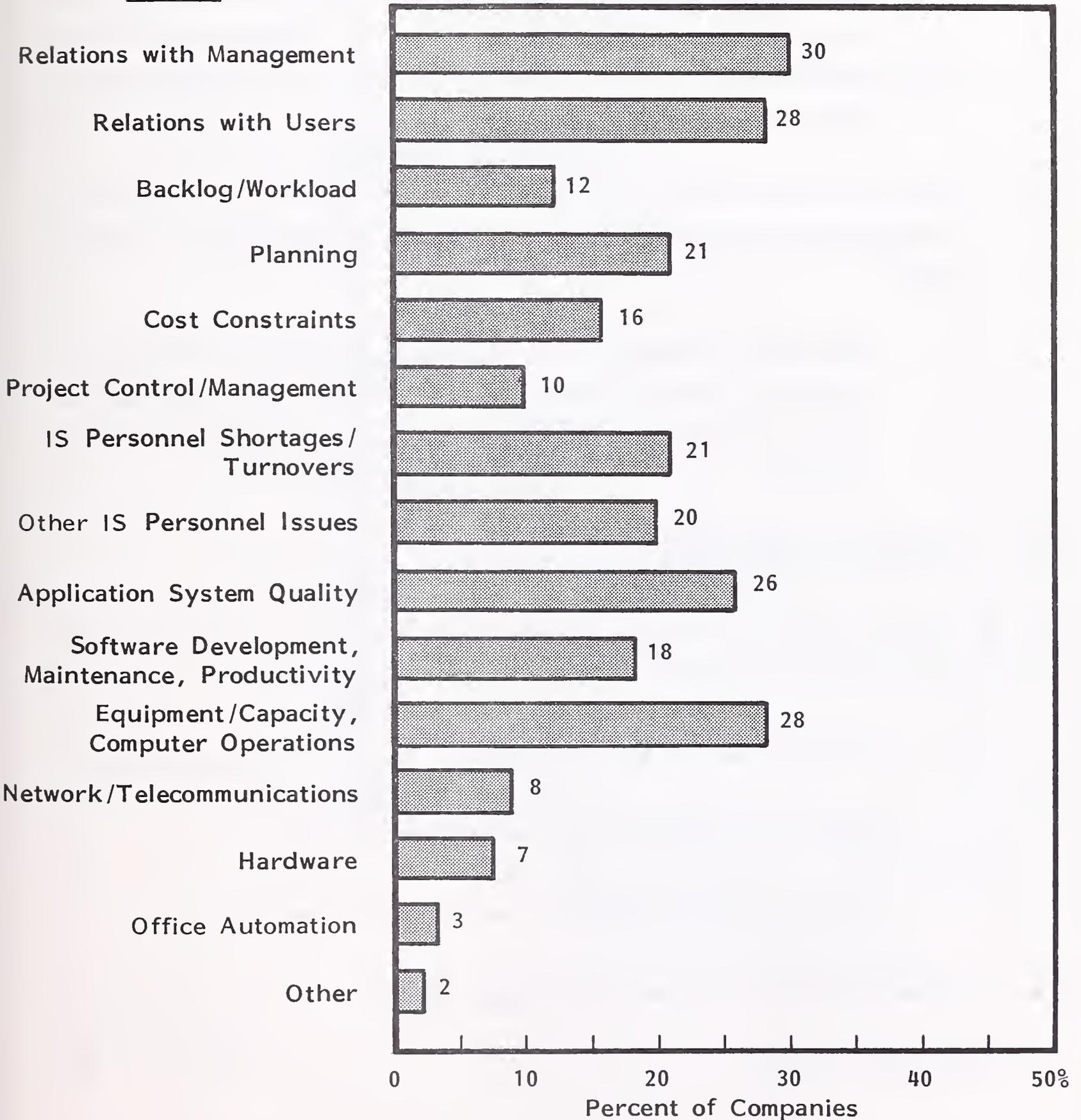
INPUT
UA82

- The "objectives" profile is quite similar to the all-industry profile, with somewhat more stress on planning and control and telecommunications/office automation, as shown in Exhibit III-13.

    - More detailed information about specific planning objectives is contained in Exhibit III-14. This exhibit shows the percentage of companies in this sector which have identified particular planning objectives as being of major importance to them.

- Much more stress is being placed in this sector on initiatives involving corporate relationships and personnel than in most other sectors, as shown in Exhibit III-15.

    - More detailed information about specific areas where an initiative is planned is contained in Exhibit III-16. This exhibit shows the percentage of companies in this sector planning a major initiative in a particular area.

4. PERSONAL COMPUTERS

- Plans for the use of personal computers in the discrete manufacturing sector area are shown in Exhibit III-17 and include:

    - The overall level of use in five years.

    - Plans for obtaining additional personal computer software.

    - Plans for obtaining additional personal computer hardware.

- These are all quite close to the all-industry figures.

INPUT

EXHIBIT III-13

INFORMATION SYSTEMS OBJECTIVES IN THE
DISCRETE MANUFACTURING SECTOR: SUMMARY

Objective

Corporate
Relationships — 43 / 43

Personnel — 8 / 5

Hardware — 25 / 16

Planning and
Control — 44 / 32

Software — 68 / 64

Costs — 8 / 8

Telecommunications /
Office Automation — 40 / 28

0   20   40   60   80   100

Index Values

☐ This Sector
▨ All Sectors

SOURCE: INPUT Surveys

- 117 -
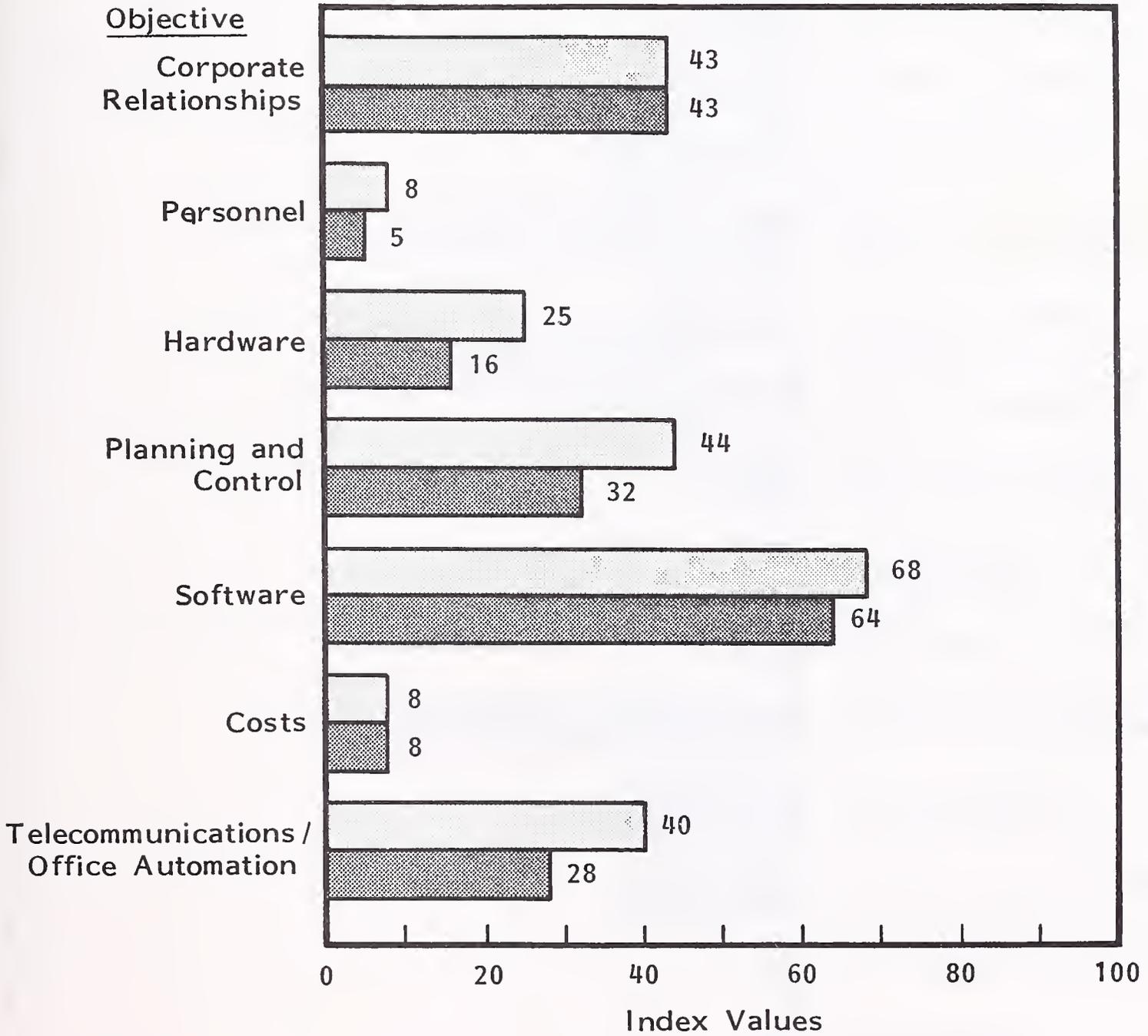
INPUT
UA82

EXHIBIT III-14

INFORMATION SYSTEMS PLANNING OBJECTIVES IN THE
DISCRETE MANUFACTURING SECTOR: DETAIL

	Percent of Companies
Support Company Objectives	11
Improve User Service/Relations	15
Improve Planning	25
End User Computing	17
Office Automation	19
Improve Management Control	19
Improve Productivity	11
Control Costs	8
Add Staff	8
New/Improved Software	57
New Hardware	21
Network/Telecommunications	21
IS Security/Disaster Recovery	4
Miscellaneous	0
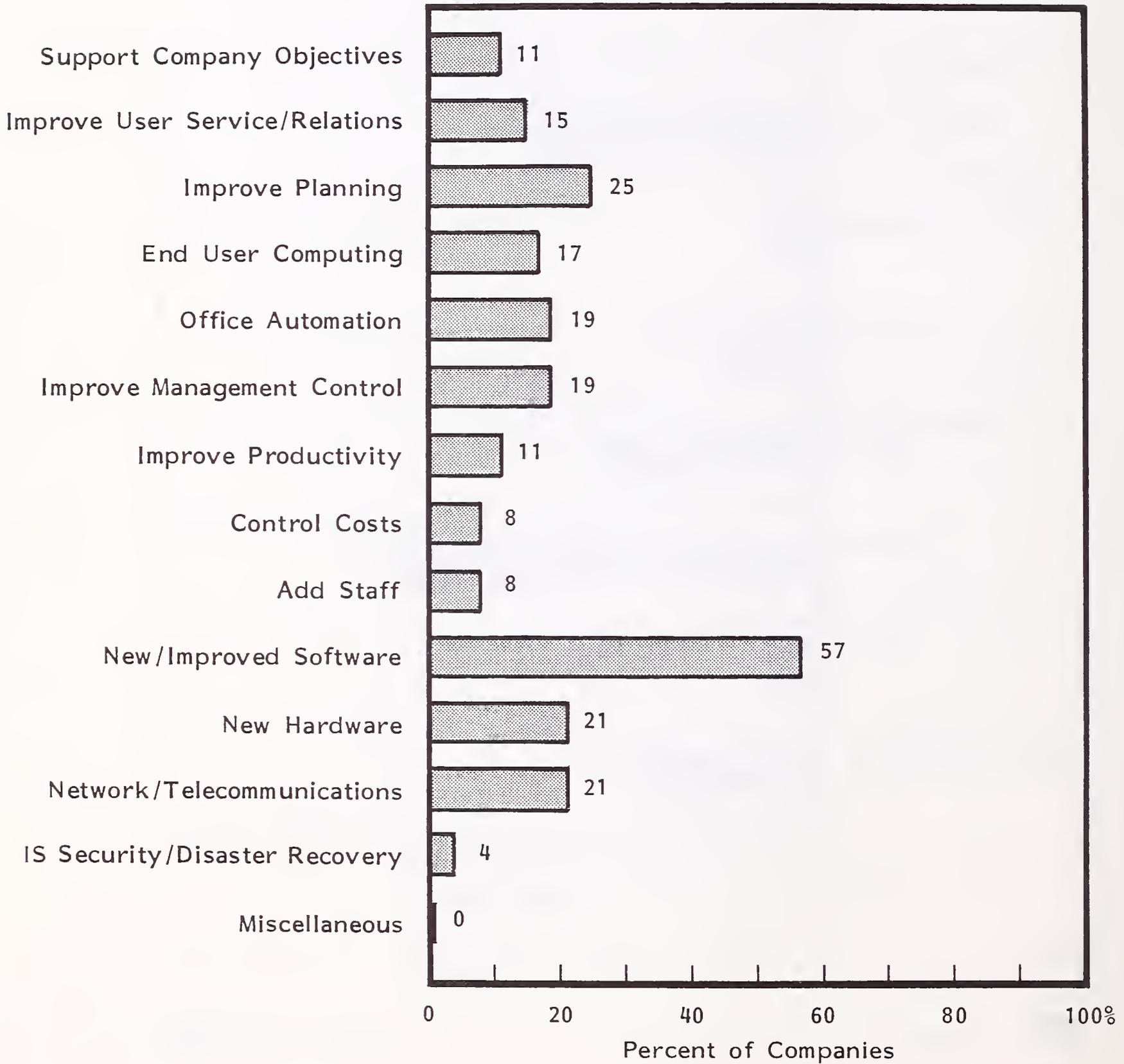
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-15

INFORMATION SYSTEMS INITIATIVES IN THE
DISCRETE MANUFACTURING SECTOR: SUMMARY

Initiative

Initiative	This Sector	All Sectors
Corporate Relationships	67	39
Personnel	64	41
Hardware	27	40
Planning and Control	39	28
Software	84	69
Costs	13	12
Telecommunications/ Office Automation	5	4

Index Values
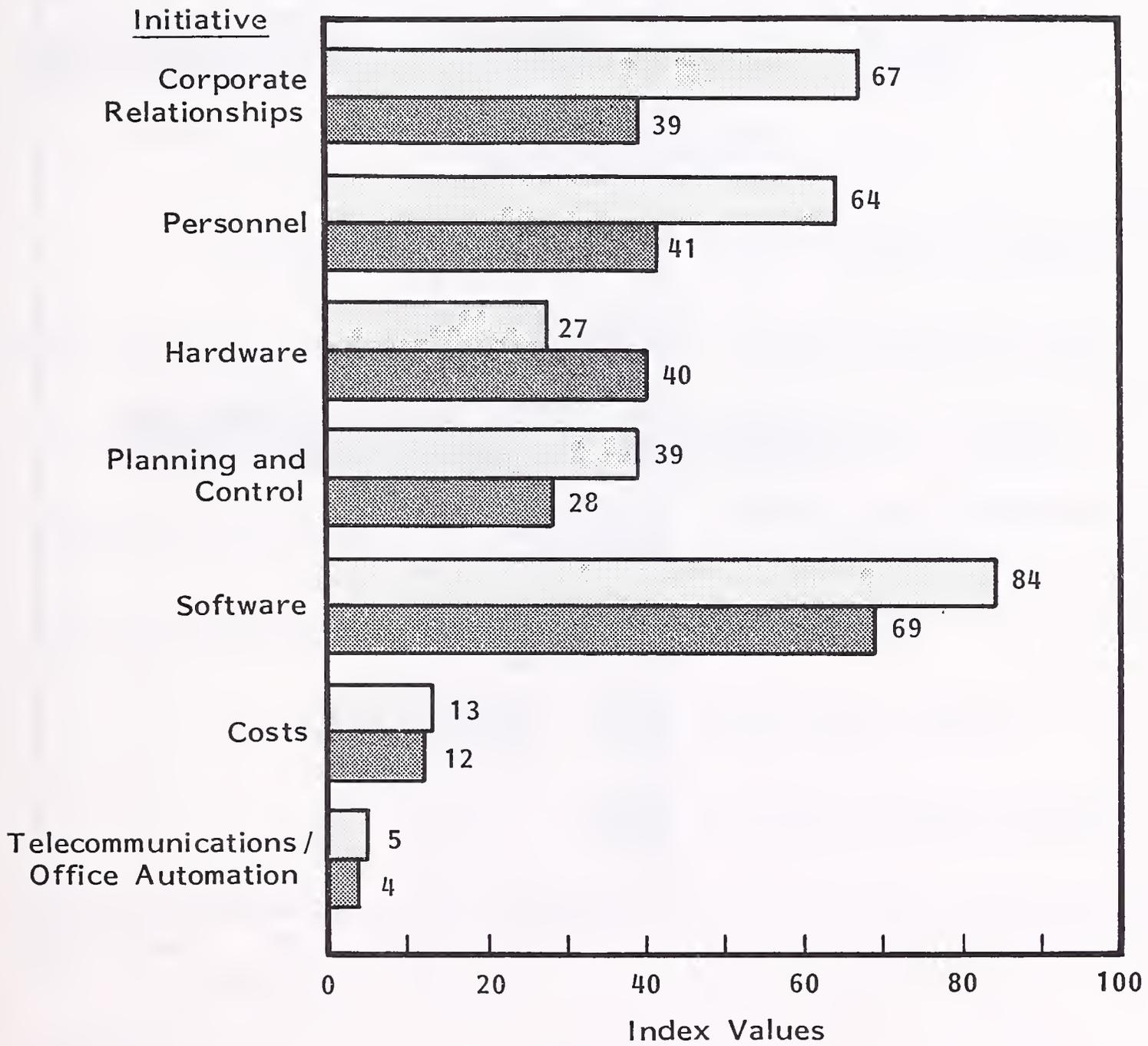
☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-16

INFORMATION SYSTEMS INITIATIVES PLANNED IN THE
DISCRETE MANUFACTURING SECTOR: DETAIL

Percent of Companies
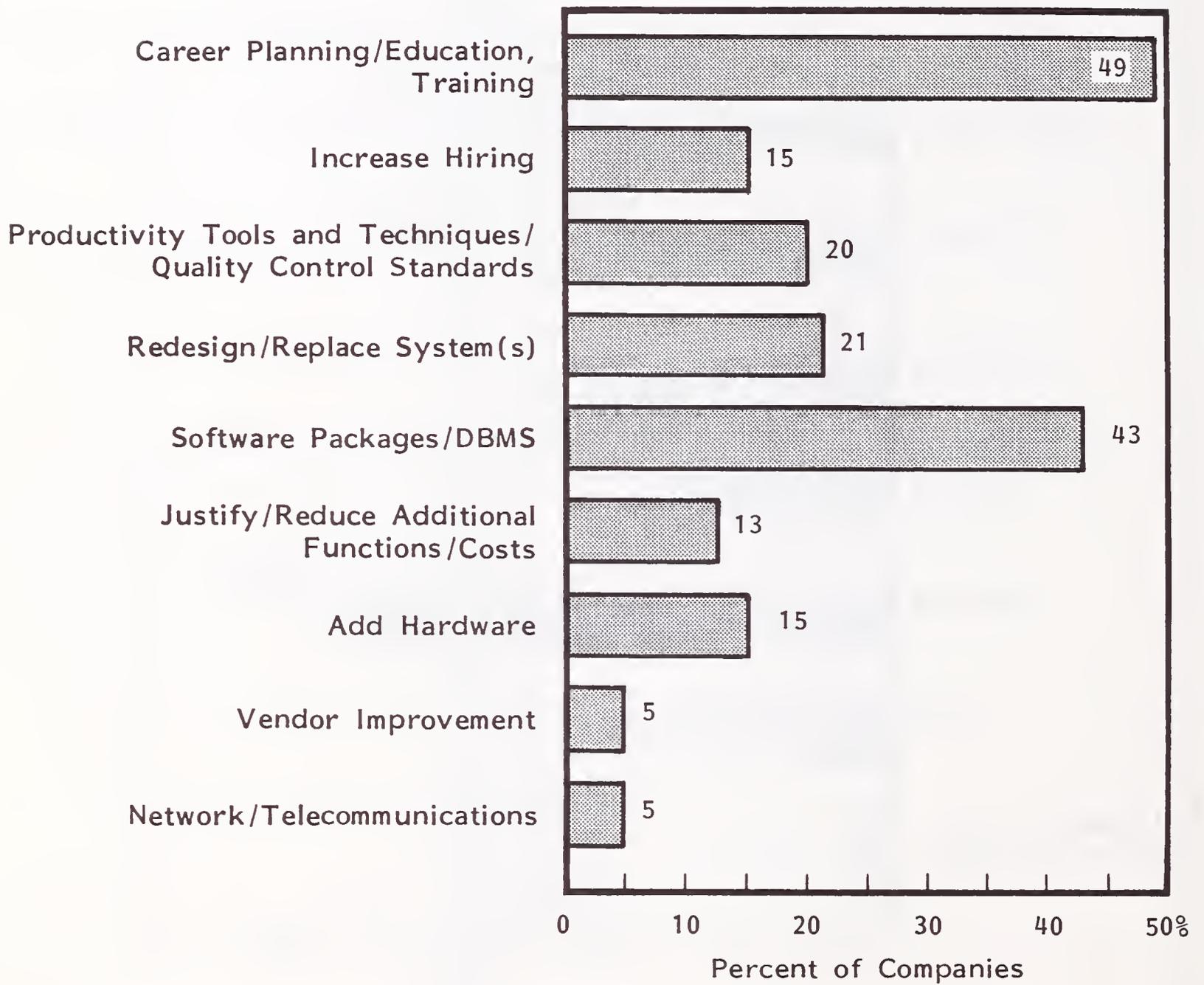
Continued

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-16 (Cont.)

INFORMATION SYSTEMS INITIATIVES PLANNED IN THE
DISCRETE MANUFACTURING SECTOR: DETAIL

INPUT
UA82

EXHIBIT III-17

PERSONAL COMPUTER ACQUISITION PLANS IN THE DISCRETE MANUFACTURING SECTOR

Expected Level of Use of Personal Computers in Five Years

More 82%

Don't Know 14%

Same 4%

User Plans for Additional Personal Computer Software

Additional Software Planned 56%

No Current Plans 44%

Source

Package 67

In-house/ Custom 33

User Plans for Additional Personal Computer Hardware

Additional Hardware Planned 56%

No Current Plans 44%

Hardware Type*

Additional PCs 53

Additional Peripherals 40

Other 20
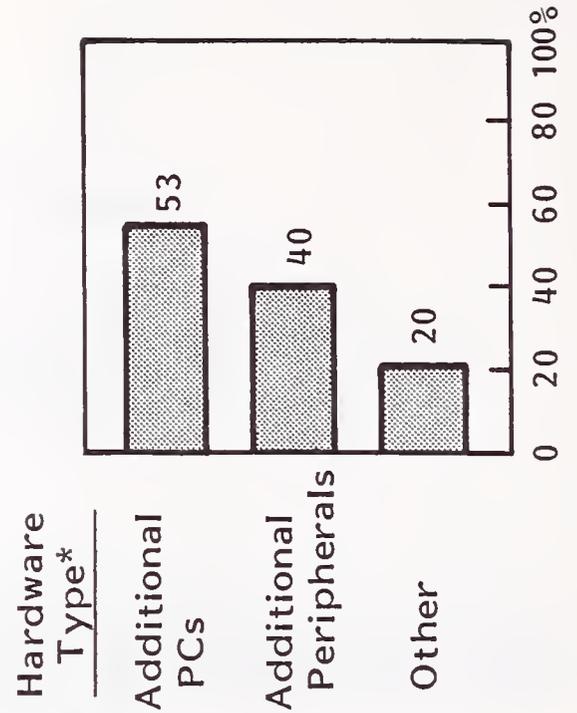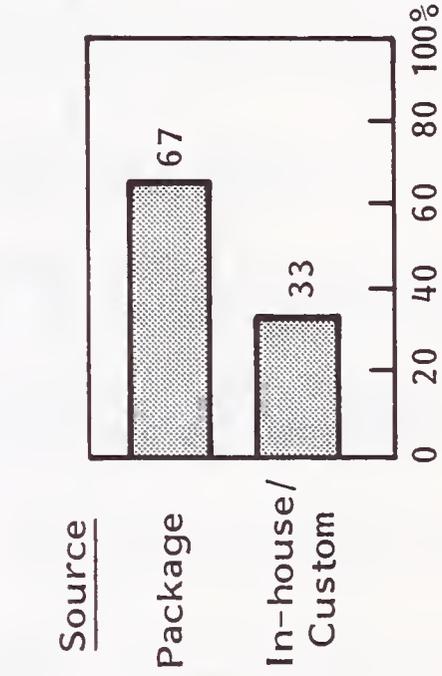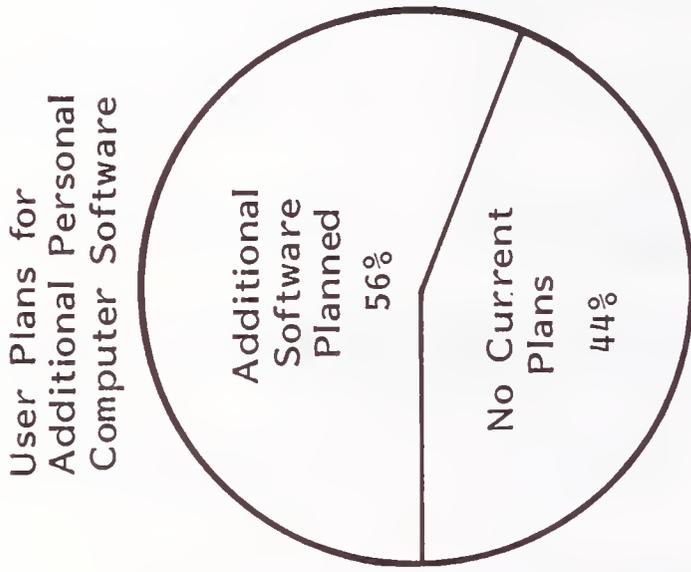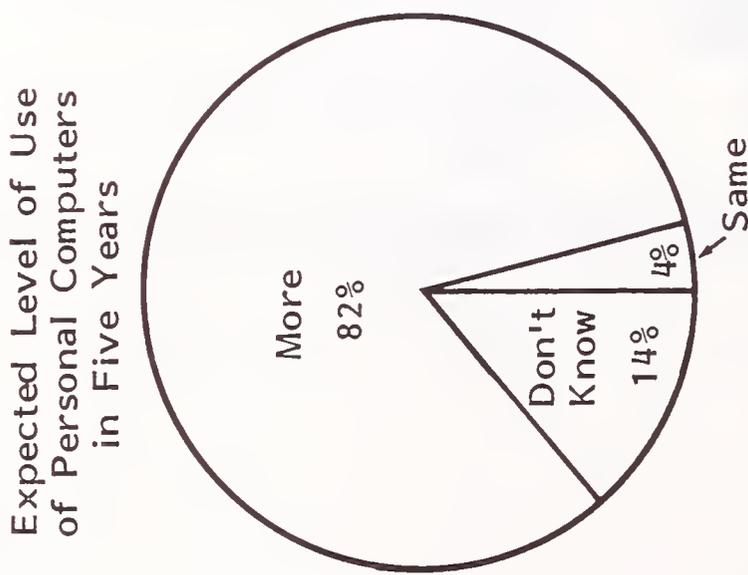
SOURCE: INPUT Surveys

*Totals more than 100% because of multiple plans

INPUT
UA82

- Exhibit III-18 shows the types of personal computer software packages now used.

    - With minor variations, this is close to the all-industry profile.

- The general categories of applications used are summarized in Exhibit III-19. This sector's profile is different in a number of respects:

    - Budgeting, financial, and data base applications are less prevalent.

    - Applications to directly support operations are much more important.

    - Exhibit III-20 provides examples of actual personal computer applications in use in the discrete manufaturing sector.

- Compared to the average user, personal computer users in this sector are even less likely to rely on the IS department for assistance, as shown in Exhibit III-21.

- In this sector 76% of departments using personal computers have had their installation less than a year, as shown in Exhibit III-22, compared to 78% generally.

C.   PROCESS MANUFACTURING SECTOR

1.   BUDGETS

- In this sector 52% of the companies expect budget increases in 1983, compared to 61% generally; 17% expect a decrease compared to 8% generally, as shown in Exhibit III-23.

INPUT

EXHIBIT III-18

TYPES OF PERSONAL COMPUTER SOFTWARE PACKAGES USED
BY THE DISCRETE MANUFACTURING SECTOR

Type of Package

Type of Package	Percent of Departments Using
"Calcs"	70
Word Processing	38
Languages/System Support	38
Business Planning	14
Graphics	10
Office Support	10
DBMS	0
Communications	0
Other	3

Percent of Departments Using
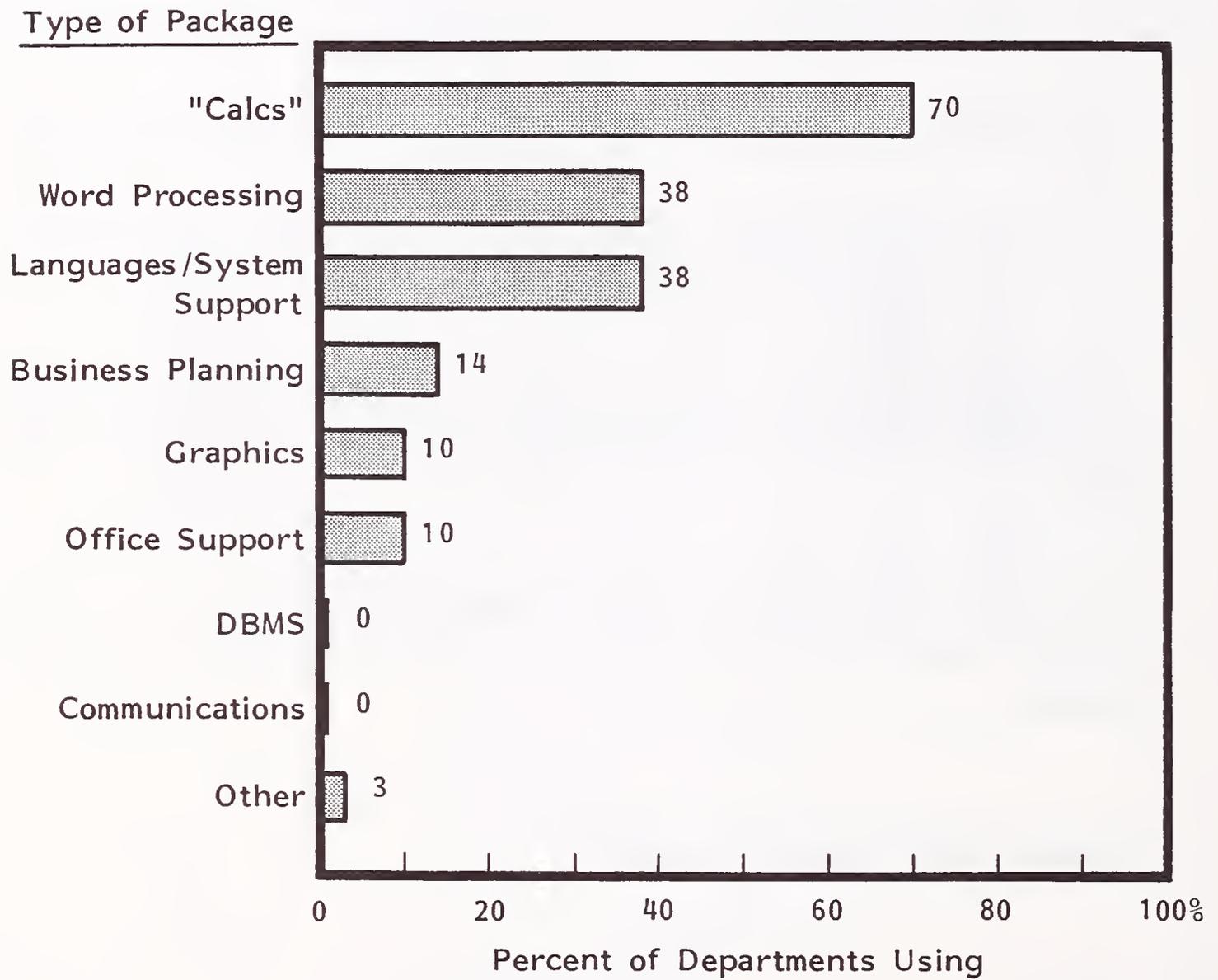
INPUT
UA82

EXHIBIT III-19

PERSONAL COMPUTER APPLICATIONS
IN THE DISCRETE MANUFACTURING SECTOR

Application Type

Budgeting/Accounting	14
Modeling/Planning	14
Other Financial	18
Operations	71
Analysis	21
Data Bases, Reporting	14
Word Processing	14
Other	28

Percent of Department Using
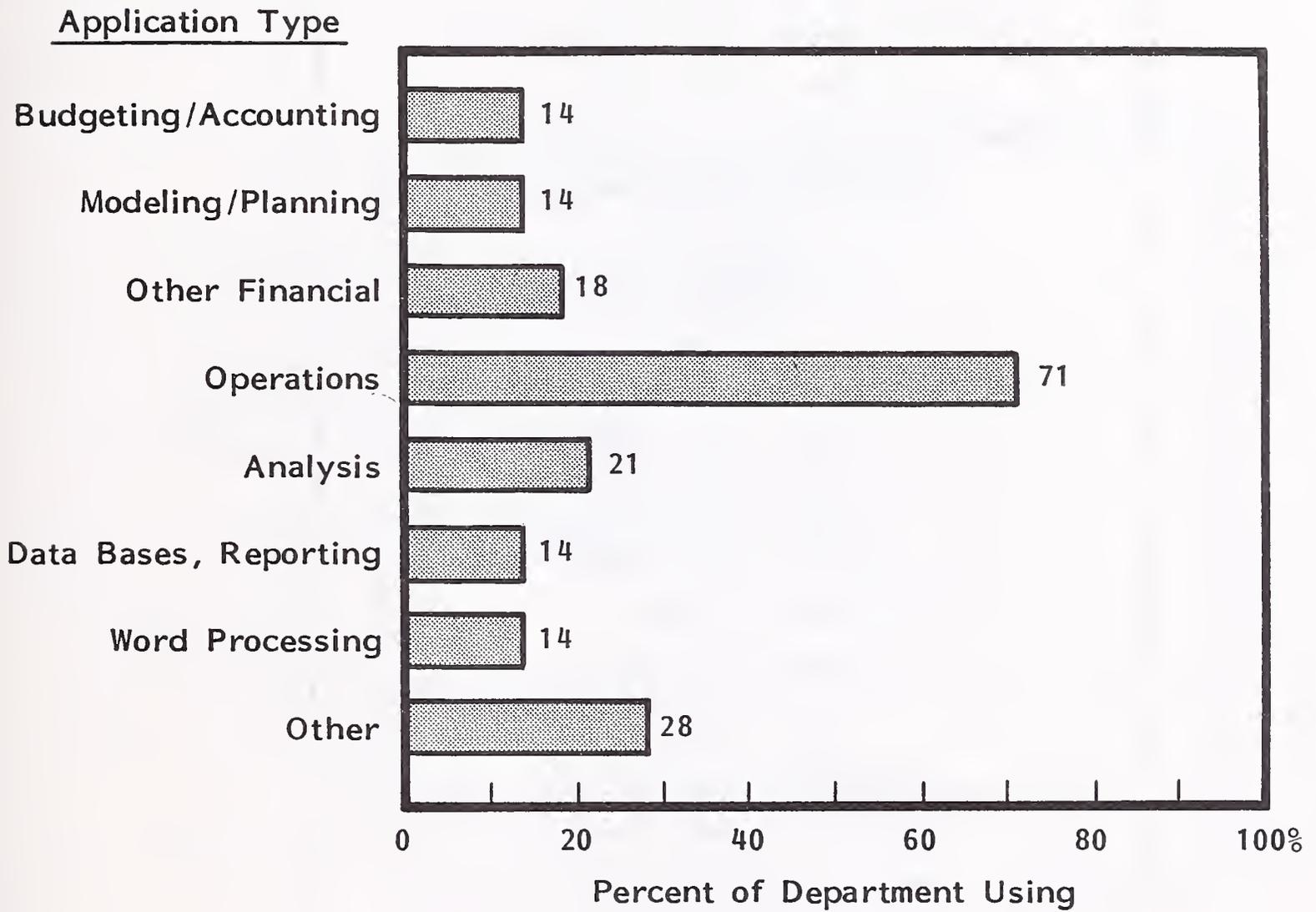
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-20

PERSONAL COMPUTER APPLICATIONS
IN THE DISCRETE MANUFACTURING SECTOR

Inventory Control

Order Entry

Word Processing

Correspondence

Manager Performance Comparisons

Interest Rate Analysis

Designing Tools for Test Equipment

Budget Management

Records

Financial Modeling

Filing

List Compilation

Profit and Loss

Report Writing

Project Estimates

Sales History

Historical Records

Data Analysis

Engineering Analysis

Used Equipment Survey

Modeling Shop Reports

Scheduling Factory Inventory Levels

Business Planning

Price Development

Qualitative Analysis

Financial Forecasting

Shipment Plotting

Foreign Tax Computation

Graphics

Mailing

SOURCE: INPUT Surveys

EXHIBIT III-21

SOURCES OF ASSISTANCE FOR PERSONAL COMPUTER USERS
IN THE DISCRETE MANUFACTURING SECTOR
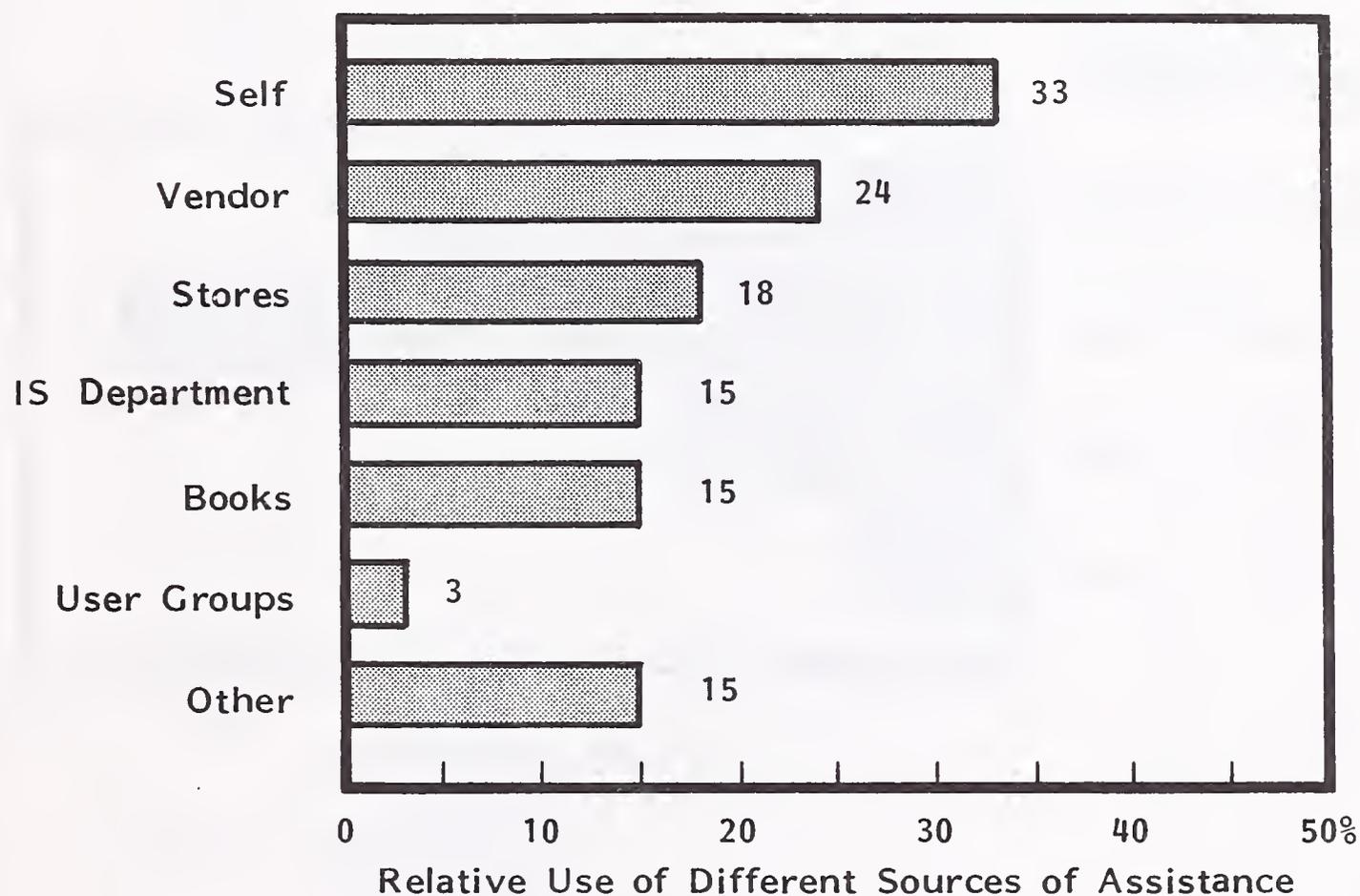
Relative Use of Different Sources of Assistance

Note: Total Is More Than 100% Because of Multiple Sources.   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-22

TIME SINCE FIRST PERSONAL COMPUTER INSTALLED IN
USER DEPARTMENTS IN THE DISCRETE MANUFACTURING SECTOR

Time Since
First Installed

Less Than 6 Months ░░░░░░░░░░░░░░░░ 31

6 Months-1 Year ░░░░░░░░░░░░░░░░░░░░░░ 45

1 Year-2 Years ░░░░░░░ 17

Over 2 Years ░░░ 7

```
     0      10      20      30      40     50%
            Percent of Departments
```

SOURCE: INPUT Surveys

- 128 -

INPUT
UA82

EXHIBIT III-23
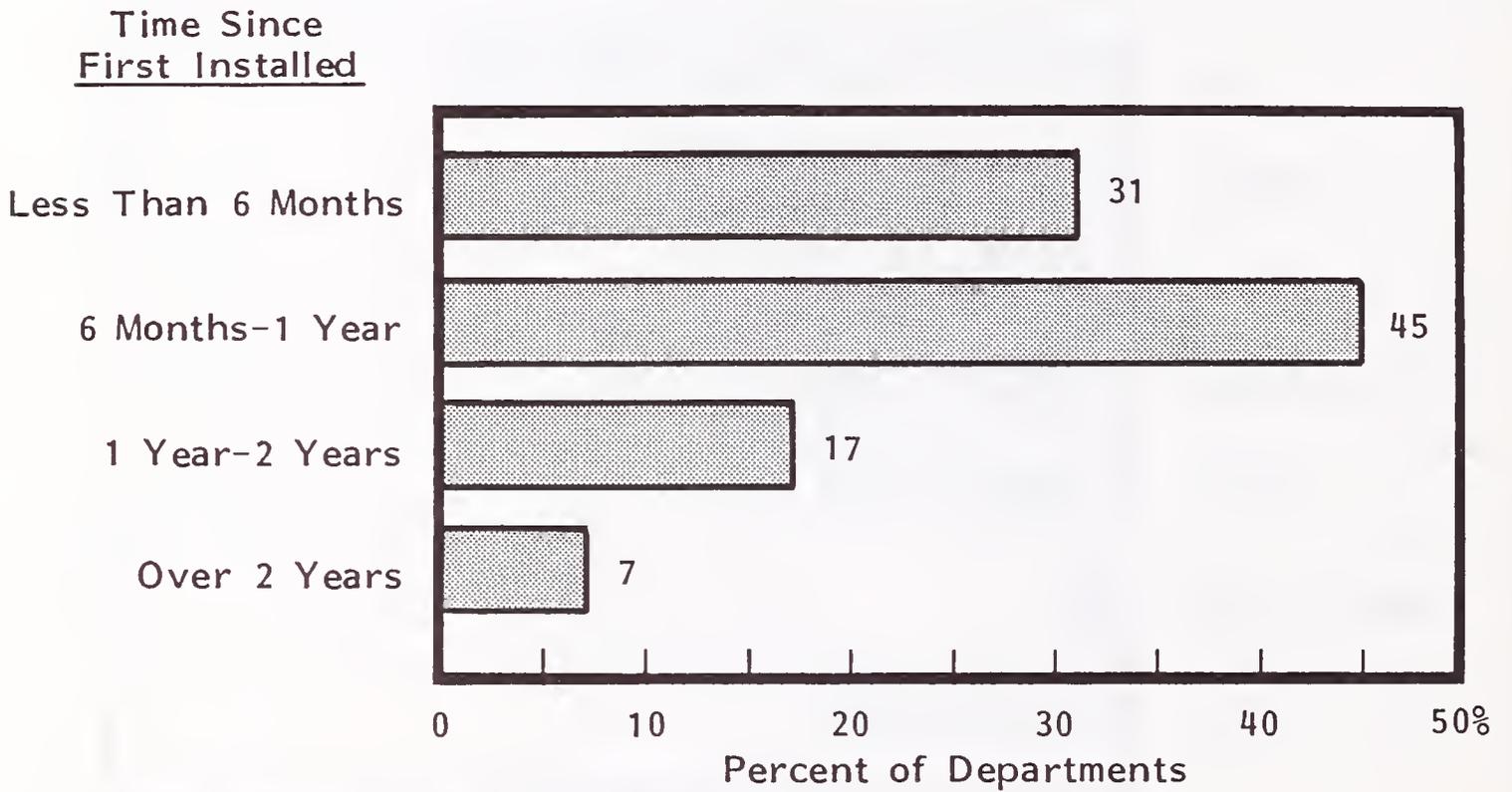
ANTICIPATED BUDGET INCREASES FOR 1983 IN PROCESS MANUFACTURING
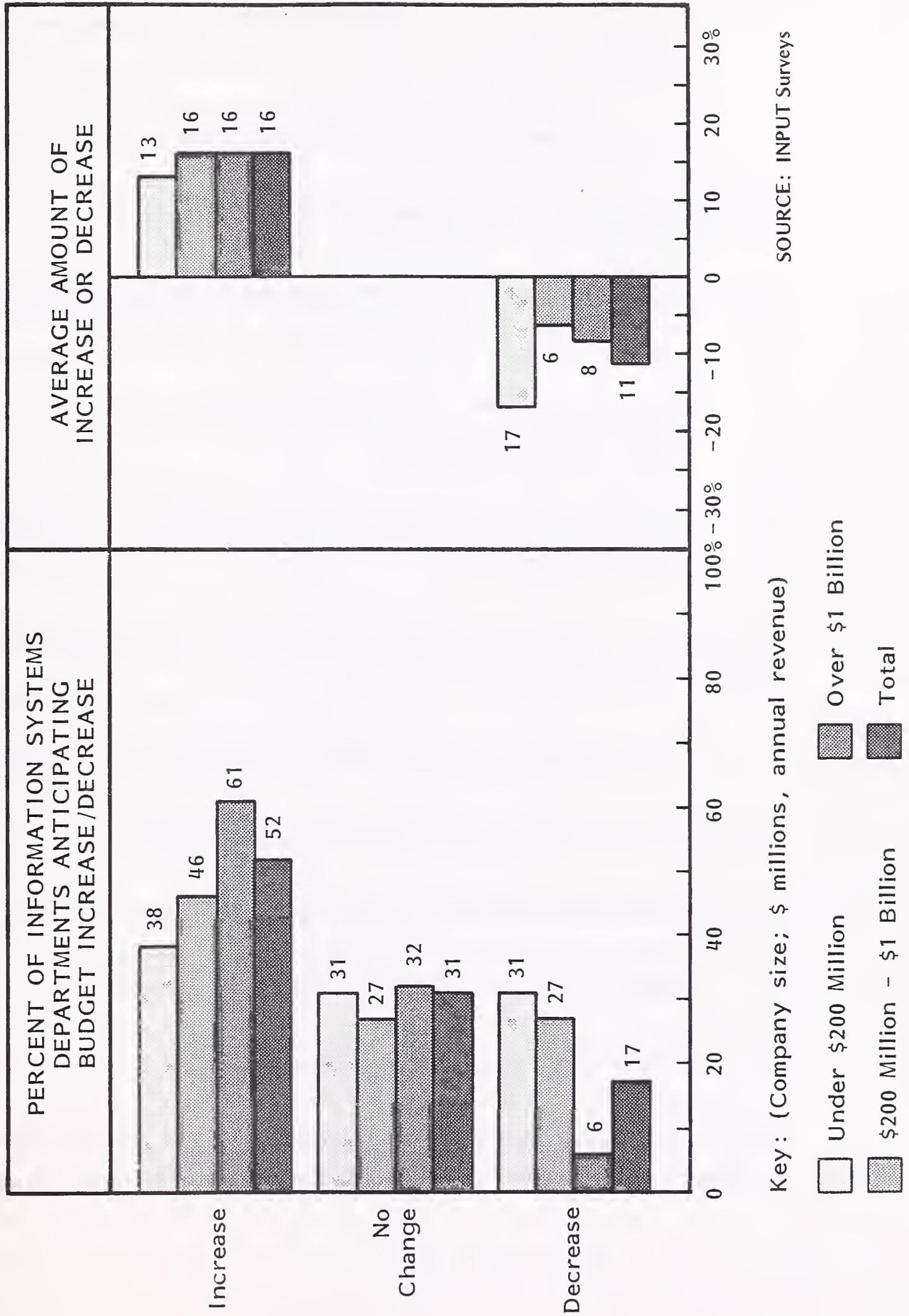
INPUT
UA82

- Companies expecting to increase their budgets foresee an average rise of 16%.

- Companies anticipating decreases expect their budgets to drop by 11%.

- The budget increases expected vary by company size.

  - Large companies: 61% expect increases in the process manufacturing sector, compared to 63% for large companies generally.

  - Medium companies: 46% expect increases, compared to 63% for medium companies generally.

  - Small companies: 38% expect increases, compared to 57% for small companies generally.

- The average budget growth expected for 1983 in the process manufacturing sector is 6%, compared to 15% in 1982.

  - This represents a decline of 59% in the average rate of growth.

- The 1982 IS budget distribution is shown in Exhibit III-24.

- The largest changes are expected in the following budget categories:

  - Large increases for mini/microcomputers and terminals.

  - A significant drop in outside processing services.

- Exhibit III-25 shows the range of the ratios between the IS budget and the company's total revenues which exist in the process manufacturing sector.

INPUT

EXHIBIT III-24

1982 BUDGET DISTRIBUTIONS AND 1982/1983 CHANGES
IN THE PROCESS MANUFACTURING SECTOR

BUDGET CATEGORY	PERCENT OF I.S. BUDGET (1982)	EXPECTED CHANGE 1982 to 1983
Personnel	42%	4%
Hardware		
Mainframe	14	3
Mini/Microcomputer	1	101
Terminals	5	26
Peripherals	5	3
Communications	9	6
Software and Services		
Software	5	8
Processing Services	2	-17
Software Maintenance	1	9
Hardware Maintenance	3	2
Other	13	7
Total	100%	6%

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-25

INFORMATION SYSTEMS BUDGET AS A PERCENT OF TOTAL REVENUES IN THE PROCESS MANUFACTURING SECTOR
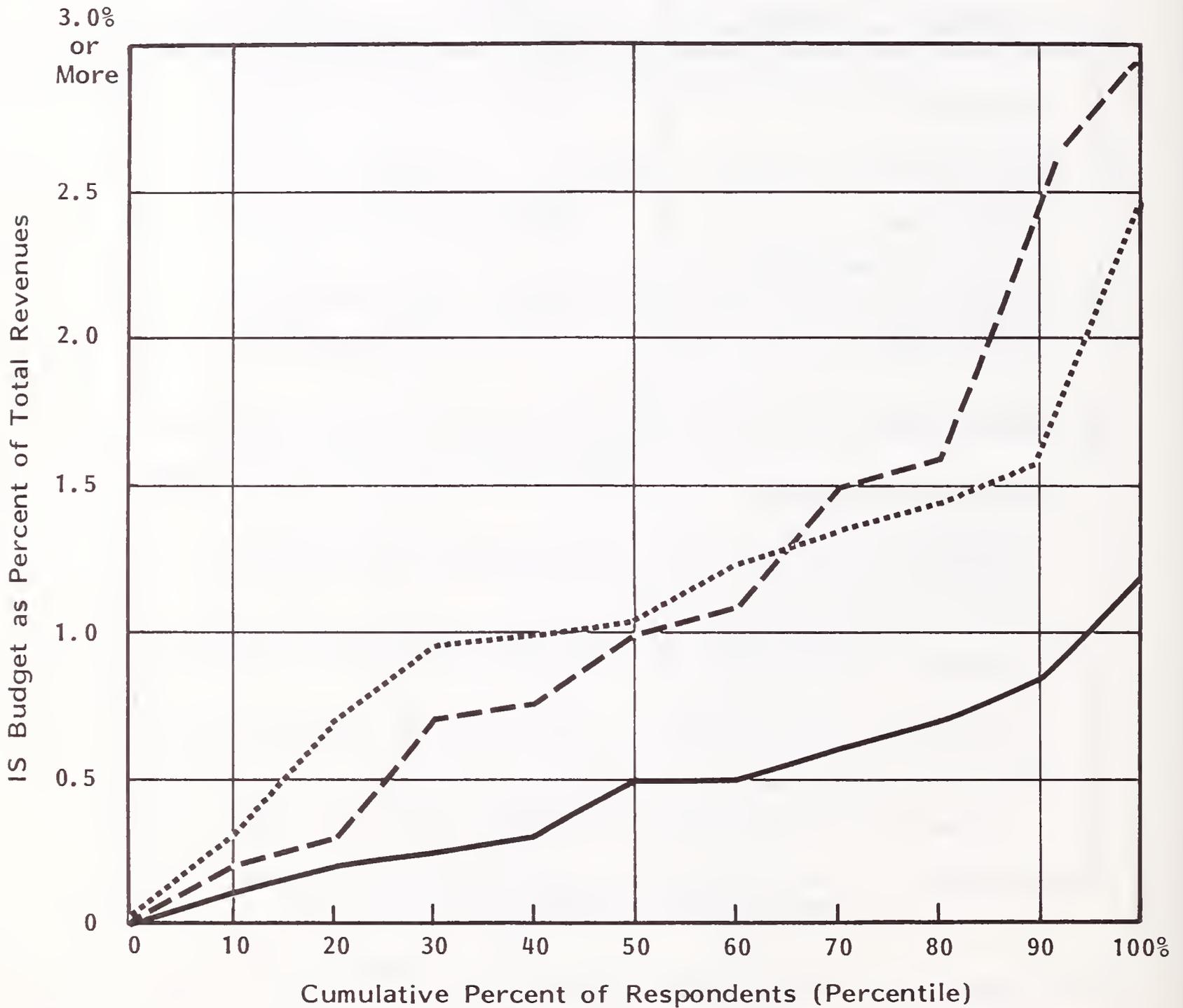
Key - Company Size:

•••••••••••• $0 - $199 million

– – – – – $200 - $999 million

———— $1 billion and over

SOURCE: INPUT Surveys

INPUT
UA82

- The IS percentage of total revenues for the average company (i.e., at the 50th percentile) in each size group was:

    • For large companies: 0.5%, compared to 0.55% for this size company generally.

    • For medium companies: 1.0%, compared to 0.8% for this size company generally.

    • For small companies: 1.1%, compared to 1.2% for this size company generally.

- The companies that spend least on data processing as a percentage of revenues are those at and below the 20th percentile. Taking the 10th percentile as representative, their IS spending percentages were:

    • Large companies: 0.1%.

    • Medium companies: 0.2%.

    • Small companies: 0.3%.

- The companies that spend the most on data processing as a percentage of revenues are those at and above the 80th percentile. Taking the 90th percentile as representative, their IS spending percentages were:

    • Large companies: 0.8%.

    • Medium companies: 2.5%.

    • Small companies: 1.6%.

INPUT

- Median spending on IS per corporate employee was $880. However, there was a broad range of spending ratios, as shown in the diagram in Exhibit III-26.

    - The reasons for this variation were discussed in Chapter II, Section B.

2. STAFFING

- In the process manufacturing sector, 46% of companies expect their IS staffs to increase in the next 12 months, compared to the industry average of 58%, as shown in Exhibit III-27.

    - The net increase in numbers of staff is expected to be 5%, compared to the all-industry average of 4%.

- Turnover in this sector is expected to be 90% of the all-industry average, as shown in Exhibit II-9.

    - Turnover rates for individual positions are shown in Exhibit III-28. For technical positions, the turnover rate is close to the industry average.

- Difficulty in recruiting staff in the process manufacturing sector is seen as more difficult than for companies in general, as shown in Exhibit III-29.

- The number of programs to be maintained averages 1,000 in this sector, although the range, both in absolute numbers and based on company size, is quite broad, as shown in Exhibit III-30.

    - Maintenance, as a proportion of total workload, is stable and very close to industry averages, as shown in Exhibit III-31.

- Company size does seem to affect the amount of maintenance, with large companies performing more than smaller companies. Medium-sized companies apparently believe that they will greatly reduce their maintenance loads from 1982 to 1983, as shown in Exhibit III-32.

INPUT

EXHIBIT III-26

INFORMATION SYSTEMS SPENDING PER EMPLOYEE BY COMPANY SIZE IN THE PROCESS MANUFACTURING SECTOR

IS Spending per Employee

($ thousands)

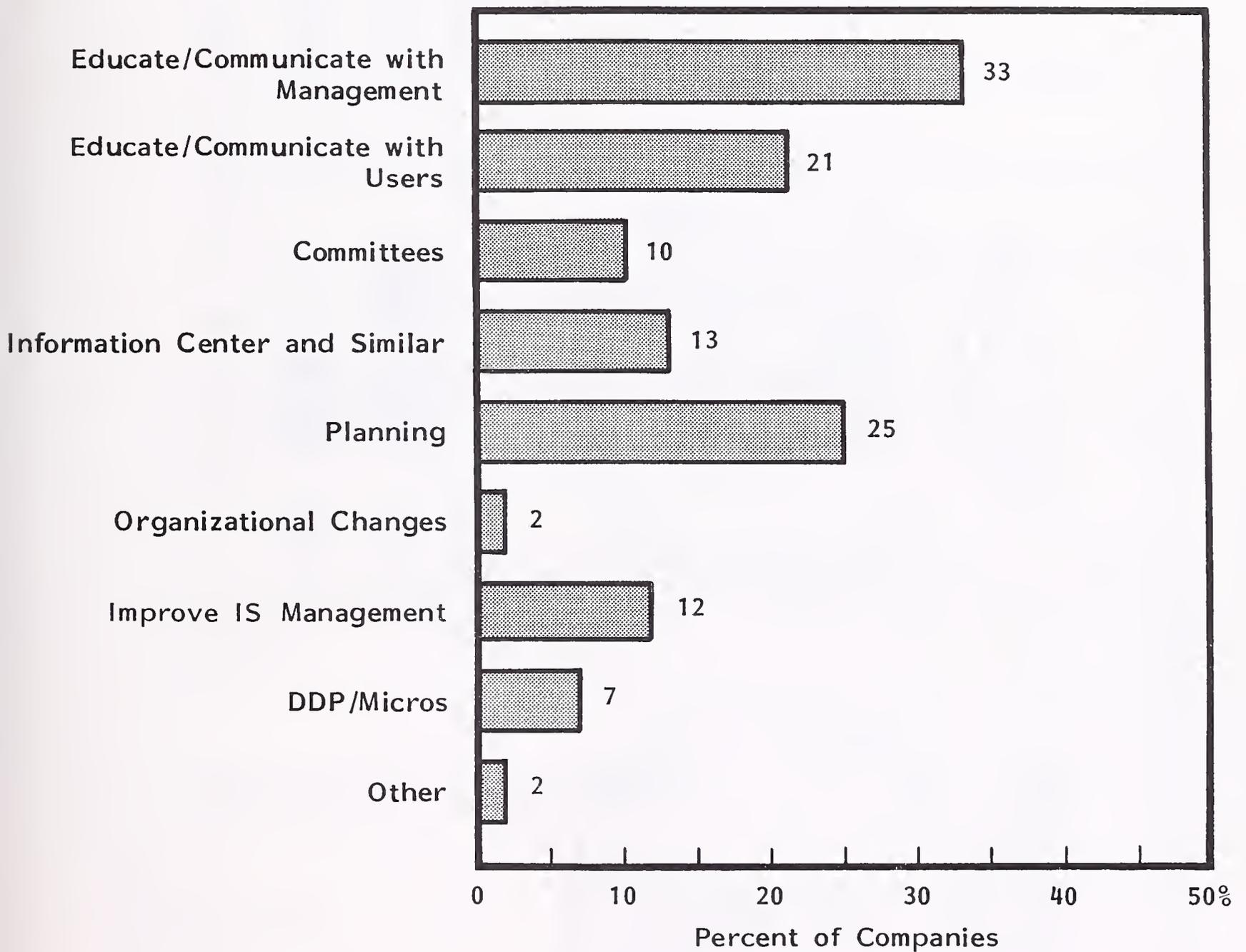━ ━ ━ ━ ━ = Median   SOURCE: INPUT Surveys

- 135 -
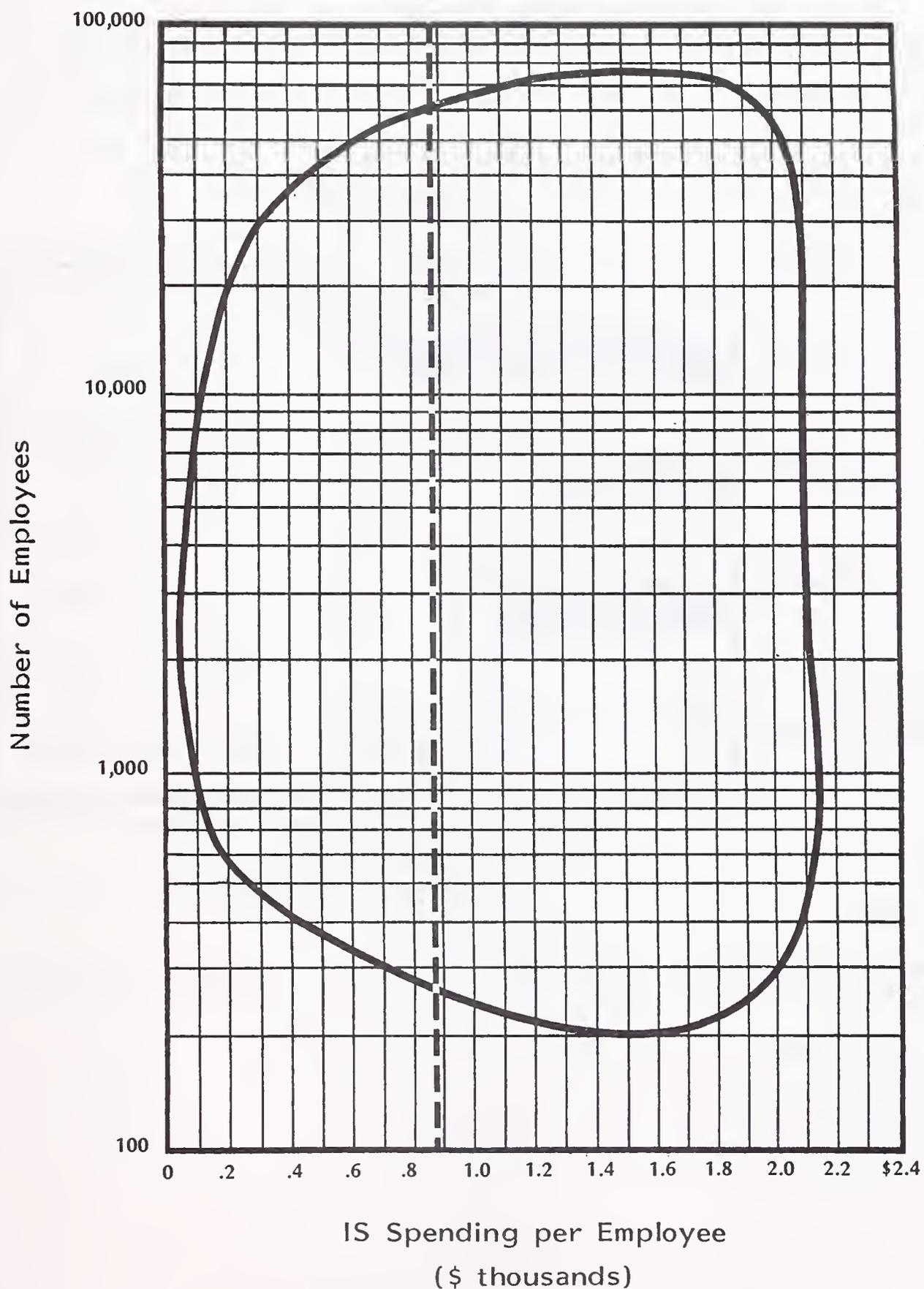
INPUT
UA82

EXHIBIT III-27

INFORMATION SYSTEMS STAFFING CHANGES EXPECTED IN THE NEXT TWELVE MONTHS IN THE PROCESS MANUFACTURING SECTOR

Percent of
Companies Expecting:

All Industries

Process Manufacturing

SOURCE: INPUT Surveys
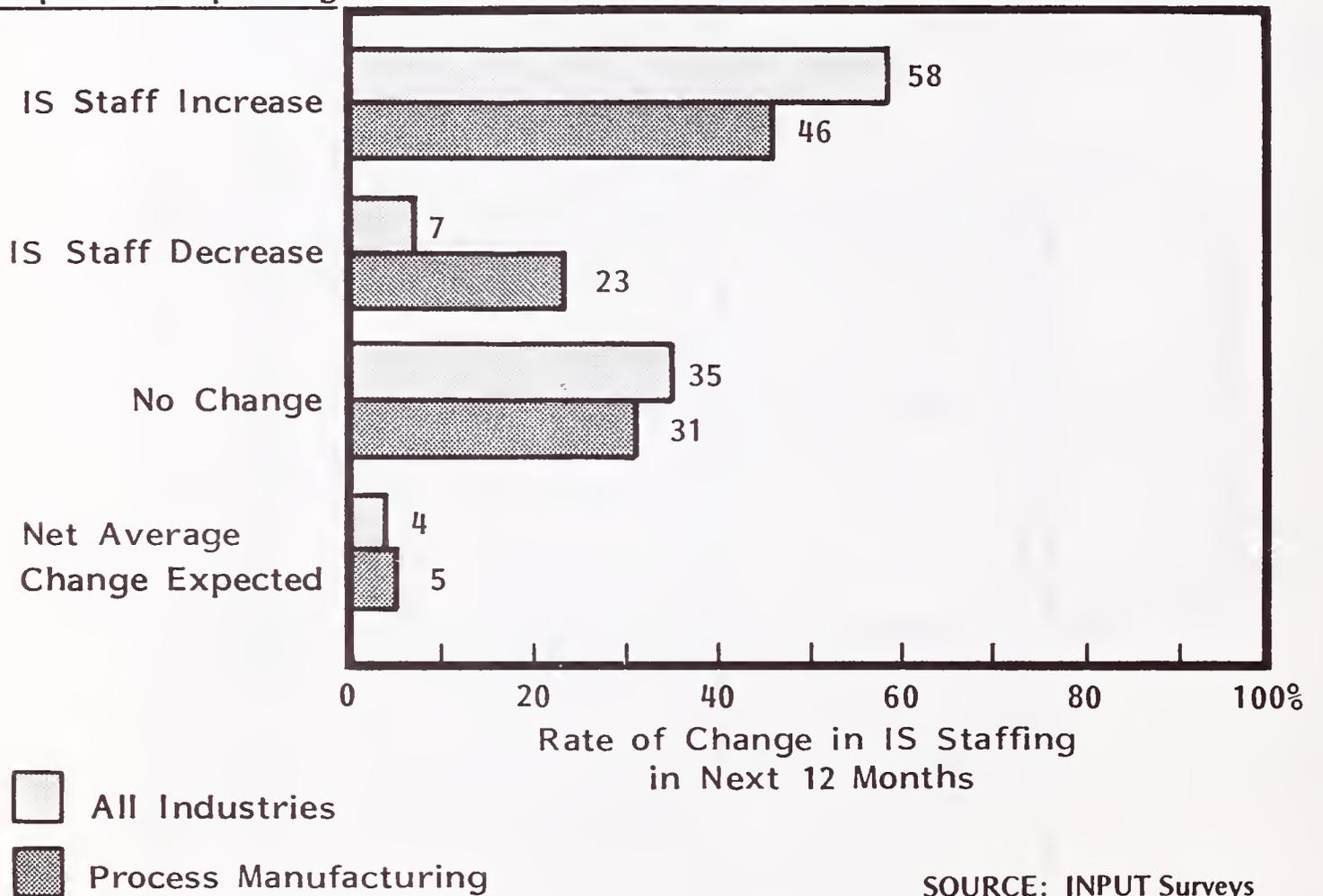
INPUT
UA82

EXHIBIT III-28

CURRENT ANNUAL TURNOVER IN THE
PROCESS MANUFACTURING SECTOR

Annual Turnover Percentage
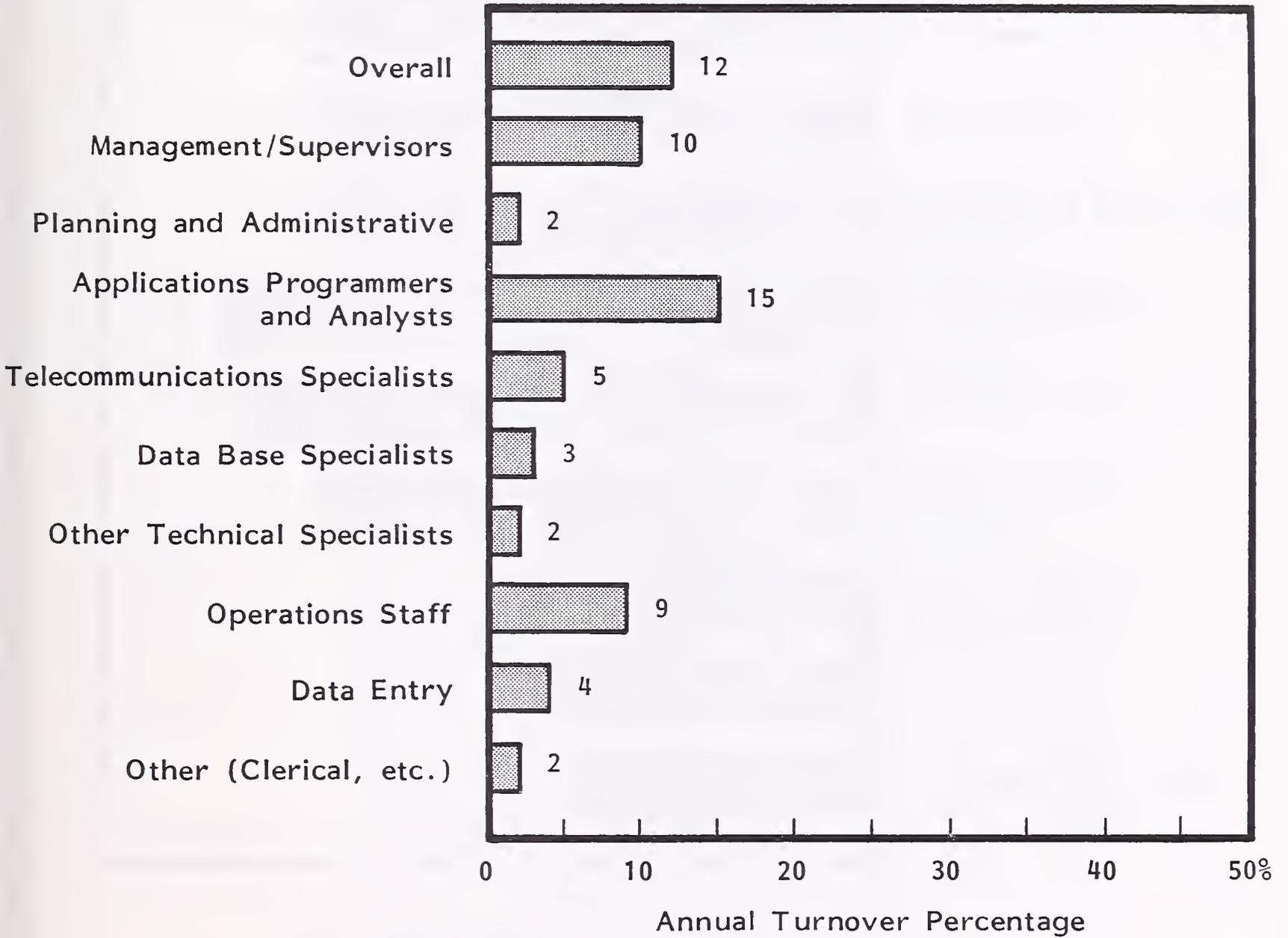
INPUT
UA82

EXHIBIT III-29

DIFFICULTY IN RECRUITING STAFF IN THE PROCESS MANUFACTURING SECTOR

Management/Supervisors	3.7
Planning and Administrative	3.6
Applications Programmers and Analysts	3.6
Telecommunications Specialists	4.2
Data Base Specialists	4.1
Other Technical Specialists	3.6
Operations Staff	2.3
Data Entry	2.1
Other (Clerical, etc.)	2.0

Difficulty in Recruiting Staff

Scale: 1 = Low, 5 = High

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-30

NUMBER OF PROGRAMS BY COMPANY SIZE
IN THE PROCESS MANUFACTURING SECTOR

Number of Programs

(thousands)

— — — — = Median   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-31

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE IN THE
PROCESS MANUFACTURING SECTOR,
1981-1983

Percent of Resources

New Development

Maintenance

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-32

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE IN THE
PROCESS MANUFACTURING SECTOR, 1981-1983

Company Size

$0-199 Million
1981   51 / 49

1982   59 / 41

1983   52 / 48

$200-999 Million
1981   54 / 46

1982   44 / 56

1983   57 / 43

$1 Billion and Over
1981   41 / 60

1982   43 / 57

1983   42 / 59

Percent of Resources

New Development

Maintenance

SOURCE: INPUT Surveys

- 141 -
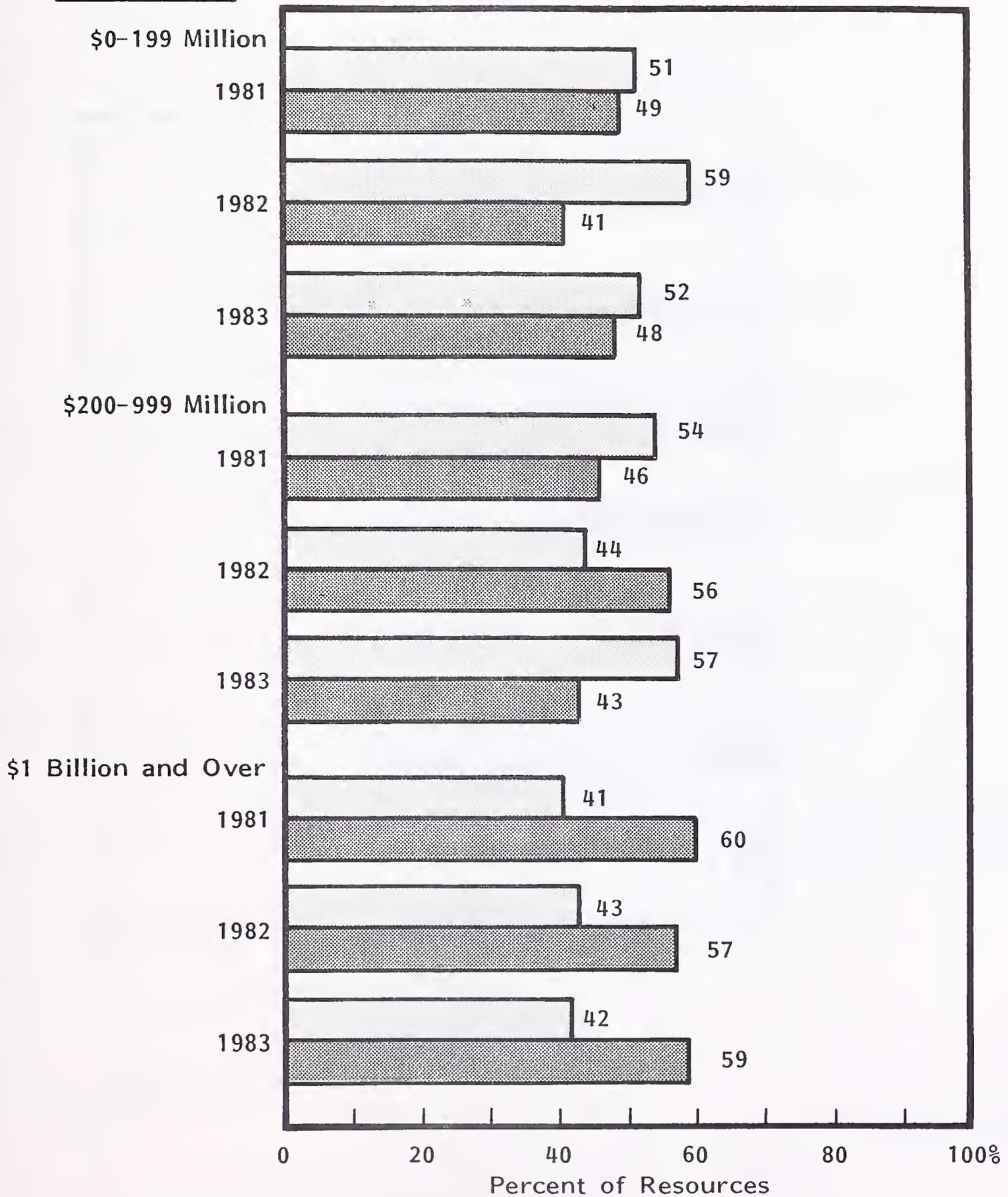
INPUT
UA82

EXHIBIT III-33

INFORMATION SYSTEMS PROBLEMS IN THE
PROCESS MANUFACTURING SECTOR: SUMMARY
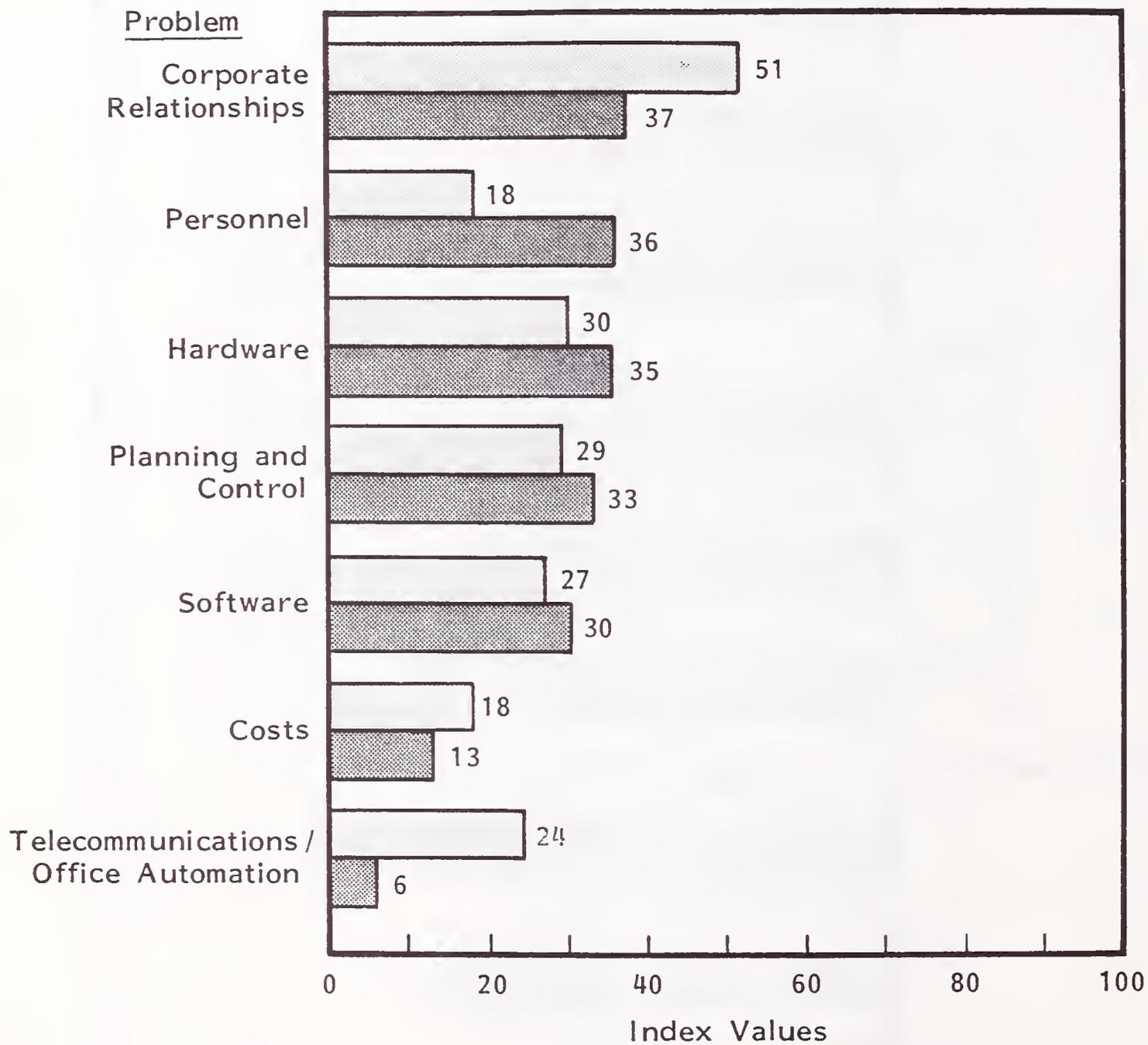
INPUT
UA82

EXHIBIT III-34

INFORMATION SYSTEMS PROBLEMS IN THE
PROCESS MANUFACTURING SECTOR: DETAIL

Problem

Problem	Percent
Relations with Management	28
Relations with Users	23
Backlog/Workload	16
Planning	5
Cost Constraints	18
Project Control/Management	8
IS Personnel Shortages/Turnovers	10
Other IS Personnel Issues	8
Application System Quality	13
Software Development, Maintenance, Productivity	15
Equipment/Capacity, Computer Operations	20
Network/Telecommunications	16
Hardware	10
Office Automation	8
Other	9

Percent of Companies

SOURCE: INPUT Surveys

- 143 -

INPUT
UA82

EXHIBIT III-35

INFORMATION SYSTEMS OBJECTIVES IN THE
PROCESS MANUFACTURING SECTOR: SUMMARY

Objectives

Objective	This Sector	All Sectors
Corporate Relationships	57	43
Personnel	2	5
Hardware	11	16
Planning and Control	32	32
Software	66	64
Costs	14	8
Telecommunications / Office Automation	52	28

0   20   40   60   80   100

Index Values

☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

- 144 -

INPUT
UA82

EXHIBIT III-36

INFORMATION SYSTEMS PLANNING OBJECTIVES IN THE
PROCESS MANUFACTURING SECTOR: DETAIL

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-37

INFORMATION SYSTEMS INITIATIVES IN THE
PROCESS MANUFACTURING SECTOR: SUMMARY

Initiative

Corporate Relationships — 75 (This Sector), 39 (All Sectors)
Personnel — 41 (This Sector), 41 (All Sectors)
Hardware — 44 (This Sector), 40 (All Sectors)
Planning and Control — 35 (This Sector), 28 (All Sectors)
Software — 66 (This Sector), 69 (All Sectors)
Costs — 13 (This Sector), 12 (All Sectors)
Telecommunications/ Office Automation — 7 (This Sector), 4 (All Sectors)

Index Values (0, 20, 40, 60, 80, 100)
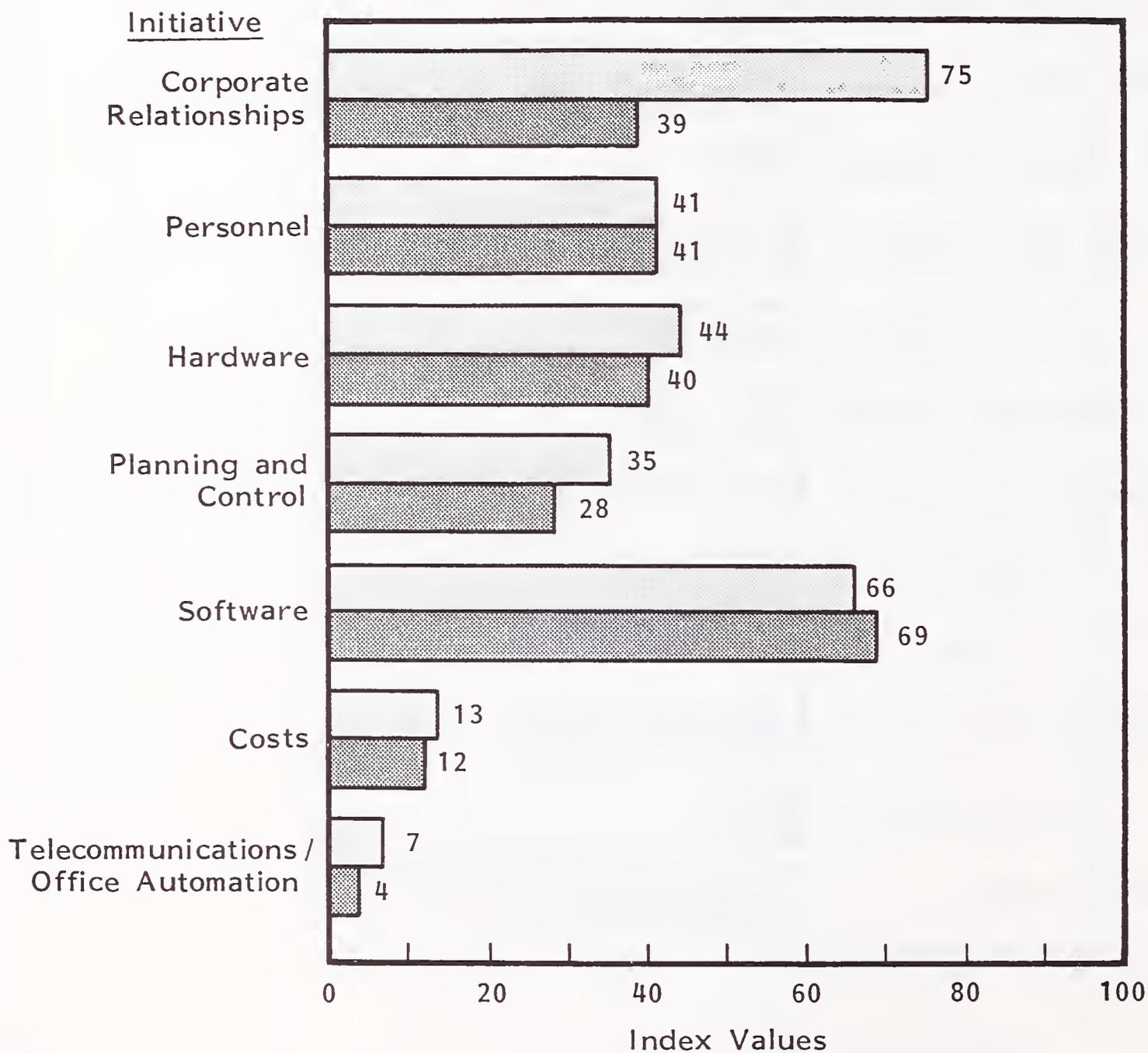
☐ This Sector
▧ All Sectors

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-38

INITIATIVES PLANNED IN THE
PROCESS MANUFACTURING SECTOR: DETAIL

Initiative	Percent of Companies
Career Planning/Education, Training	25
Increase Hiring	16
Productivity Tools and Techniques/ Quality Control Standards	28
Redesign/Replace System(s)	20
Software Packages/DBMS	16
Justify/Reduce Additional Functions/Costs	13
Add Hardware	15
Vendor Improvement	16
Network/Telecommunications	7

Percent of Companies

Continued

SOURCE: INPUT Surveys

- 147 -
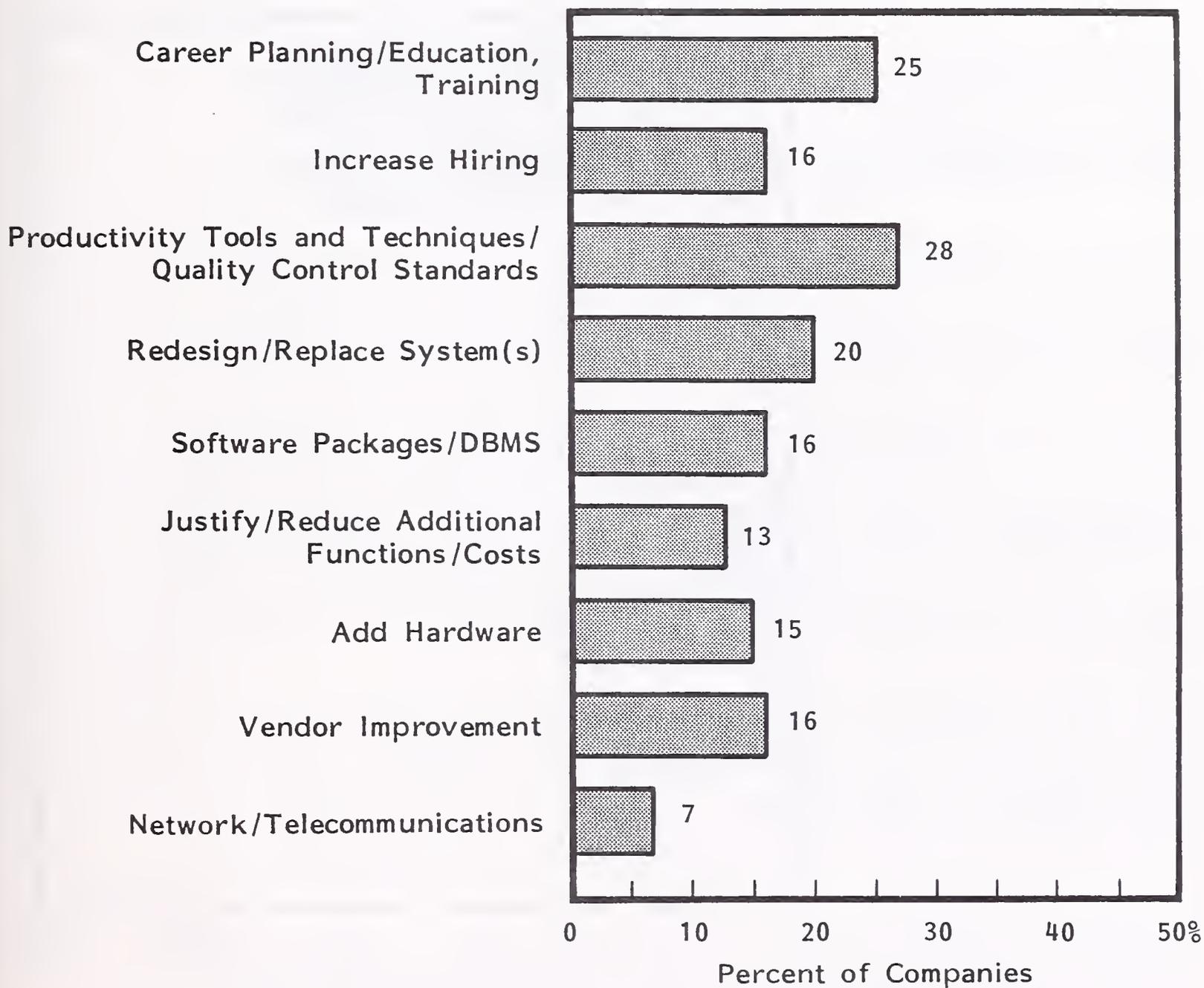
INPUT
UA82

EXHIBIT III-38 (Cont.)

INITIATIVES PLANNED IN THE
PROCESS MANUFACTURING SECTOR: DETAIL
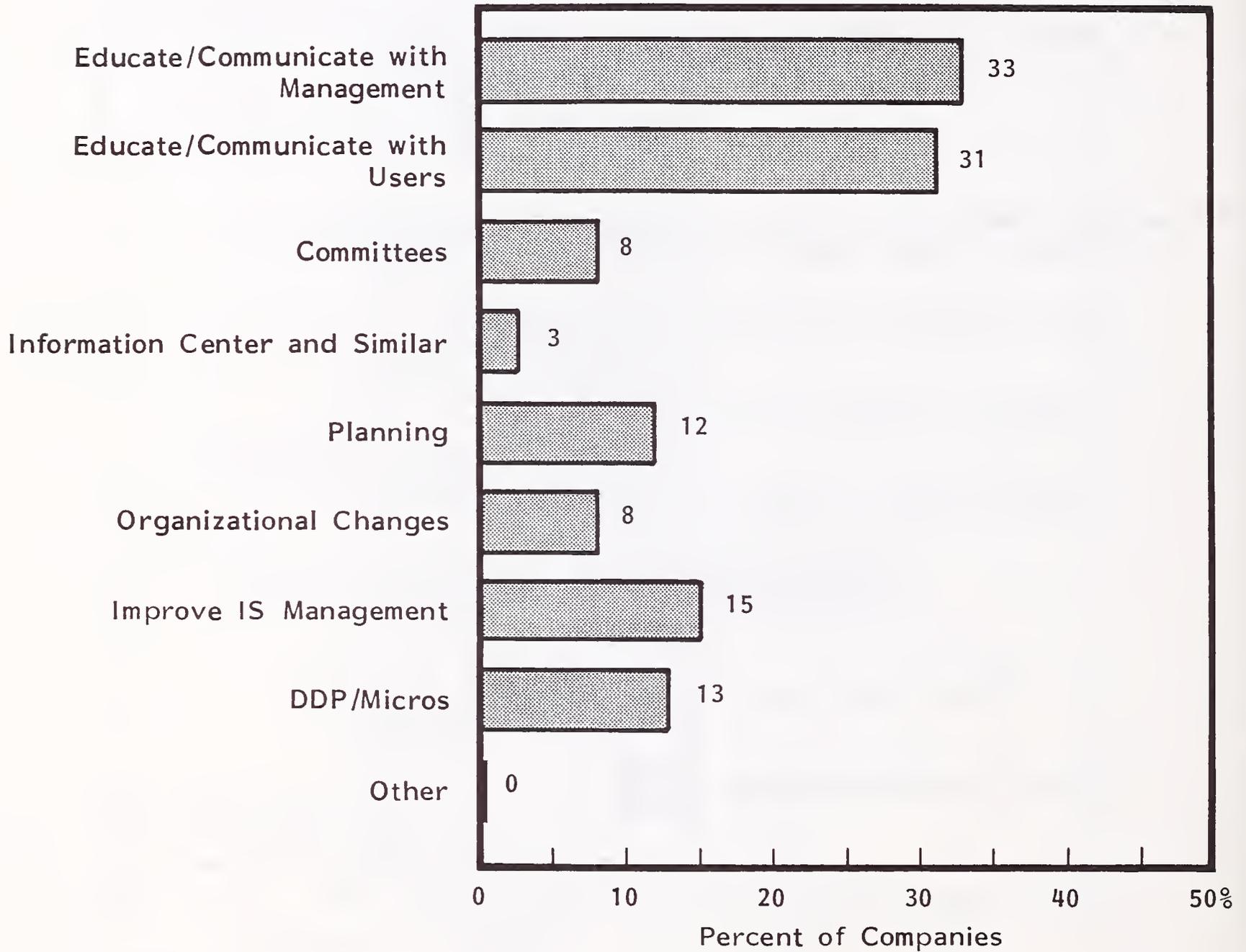
SOURCE: INPUT Surveys

INPUT
UA82

3.   INFORMATION SYSTEMS ISSUES

- Note: please refer to Chapter II, Section D for a general discussion of IS problems, objectives, and initiatives and their interrelationships.

- The process manufacturing sector in general sees itself with fewer problems than average, as shown in Exhibit III-33.

    - Only in corporate relationships and telecommunications/office automation are this sector's problems above average in intensity.

    - More detailed information about specific problem areas is contained in Exhibit II-34. This exhibit shows the percentage of companies in this sector which regard an issue as a major problem.

- The objectives profile mirrors the problems profile in that the objectives receiving more priority than average are those which are perceived to be significant problems for the industry's companies, as shown in Exhibit III-35. Otherwise, the process industry's objectives profile is similar to the all-industry profile.

    - More detailed information about specific planning objectives is contained in Exhibit III-36. This exhibit shows the percentage of companies in this sector which have identified particular planning objectives as being of major importance.

- Much more stress is being placed by this sector on initiatives involving corporate relationships than is true for most other sectors, as shown in Exhibit III-37.

    - More detailed information about specific areas where an initiative is planned is contained in Exhibit III-38. this exhbit shows the percentage

INPUT

of companies in this sector planning a major initiative in a particular area.

4.   PERSONAL COMPUTERS

- Plans for the use of personal computers in the process manufacturing sector are shown in Exhibit III-39 and include:

  - The overall level of use in five years.

  - Plans for obtaining additional personal computer software.

  - Plans for obtaining additional personal computer hardware.

- This sector plans considerably more hardware and software acquisitions than the typical sector.

- Exhibit III-40 shows the types of personal computer software packages now used.

  - More packages of practically every kind are used, compared to the industry average.

- The general categories of applications used are summarized in Exhibit III-41. The application profile is generally similar to the all-industry average.

  - Exhibit III-42 provides examples of actual personal computer applications in use in the process manufacturing sector.

- Compared to the average user, personal computer users in this sector are about as likely to rely on the IS department for assistance, as shown in Exhibit III-43. Vendors and books are the most likely to be utilized by this group.

INPUT

EXHIBIT III-39

PERSONAL COMPUTER ACQUISITION PLANS IN THE PROCESS MANUFACTURING SECTOR

User Plans for
Additional Personal
Computer Hardware

Additional
Hardware
Planned
82%

No
Current
Plans
18%

User Plans for
Additional Personal
Computer Software

Additional
Software
Planned
71%

No
Current
Plans
29%

Expected Level of Use
of Personal Computers
in Five Years

More
76%

Same
15%

Don't
Know
9%

Hardware
Type*

Additional
PCs   74

Additional
Peripherals 37

Other   11

SOURCE: INPUT Surveys

Source

Package   84

In-house/
Custom   16
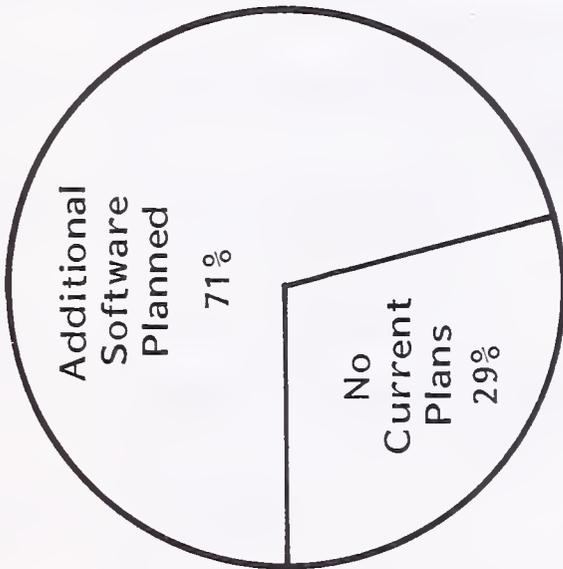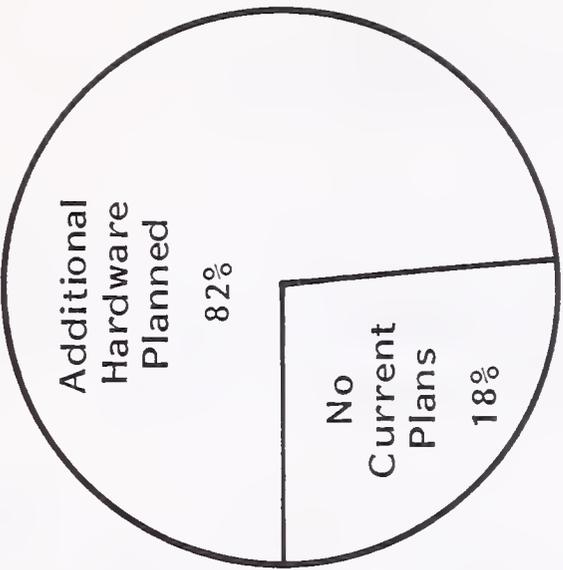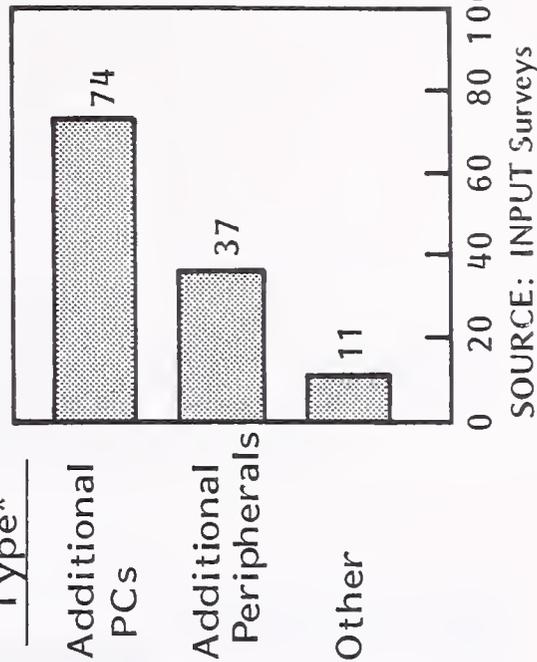
*Totals more than 100%
because of multiple plans

INPUT
UA82

EXHIBIT III-40

TYPES OF PERSONAL COMPUTER SOFTWARE PACKAGES USED
BY THE PROCESS MANUFACTURING SECTOR

Type of Package

Percent of Departments Using
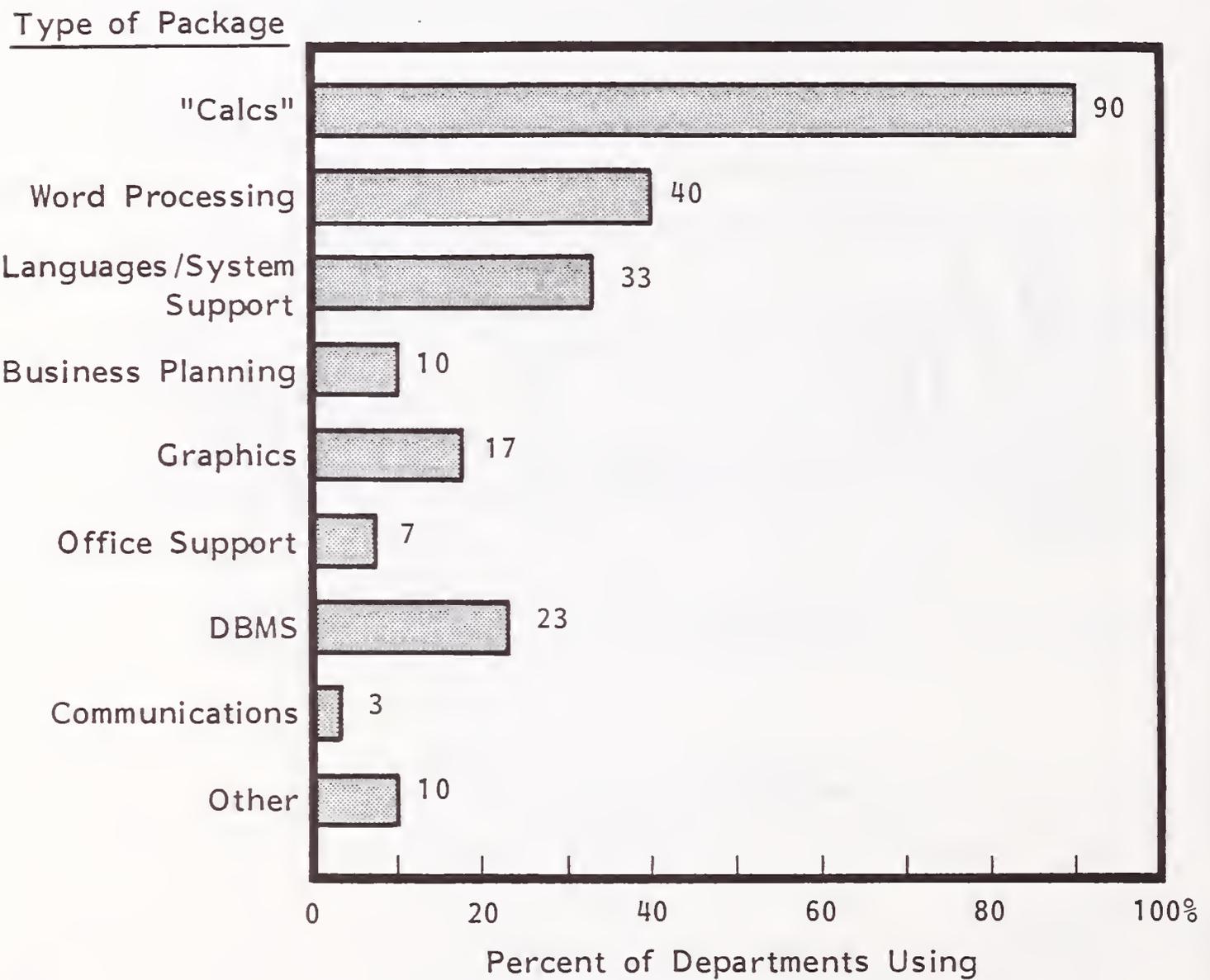
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-41

PERSONAL COMPUTER APPLICATIONS
IN THE PROCESS MANUFACTURING SECTOR

Application Type

Budgeting/Accounting	23
Modeling/Planning	27
Other Financial	33
Operations	33
Analysis	33
Data Bases, Reporting	43
Word Processing	13
Other	7

Percent of Departments Using Application

0   20   40   60   80   100%
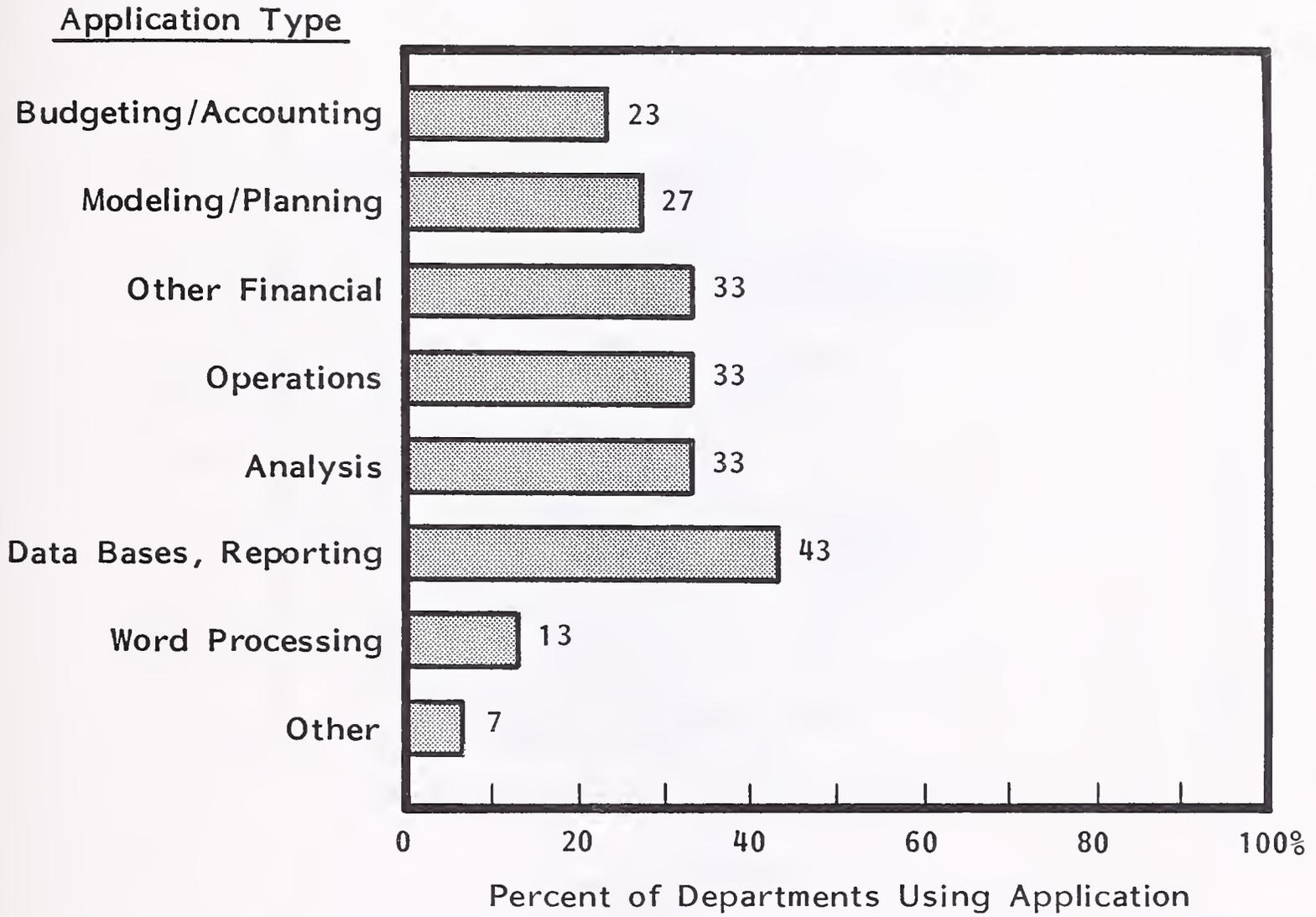
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-42

PERSONAL COMPUTER APPLICATIONS IN THE PROCESS MANUFACTURING SECTOR

Word Processing

DBMS

Financial Modeling

Research

Forecasts

Profit Planning and Analysis

Budgets

Engineering Analysis

Spread Sheets

Contract Writing

File Manipulation

Inventory Control

Process Control

Research and Development

On-line Acquisition

Program Development

Manufacturing

General Ledger

Plotting

Charts

Scheduling

VisiCalc Constructions

Corporate Relocation Files

Consolidation

Corporate Planning

Shipping Scheduling

Run Regressions

Pressure Calculations

Bill of Materials

Calculation of Bills

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-43

SOURCES OF ASSISTANCE FOR
PERSONAL COMPUTER USERS
IN THE PROCESS MANUFACTURING SECTOR

Note: Total Is More Than 100% Because of Multiple Sources.   SOURCE: INPUT Surveys

INPUT
UA82

- In this sector 76% of departments using personal computers have had their installation less than a year, as shown in Exhibit III-44, compared to 78% generally.

D. TRANSPORTATION SECTOR

1. BUDGETS

- In this sector 64% of the companies expect budget increases in 1983, compared to 61% generally; 7% expect a decrease compared to 8% generally, as shown in Exhibit III-45.

  - Companies expecting to increase their budgets foresee an average rise of 20%.

  - Companies anticipating decreases expect their budgets to drop by 20%.

- The budget increases expected vary by company size.

  - Large companies: 50% expect increases in the transportation sector, compared to 63% for large companies generally.

  - Medium companies: 60% expect increases, compared to 63% for medium companies generally.

  - Small companies: 80% expect increases, compared to 57% for small companies generally.

- The average budget growth expected for 1983 in the transportation sector is 12%, compared to 9% in 1982.

INPUT

EXHIBIT III-44

TIME SINCE FIRST PERSONAL COMPUTER INSTALLED
IN USER DEPARTMENTS IN THE PROCESS MANUFACTURING SECTOR

Time Since
First Installed

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-45
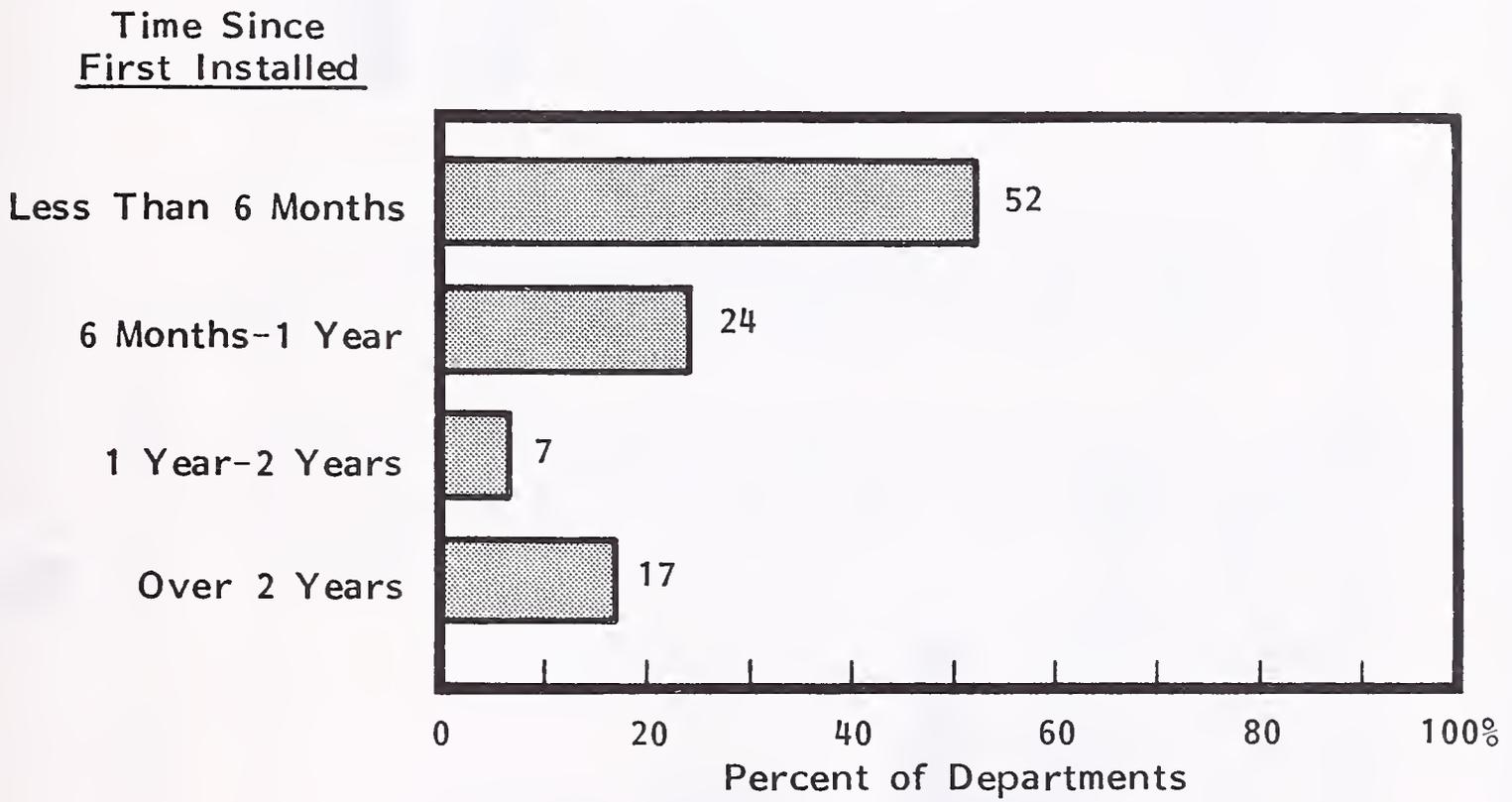
ANTICIPATED BUDGET INCREASES FOR 1983 IN TRANSPORTATION
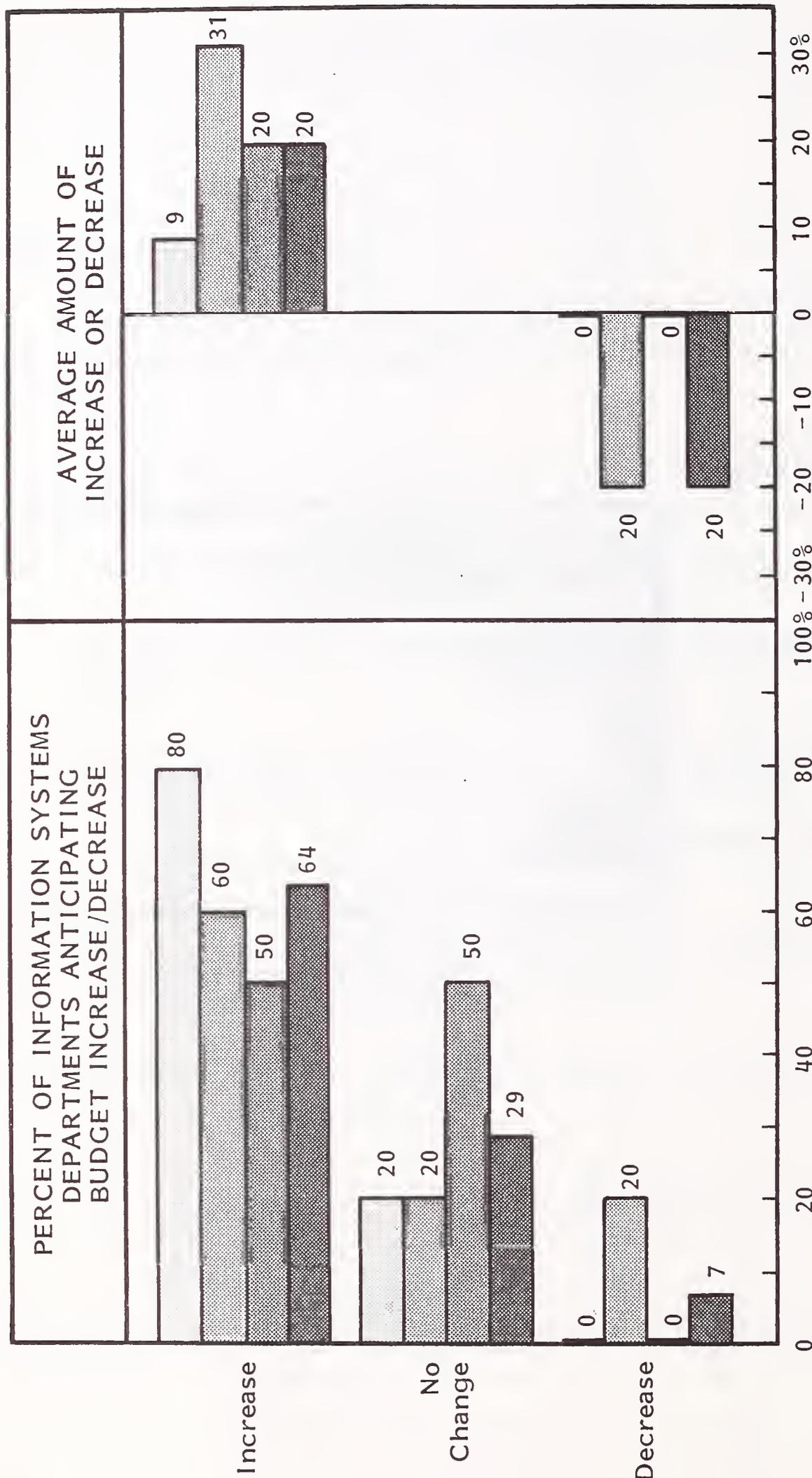
SOURCE: INPUT Surveys

Key: (Company size; $ millions, annual revenue)

☐ Under $200 Million   ▨ Over $1 Billion

▨ $200 Million – $1 Billion   ▨ Total

INPUT
UA82

- This represents an increase of 34% in the rate of growth.

• The 1982 IS budget distribution is shown in Exhibit III-46.

  - The largest changes are expected in communications and software.

• Exhibit III-47 shows the range of the ratios between the IS budget and the company's total revenues which exist in the transportation sector.

  - The IS percentage of total revenues for the average company (i.e., for 50% of respondents) in each size group was:

    . For large and medium companies: 0.2%, compared to about 7% for this size company generally. (Note: Due to sample sizing, large and medium companies have been combined for analysis.)

  - The companies that spend least on data processing as a percentage of revenues are those at and below the 20% mark. Their IS spending percentages were:

    . Large and medium companies: 0.1%.

    . Small companies: 0.1%.

  - The companies that spend the most on data processing as a percentage of revenues are those at and above the 80% mark. Their IS spending percentages were:

    . Large and medium companies: 0.4%.

    . Small companies: 1.8%.

INPUT

EXHIBIT III-46

1982 BUDGET DISTRIBUTION AND 1982/1983 CHANGES
IN THE TRANSPORTATION SECTOR

BUDGET CATEGORY	PERCENT OF IS BUDGET (1982)	EXPECTED CHANGE 1982 to 1983
Personnel	42%	11%
Hardware		
Mainframe	15	9
Mini/Microcomputer	1	8
Terminals	5	6
Peripherals	7	3
Communications	6	17
Software and Services		
Software	5	38
Processing Services	< 1	–
Software Maintenance	3	6
Hardware Maintenance	7	7
Other	9	10
Total	100%	12%

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-47

INFORMATION SYSTEMS BUDGET AS A PERCENT OF TOTAL REVENUES IN THE TRANSPORTATION SECTOR

Cumulative Percent of Respondents (Percentile)
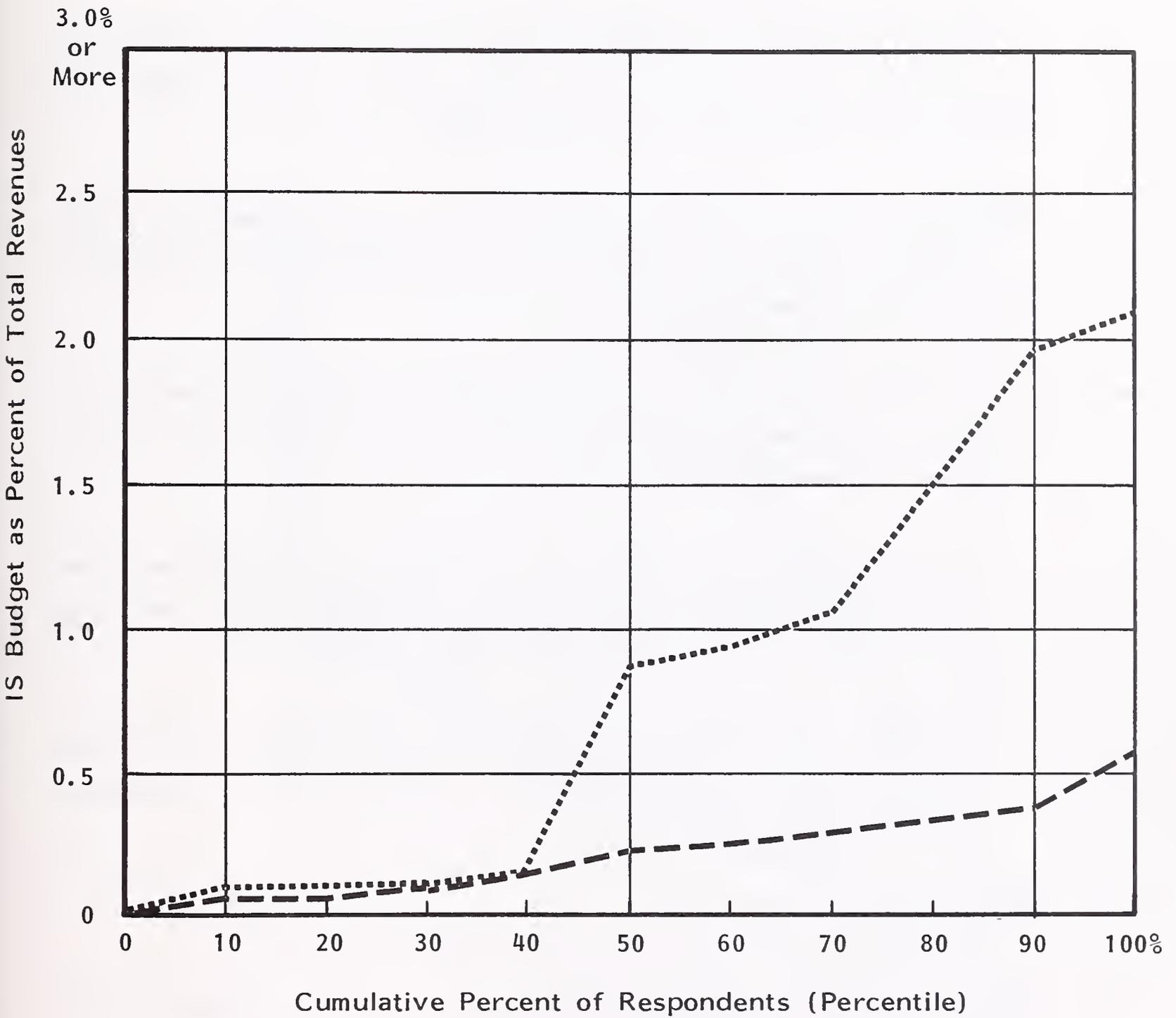
Key - Company Size:

•••••••••••• $0 - $199 million

— — — — $200 million and over

SOURCE: INPUT Surveys

INPUT
UA82

2.   STAFFING

- Median spending on IS per corporate employee was $590. However, there was a broad range of spending ratios as shown in the diagram in Exhibit III-48.

    - The reasons for this variation were discussed in Chapter II, Section B.

- Turnover in this sector is expected to be about 90% of the all-industry average in 1983, as shown in Exhibit II-9. Current turnover rates for individual positions are not shown due to insufficient data.

- Difficulty in recruiting staff in this sector was seen to be less than average and, except for technical specialists, was not generally seen as a major problem, as shown in Exhibit III-49.

- The number of programs to be maintained averages 800 in this sector, although the range, both in absolute numbers and based on company size, is quite broad, as shown in Exhibit III-50.

    - Maintenance, as a proportion of total workload, is about 40% and is not expected to change appreciably. New development is more important in this sector than in most others, as shown in Exhibit III-51.

    - Company size does have an impact on the proportion of maintenance, with the largest companies having the greatest maintenance loads, as shown in Exhibit III-52.

3.   INFORMATION SYSTEMS ISSUES

- Note: please refer to Chapter II, Section D for a general discussion of IS problems, objectives, and initiatives and their interrelationships.

INPUT

EXHIBIT III-48

INFORMATION SYSTEMS SPENDING PER EMPLOYEE, BY COMPANY SIZE IN THE TRANSPORTATION SECTOR

IS Spending per Employee
($ thousands)
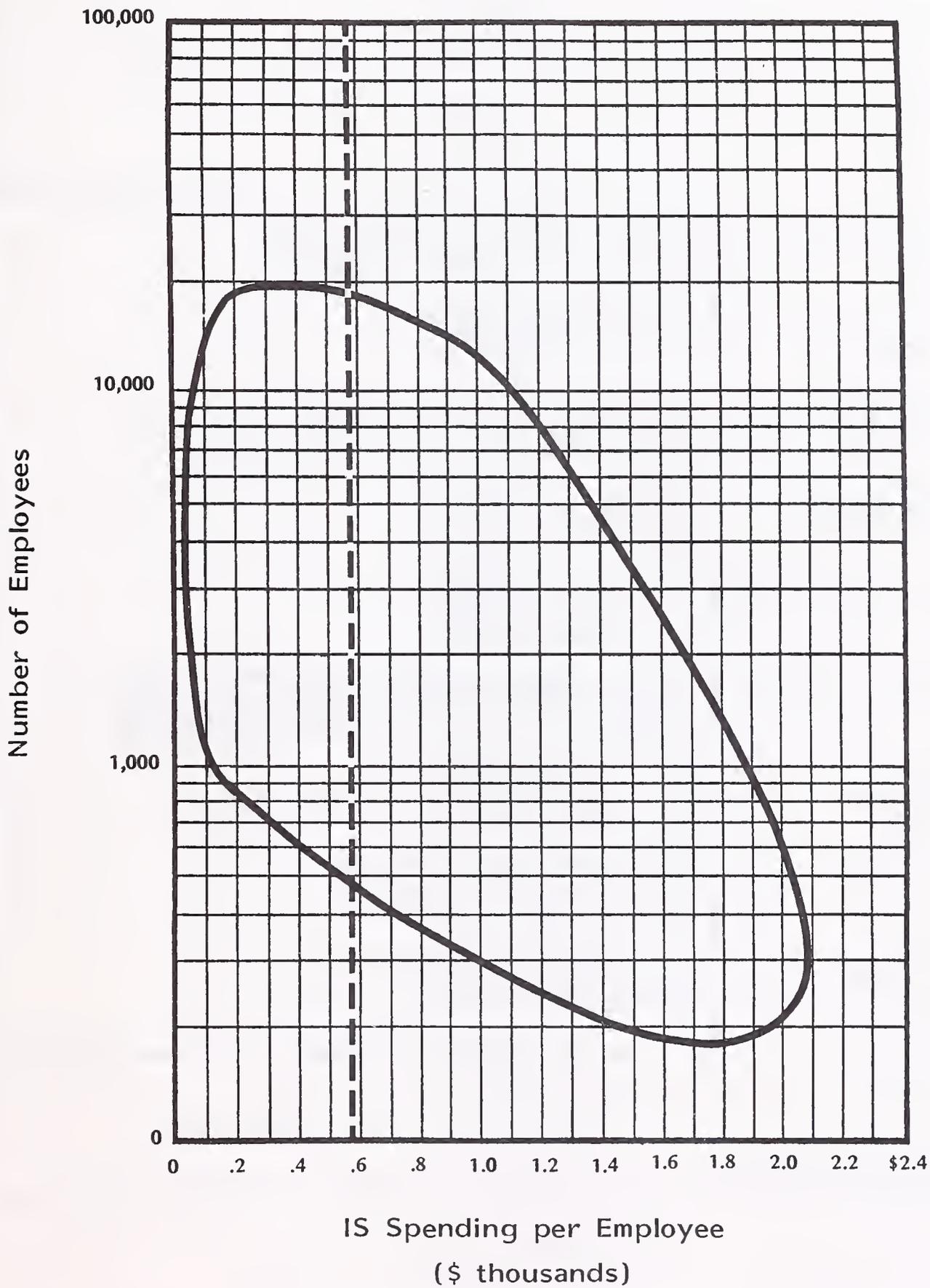
━ ━ ━ ━ = Median

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-49

INFORMATION SYSTEMS DIFFICULTY IN RECRUITING STAFF
IN THE TRANSPORTATION SECTOR
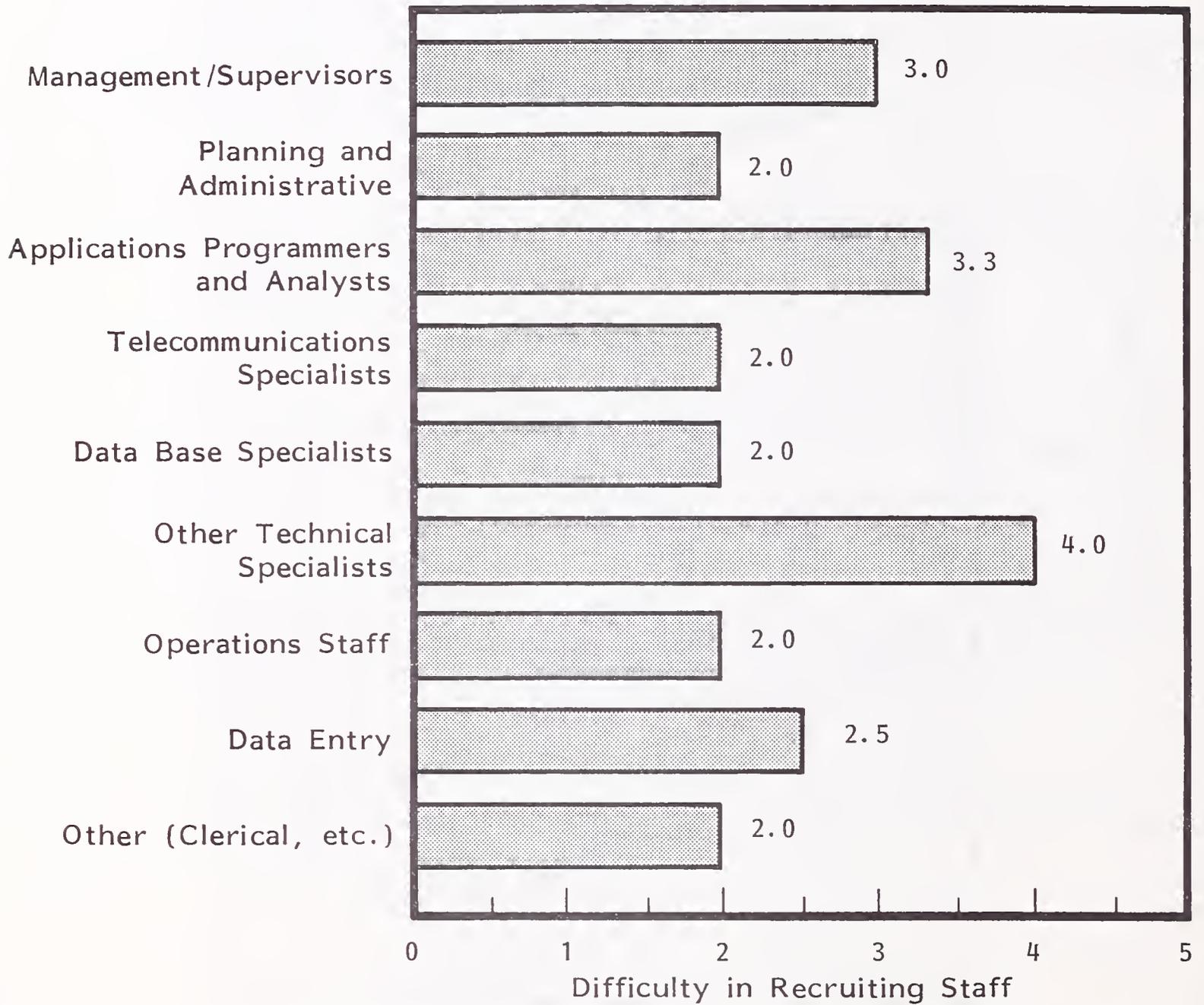
Scale: 1 = Low, 5 = High

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-50

NUMBER OF PROGRAMS BY COMPANY SIZE
IN THE TRANSPORTATION SECTOR
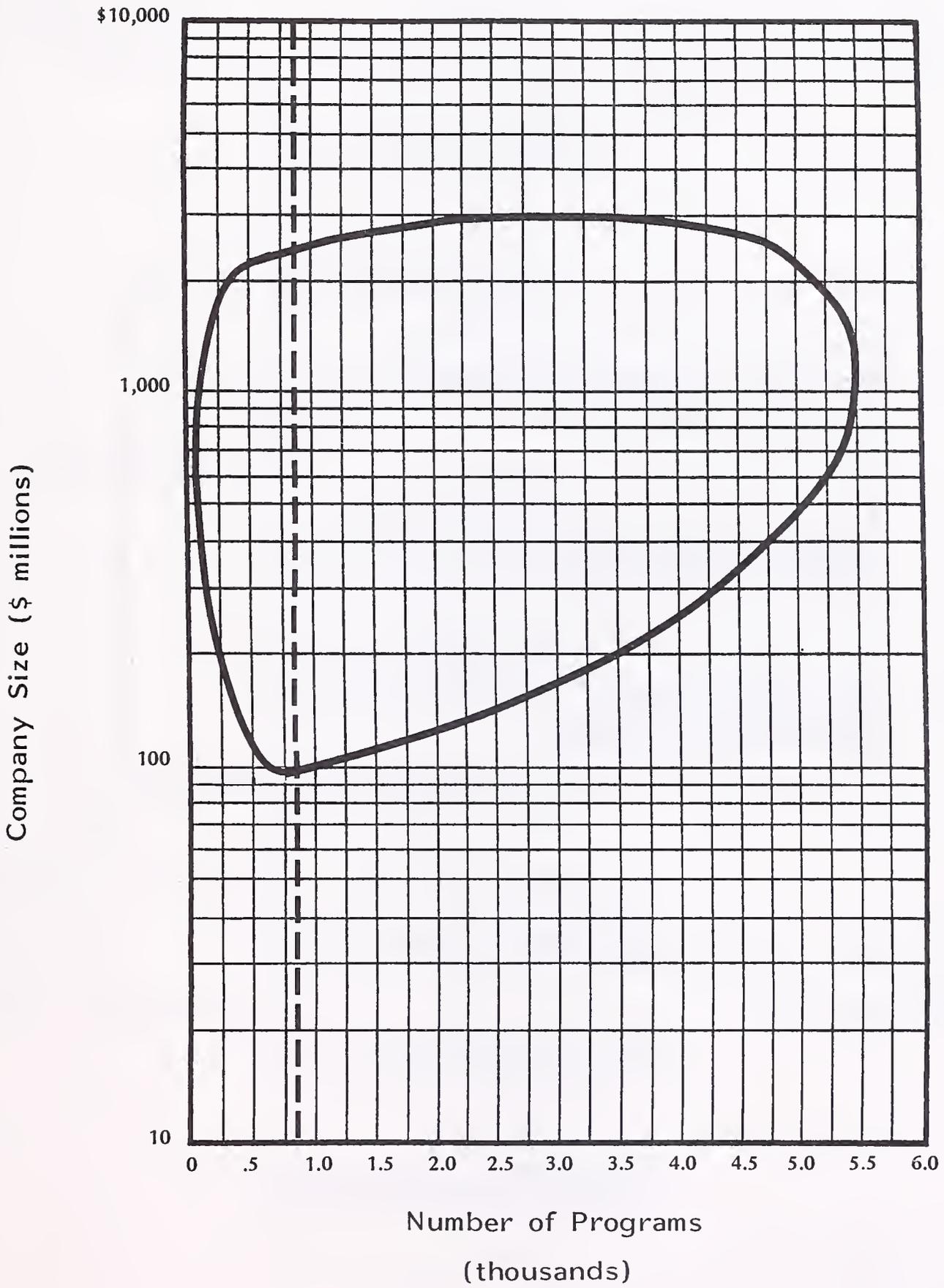
- - - - = Median   SOURCE: INPUT Surveys

EXHIBIT III-51

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE IN THE
TRANSPORTATION SECTOR,
1981-1983

Percent of Resources
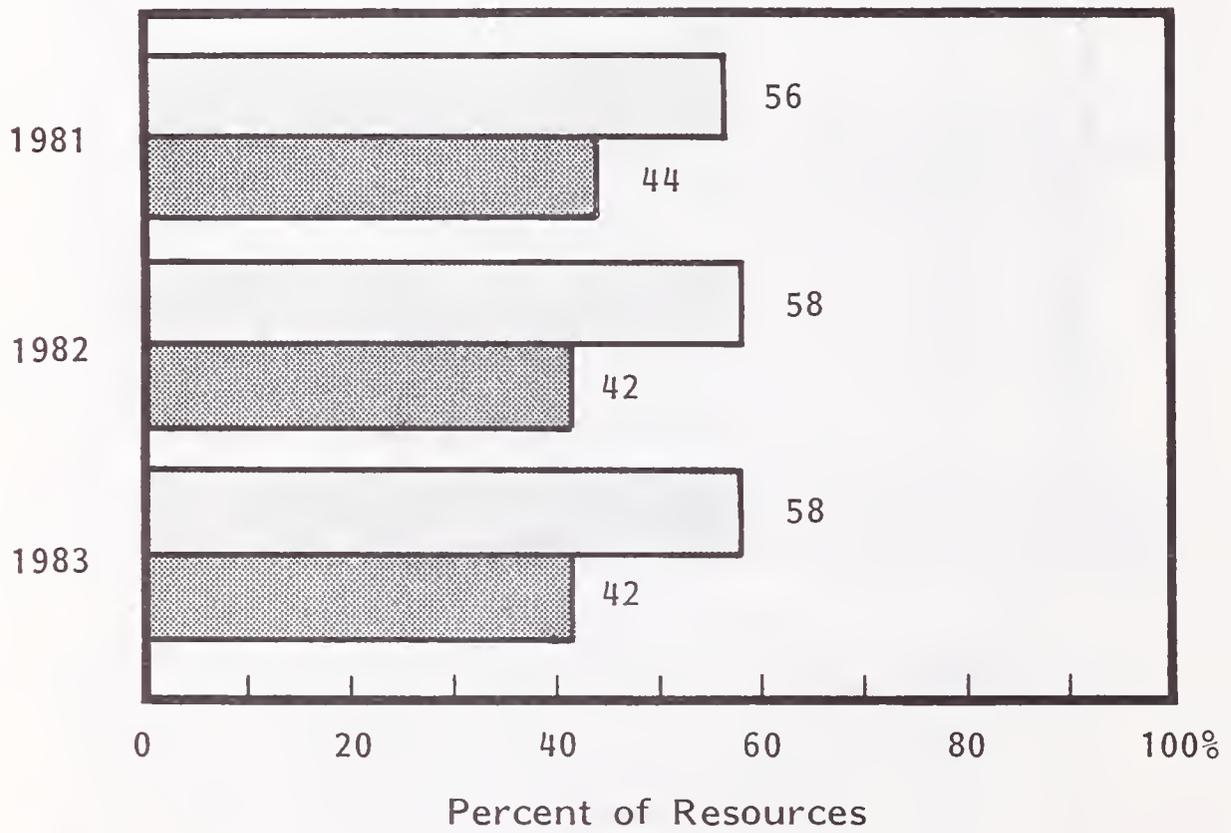
☐ New Development
▨ Maintenance

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-52

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE IN THE TRANSPORTATION SECTOR, 1981-1983

Company Size

$0-199 Million
1981 — 58 / 42
1982 — 58 / 42
1983 — 60 / 40

$200-999 Million
1981 — 58 / 42
1982 — 64 / 36
1983 — 61 / 39

$1 Billion and Over
1981 — 47 / 53
1982 — 47 / 53
1983 — 47 / 53

Percent of Resources

☐ New Development

▨ Maintenance

SOURCE: INPUT Surveys

- 167 -

INPUT
UA82
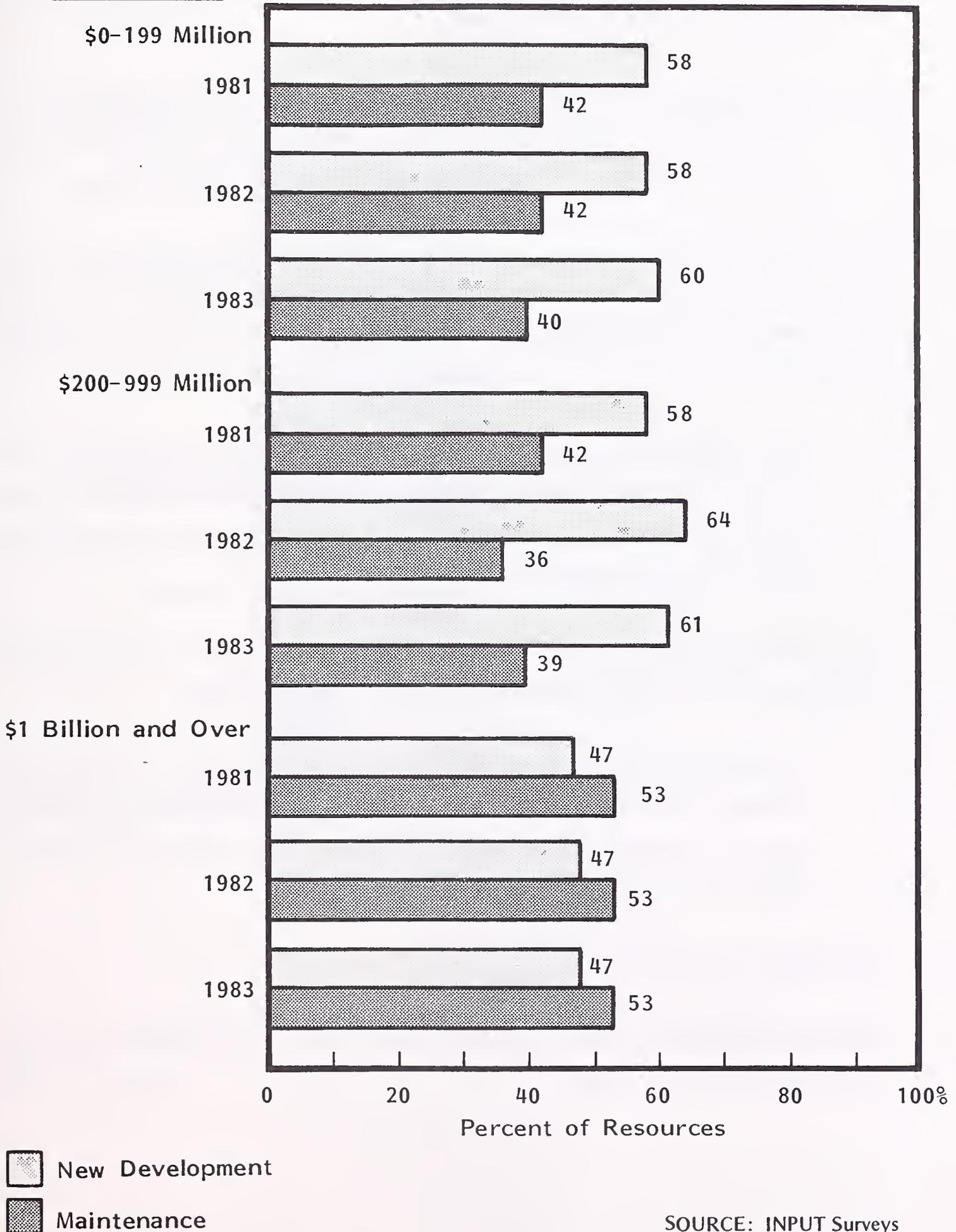
- The problem profile for the transportation sector is generally similar to the all-industry average, as shown in Exhibit III-53. In most areas this sector sees itself with fewer problems than average.

  - This sector sees itself as generally having fewer planning and control problems than do most sectors.

  - More detailed information about specific problem areas is contained in Exhibit III-54. This exhibit shows the percentage of companies in this sector which regard an issue as a major problem.

- While seeing itself as having somewhat fewer problems than average, the transportation sector has major objectives far above average in corporate relationships, software, and telecommunications/office automation, as shown in Exhibit III-55.

  - More detailed information about specific planning objectives is contained in Exhibit III-56. This exhibit shows the percentage of companies in this sector which have identified particular planning objectives of major importance.

- The transportation sector does not place greater stress on particular initiative areas than the all-industry average, as shown in Exhibit III-57.

  - More detailed information about specific areas where an initiative is planned is contained in Exhibit III-58. This exhibit shows the percentage of companies in this sector planning a major initiative in a particular area.

4. PERSONAL COMPUTERS

- Plans for the use of personal computers in the transportation sector are shown in Exhibit III-59 and include:

INPUT

EXHIBIT III-53

INFORMATION SYSTEMS PROBLEMS IN THE
TRANSPORTATION SECTOR: SUMMARY

Problem

- Corporate Relationships: 43 (This Sector), 37 (All Sectors)
- Personnel: 26 (This Sector), 36 (All Sectors)
- Hardware: 26 (This Sector), 35 (All Sectors)
- Planning and Control: 17 (This Sector), 33 (All Sectors)
- Software: 26 (This Sector), 30 (All Sectors)
- Costs: 9 (This Sector), 13 (All Sectors)
- Telecommunications / Office Automation: 9 (This Sector), 6 (All Sectors)

Index Values

☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

- 169 -

INPUT
UA82

EXHIBIT III-54

INFORMATION SYSTEMS PROBLEMS
IN THE TRANSPORTATION SECTOR: DETAIL

<u>Problem</u>

Problem	Value
Relations with Management	17
Relations with Users	26
Backlog/Workload	13
Planning	0
Cost Constraints	9
Project Control/Management	4
IS Personnel Shortages/Turnovers	22
Other IS Personnel Issues	4
Application System Quality	9
Software Development, Maintenance, Productivity	17
Equipment/Capacity, Computer Operations	17
Network/Telecommunications	0
Hardware	19
Office Automation	0
Other	10

Percent of Companies

0   10   20   30   40   50%

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-55

INFORMATION SYSTEMS OBJECTIVES IN THE
TRANSPORTATION SECTOR: SUMMARY
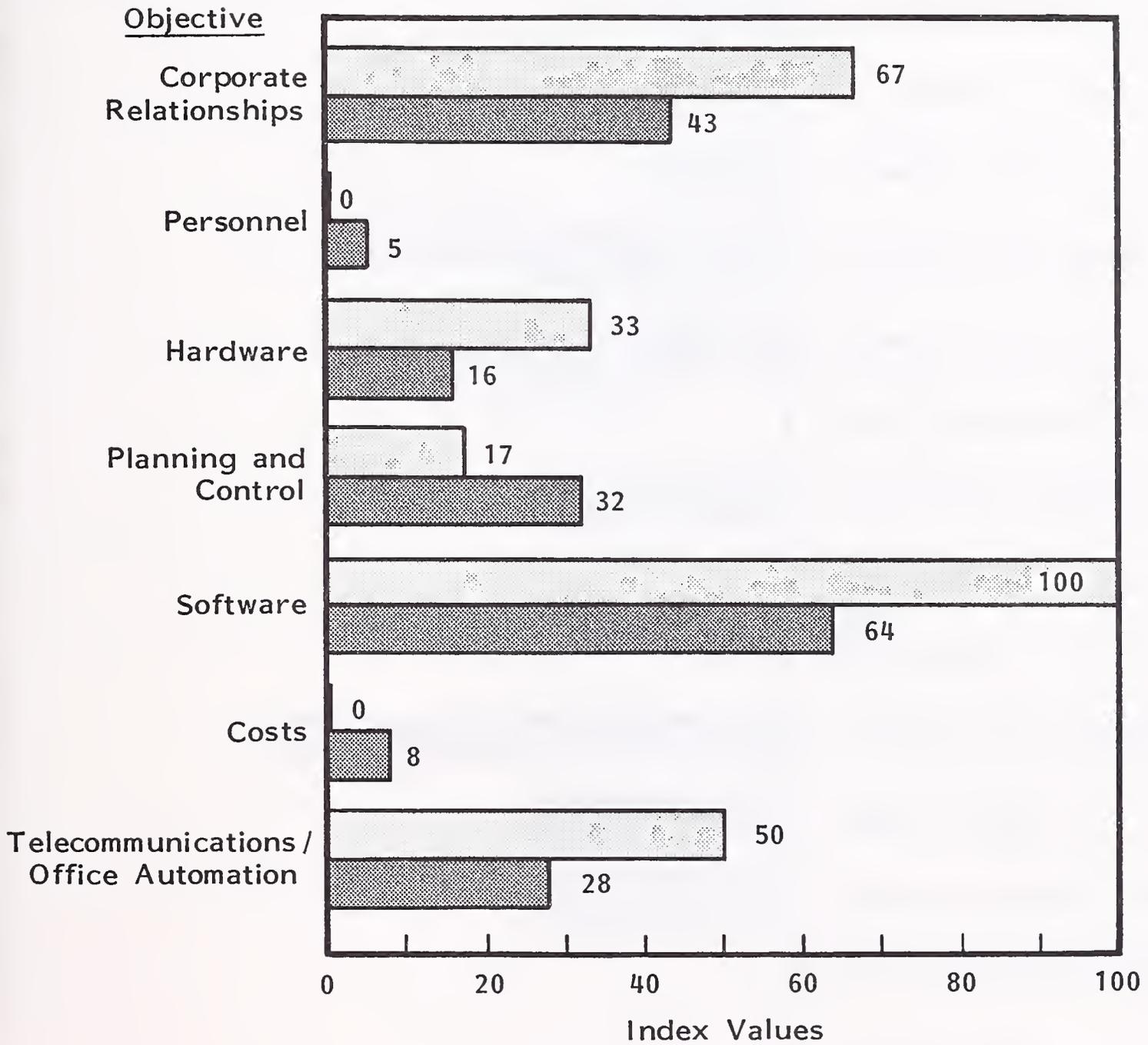
This Sector

All Sectors

INPUT
UA82

EXHIBIT III-56

INFORMATION SYSTEMS PLANNING OBJECTIVES
IN THE TRANSPORTATION SECTOR: DETAIL

Support Company Objectives — 17
Improve User Service/Relations — 17
Improve Planning — 17
End User Computing — 33
Office Automation — 17
Improve Management Control — 0
Improve Productivity — 33
Control Costs — 0
Add Staff — 0
New/Improved Software — 67
New Hardware — 33
Network/Telecommunications — 33
IS Security/Disaster Recovery — 0
Miscellaneous — 0

Percent of Companies

0   20   40   60   80   100%
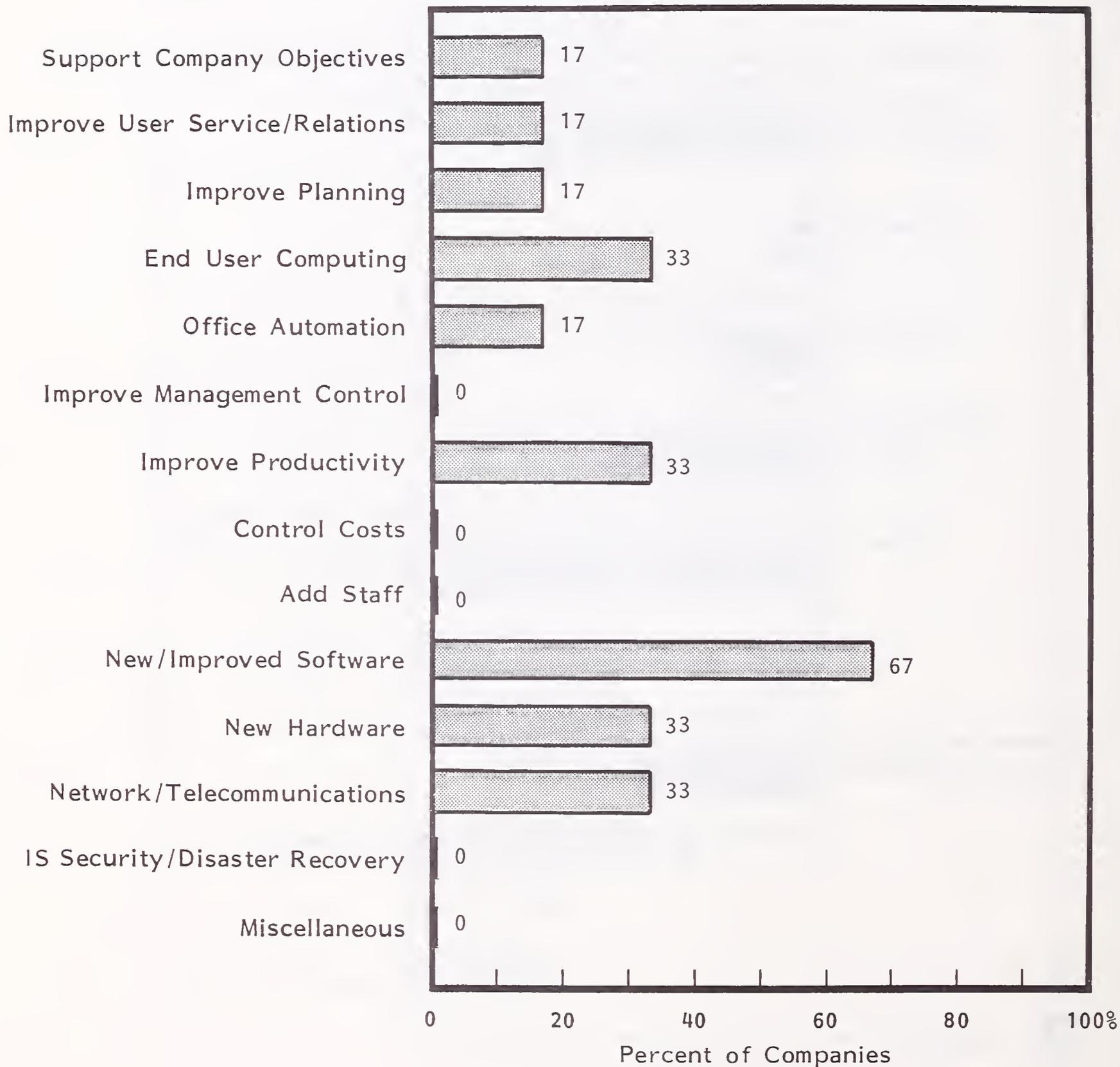
INPUT
UA82

EXHIBIT III-57

INFORMATION SYSTEMS INITIATIVES IN THE
TRANSPORTATION SECTOR

Initiative

	This Sector	All Sectors
Corporate Relationships	39	39
Personnel	15	41
Hardware	48	40
Planning and Control	5	28
Software	73	69
Costs	0	12
Telecommunications / Office Automation	5	4

Index Values
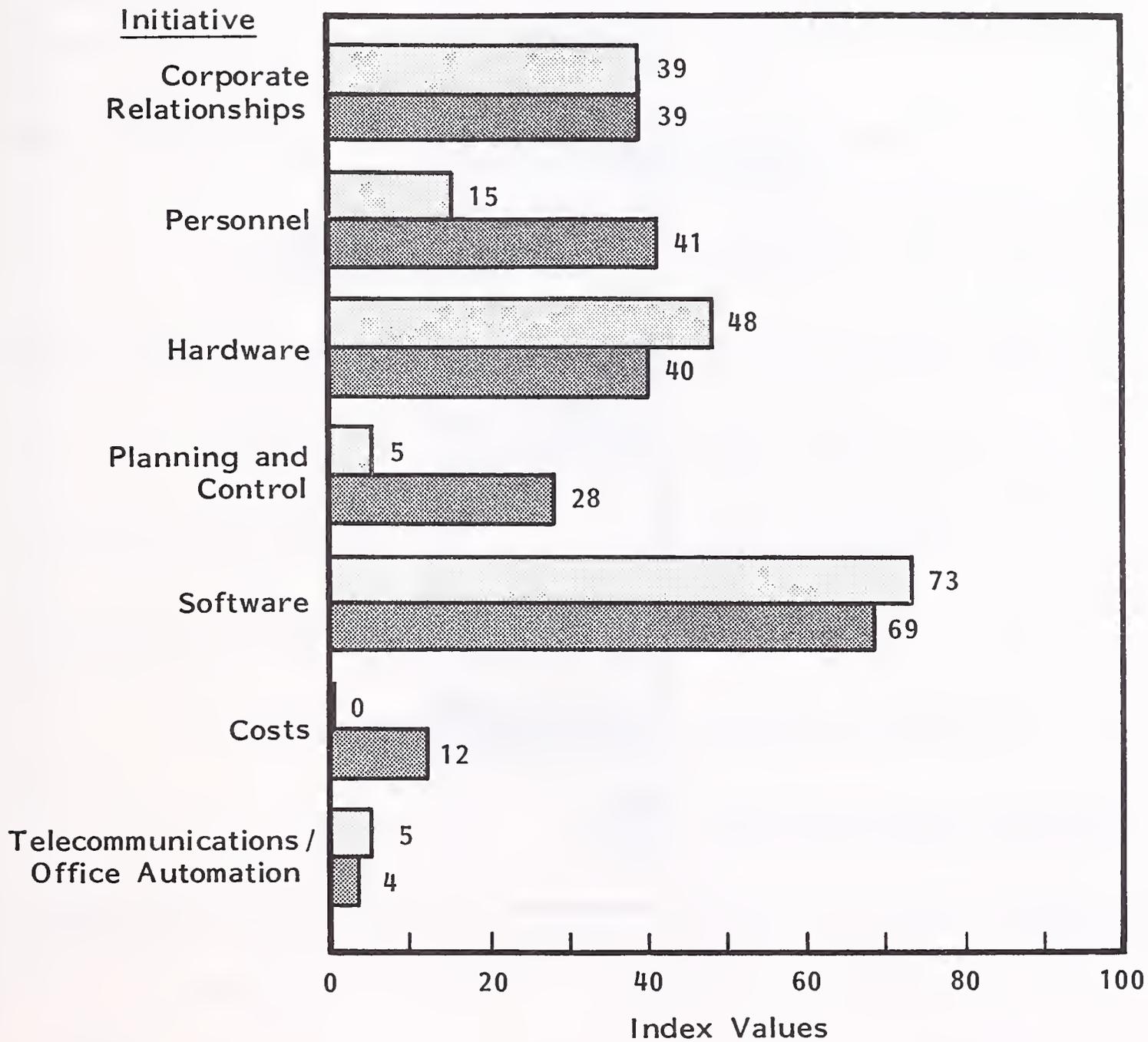
☐ This Sector
▨ All Sectors

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-58

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE TRANSPORTATION SECTOR

Career Planning/Education, Training — 10

Increase Hiring — 5

Productivity Tools and Techniques/ Quality Control Standards — 29

Redesign/Replace System(s) — 24

Software Packages/DBMS — 10

Justify/Reduce Additional Functions/Costs — 0

Add Hardware — 19

Vendor Improvement — 19

Network/Telecommunications — 5

0   10   20   30   40   50%

Percent of Companies
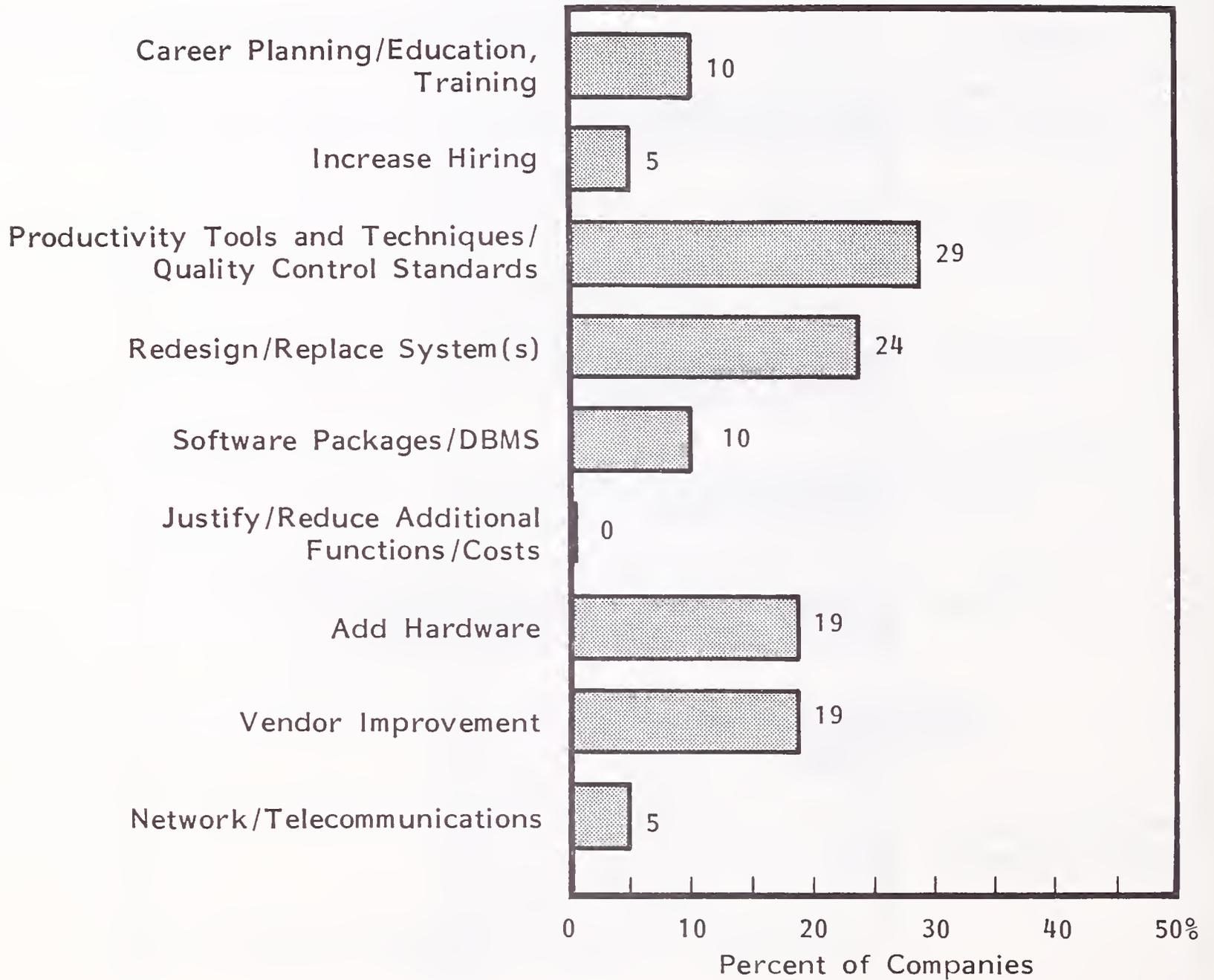
Continued

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-58 (Cont.)

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE TRANSPORTATION SECTOR

INPUT
UA82

EXHIBIT III-59
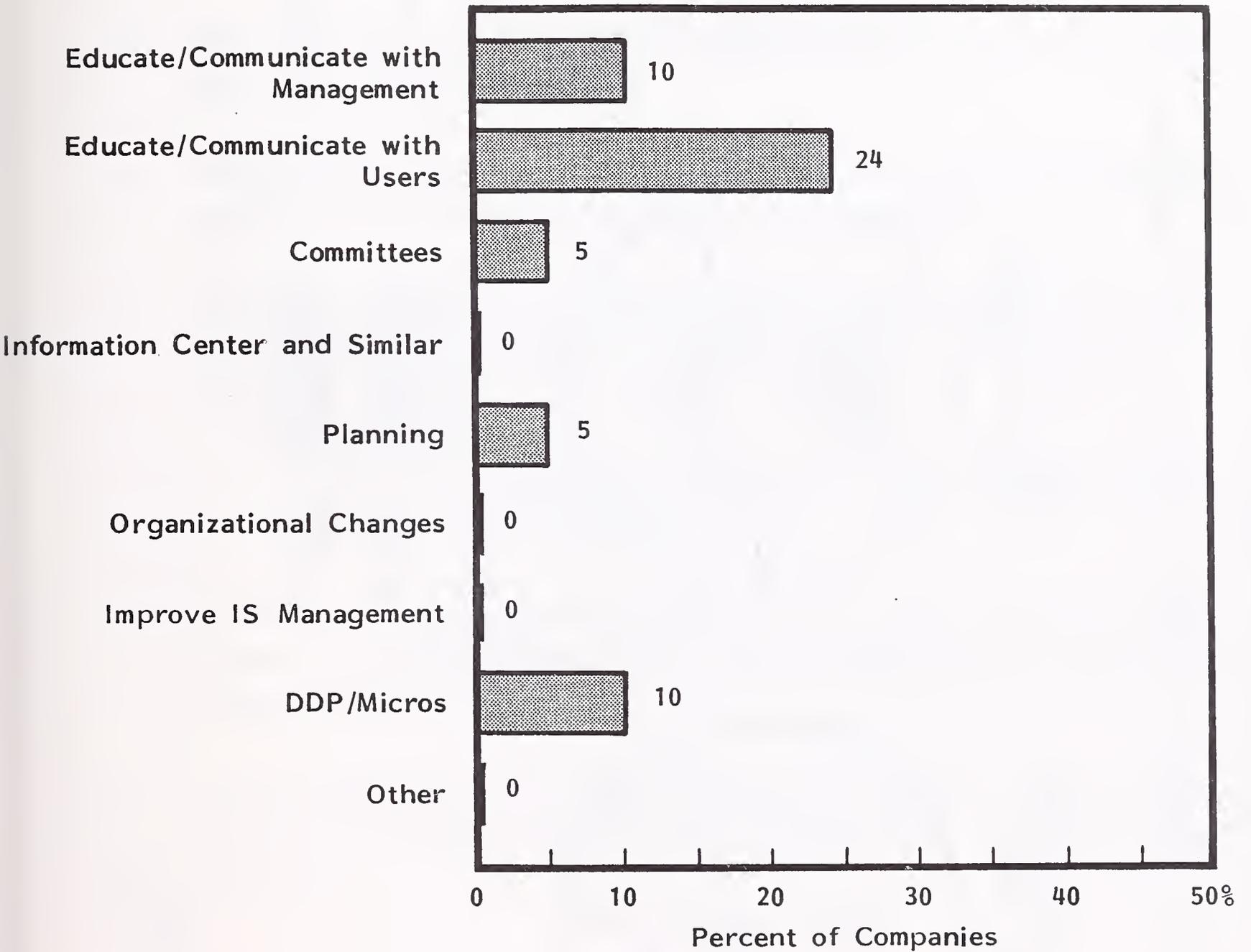
PERSONAL COMPUTER ACQUISITION PLANS IN THE TRANSPORTATION SECTOR

Expected Level of Use
of Personal Computers
in Five Years
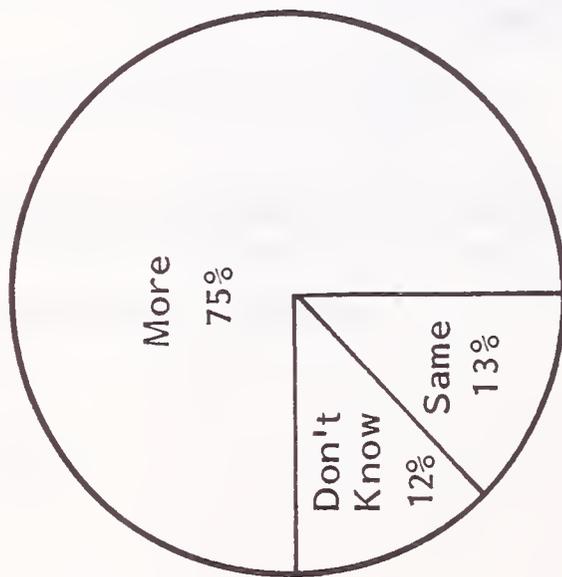
User Plans for
Additional Personal
Computer Software

User Plans for
Additional Personal
Computer Hardware

More
75%

Don't
Know
12%

Same
13%

Additional
Software
Planned
56%

No Current
Plans
44%

Additional
Hardware
Planned
78%

No
Current
Plans
22%

Hardware
Type*

Additional
PCs — 57

Additional
Peripherals — 29

Other — 14

Source

Package — 50

In-house/
Custom — 50

* Totals more than 100%
because of multiple plans

SOURCE: INPUT Surveys

INPUT
UA82
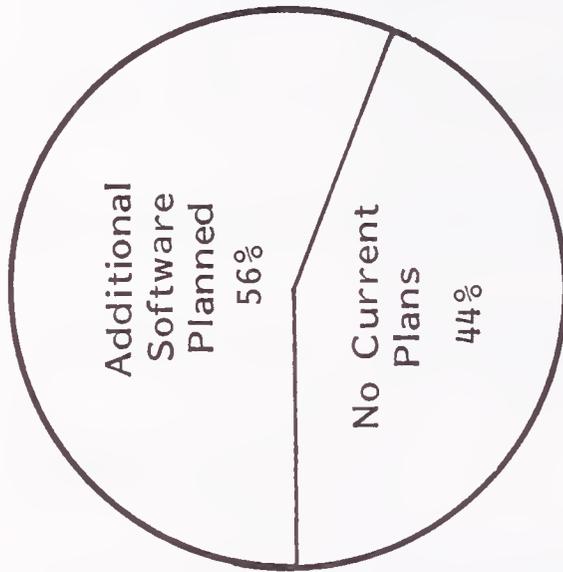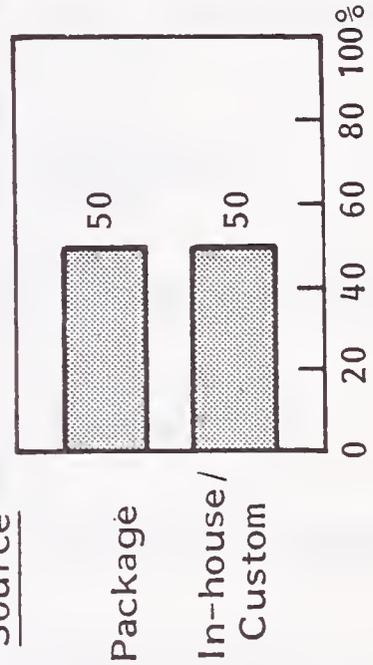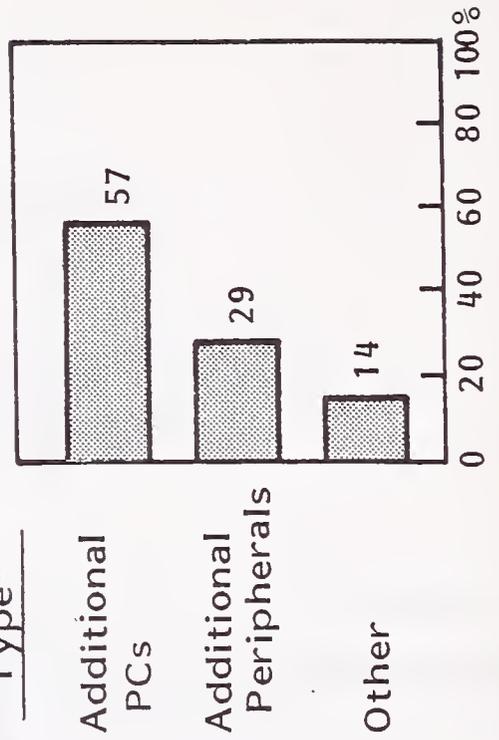
- The overall level of use in five years.

- Plans for obtaining additional personal computer software.

- Plans for obtaining additional personal computer hardware.

- These plans are similar to those in industry generally, except that more custom software is planned.

- Exhibit III-60 shows the types of personal computer software packages now used. The non-Calc packages are used far less in this section.

- The general categories of applications used are summarized in Exhibit III-61. The general profile is similar to other sectors, but the overall intensity of use is less.

- Exhibit III-62 provides examples of actual personal computer applications in use in the transportation sector.

- Compared to the average user, personal computer users in this sector are somewhat less likely to rely on the IS department for assistance, as shown in Exhibit III-63.

- In this sector 100% of departments using personal computers have had their installation less than a year, as shown in Exhibit III-64, compared to 78% generally.

INPUT

EXHIBIT III-60

TYPES OF PERSONAL COMPUTER SOFTWARE PACKAGES USED IN THE TRANSPORTATION SECTOR
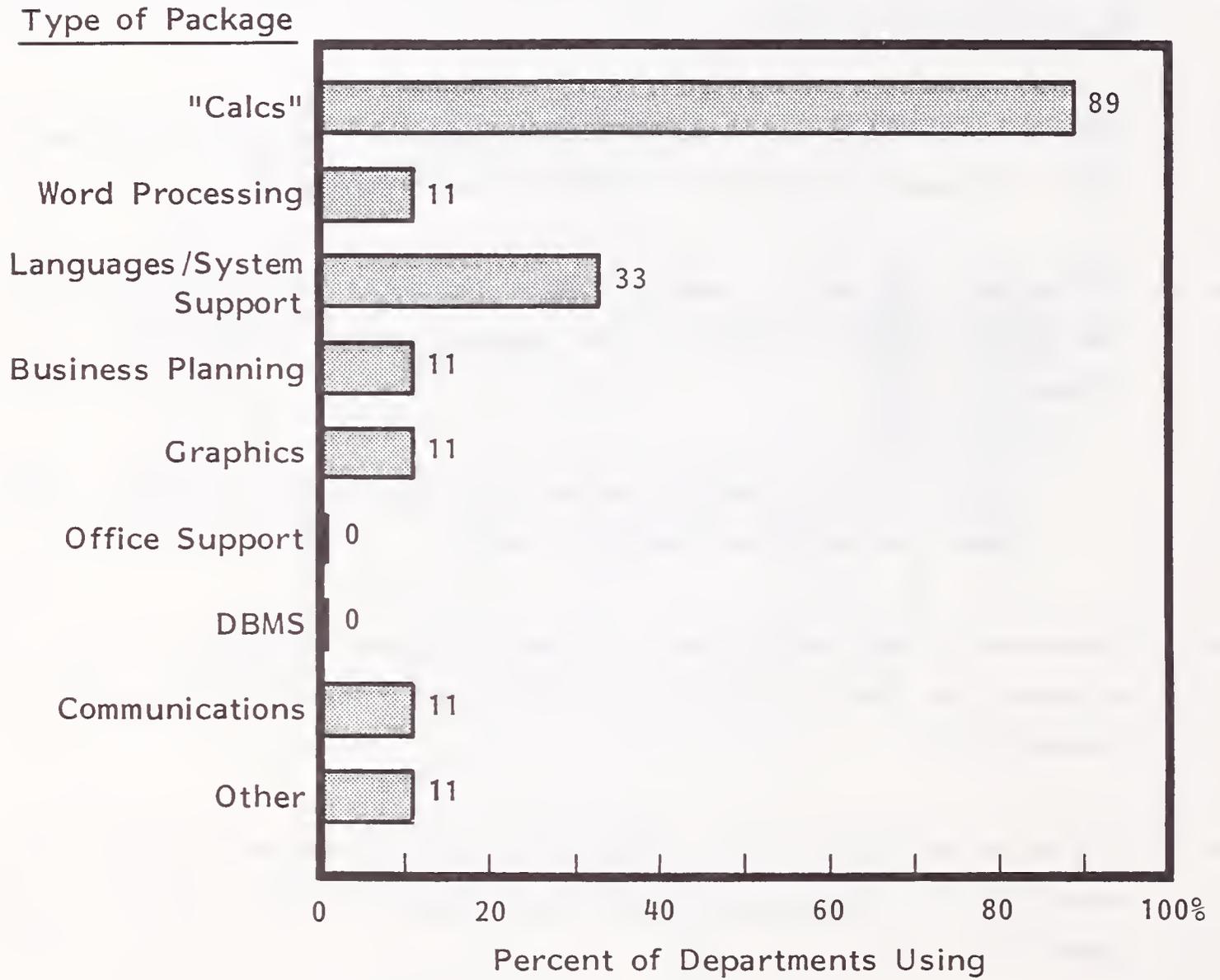
Type of Package

Type of Package	Percent
"Calcs"	89
Word Processing	11
Languages/System Support	33
Business Planning	11
Graphics	11
Office Support	0
DBMS	0
Communications	11
Other	11

0   20   40   60   80   100%

Percent of Departments Using

EXHIBIT III-61

- 179 -

PERSONAL COMPUTER APPLICATIONS IN THE TRANSPORTATION SECTOR

Application Type

Application Type	Percent
Budgeting/Accounting	33
Modeling/Planning	11
Other Financial	33
Operations	33
Analysis	11
Data Bases, Reporting	22
Word Processing	0
Other	22

Percent of Department Using
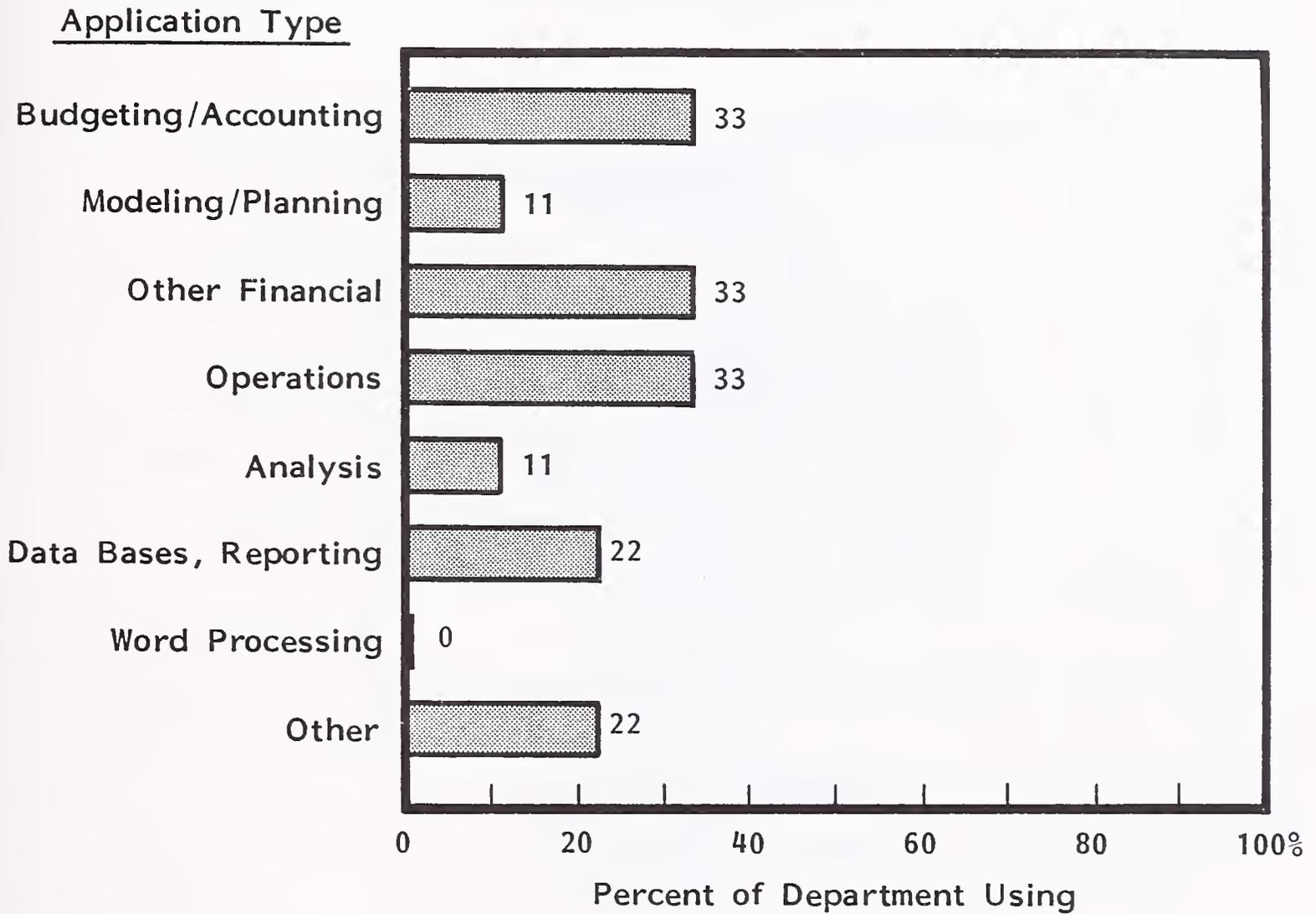
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-62

PERSONAL COMPUTER APPLICATIONS IN THE TRANSPORTATION SECTOR

Engineering

Spread Sheets

Graphics

Financial Planning and Modeling

Balancing

Financial Statements

Train Operations Simulation

MIT Service Planning Model

Budgets

Cost Control

Labor

Inventory Control

SOURCE: INPUT Surveys

EXHIBIT III-63

SOURCES OF ASSISTANCE FOR PERSONAL COMPUTER USERS
IN THE TRANSPORTATION SECTOR
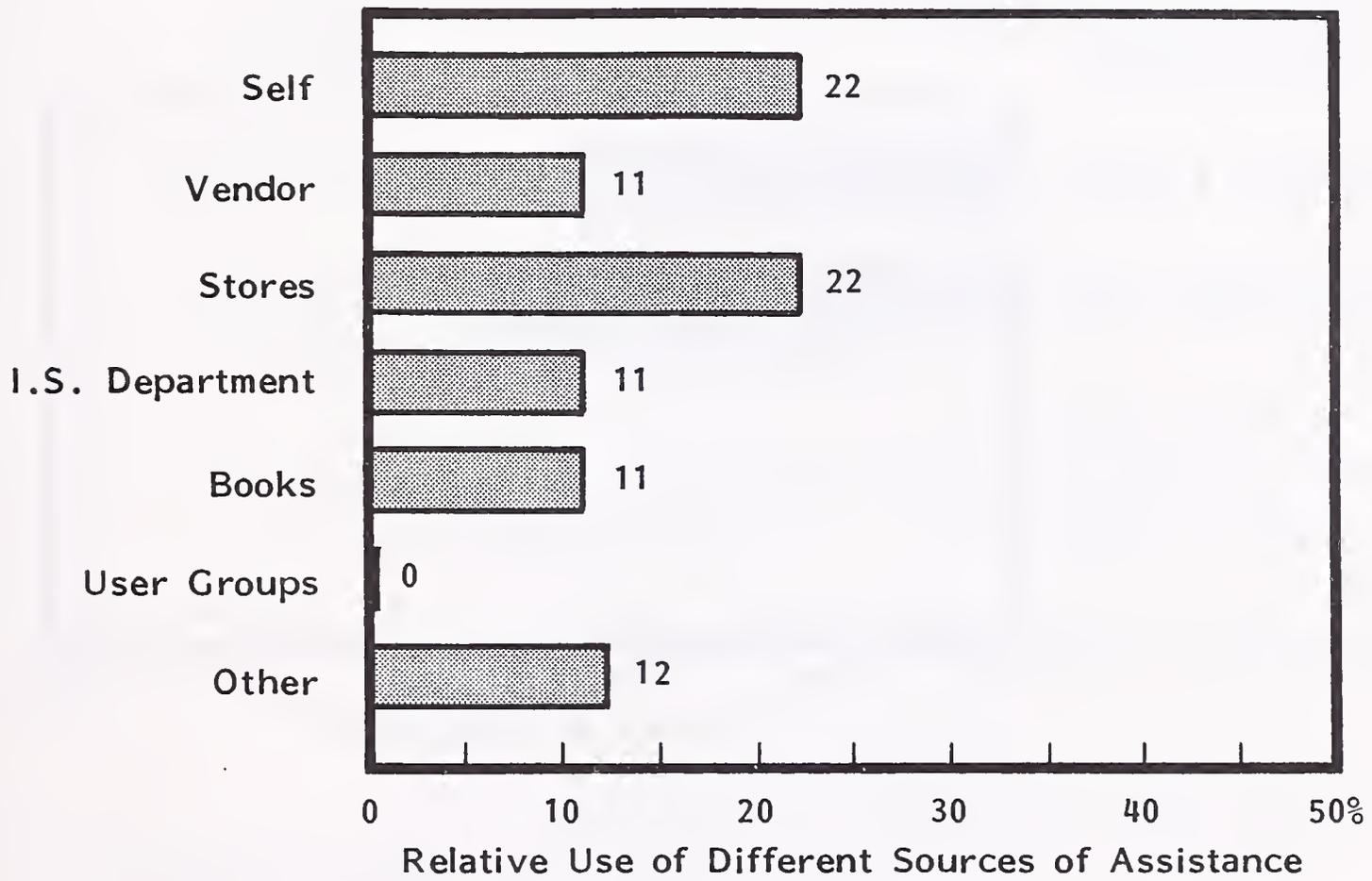
Note: Total Is More Than 100% Because of Multiple Sources.

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-64

TIME SINCE FIRST PERSONAL COMPUTER INSTALLED
IN USER DEPARTMENTS IN THE TRANSPORTATION SECTOR

Time Since
First Installed
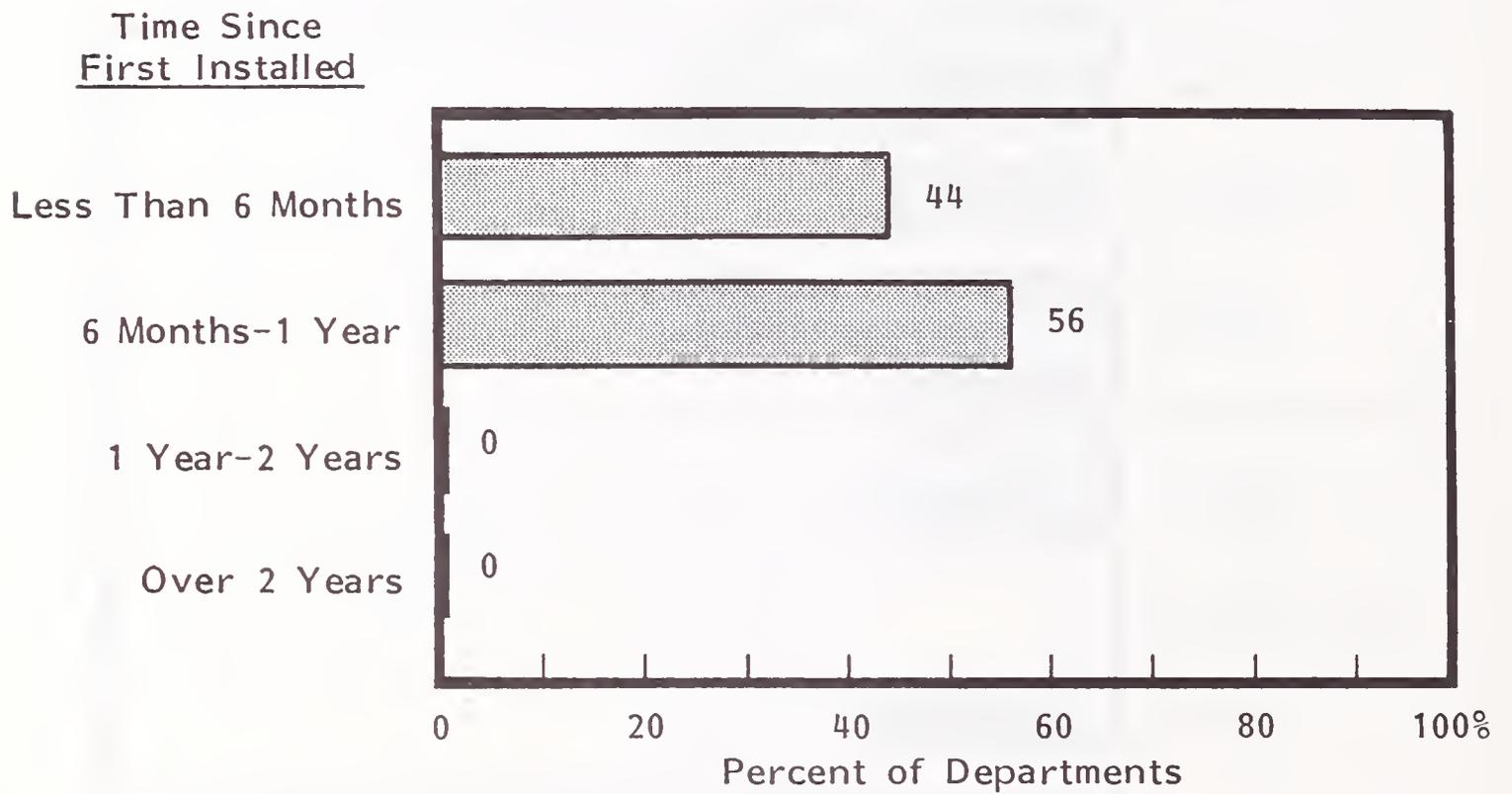
SOURCE: INPUT Surveys

INPUT
UA82

E.   UTILITY SECTOR

I.   BUDGETS

- In this sector 57% of the companies expect budget increases in 1983, compared to 61% generally; none expects a decrease, compared to 8% generally, as shown in Exhibit III-65.

    - Companies expecting to increase their budgets foresee an average rise of 13%.

- The budget increases expected vary by company size.

    - Large companies: 54% expect increases in the utility sector, compared to 63% for large companies generally.

    - Medium companies: 71% expect increases, compared to 63% for medium companies generally.

    - Small companies: 33% expect increases, compared to 57% for small companies generally.

- The average budget growth expected for 1983 in the utility sector is 7%, compared to 16% in 1982.

    - This represents a decline of 56% in the rate of increase.

- The 1982 IS budget distribution is shown in Exhibit III-66.

    - No one category stands out as having a significant increase for 1983.

- 183 -

INPUT

EXHIBIT III-65

ANTICIPATED BUDGET INCREASES FOR 1983 IN THE UTILITIES SECTOR
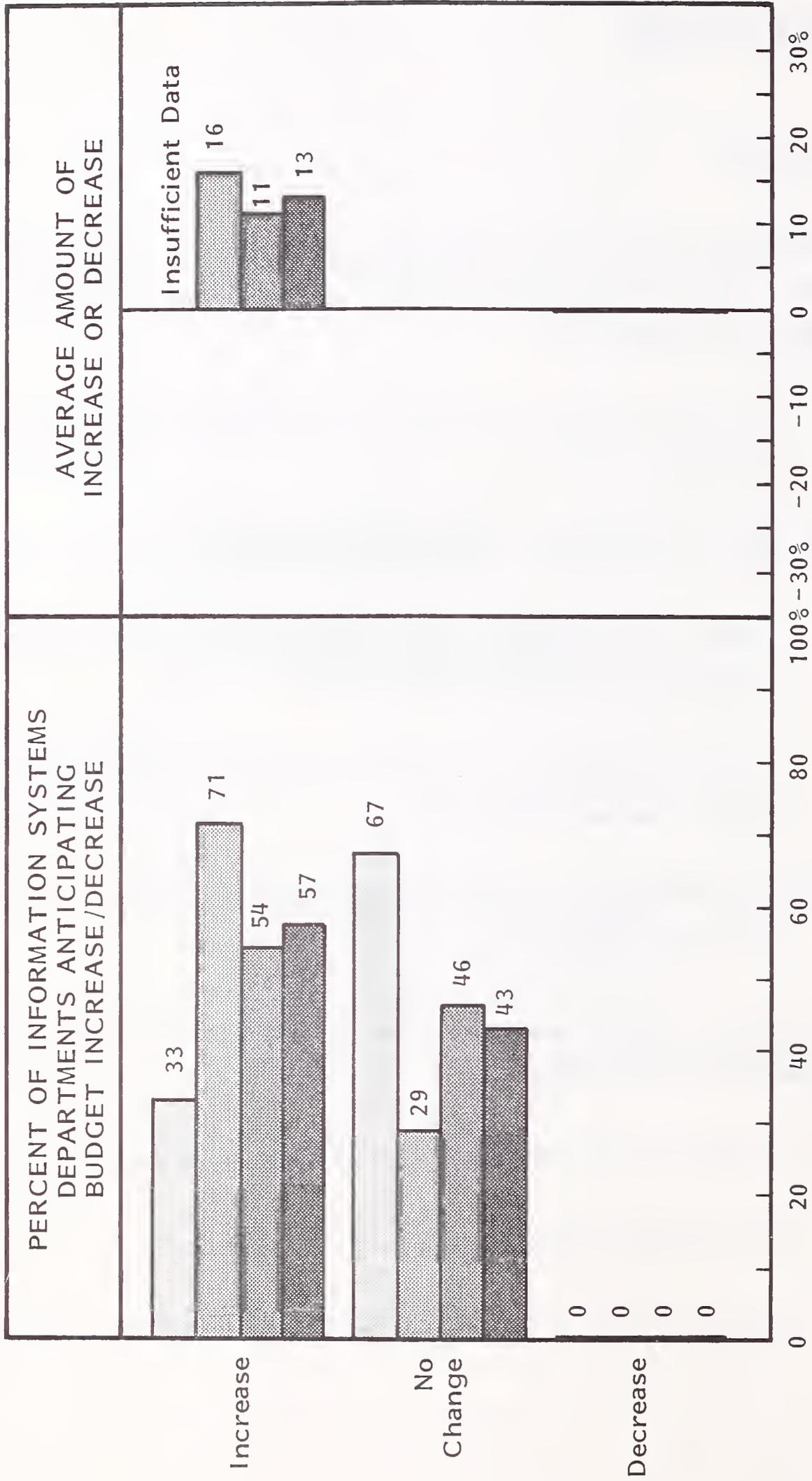
PERCENT OF INFORMATION SYSTEMS
DEPARTMENTS ANTICIPATING
BUDGET INCREASE/DECREASE

AVERAGE AMOUNT OF
INCREASE OR DECREASE

Insufficient Data

Key: (Company size; $ millions, annual revenue)

☐ Under $200 Million

▨ $200 Million – $1 Billion

▨ Over $1 Billion

▨ Total

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-66

1982 BUDGET DISTRIBUTION AND 1982/1983 CHANGES
IN THE UTILITIES SECTOR

BUDGET CATEGORY	PERCENT OF IS BUDGET (1982)	EXPECTED CHANGE 1982 to 1983
Personnel	47%	11%
Hardware		
Mainframe	21	9
Mini/Microcomputer	<1	12
Terminals	2	5
Peripherals	4	2
Communications	3	8
Software and Services		
Software	2	7
Processing Services	1	3
Software Maintenance	1	5
Hardware Maintenance	6	6
Other	13	5
Total	100%	7%

SOURCE: INPUT Surveys

INPUT
UA82

- Exhibit III-67 shows the range of the ratios between the IS budget and the company's total revenues which exist in the utility sector.

  - The IS percentage of total revenues for the average company (i.e., for 50% of respondents) in each size group was:

    - For large companies: 0.7%, compared to 0.55% for this size company generally.

    - For medium companies: 0.9%, compared to 0.8% for this size company generally.

    - For small companies: 0.5%, compared to 1.2% for this size company generally.

  - The companies that spend least on data processing as a percentage of revenues are those at and below the 20% mark. Their IS spending percentages were:

    - Large companies: 0.2%.

    - Medium companies: 0.25%.

    - Small companies: 0.2%.

  - The companies that spend the most on data processing as a percentage of revenues are those at and above the 80% mark. Their IS spending percentages were:

    - Large companies: 1.0%.

    - Medium companies: 1.3%.

    - Small companies: 2.4%.

- 186 -

INPUT

EXHIBIT III-67

INFORMATION SYSTEMS BUDGET AS A PERCENT OF TOTAL REVENUES IN THE UTILITIES SECTOR
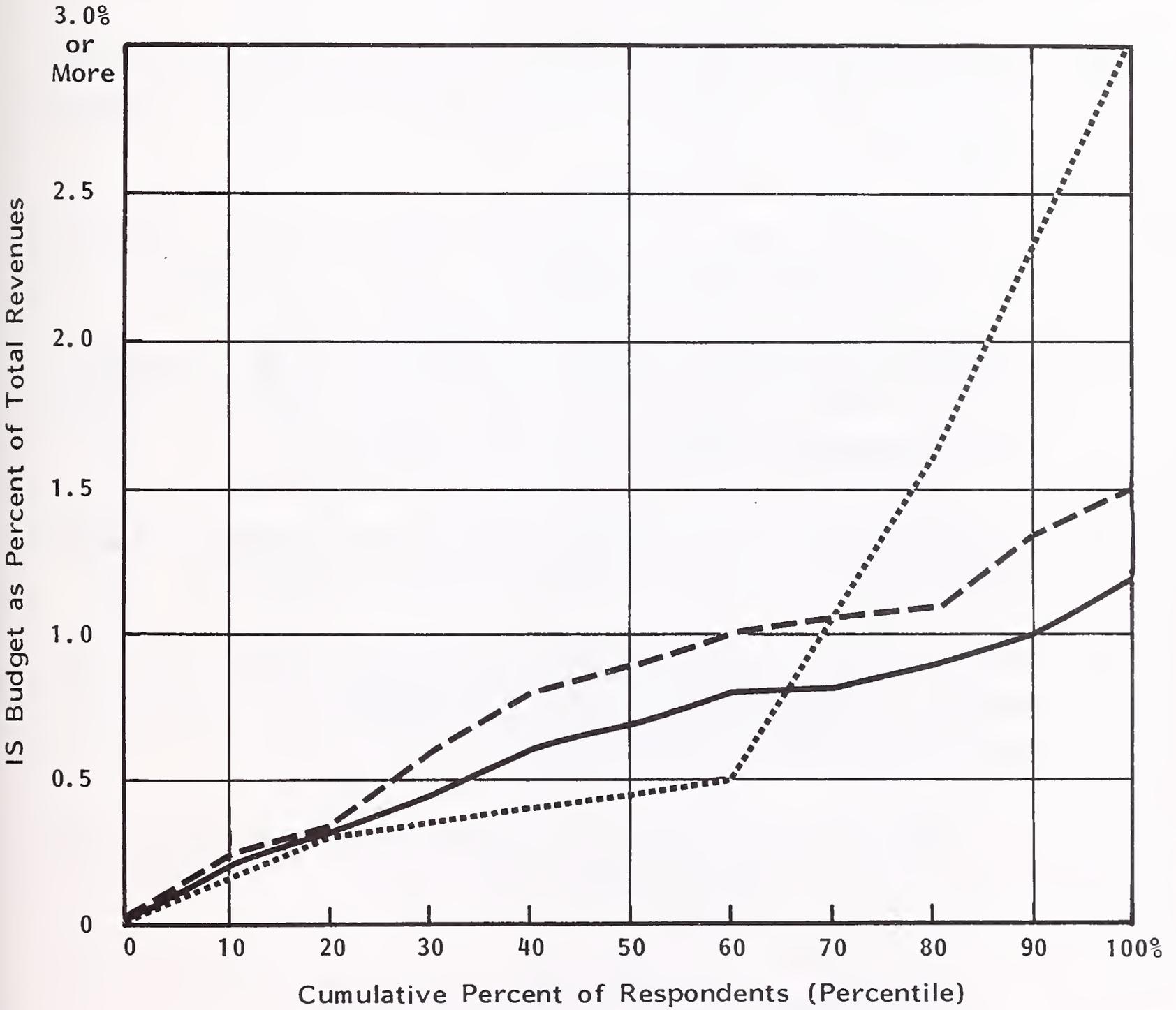
Key – Company Size:

⋯⋯⋯⋯ $0 – $199 million

━ ━ ━ $200 – $999 million

━━━━ $1 billion and over

SOURCE: INPUT Surveys

INPUT
UA82

- Median spending on IS per corporate employee was $1,540. However, there was a broad range of spending ratios, as shown in the diagram in Exhibit III-68.

    - The reasons for this variation were discussed in Chapter II, Section B.

2. STAFFING

- In the staffing sector, 100% of companies expect their IS staffs to increase in the next 12 months, compared to the industry average of 58%, as shown in Exhibit III-69.

    - The net increase in number of staff is expected to be 9%, compared to the all-industry average of 4%.

- Turnover in this sector is expected to be 50% greater than the all-industry average in 1983, as shown in Exhibit II-9. Current turnover rates for individual positions are not shown because of insufficient data.

- Difficulty in recruiting staff in this sector is somewhat less difficult in all job categories than the all-industry average, as shown in Exhibit III-70.

- The number of programs to be maintained averages 1,000 in this sector, although the range, both in absolute numbers and based on a company size, is quite broad, as shown in Exhibit III-71.

    - Maintenance, as a proportion of total workload, is very similar to the all-industry average, as shown in Exhibit III-72.

    - Company size is not a significant factor in affecting the new development-maintenance split, as shown in Exhibit III-73.

INPUT

EXHIBIT III-68

INFORMATION SYSTEMS SPENDING PER EMPLOYEE
BY COMPANY SIZE IN THE UTILITIES SECTOR

IS Spending per Employee

($ thousands)
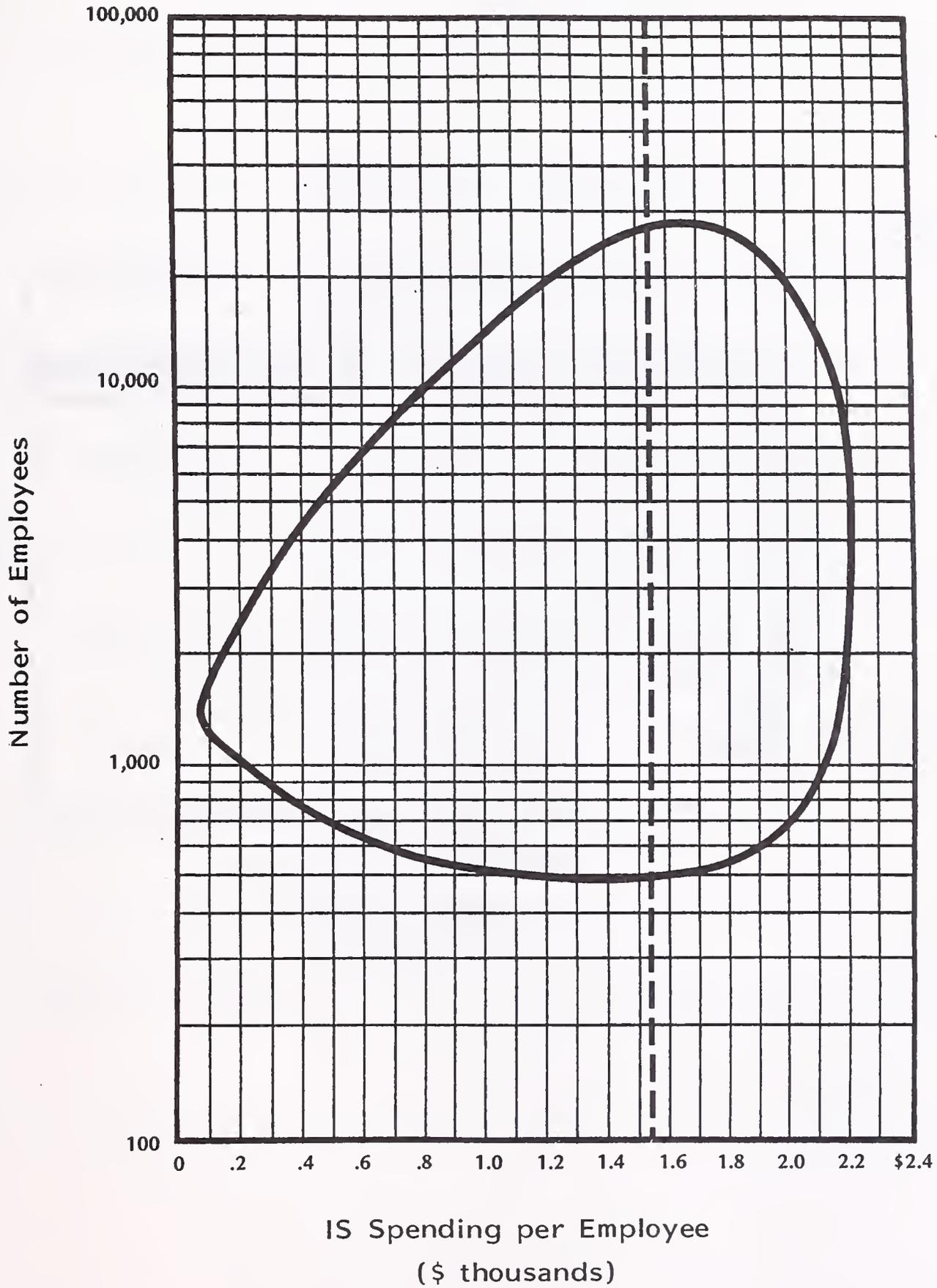
━ ━ ━ ━ = Median   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-69

INFORMATION SYSTEMS STAFFING CHANGES EXPECTED IN THE
NEXT TWELVE MONTHS IN THE UTILITIES SECTOR

Percent of
Companies Expecting:

IS Staff Increase — 58 / 100

IS Staff Decrease — 7 / 0

No Change — 35 / 0

Net Average Change Expected — 4 / 9

Rate of Change in IS Staffing
in Next 12 Months
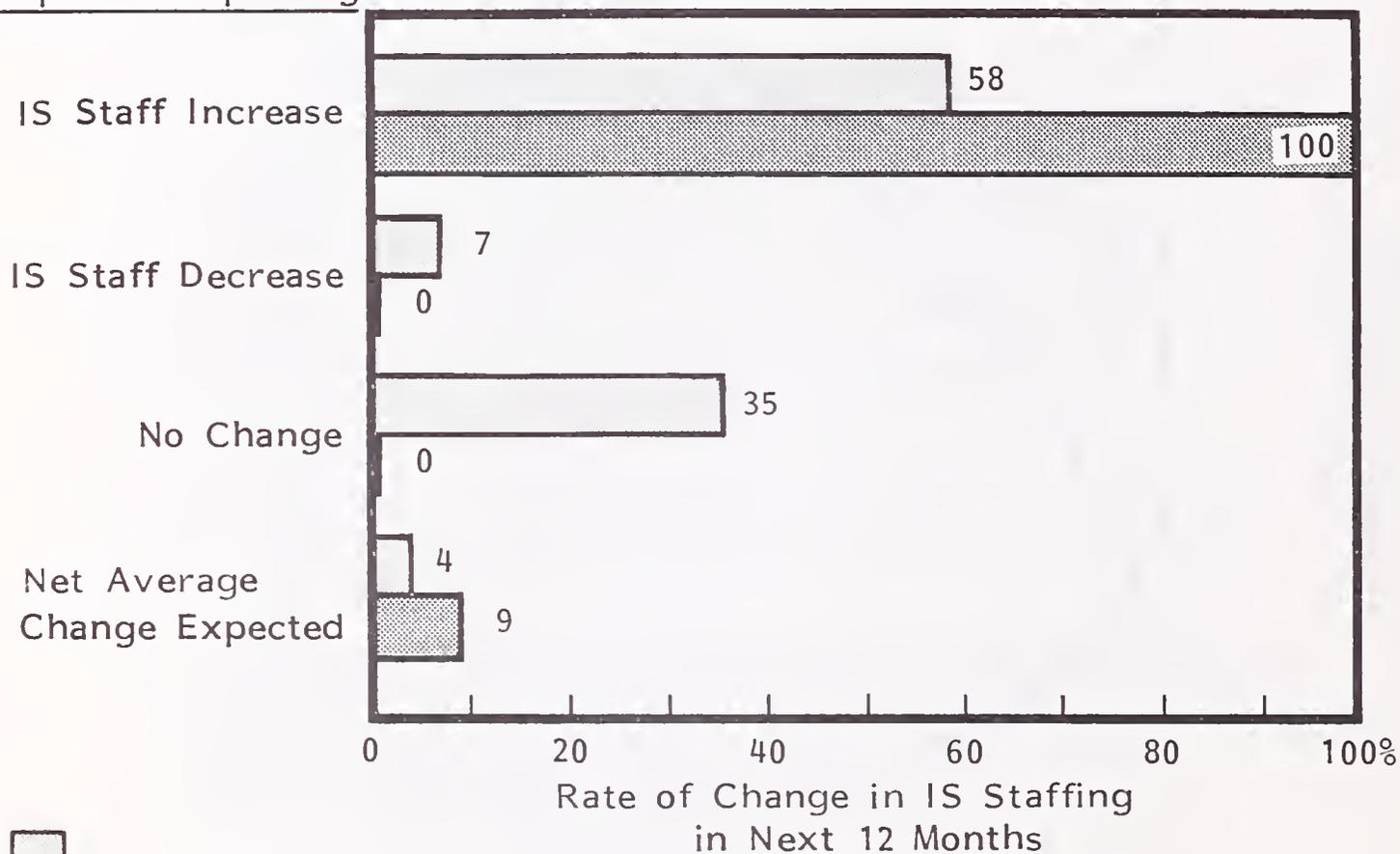
☐ All Industries

▨ Utilities

SOURCE: INPUT Surveys

- 190 -

INPUT
UA82

EXHIBIT III-70

INFORMATION SYSTEMS DIFFICULTY IN RECRUITING STAFF
IN THE UTILITIES SECTOR
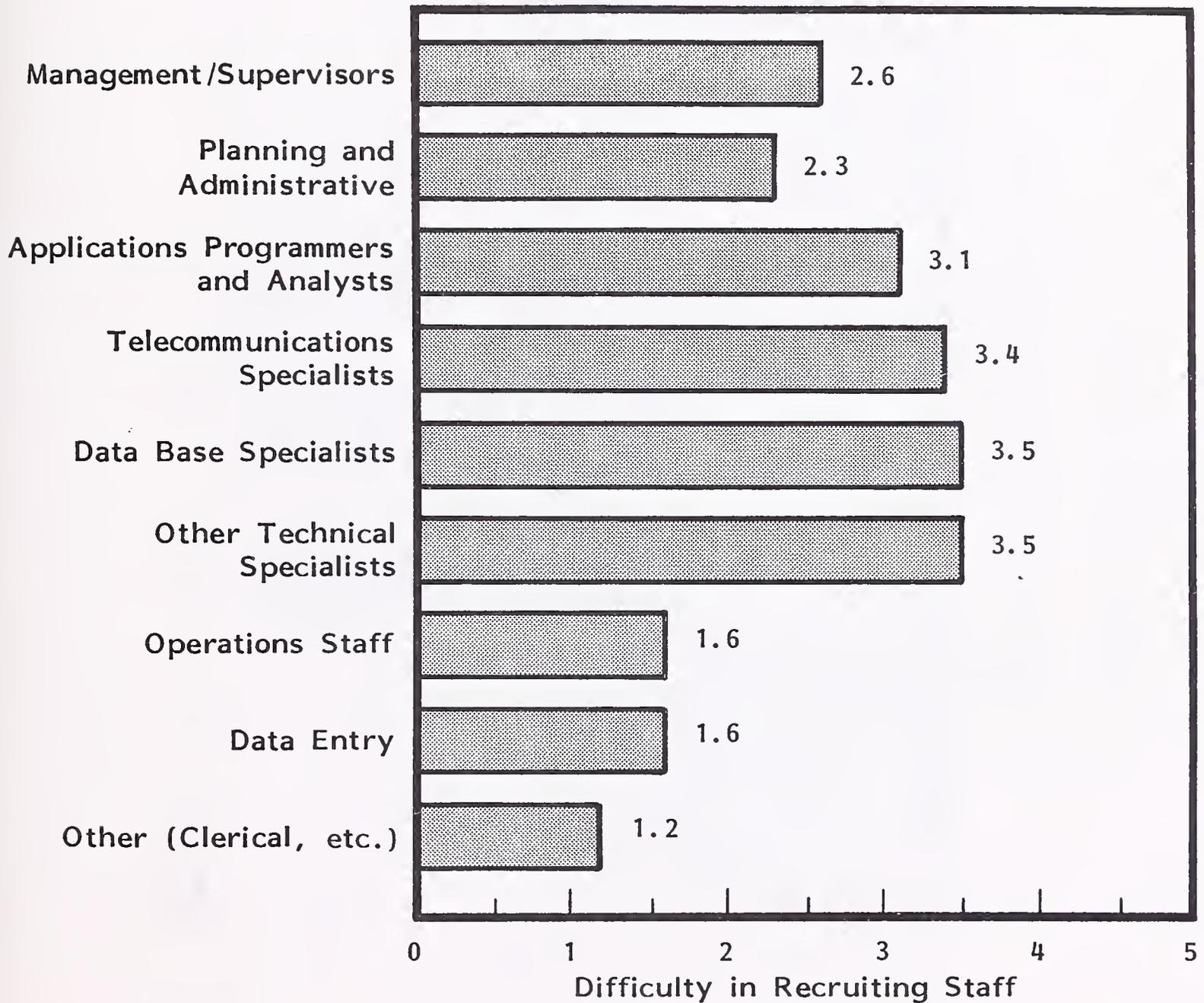
Scale: 1 = Low, 5 = High

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-71

NUMBER OF PROGRAMS BY COMPANY SIZE
IN THE UTILITIES SECTOR

Number of Programs

(thousands)
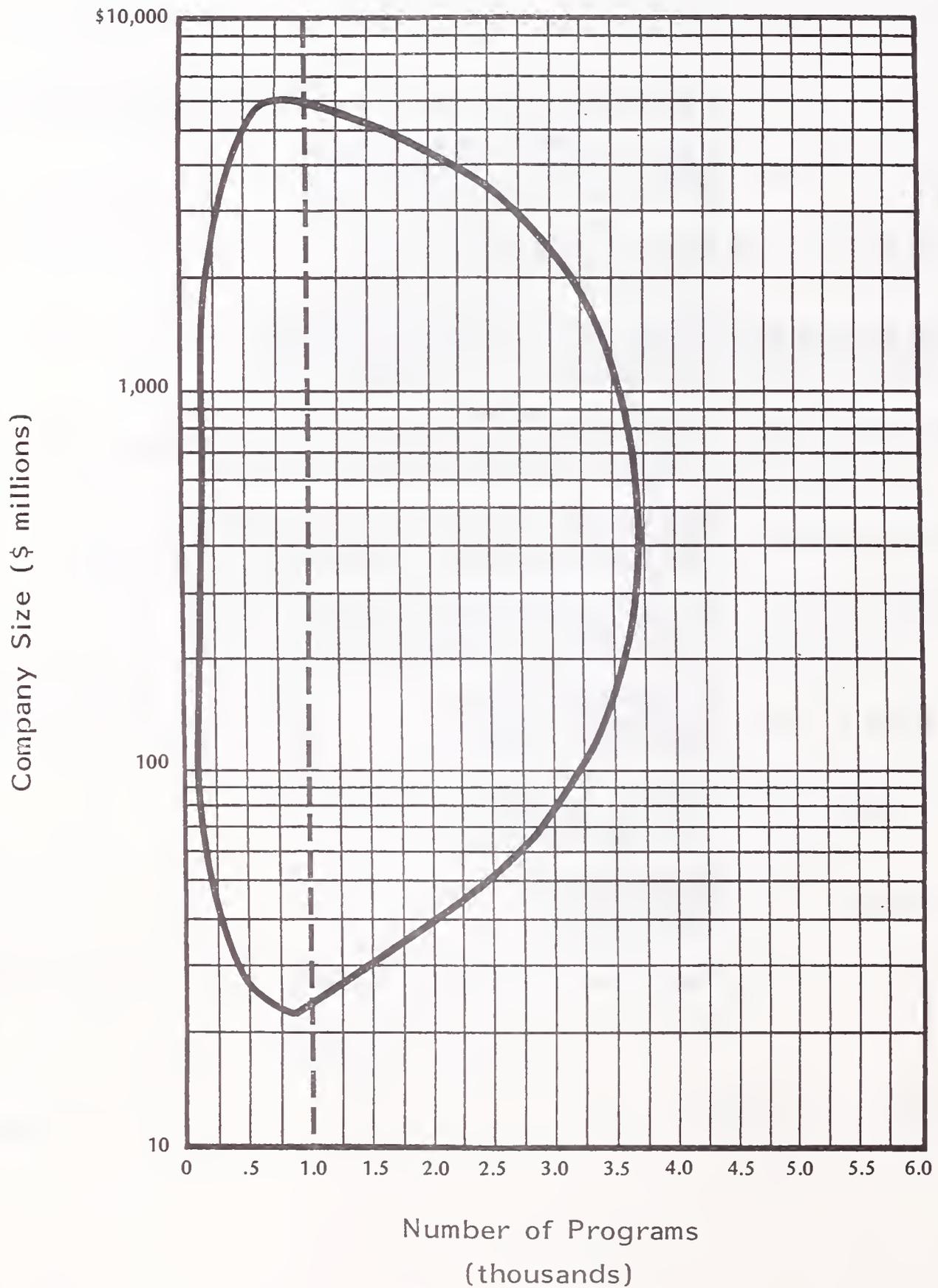
– – – – – = Median   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-72

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE IN THE UTILITIES SECTOR,
1981-1983

Percent of Resources
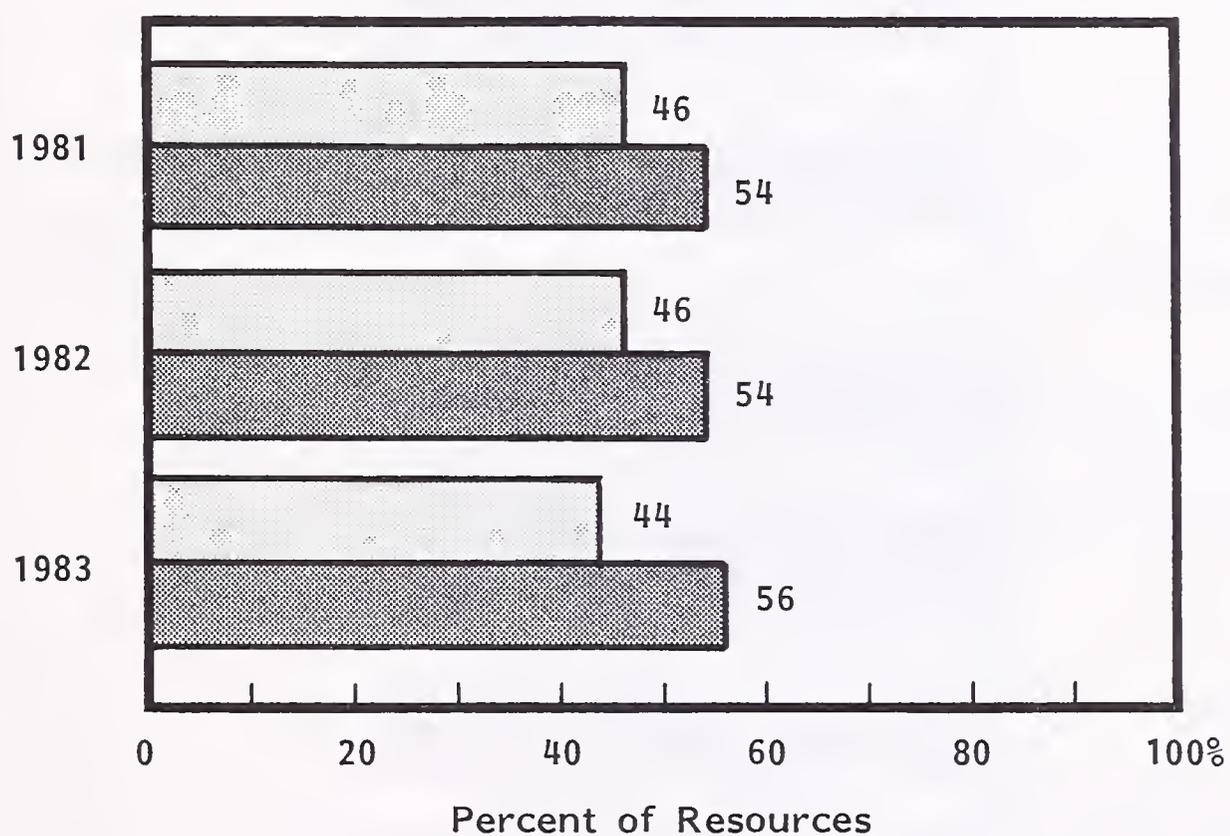
□ New Development
▨ Maintenance

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-73

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE IN THE UTILITIES SECTOR, 1981-1983

INPUT
UA82

Company Size

Percent of Resources

☐ New Development

▨ Maintenance

SOURCE: INPUT Surveys
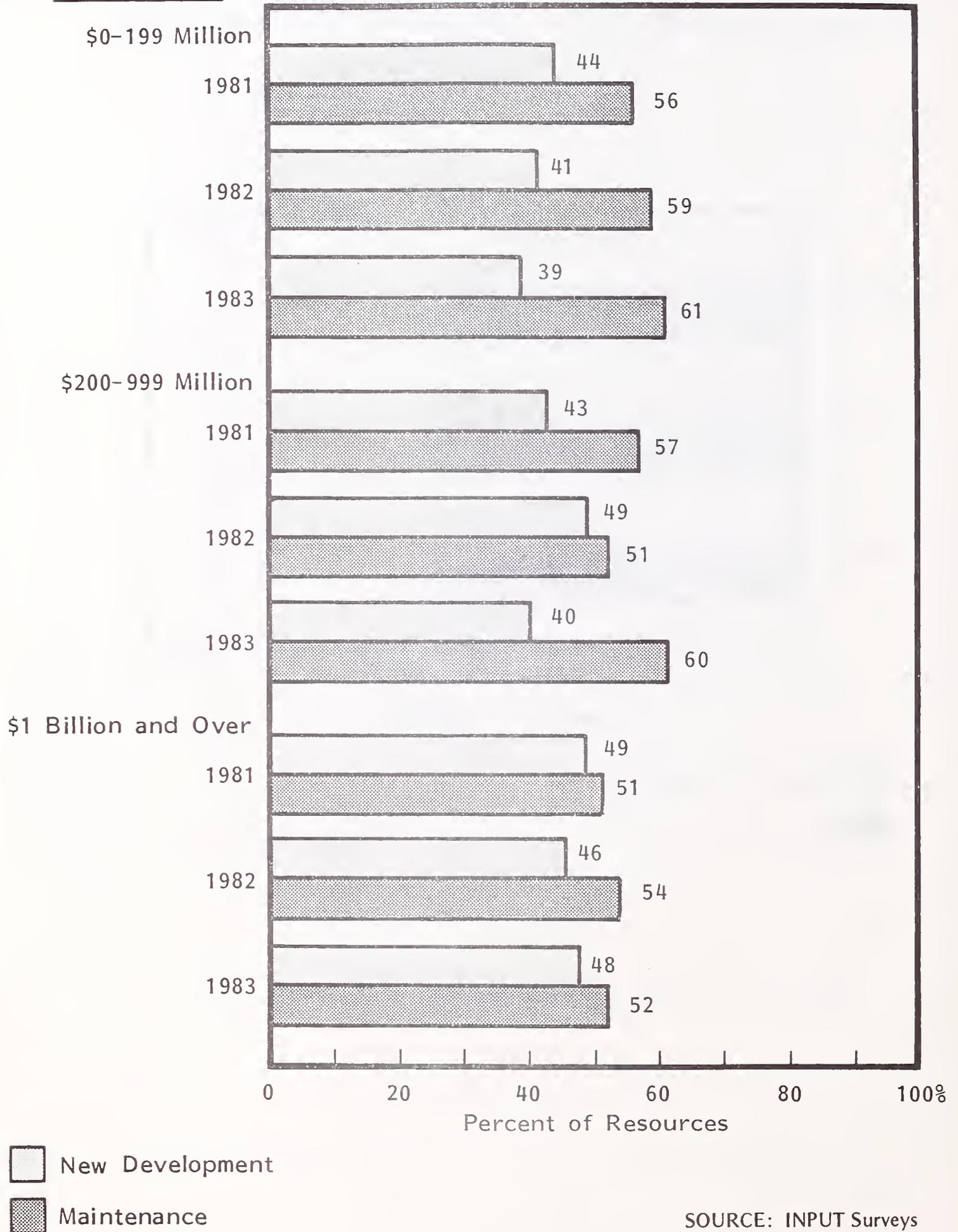
3.   INFORMATION SYSTEMS ISSUES

●   Note: Please refer to Chapter II, Section D for a general discussion of IS
     problems, objectives, and initiatives and their interrelationships.

●   Personnel and planning and control are seen as major problems more often in
     the utilities sector than in most other sectors, as whon in Exhibit III-74.

     -    More detailed information about specific problem areas is contained in
          Exhibit III-75. This exhibit shows the percentage of companies in this
          sector which regard an issue as a major problem.

●   Planning and control as well as hardware are major objectives considerably
     more often for the utilities sector than other sectors, as shown in Exhibit
     III-76.

     -    More detailed information about specific planning objectives is con-
          tained in Exhibit III-77. This exhibit shows the percentage of com-
          panies in this sector which have identified particular planning objec-
          tives as being of major importance to them.

●   This sector plans many more major initiatives in planning and control than do
     other sectors, as shown in III-78. Corporate relationships is the only other
     area where the utility sector is planning more initiatives than average.

     -    More detailed information about specific areas where an initiative is
          planned is contained in Exhibit III-79. This exhibit shows the percent-
          age of companies in this sector which plan a major initiative in a
          particular area.

INPUT

EXHIBIT III-74

INFORMATION SYSTEMS PROBLEMS IN THE
UTILITIES SECTOR

Problem

Corporate Relationships — 44 (This Sector), 37 (All Sectors)

Personnel — 50 (This Sector), 36 (All Sectors)

Hardware — 31 (This Sector), 35 (All Sectors)

Planning and Control — 41 (This Sector), 33 (All Sectors)

Software — 18 (This Sector), 30 (All Sectors)

Costs — 19 (This Sector), 13 (All Sectors)

Telecommunications/ Office Automation — 12 (This Sector), 6 (All Sectors)

Index Values

☐ This Sector
▨ All Sectors

SOURCE: INPUT Surveys

- 196 -
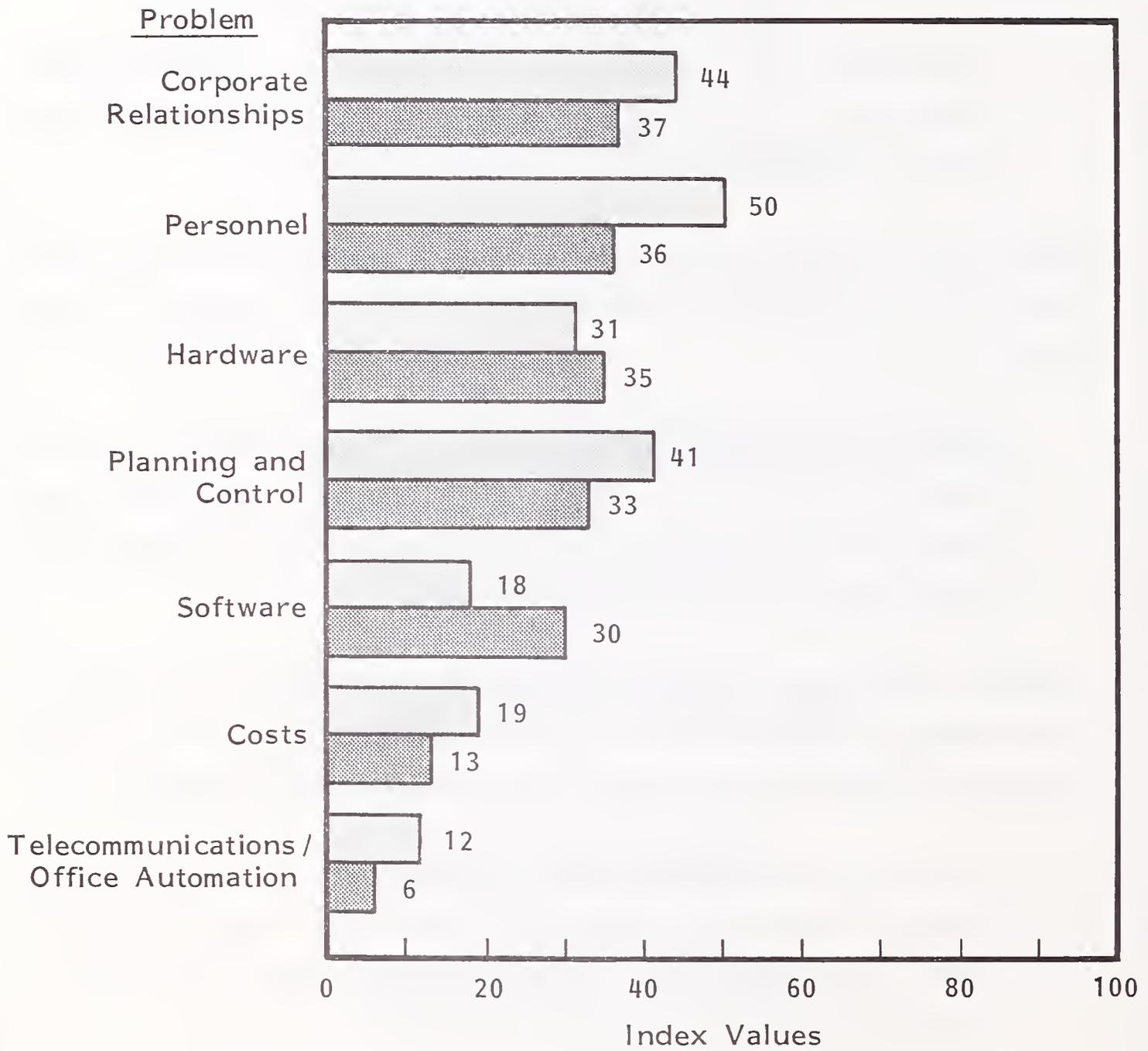
INPUT
UA82

EXHIBIT III-75

INFORMATION SYSTEMS PROBLEMS IN THE UTILITIES SECTOR

<u>Problem</u>
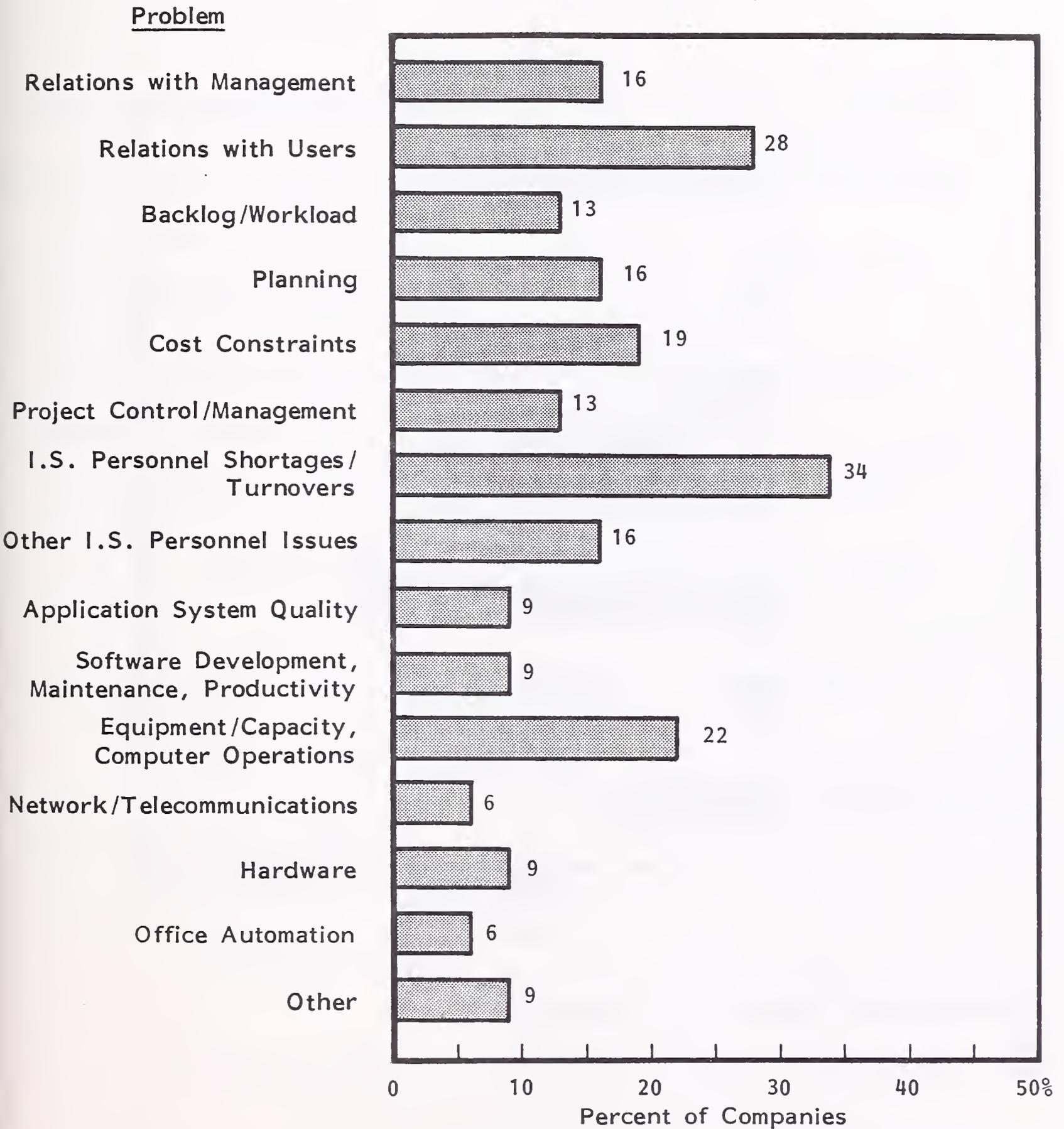
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-76

INFORMATION SYSTEMS OBJECTIVES IN THE
UTILITIES SECTOR

Objectives		Index Values
Corporate Relationships	This Sector	50
	All Sectors	43
Personnel	This Sector	0
	All Sectors	5
Hardware	This Sector	50
	All Sectors	16
Planning and Control	This Sector	51
	All Sectors	32
Software	This Sector	64
	All Sectors	64
Costs	This Sector	9
	All Sectors	8
Telecommunications/ Office Automation	This Sector	18
	All Sectors	28
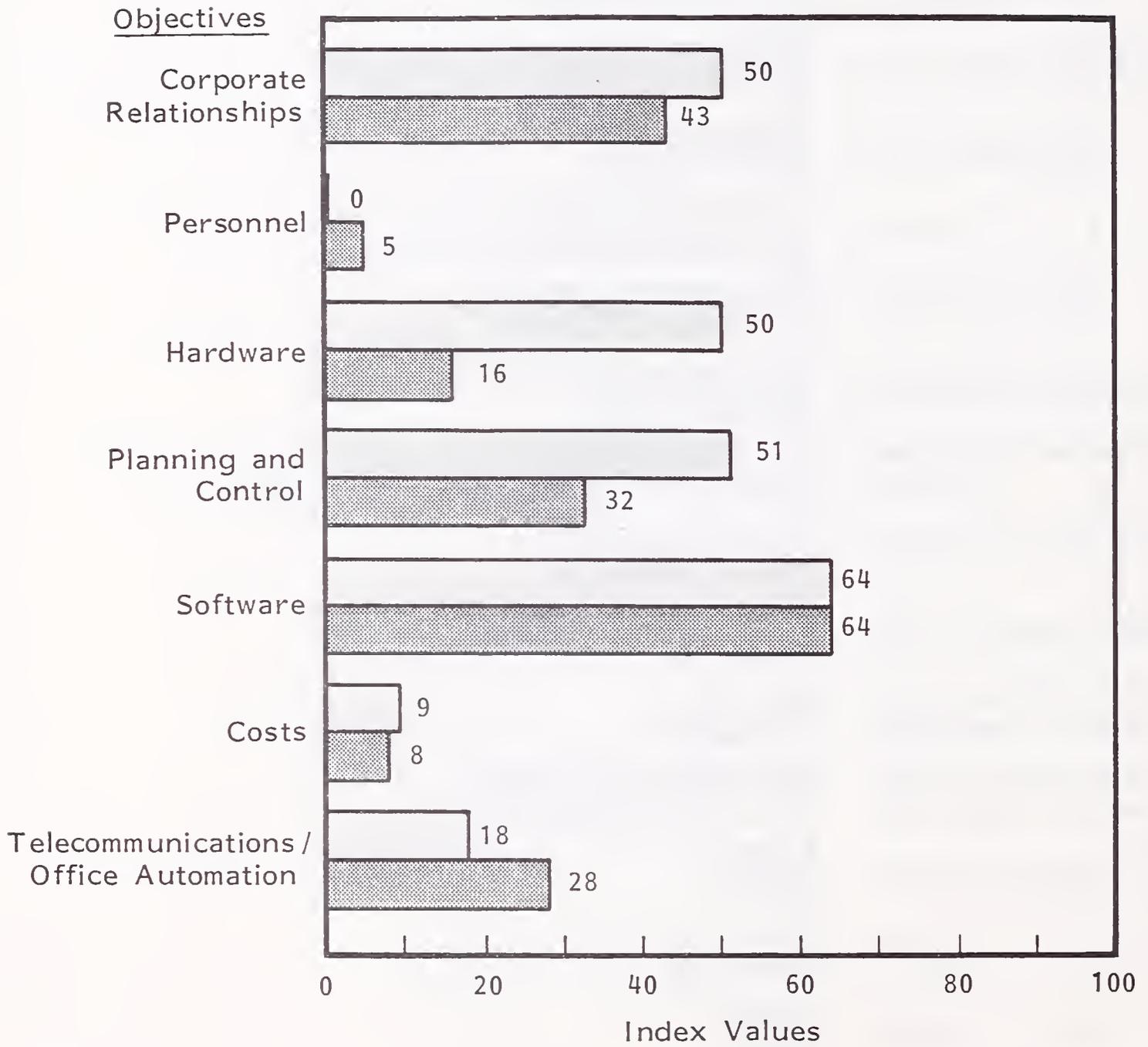
☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-77

INFORMATION SYSTEMS PLANNING OBJECTIVES
IN THE UTILITIES SECTOR

Objective	Percent
Support Company Objectives	5
Improve User Service/Relations	36
Improve Planning	5
End User Computing	9
Office Automation	18
Improve Management Control	46
Improve Productivity	32
Control Costs	9
Add Staff	0
New/Improved Software	32
New Hardware	27
Network/Telecommunications	0
IS Security/Disaster Recovery	23
Miscellaneous	5

Percent of Companies
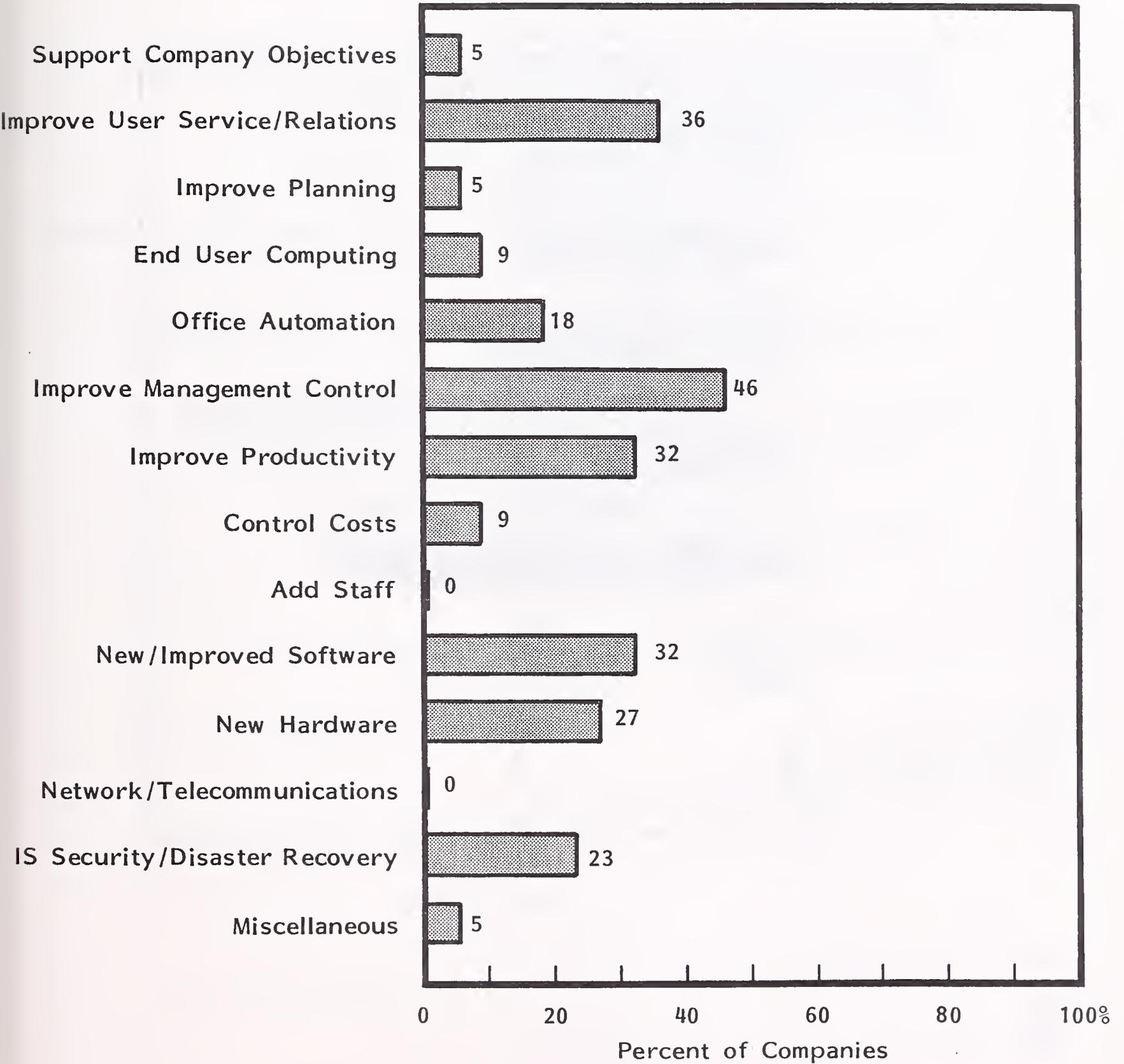
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-78

INFORMATION SYSTEMS INITIATIVES IN THE
UTILITIES SECTOR

Initiatives

Initiative	This Sector	All Sectors
Corporate Relationships	72	39
Personnel	43	41
Hardware	25	40
Planning and Control	91	28
Software	69	69
Costs	13	12
Telecommunications / Office Automation	0	4

Index Values

☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

- 200 -
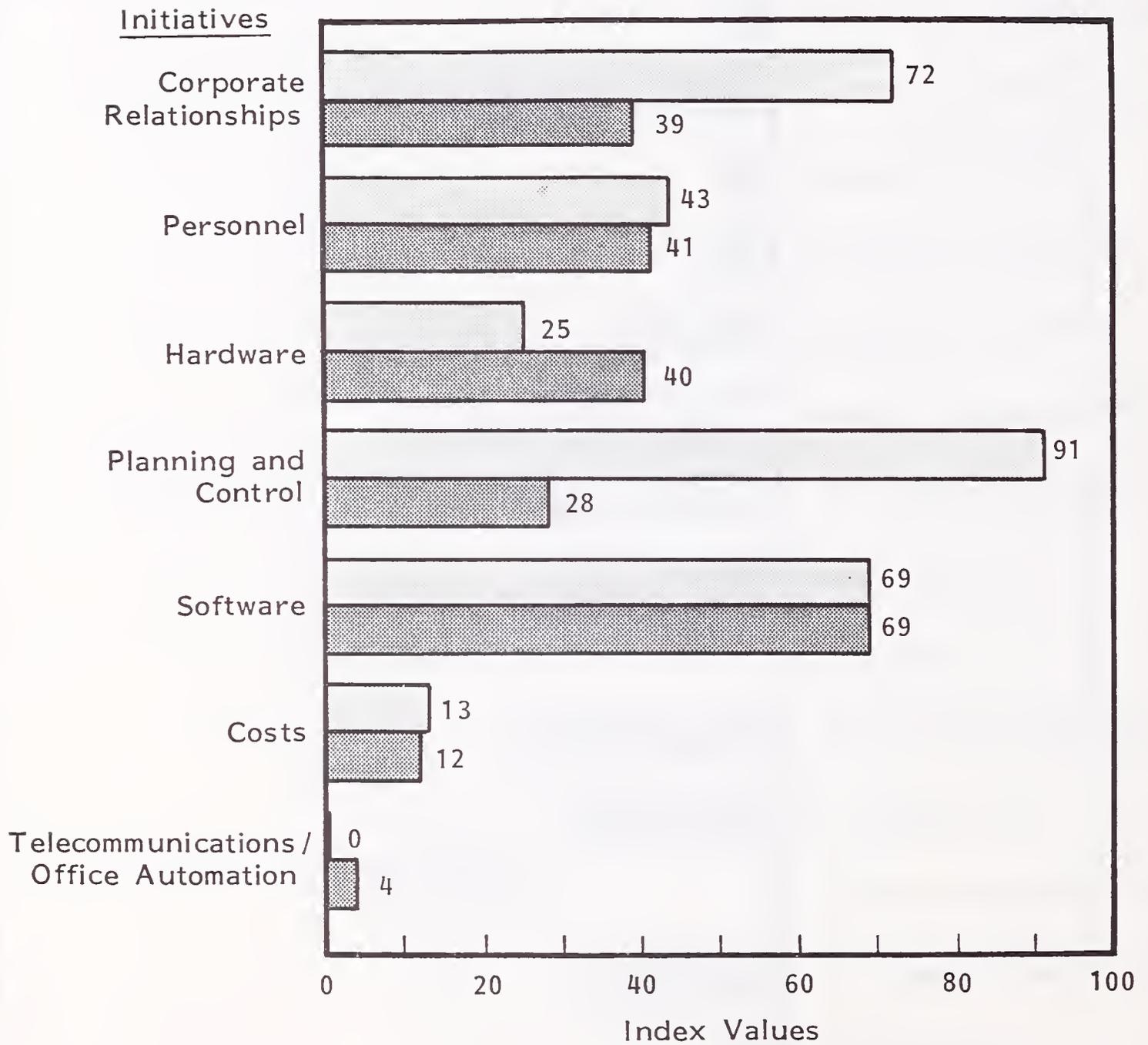
INPUT
UA82

EXHIBIT III-79

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE UTILITIES SECTOR

Career Planning/Education, Training	41
Increase Hiring	25
Productivity Tools and Techniques/ Quality Control Standards	22
Redesign/Replace System(s)	25
Software Packages/DBMS	22
Justify/Reduce Additional Functions/Costs	13
Add Hardware	19
Vendor Improvement	3
Network/Telecommunications	0

0   10   20   30   40   50%

Percent of Companies
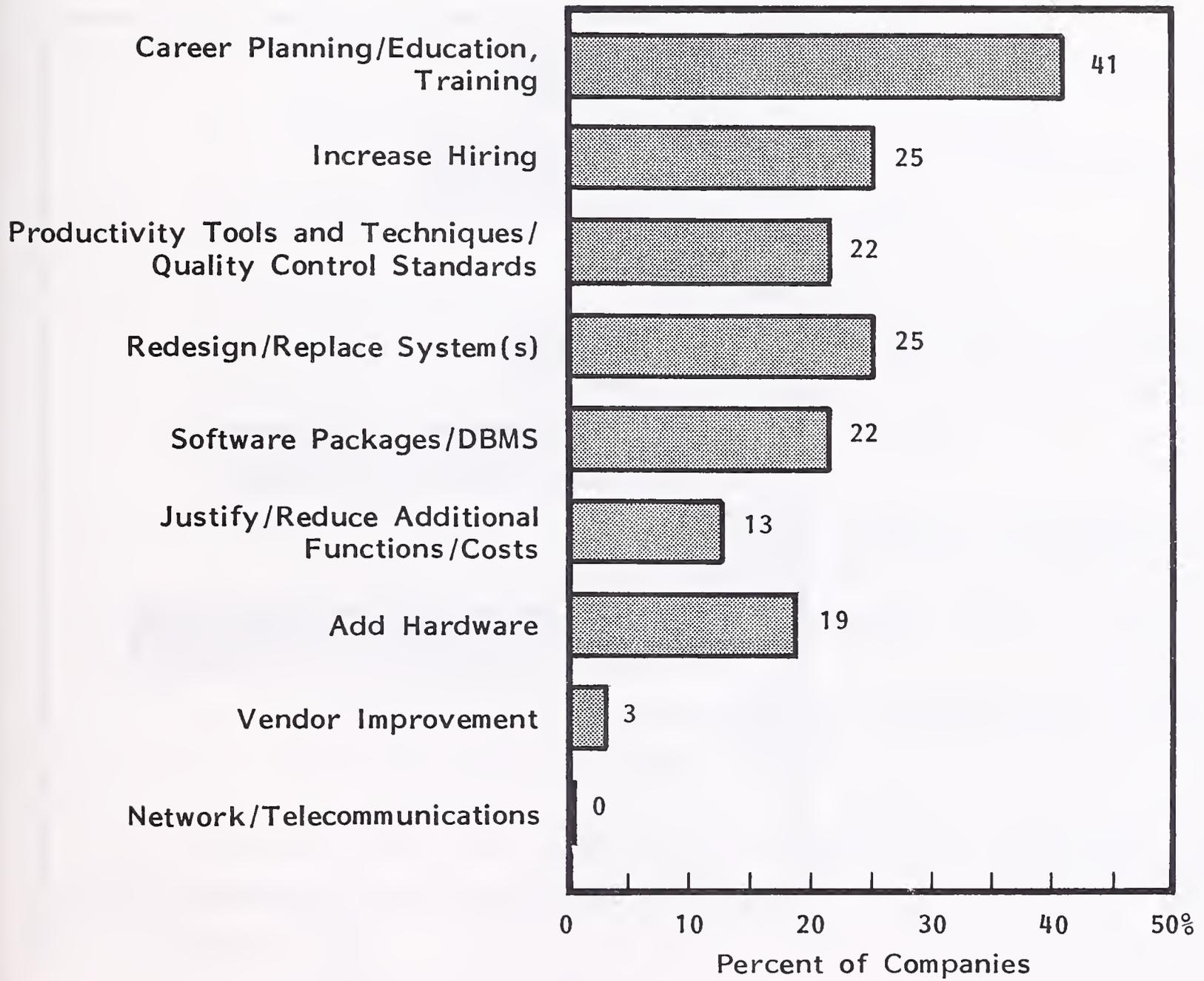
Continued

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-79 (Cont.)

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE UTILITIES SECTOR
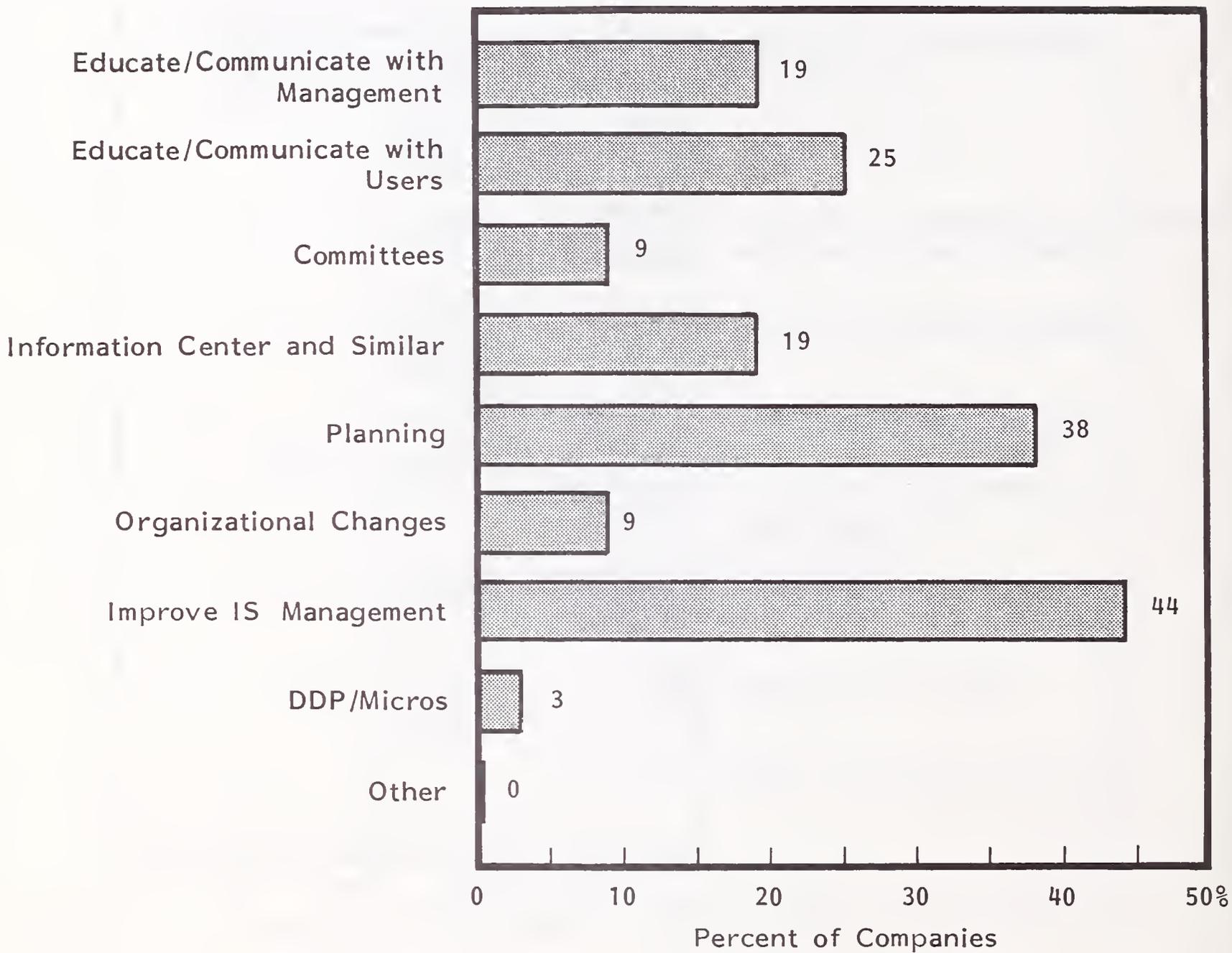
SOURCE: INPUT Surveys

INPUT
UA82

4.   PERSONAL COMPUTERS

● Plans for the use of personal computers in this sector are shown in Exhibit III-80 and include:

-   The overall level of use in five years.

-   Plans for obtaining additional personal computer software.

-   Plans for obtaining additional personal computer hardware.

● The utility sector's plans are in line with industry generally.

● Exhibit III-81 shows the types of personal computer software packages now used. "Calc, " word processing, languages/support system, and office support packages are used somewhat more than average. Other packages are used considerably less than average.

● The general categories of applications used are summarized in Exhibit III-82. Here the profile is much different than average with data base and word processing applications used much more than average.

-   Exhibit III-83 provides examples of actual personal computer applications in use in the utility sector.

● Compared to the average user, personal computer users in this sector are much more likely to rely on the IS department for assistance, as shown in Exhibit III-84.

● In this sector 63% of departments using personal computers have had their installation less than a year, as shown in Exhibit III-85, compared to 78% generally.

INPUT

EXHIBIT III-80

PERSONAL COMPUTER ACQUISITION PLANS IN THE UTILITIES SECTOR

Expected Level of Use
of Personal Computers
in Five Years
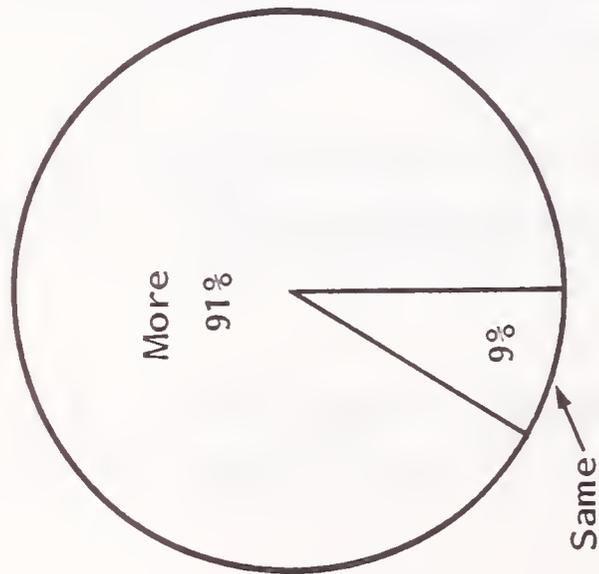
More
91%

Same
9%

User Plans for
Additional Personal
Computer Software

Additional
Software
Planned
69%

No
Current
Plans
31%

Source

Package   50

In-house/
Custom   50

0 20 40 60 80 100%

User Plans for
Additional Personal
Computer Hardware

Additional
Hardware
Planned
83%

No
Current
Plans
17%

Hardware
Type*

Additional
PCs   70

Additional
Peripherals   30

Other   0

0 20 40 60 80 100%

SOURCE: INPUT Surveys

* Totals more than 100%
because of multiple plans

- 204 -
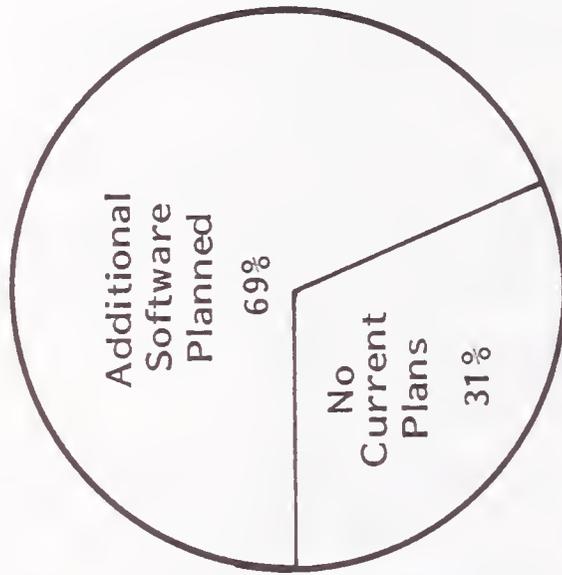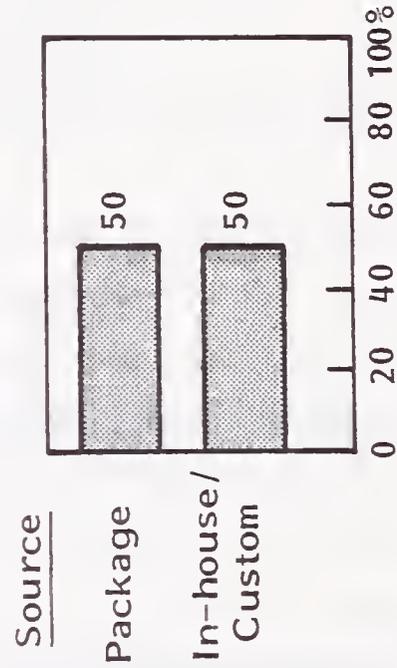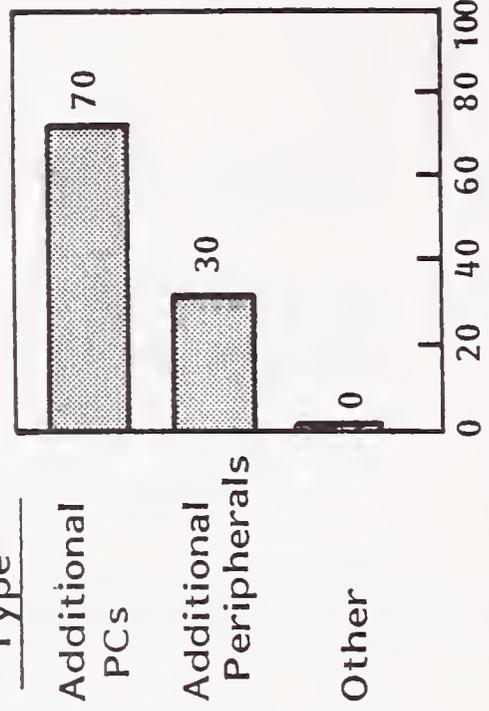
INPUT
UA82

EXHIBIT III-81

TYPES OF PERSONAL COMPUTER SOFTWARE PACKAGES
USED IN THE UTILITIES SECTOR

Type of Package

Percent of Departments Using

- 205 -
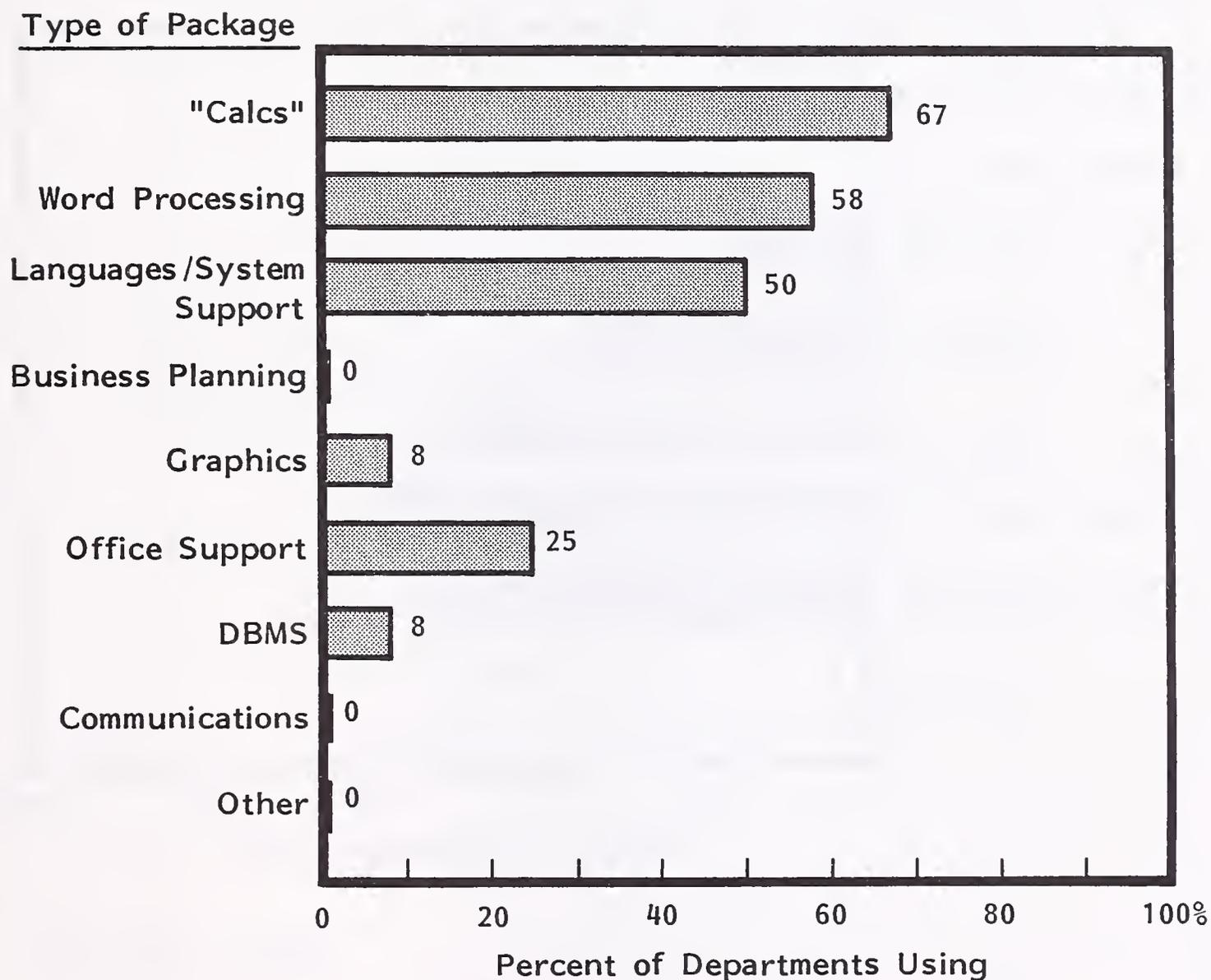
INPUT
UA82

EXHIBIT III-82

PERSONAL COMPUTER APPLICATIONS IN THE
UTILITIES SECTOR

Application Type

Application Type	Percent
Budgeting/Accounting	17
Modeling/Planning	0
Other Financial	17
Operations	33
Analysis	50
Data Bases, Reporting	58
Word Processing	50
Other	0

Percent of Department Using
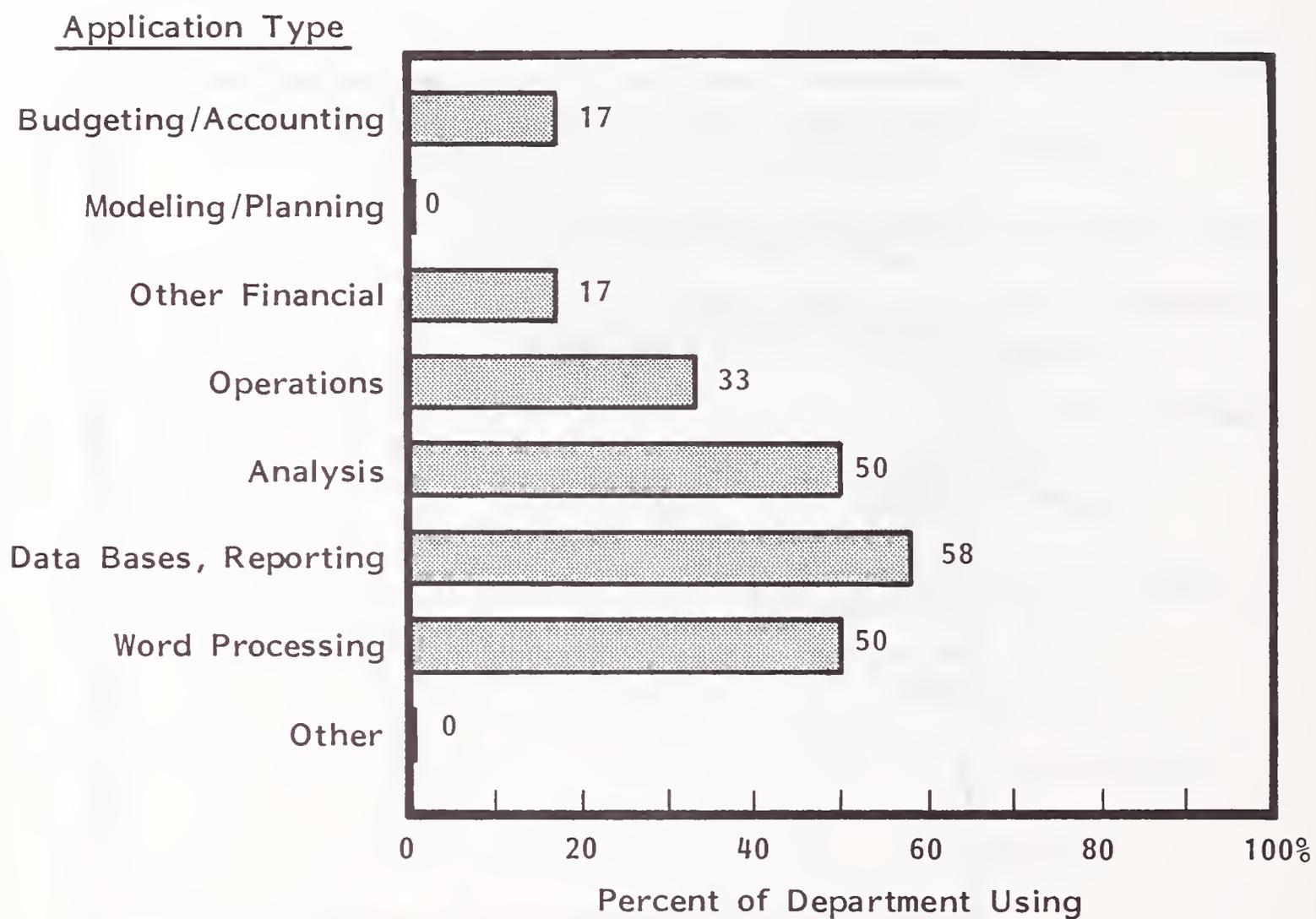
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-83

PERSONAL COMPUTER APPLICATIONS
IN THE UTILITIES SECTOR

Fuel Analysis

Data Base

Word Processing

Library Updates

Railroad Profiles

Civil Engineering Analysis

Cost Reports

Spread Sheets

Filing

Historical Claims

Cash Administration

Financial Modeling

Debt Portfolio

Balancing Records

Software Review

Report Writing

Calculating

Rate Analysis

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-84

SOURCES OF ASSISTANCE FOR PERSONAL COMPUTER USERS
IN THE UTILITIES SECTOR
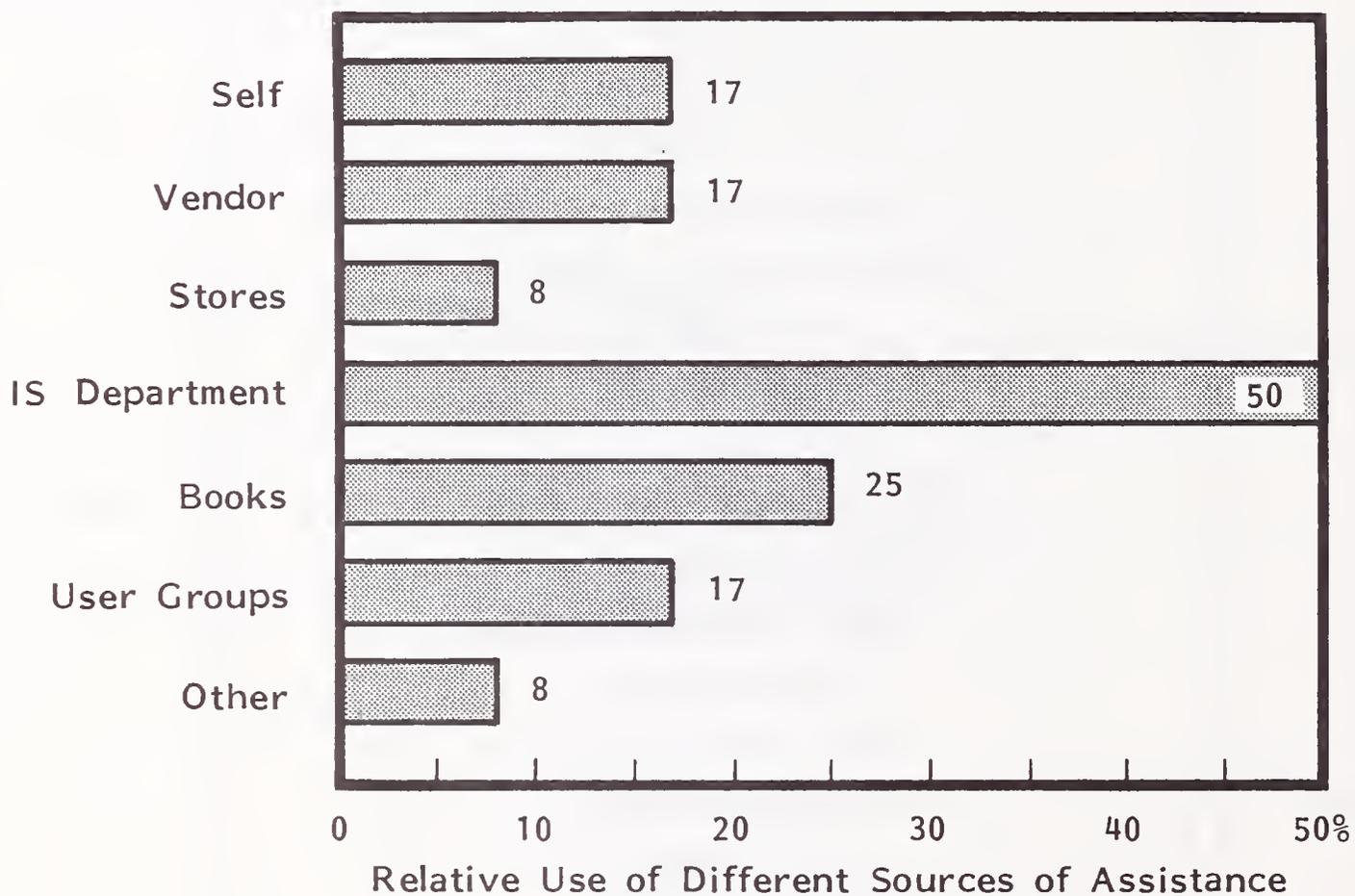
Relative Use of Different Sources of Assistance

Note: Total Is More Than 100% Because of Multiple Sources.   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-85

TIME SINCE FIRST PERSONAL COMPUTER INSTALLED
IN USER DEPARTMENTS IN THE UTILITIES SECTOR

Time Since
First Installed
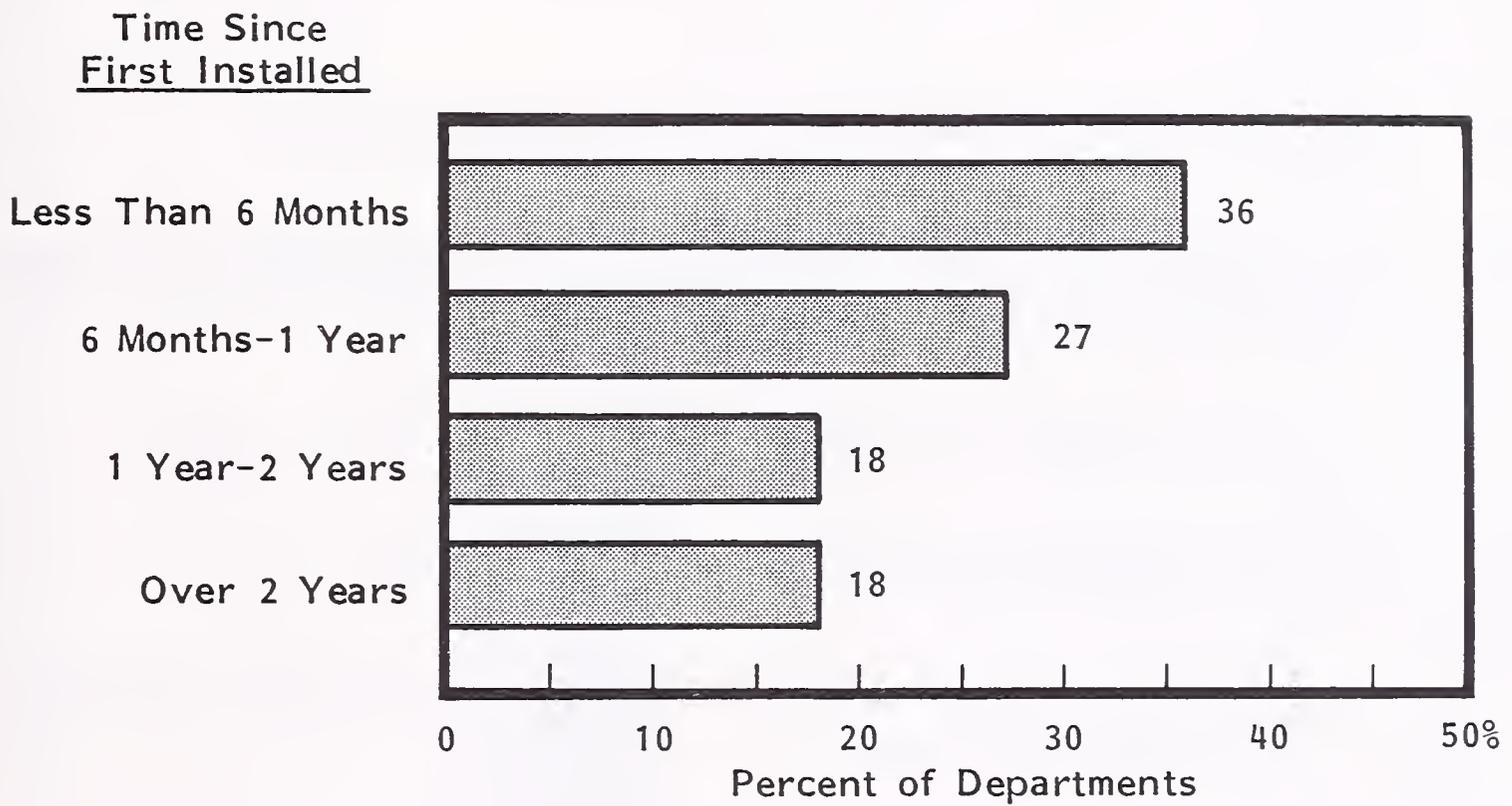
SOURCE: INPUT Surveys

INPUT
UA82

F.   BANKING AND FINANCE SECTOR

1.   BUDGETS

- In this sector 100% of the organizations expect budget increases in 1983, compared to 61% generally; none expects a decrease compared to 8% generally, as shown in Exhibit III-86. Respondents foresee an average rise of 15%.

- The budget increases expected do not vary by organization size.

- The average budget growth expected for 1983 in the banking and finance sector is 15%, compared to 17% in 1982.

  - This represents a decline of 14% in the average rate of growth.

- The 1982 IS budget distribution is shown in Exhibit III-87.

  - Significant increases are expected in all categories except mainframes and processing services.

- Exhibit III-88 shows the range of the ratios between the IS budget and the unit's total assets which exist in the banking and finance sector.

  - The IS percentage of total assets for the average company (i.e., at the 50th percentile) in each size group was:

    . For large companies: 0.2%, compared to 0.65% for companies with equivalent revenues.

- 210 -

EXHIBIT III-86

ANTICIPATED BUDGET INCREASES FOR 1983 IN THE BANKING AND FINANCE SECTOR
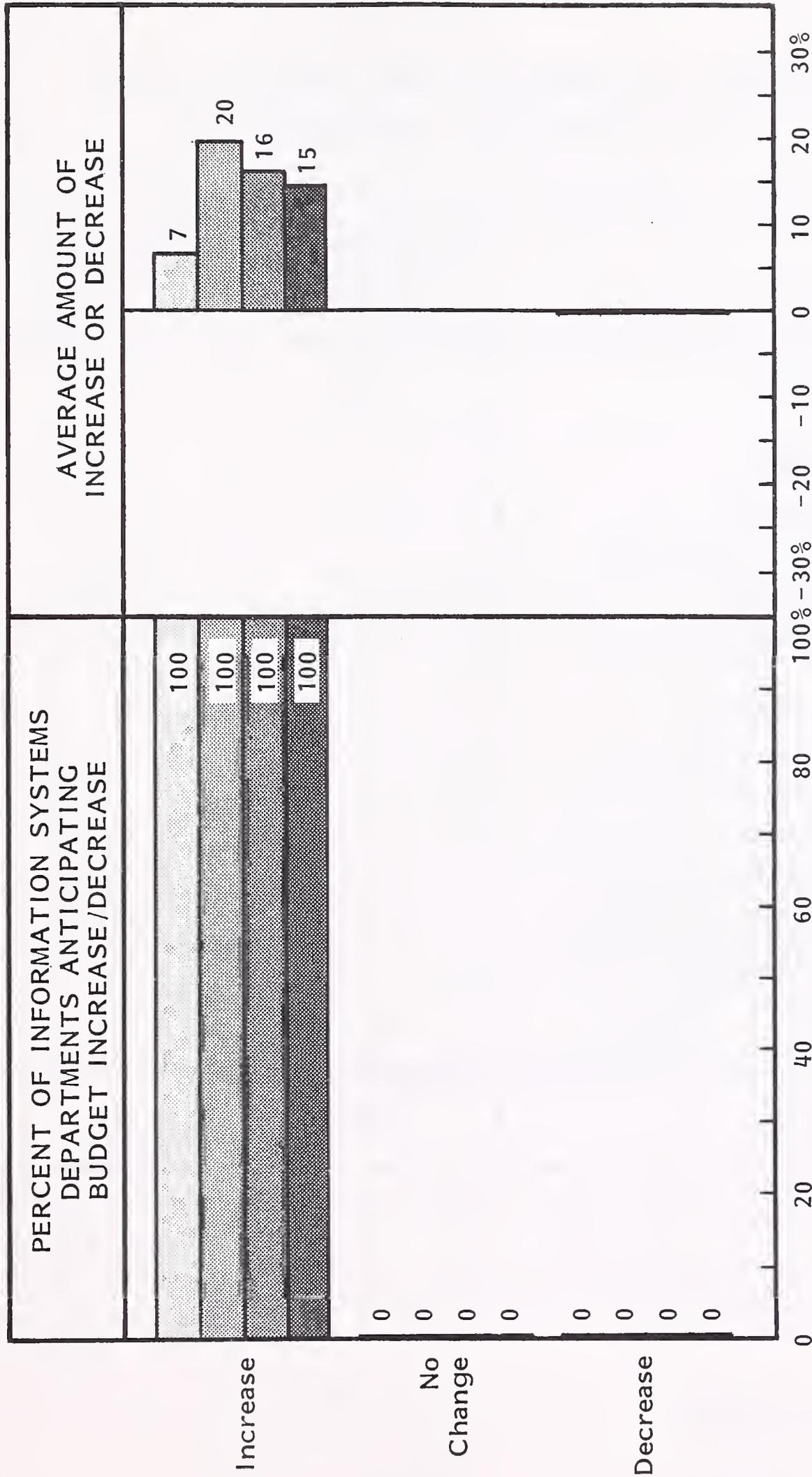
SOURCE: INPUT Surveys

Key: (Company size; $ millions, annual revenue)

Under $200 Million

$200 Million - $1 Billion

Over $1 Billion

Total

- 211 -

INPUT
UA82

EXHIBIT III-87

1982 BUDGET DISTRIBUTION AND 1982/1983 CHANGES
IN THE BANKING AND FINANCE SECTOR

BUDGET CATEGORY	PERCENT OF IS BUDGET (1982)	EXPECTED CHANGE 1982 to 1983
Personnel	43%	13%
Hardware		
Mainframe	15	7
Mini/Microcomputer	1	15
Terminals	3	24
Peripherals	6	17
Communications	5	33
Software and Services		
Software	2	28
Processing Services	2	-28
Software Maintenance	3	19
Hardware Maintenance	4	18
Other	16	15
Total	100%	15%

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-88

INFORMATION SYSTEMS BUDGET AS A PERCENT OF TOTAL ASSETS IN THE BANKING AND FINANCE SECTOR
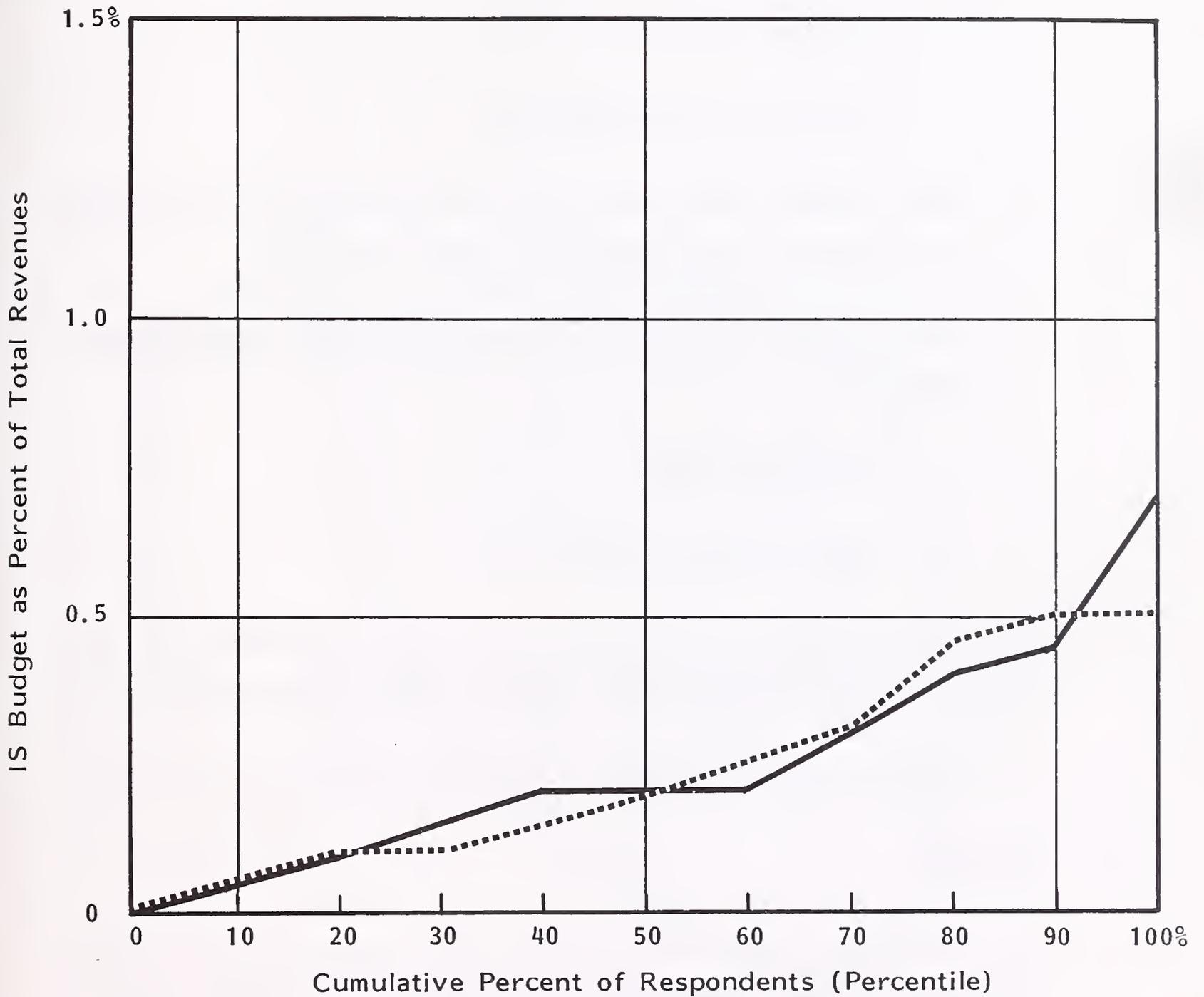
Key - Company Size (Assets):

••••••••••••• Under $1 billion

──────── $1 billion and over

SOURCE: INPUT Surveys

- 213 -

. For medium and small units: 0.2%, compared to approximately
1.0% for companies with equivalent revenues.

- The organizations that spend least on data processing as a percentage
of revenues are those at and below the 20th percentile. Taking the
10th percentile as representative, their IS spending percentages were:

. Large units: 0.1%.

. Medium and small units: 0.1%.

- The companies that spend the most on data processing as a percentage
of revenues are those at and above the 80th percentile.

- Taking the 90th percentile as representative, their IS spending percent-
ages were:

. Large units: 0.5%.

. Medium and small units: 0.5%.

● Median spending on IS per corporate employee was $3,400. However, there
was a broad range of spending ratios, as shown in the diagram in Exhibit III-89.

- The reasons for this variation were discussed in Chapter II, Section B.

2. STAFFING

● In the staffing sector 47% of organizations expect their IS staffs to increase
in the next 12 months, compared to the industry average of 58%, as shown in
Exhibit III-90.

INPUT

EXHIBIT III-89

INFORMATION SYSTEMS SPENDING PER EMPLOYEE BY COMPANY SIZE IN THE BANKING AND FINANCE SECTOR

IS Spending per Employee

($ thousands)

━ ━ ━ ━ = Median   SOURCE: INPUT Surveys

- 215 -

INPUT
UA82

EXHIBIT III-90

INFORMATION SYSTEMS STAFFING CHANGES EXPECTED IN THE
NEXT TWELVE MONTHS IN THE BANKING AND FINANCE SECTOR

Percent of
Companies Expecting:

IS Staff Increase — 58 (All Industries), 47 (Banking and Finance)

IS Staff Decrease — 7 (All Industries), 0 (Banking and Finance)

No Change — 35 (All Industries), 53 (Banking and Finance)

Net Average
Change Expected — 4 (All Industries), 7 (Banking and Finance)

Rate of Change in IS Staffing
in Next 12 Months
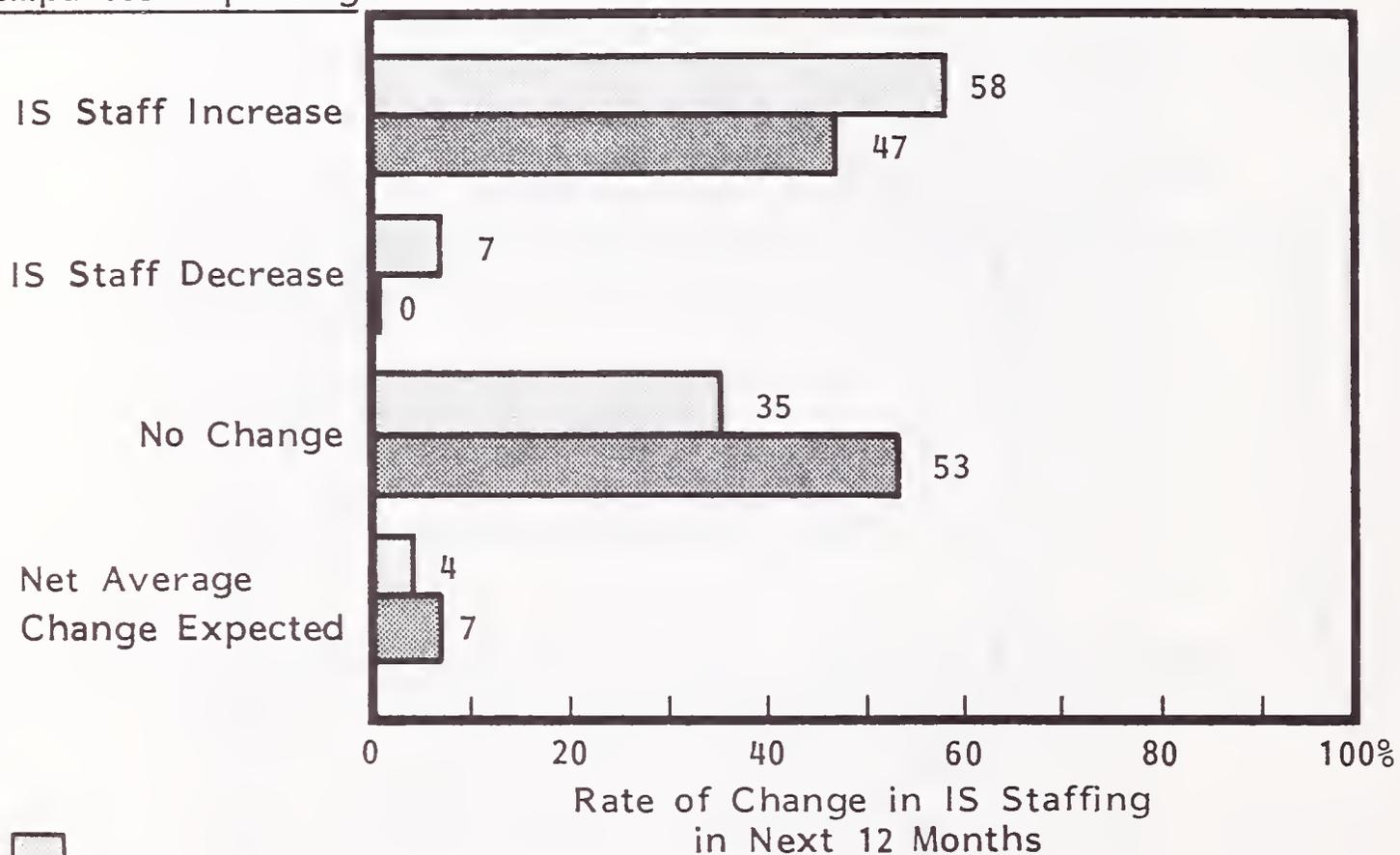
☐ All Industries
▨ Banking and Finance

SOURCE: INPUT Surveys

INPUT
UA82

-   The net increase in number of staff is expected to be 7%, compared to the all-industry average of 4%.

-   Turnover in this sector is expected to be 50% more than the all-industry average in 1983, as shown in Exhibit II-9.

    -   Current turnover rates for individual positions are shown in Exhibit III-91. For technical positions turnover is appreciably greater than average.

-   Difficulty in recruiting staff in this sector is considered to be relatively high and is somewhat above all-industry averages, as shown in Exhibit III-92.

-   The number of programs to be maintained averages 800 in this sector, although the range, both in absolute numbers and based on company size, is quite broad, as shown in Exhibit III-93.

    -   Maintenance, as a proportion of total workload, is greater than that for most sectors and has increased somewhat, as shown in Exhibit III-94.

    -   Company size does not generally have a significant impact on the maintenance proportion, as shown in Exhibit III-95.

3.   INFORMATION SYSTEMS ISSUES

-   Note: please refer to Chapter II, Section D for a general discussion of IS problems, objectives, and initiatives and their interrelationships.

-   The banking and finance sector sees itself with significantly more problems than average in hardware, software, and planning and control, as shown in Exhibit III-96.

INPUT

EXHIBIT III-91

CURRENT ANNUAL TURNOVER IN THE
BANKING AND FINANCE SECTOR

Overall — 16

Management/Supervisors — 7

Planning and Administrative — 5

Applications Programmers and Analysts — 20

Telecommunications Specialists — 17

Data Base Specialists — 1

Other Technical Specialists — 16

Operations Staff — 14

Data Entry — 12

Other (Clerical, etc.) — 11

0   10   20   30   40   50%

Percent of Annual Turnover

SOURCE: INPUT Surveys

- 218 -
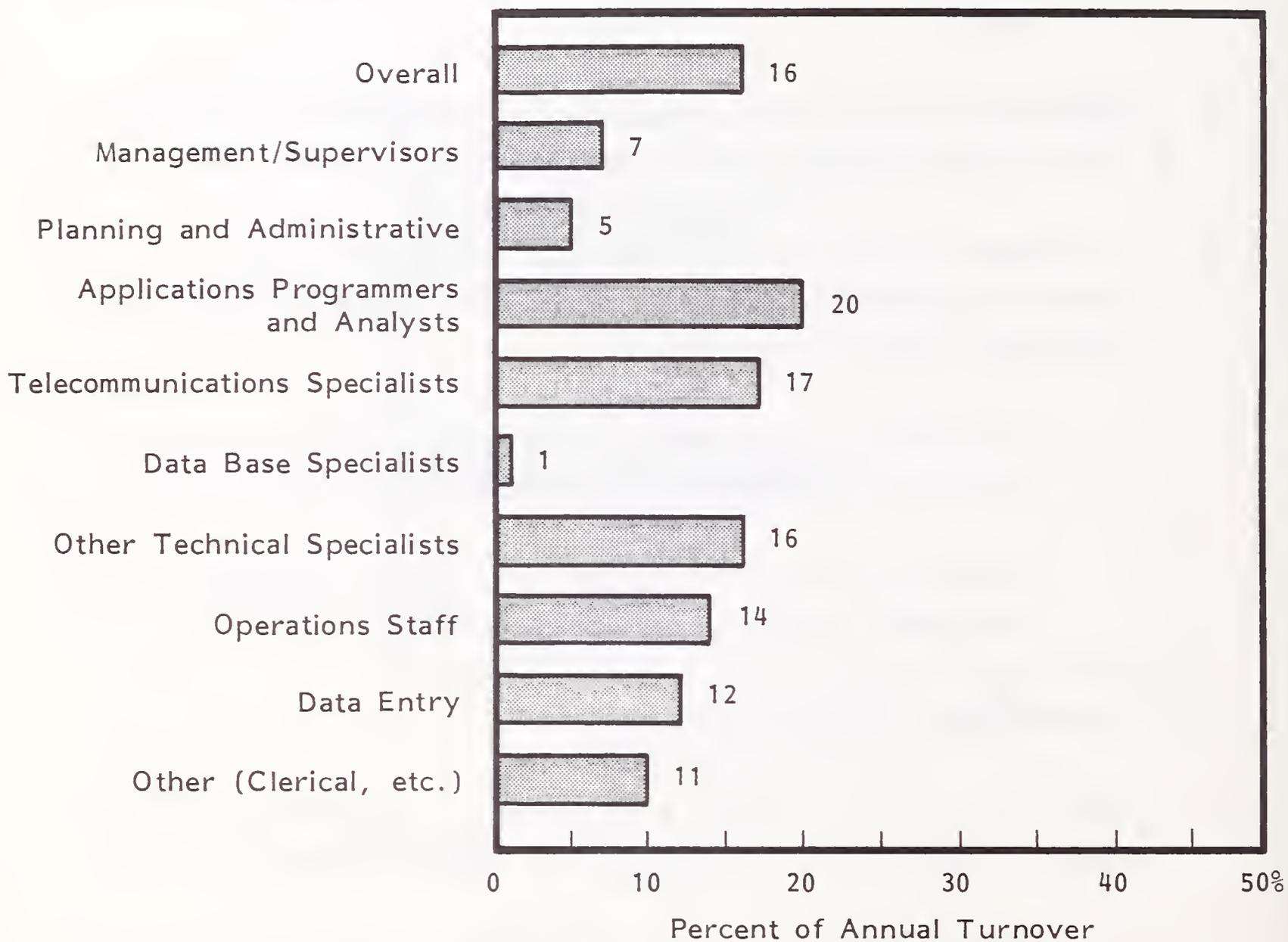
INPUT
UA82

EXHIBIT III-92

INFORMATION SYSTEMS DIFFICULTY IN RECRUITING STAFF
IN THE BANKING AND FINANCE SECTOR
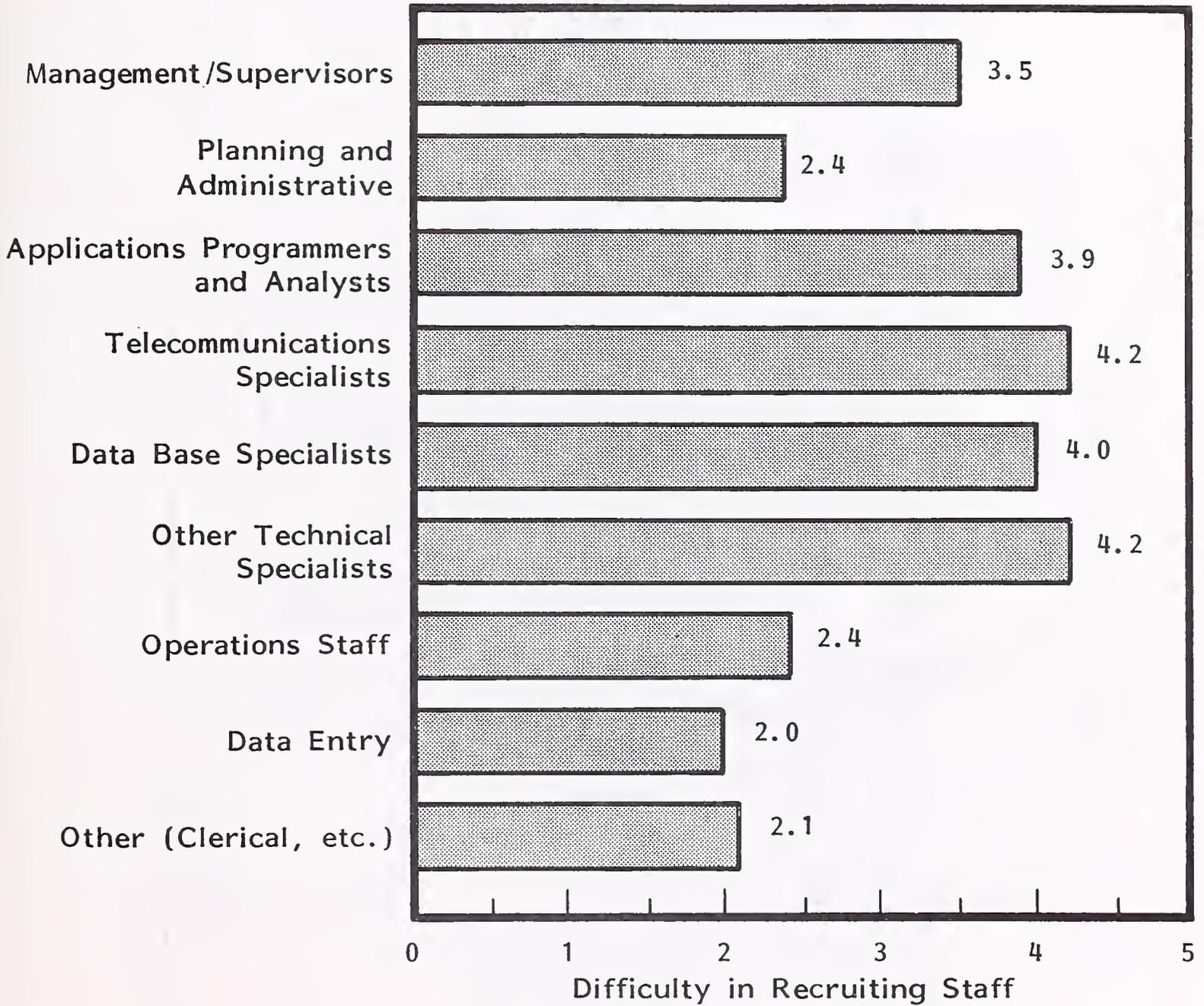
Scale: 1 = Low, 5 = High

EXHIBIT III-93

NUMBER OF PROGRAMS BY COMPANY SIZE
IN THE BANKING AND FINANCE SECTOR

Company Size ($ millions)

Number of Programs

(thousands)
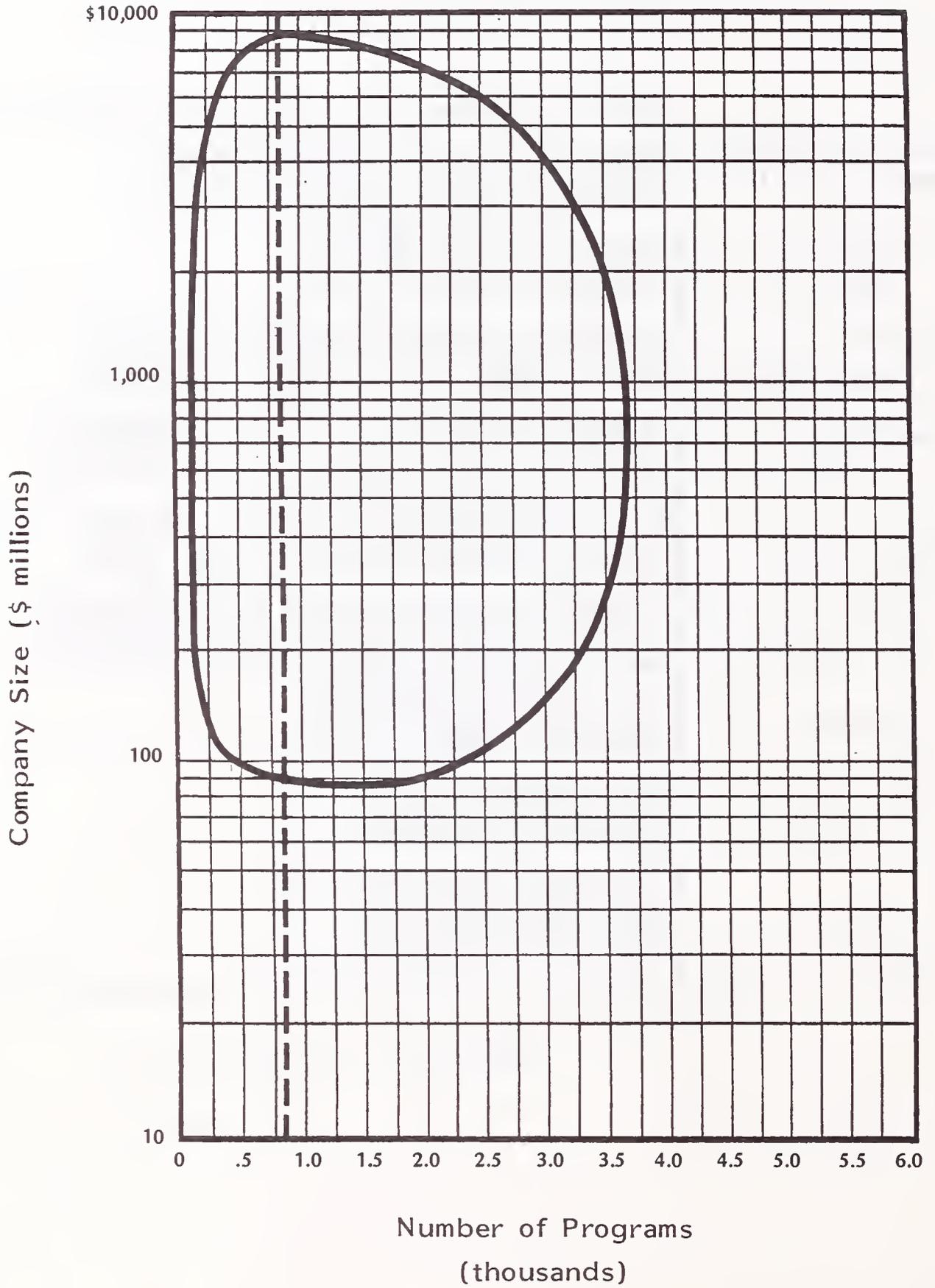
= = = = = Median

EXHIBIT III-94

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE
IN THE BANKING AND FINANCE SECTOR, 1981-1983

Percent of Resources
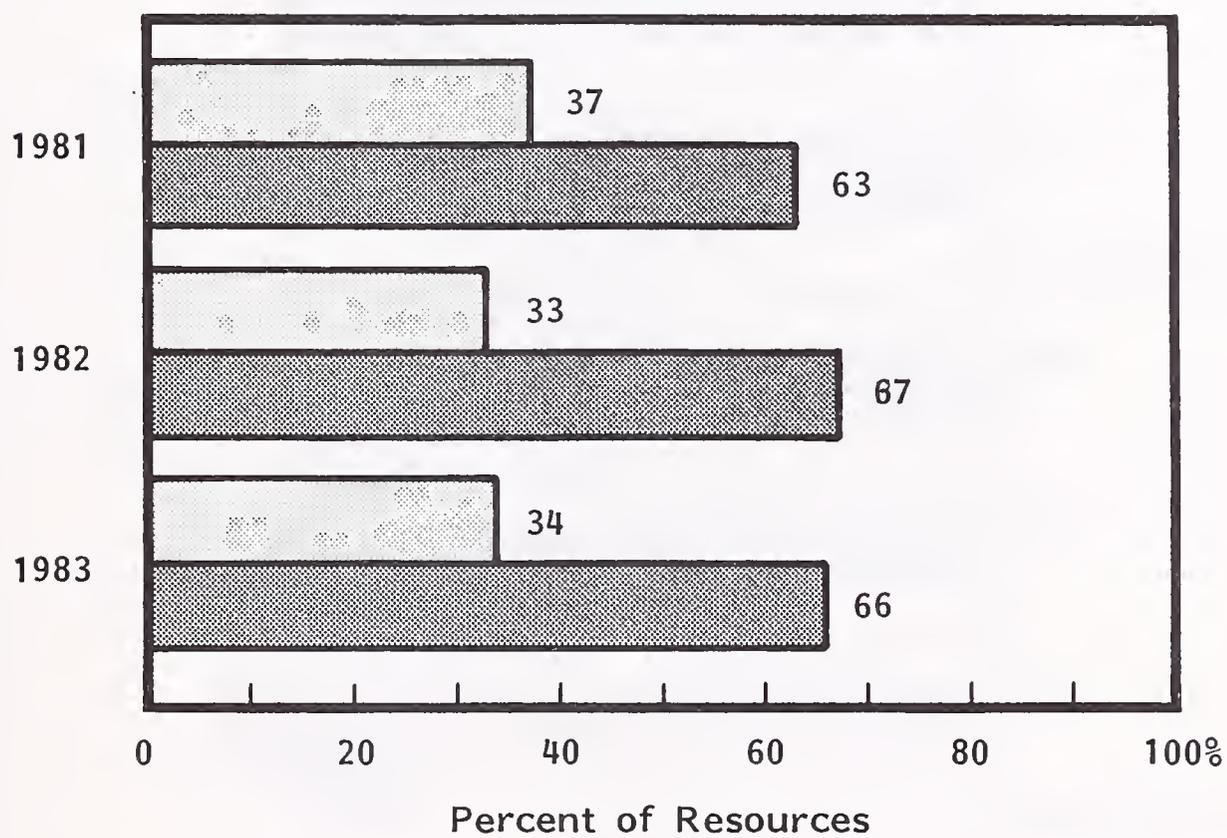
New Development

Maintenance

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-95

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE IN THE
BANKING AND FINANCE SECTOR, 1981-1983

Company Size

Percent of Resources

☐ New Development

▨ Maintenance

- 222 -
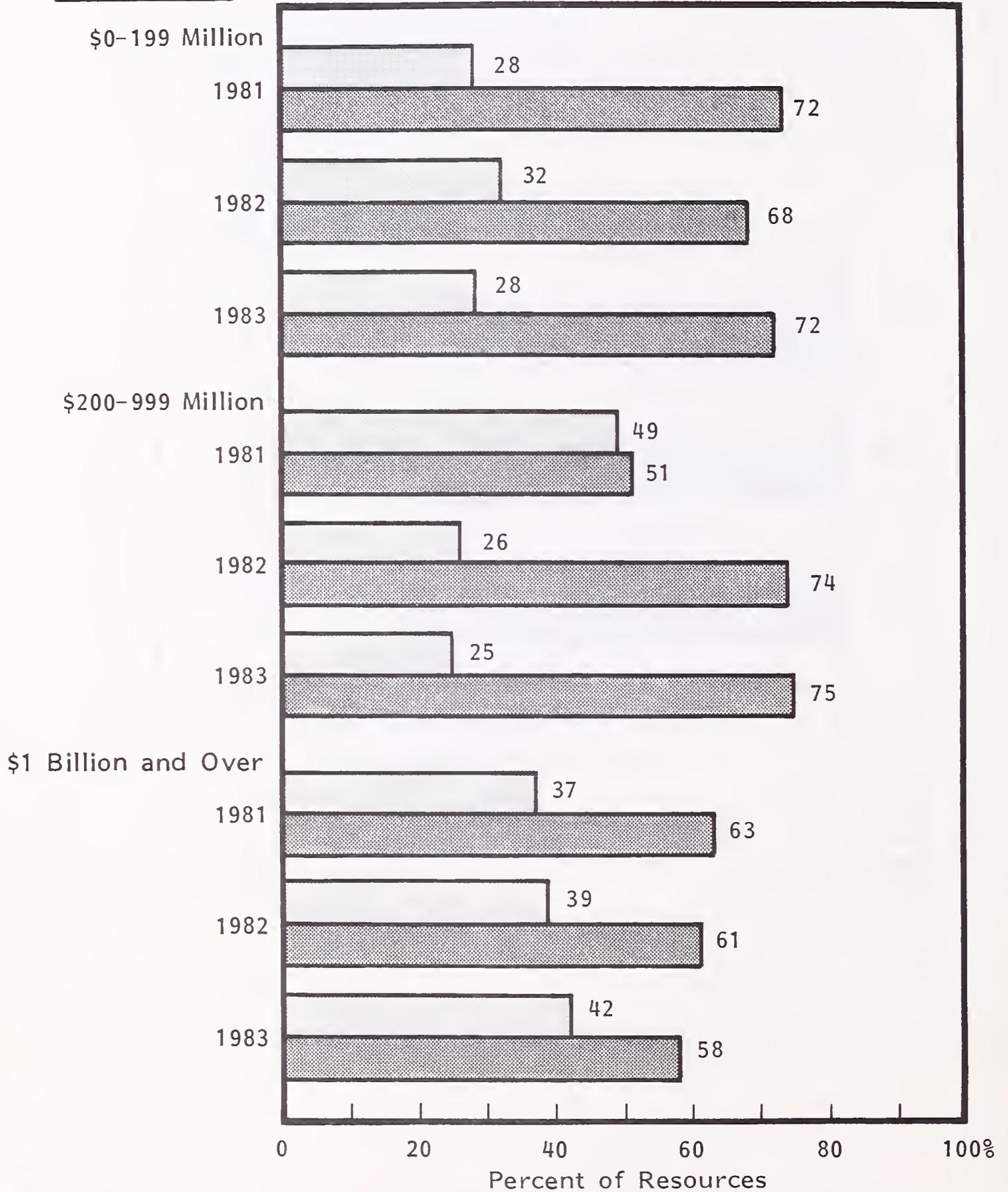
INPUT
UA82

EXHIBIT III-96

INFORMATION SYSTEMS PROBLEMS IN THE
BANKING AND FINANCE SECTOR
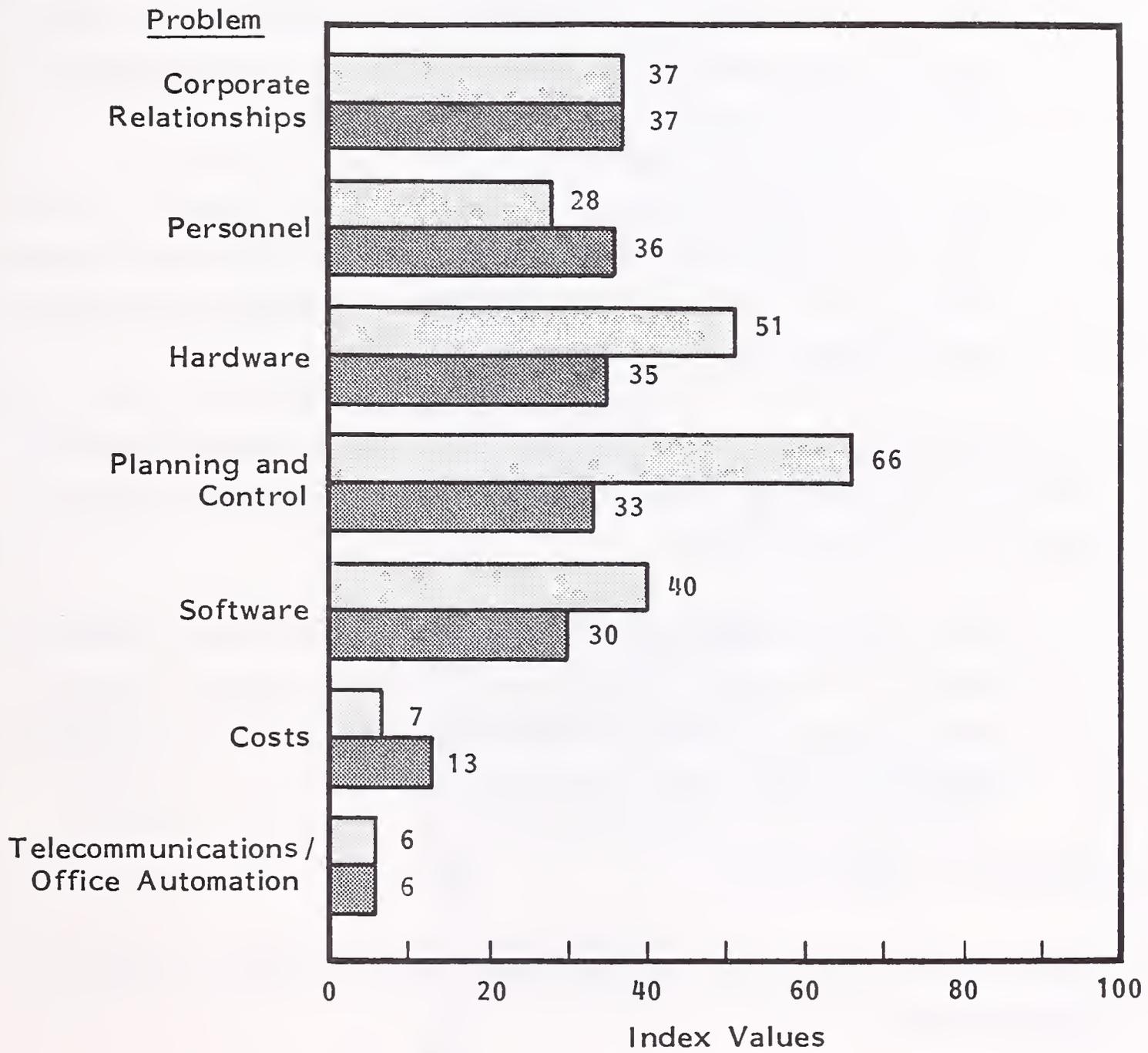
Problem

SOURCE: INPUT Surveys

□ This Sector
▨ All Sectors

INPUT
UA82

- More detailed information about specific problem areas is contained in Exhibit III-97. This exhibit shows the percentage of companies in this sector which regard an issue as a major problem.

- Software and planning and control are also areas where banking and finance organizations have major goals, as shown in Exhibit III-98.

  - Note also that cost control is more important for banking and finance than any other sector. This is directly related to the cost squeeze that many financial institutions have experienced in 1982.

  - More detailed information about specific planning objectives is contained in Exhibit III-99. This exhibit shows the percentage of companies in this sector which have identified particular planning objectives as being of major importance to them.

- As can be see in Exhibit III-100, this sector is stressing software initiatives. Initiatives for improving corporate relationships are much more important here than in most other sectors.

  - More detailed information about specific areas where an initiative is planned is contained in Exhibit III-101. This exhibit shows the percentage of companies in this sector planning a major initiative in a particular area.

4. PERSONAL COMPUTERS

- Plans for the use of personal computers in this sector are shown in Exhibit III-102 and include:

  - The overall level of use in five years.

  - Plans for obtaining additional personal computer software.

INPUT

EXHIBIT III-97

INFORMATION SYSTEMS PROBLEMS
IN THE BANKING AND FINANCE SECTOR

Problem

Problem	Percent of Companies
Relations with Management	20
Relations with Users	17
Backlog/Workload	28
Planning	24
Cost Constraints	7
Project Control/Management	14
IS Personnel Shortages/Turnovers	28
Other IS Personnel Issues	0
Application System Quality	20
Software Development, Maintenance, Productivity	20
Equipment/Capacity, Computer Operations	35
Network/Telecommunications	3
Hardware	16
OA	3
Other	24

Percent of Companies

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-98

INFORMATION SYSTEMS OBJECTIVES IN THE
BANKING AND FINANCE SECTOR

Corporate Relationships
25
43

Personnel
5
5

Hardware
35
16

Planning and Control
40
32

Software
100
64

Costs
30
8

Telecommunications / Office Automation
10
28

Index Values
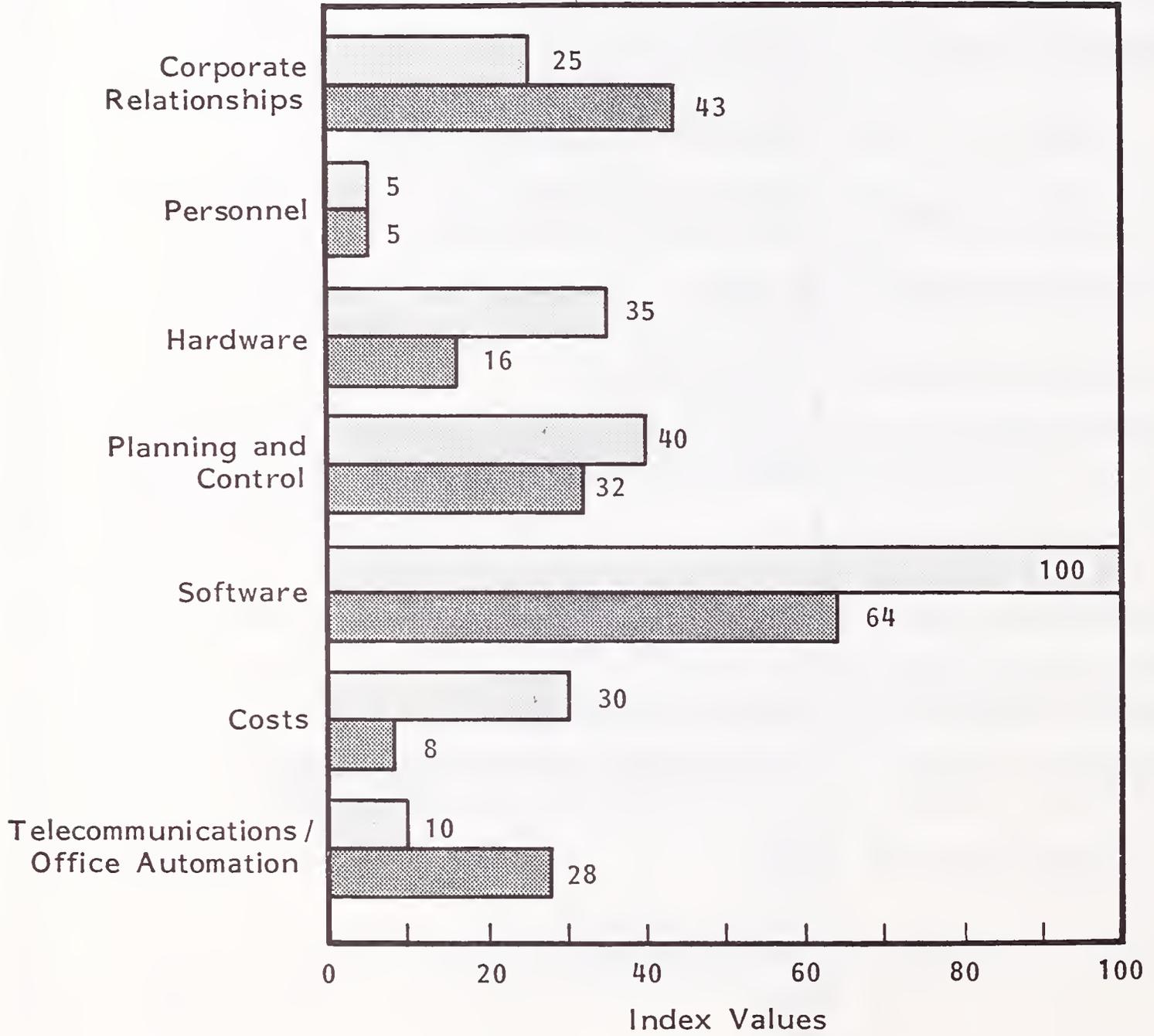
☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-99

INFORMATION SYSTEMS OBJECTIVES
IN THE BANKING AND FINANCE SECTOR

Support Company Objectives	10
Improve User Service/Relations	15
Improve Planning	20
End User Computing	0
Office Automation	0
Improve Management Control	20
Improve Productivity	20
Control Costs	30
Add Staff	5
New/Improved Software	80
New Hardware	30
Network/Telecommunications	10
IS Security/Disaster Recovery	5
Miscellaneous	0

Percent of Companies

0   20   40   60   80   100%
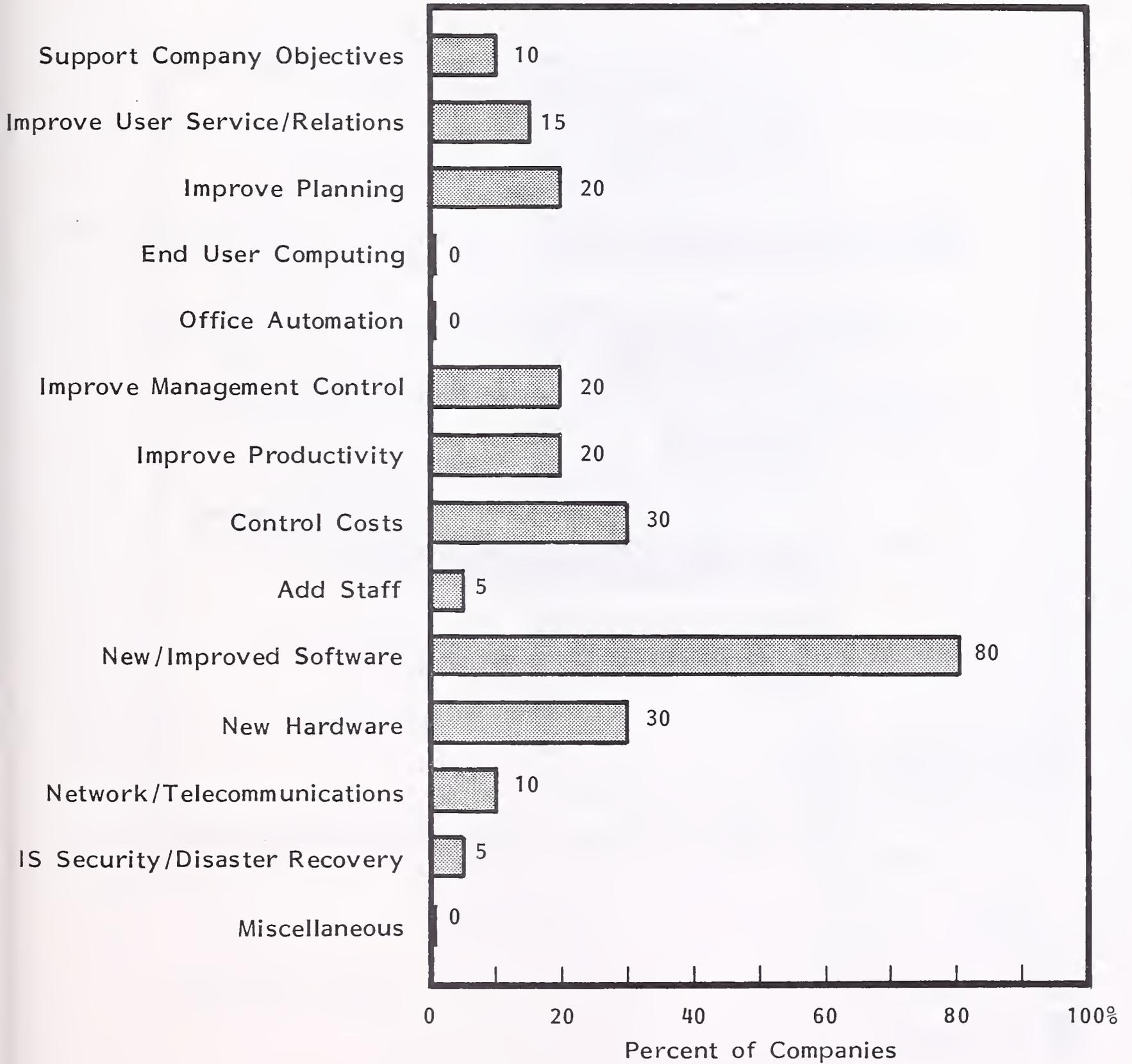
EXHIBIT III-100

INFORMATION SYSTEMS INITIATIVES IN THE
BANKING AND FINANCE SECTOR

Initiative

Initiative	This Sector	All Sectors
Corporate Relationships	66	39
Personnel	45	41
Hardware	55	40
Planning and Control	28	28
Software	113	69
Costs	10	12
Telecommunications / Office Automation	3	4

Index Values
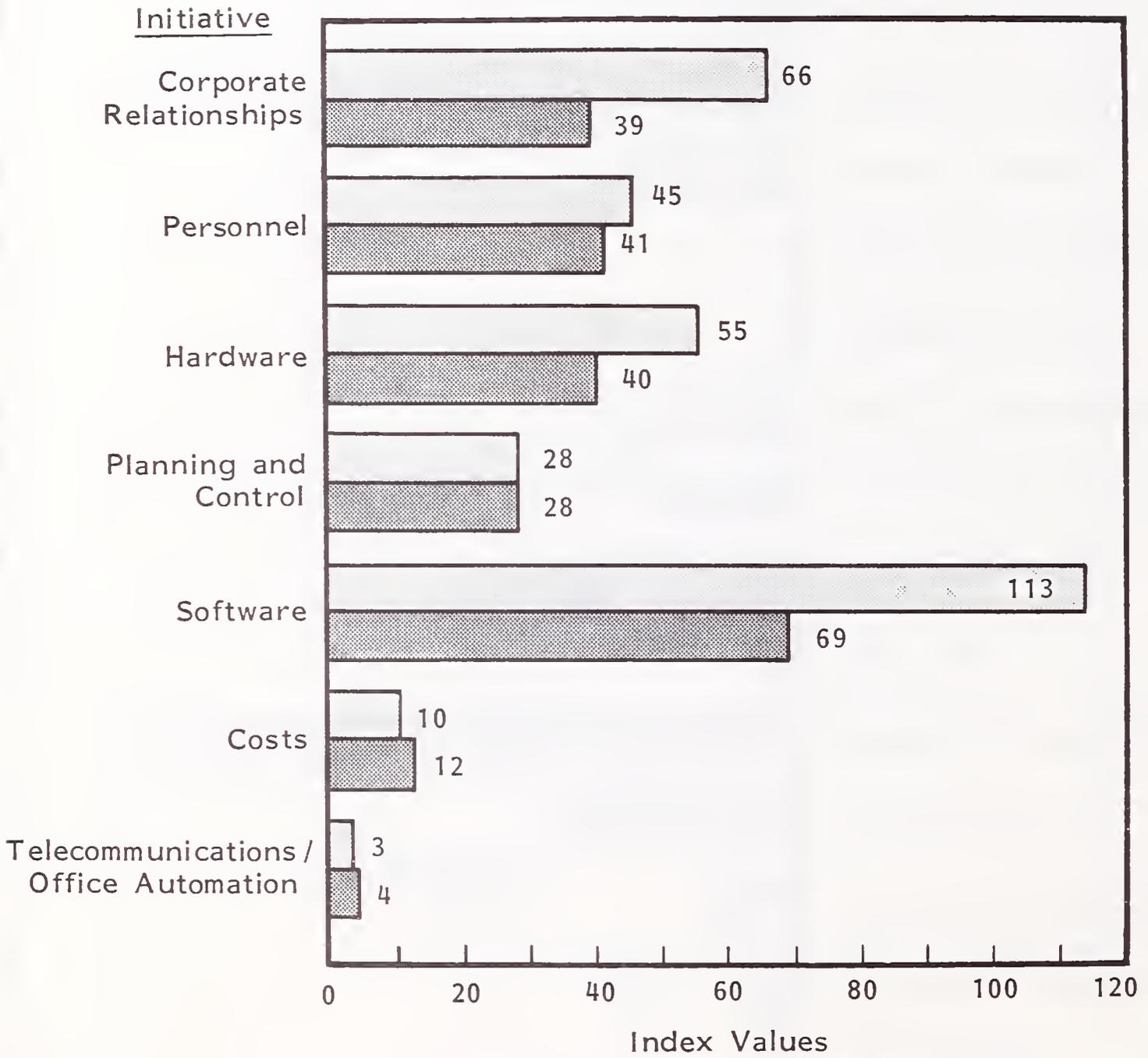
☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-101

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE BANKING AND FINANCE SECTOR
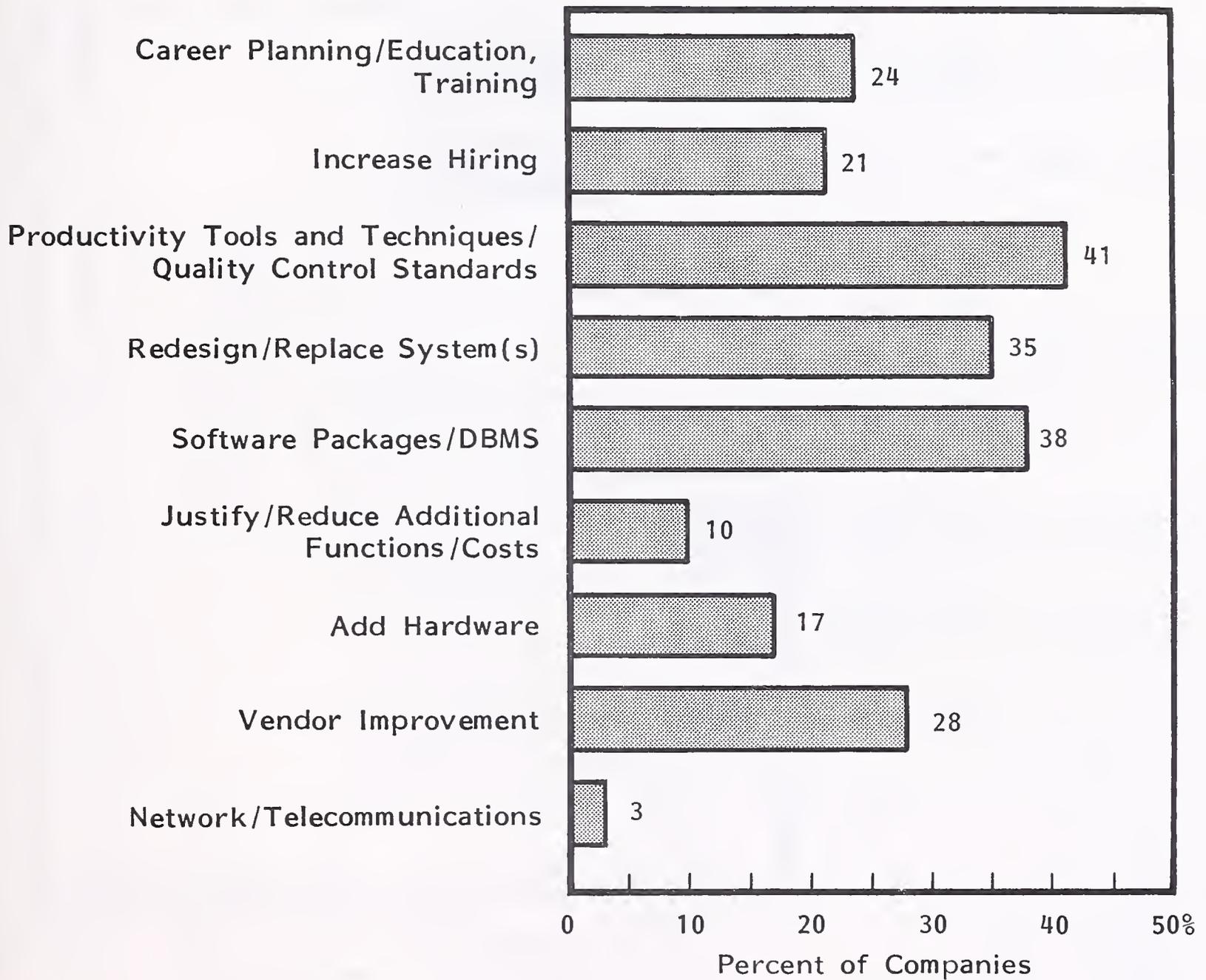
Continued

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-101 (Cont.)

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE BANKING AND FINANCE SECTOR

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-102
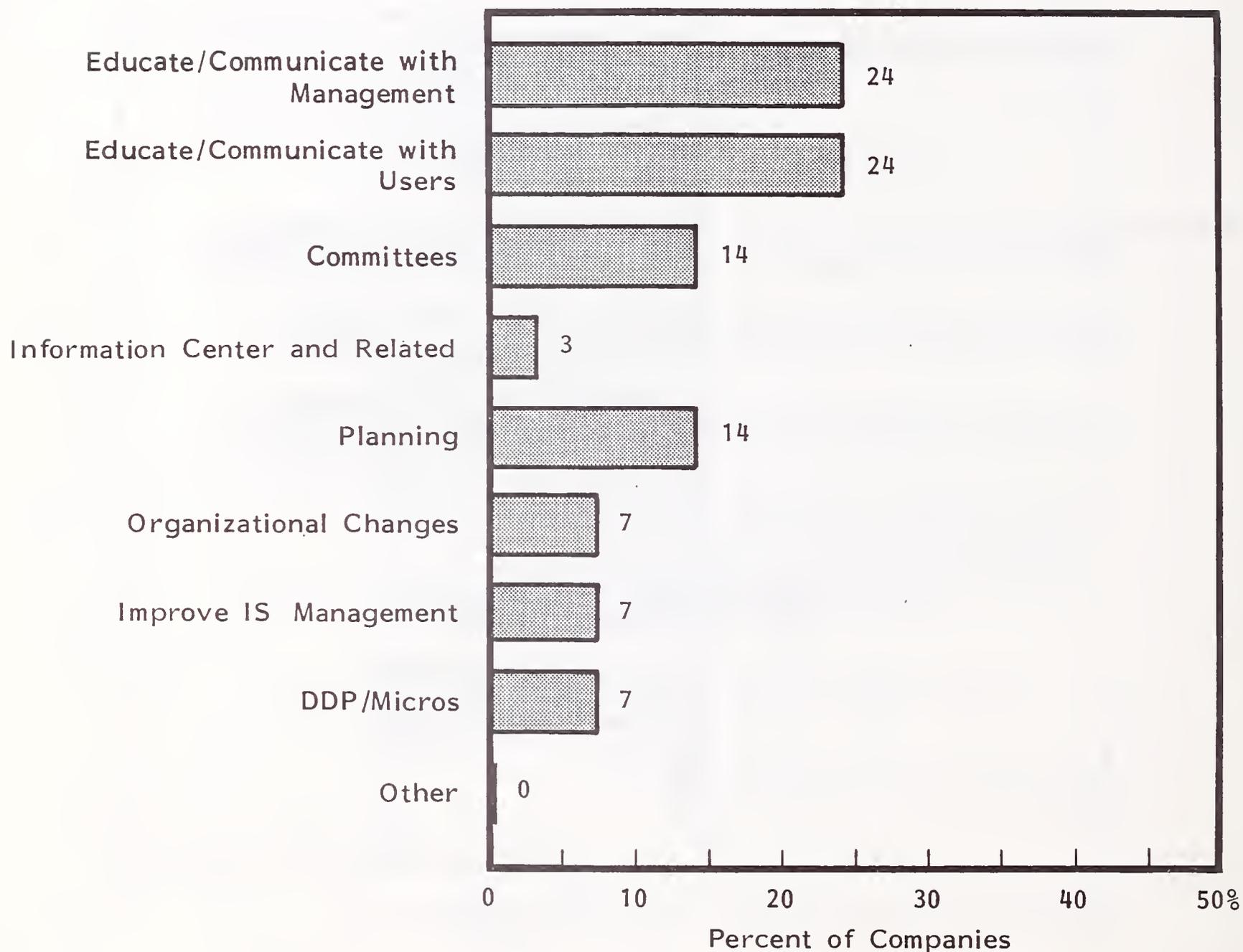
PERSONAL COMPUTER ACQUISITION PLANS IN THE BANKING AND FINANCE SECTOR

Expected Level of Use
of Personal Computers
in Five Years
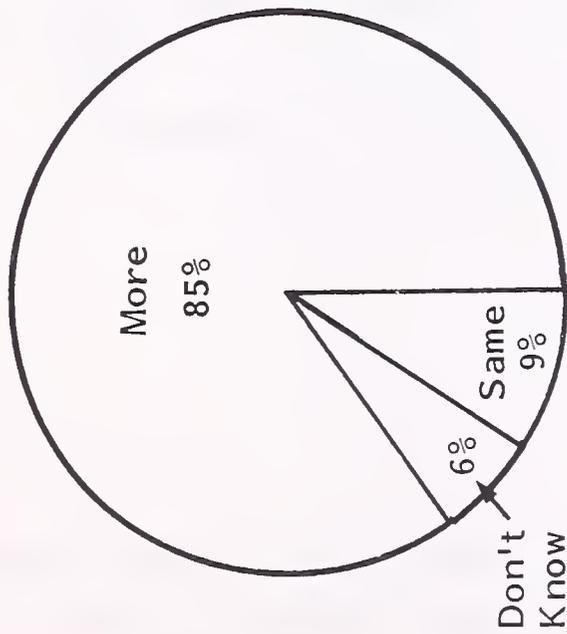
User Plans for
Additional Personal
Computer Software

User Plans for
Additional Personal
Computer Hardware

More
85%

Same
9%

6%

Don't
Know

Additional
Software
Planned
40%

No Current
Plans
60%

Additional
Hardware
Planned
47%

No Current
Plans
53%

Source

Package   50

In-house/
Custom   50

Hardware
Type*

Additional
PCs   59

Additional
Peripherals   29

Other   24
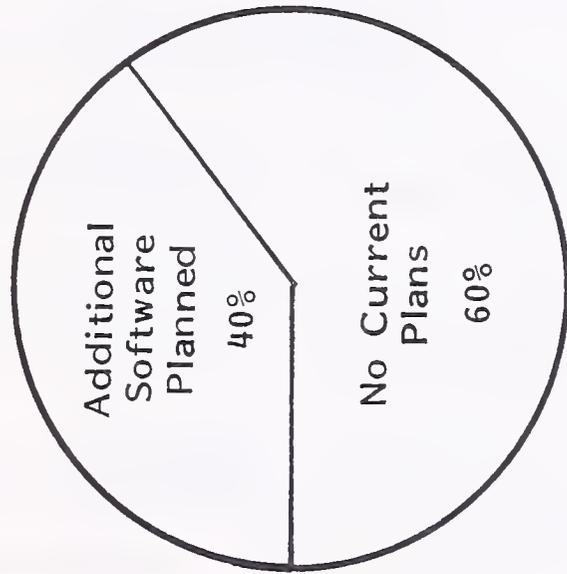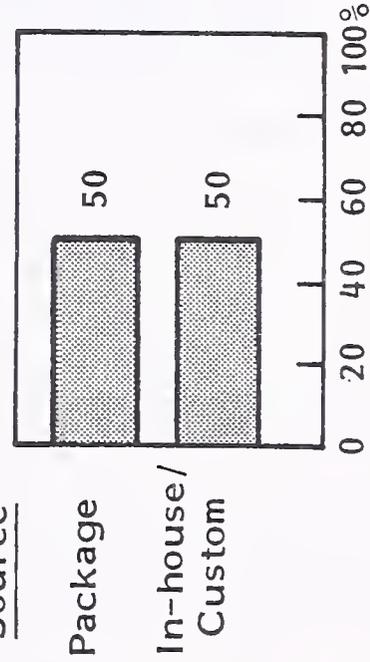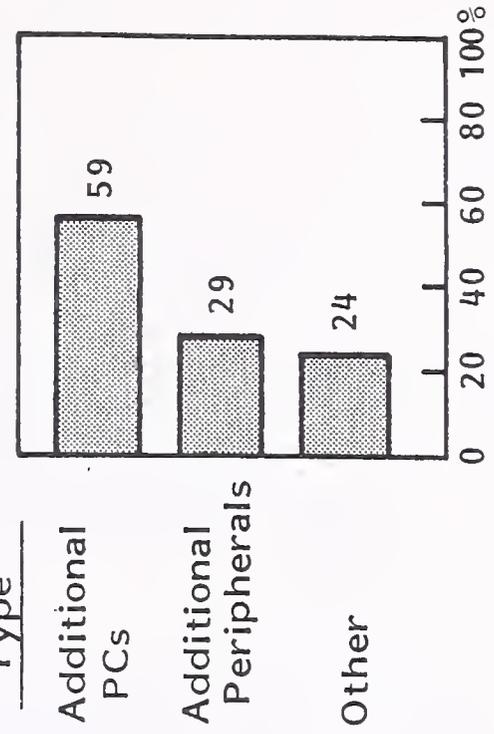
* Totals more than 100%
because of multiple plans

SOURCE: INPUT Surveys

INPUT
UA82

- Plans for obtaining additional personal computer hardware.

- Expected plans are very close to those of industry in general.

- Exhibit III-103 shows the types of personal computer software packages now used.

  - As might be expected in this sector, the "Calcs" account for most packages used.

- The general categories of applications used are summarized in Exhibit III-104.

  - The general types of applications are similar to those in other sectors.

  - Exhibit III-105 provides examples of actual personal computer applications in use in the banking and finance sector.

- Compared to the average user, personal computer users in this sector are less likely to rely on the IS department for assistance, as shown in Exhibit III-106.

- In this sector 79% of departments using personal computers have had their installation less than a year, as shown in Exhibit III-107, compared to 78% generally.

G.   INSURANCE SECTOR

1.   BUDGETS

- In this sector 91% of the companies expect budget increases in 1983, compared to 61% generally; none expects a decrease compared to 8% generally, as shown in Exhibit III-108.

INPUT

EXHIBIT III-103

TYPES OF PERSONAL COMPUTER SOFTWARE PACKAGES
USED BY THE BANKING AND FINANCE SECTOR

Type of Package

Type of Package	Percent of Departments Using
"Calcs"	86
Word Processing	32
Languages/System Support	11
Business Planning	14
Graphics	8
Office Support	14
DBMS	0
Communications	0
Other	3

Percent of Departments Using
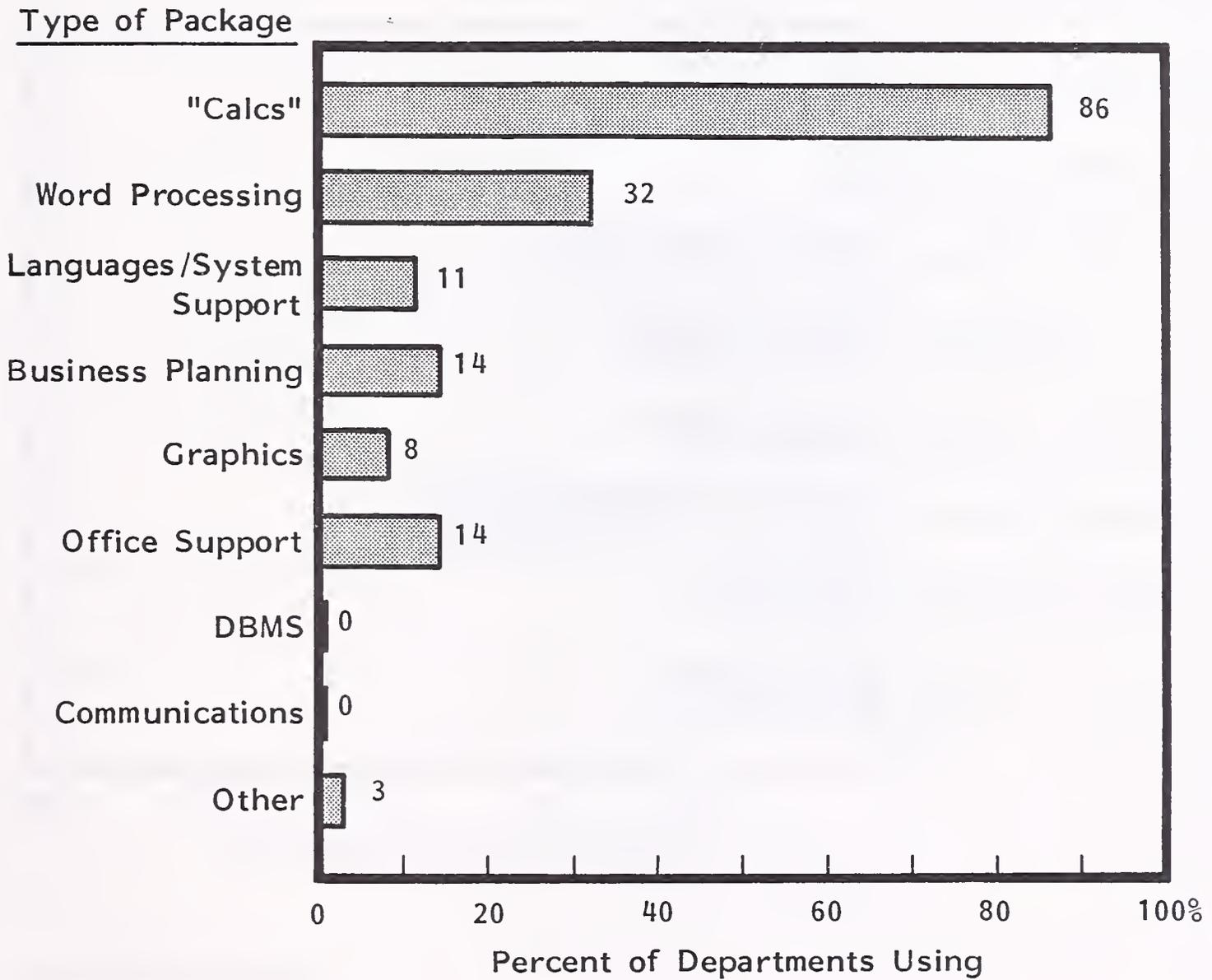
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-104

PERSONAL COMPUTER APPLICATIONS
IN THE BANKING AND FINANCE SECTOR
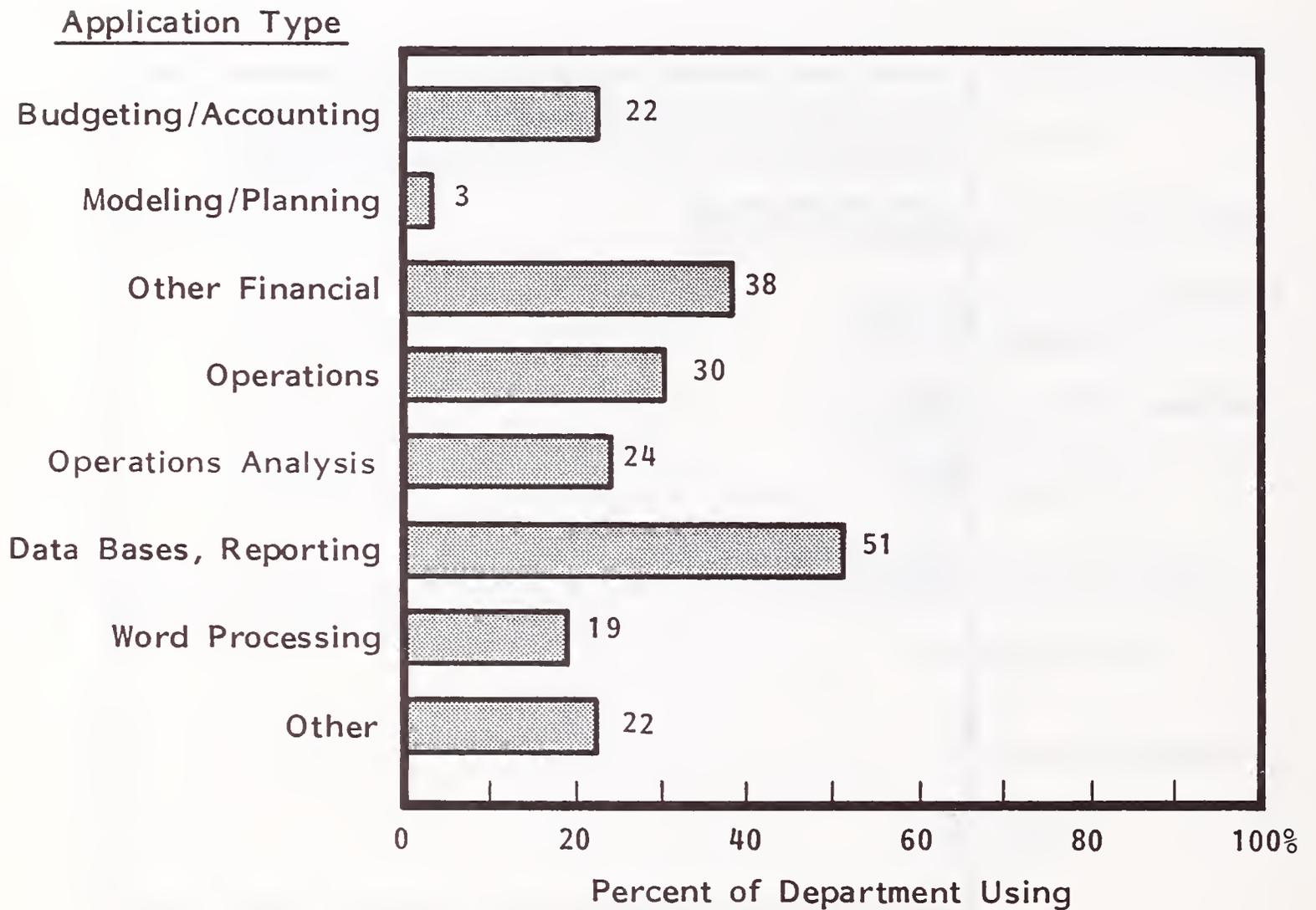
EXHIBIT III-105

PERSONAL COMPUTER APPLICATIONS
IN THE BANKING AND FINANCE SECTOR

Cash Management	Demographic
Depreciation Analysis	Market Research
Purchase versus Lease Analysis	Promotion Letters
Statistical Data	Investment Analysis
Interest Rates	Fixed Assets
Spread Sheet	TSO
Financial Analysis and Modeling	Business Graphics
Management Reports	Consolidation of Subsidiaries
Profit and Loss	Cost Flow
Future Customer Work	Internal Applications
Reports	Billing Program
Communications	Trend Analysis
Bond Management	Float Report
Records	Bond Issue
Payroll	Debt Structuring
Word Processing	Records Verification
Job Descriptions	Mail Lists
DBMS	Dow Jones Lists
Amortization	Slide Production
Scheduling	Graphics
Scoring Test Profiles	Real Estate Tracking

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-106

SOURCES OF ASSISTANCE FOR PERSONAL COMPUTER USERS
IN THE BANKING AND FINANCE SECTOR
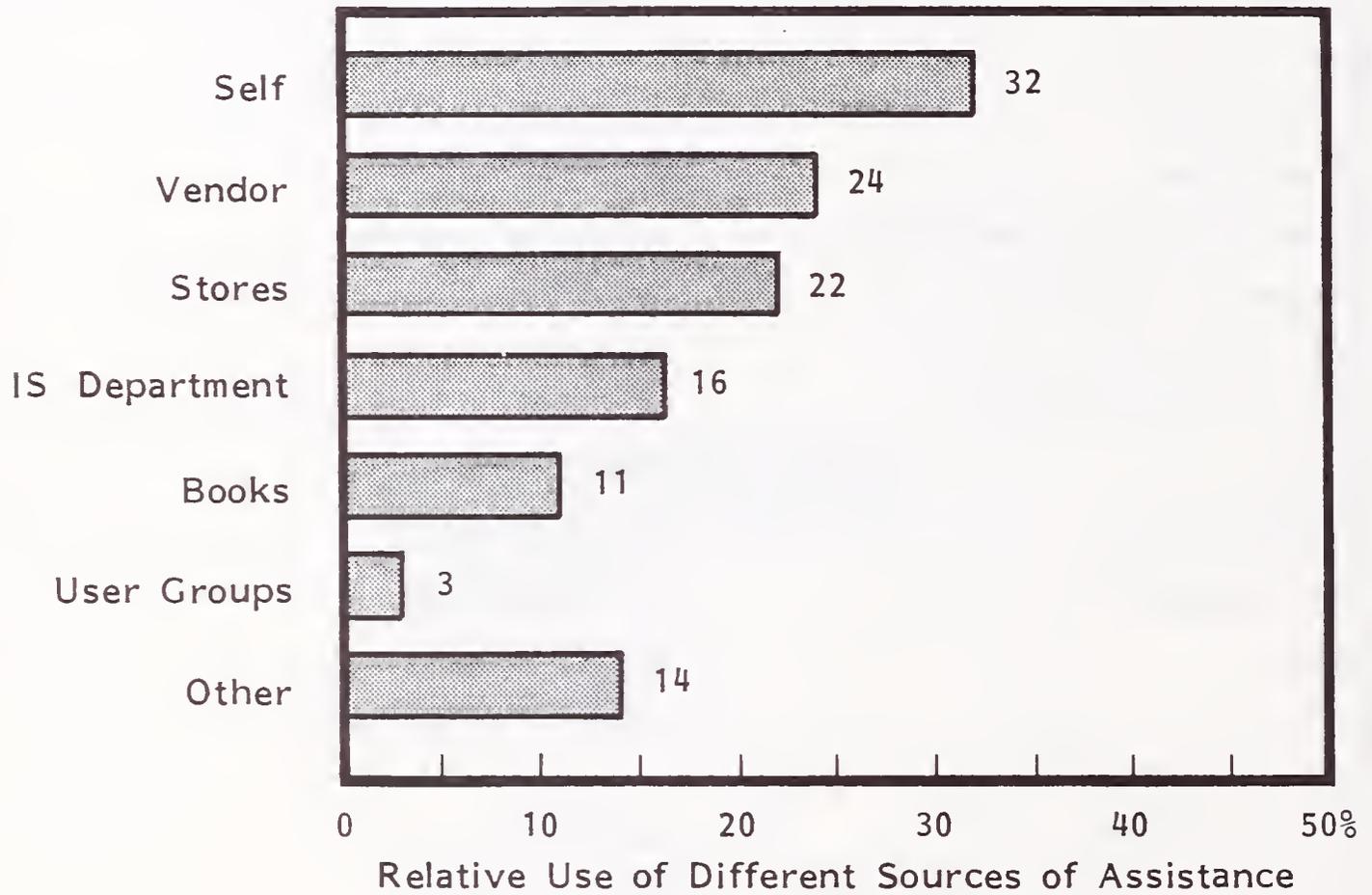
Relative Use of Different Sources of Assistance

Note: Total Is More Than 100% Because of Multiple Sources.   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-107

TIME SINCE FIRST PERSONAL COMPUTER INSTALLED IN USER DEPARTMENTS IN THE BANKING AND FINANCE SECTOR

Time Since
First Installed
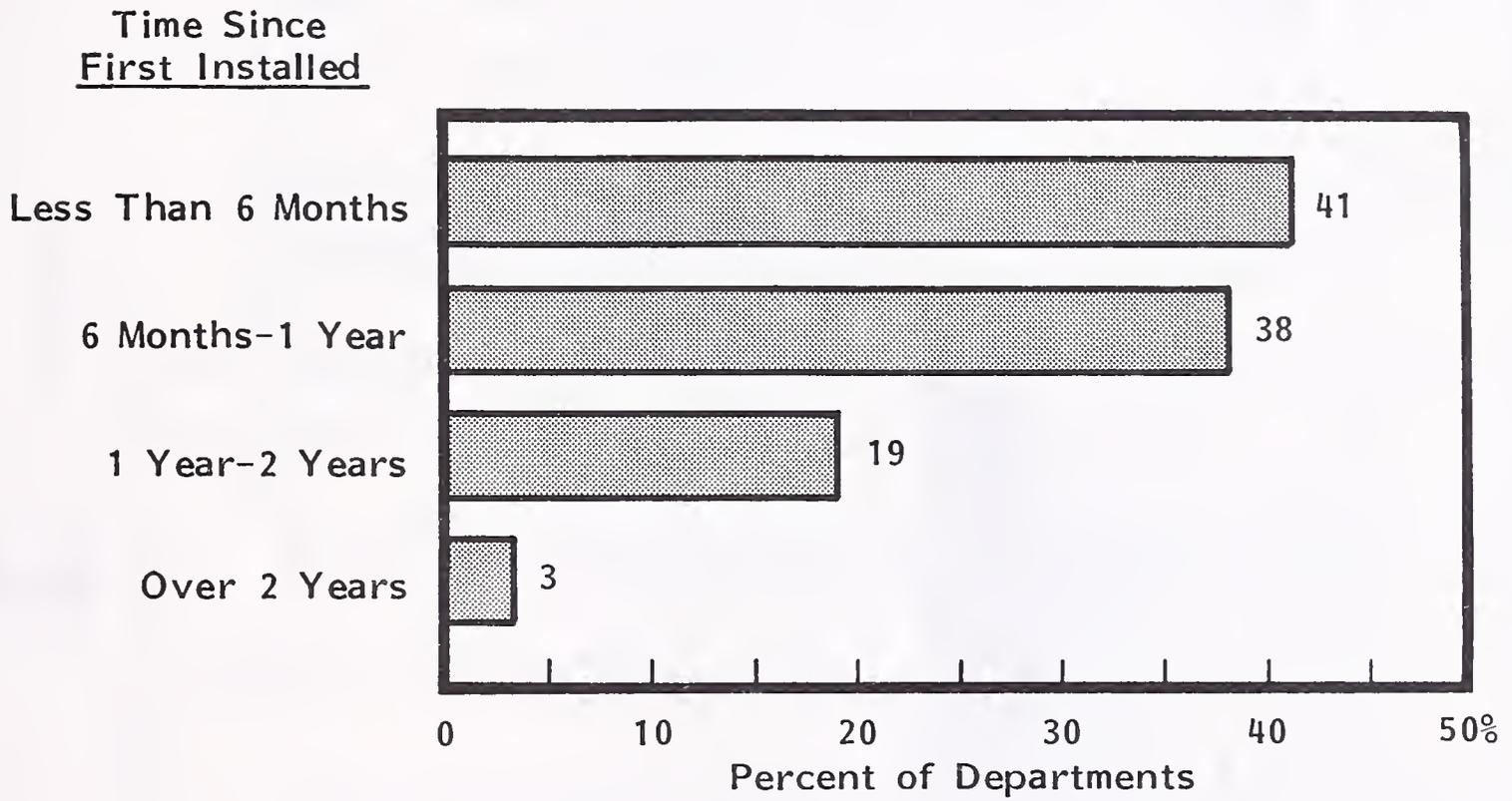
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-108

ANTICIPATED BUDGET INCREASES FOR 1983 IN THE INSURANCE SECTOR
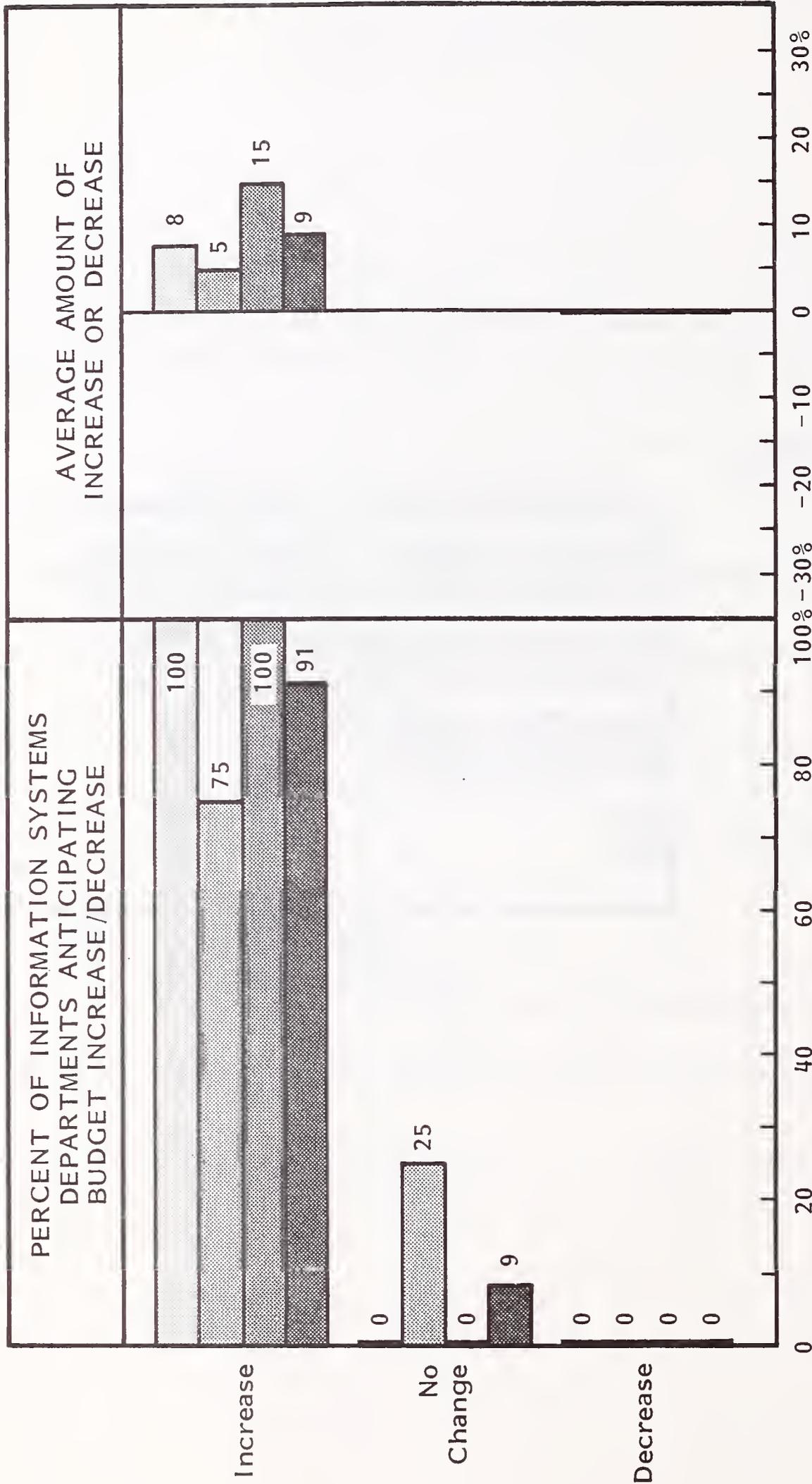
SOURCE: INPUT Surveys

Key: (Company size; $ millions, annual revenue)

☐ Under $200 Million

▨ $200 Million – $1 Billion

▨ Over $1 Billion

■ Total

INPUT
UA82

- Companies expecting to increase their budgets foresee an average rise of 9%.

• The budget increases expected vary by company size.

  - Large companies: 100% expect increases in the insurance sector, compared to 63% for large companies generally.

  - Medium compnies: 75% expect increases, compared to 63% for medium companies generally.

  - Small companies: 100% expect increases, compared to 57% for small companies generally.

• The average budget growth expected for 1983 in the insurance sector is 8%, compared to 12% in 1982.

  - This represents a decline of 31% in the average rate of growth.

• The 1982 IS budget distribution is shown in Exhibit III-109.

  - Mainframes, terminals, and software are the leading growth areas.

• Exhibit III-110 shows the range of the ratios between the IS budget and the company's total revenues which exist in the insurance sector.

  - The IS percentage of total revenues for the average company (i.e., at the 50th percentile) in each size group was:

    • For large and medium companies: 1.0%, compared to 0.7% for this size company generally.

- 239 -

INPUT

EXHIBIT III-109

1982 BUDGET DISTRIBUTION AND 1982/1983 CHANGES
IN THE INSURANCE SECTOR

BUDGET CATEGORY	PERCENT OF IS BUDGET (1982)	EXPECTED CHANGE 1982 to 1983
Personnel	51%	7%
Hardware		
Mainframe	17	13
Mini/Microcomputer	2	6
Terminals	3	14
Peripherals	2	2
Communications	4	6
Software and Services		
Software	3	14
Processing Services	2	-6
Software Maintenance	1	8
Hardware Maintenance	4	10
Other	11	10
Total	100%	8%

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-110

INFORMATION SYSTEMS BUDGET AS PERCENT OF TOTAL REVENUES IN THE INSURANCE SECTOR
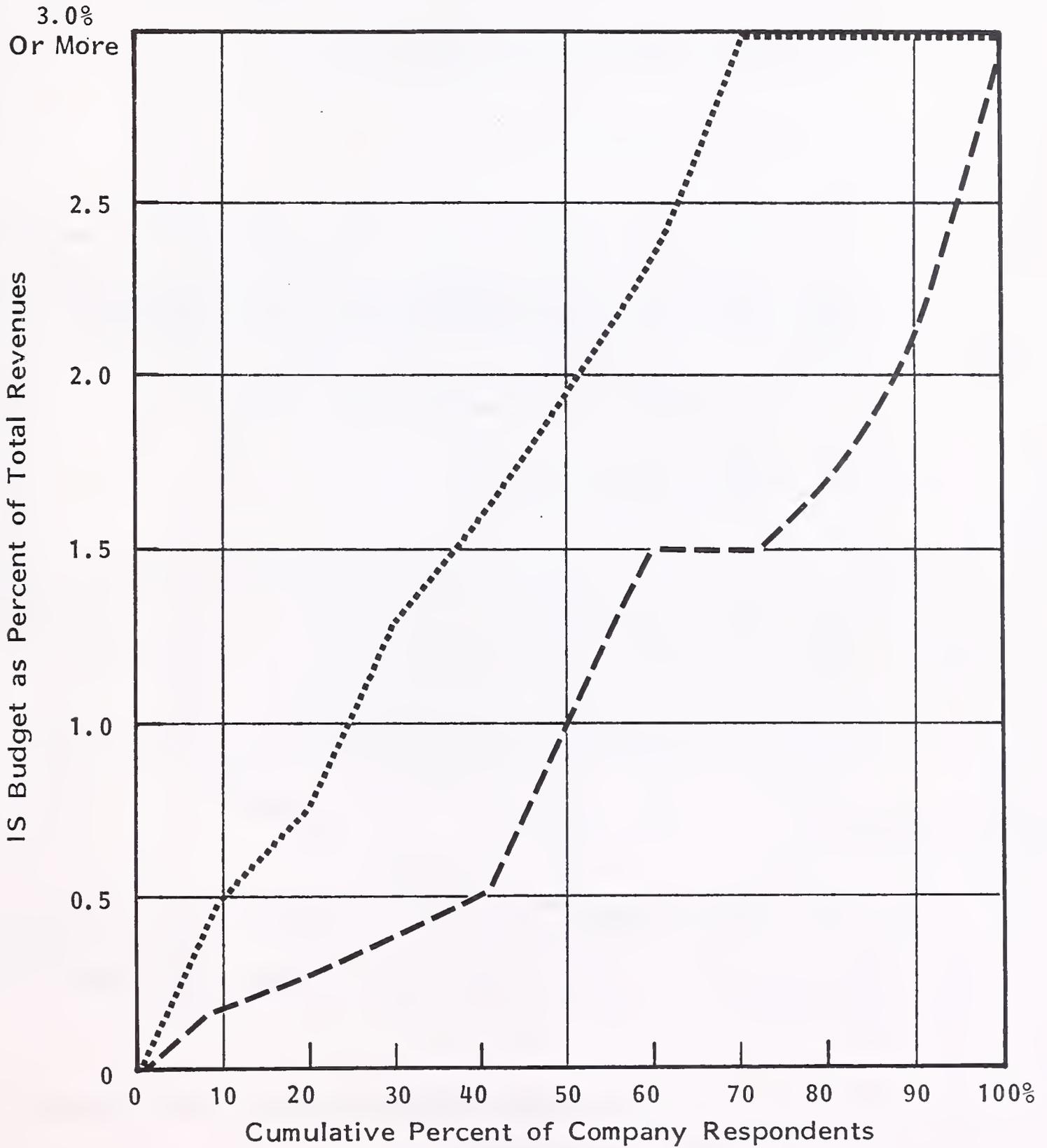
Key: Company Size = ·········· $0 - $199, ━ ━ ━ $200 and Over

NOTE: Revenues = Premiums (Direct Premiums for P & C)   SOURCE: INPUT Surveys

- 241 -

INPUT
UA82

.   For small companies: 2.0%, compared to 1.2% for this size
        company generally.

-       The companies that spend least on data processing as a percentage of
        revenues are those at and below the 20th percentile. Taking the 10th
        percentile as representative, their IS spending percentages were:

        .   Large and medium companies: 0.2%.

        .   Small companies: 0.5%.

-       The companies that spend the most on data processing as a percentage
        of revenues are those at and above the 80th percentile. Taking the
        90th percentile as representative, their IS spending percentages were:

        .   Large and medium companies: 2.1%.

        .   Small companies: 3.0%.

●   Median spending on IS per corporate employee was $2,840. However, there
    was a broad range of spending ratios, as shown in the diagram in Exhibit III-
    111.

    -       The reasons for this variation were discussed in Chapter II, Section B.

2. STAFFING

●   In the insurance sector 73% of companies expect their IS staffs to increase in
    the next 12 months, compared to the industry average of 58%, as shown in
    Exhibit III-112.

    -       The net increase in number of staff is expected to be 6%, compared to
            the all-industry average of 4%.

INPUT

EXHIBIT III-111

INFORMATION SYSTEMS SPENDING PER EMPLOYEE
BY COMPANY SIZE IN THE INSURANCE SECTOR

©1982 by INPUT. Reproduction Prohibited.

IS Spending per Employee

($ thousands)

– – – – – = Median   SOURCE: INPUT Surveys

- 243 -
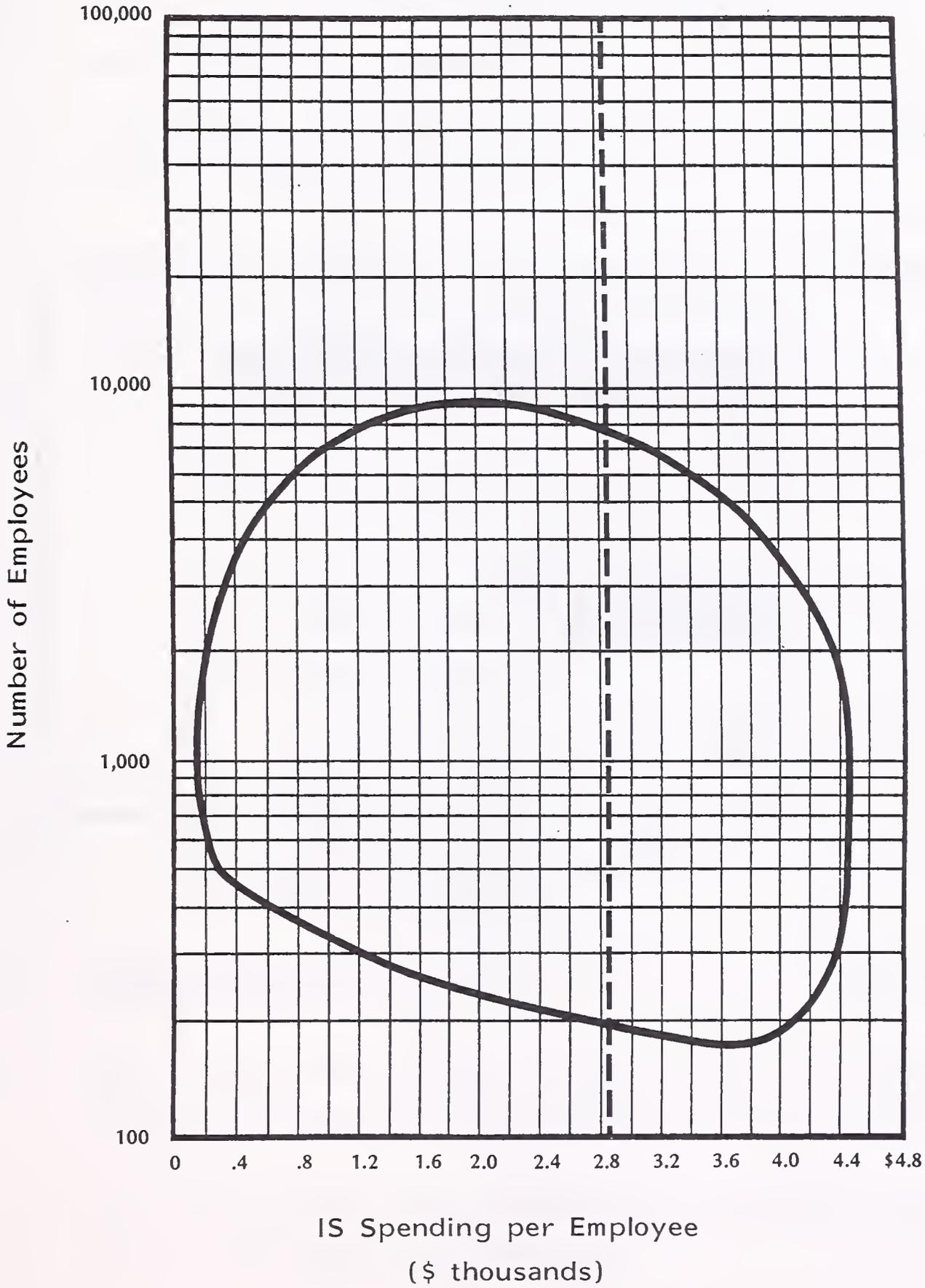
INPUT
UA82

EXHIBIT III-112

INFORMATION SYSTEMS STAFFING CHANGES EXPECTED IN THE NEXT TWELVE MONTHS IN THE INSURANCE SECTOR

Percent of
Companies Expecting:

IS Staff Increase — 58, 73

IS Staff Decrease — 7, 0

No Change — 35, 27

Net Average Change Expected — 4, 6

Rate of Change in IS Staffing
in Next 12 Months
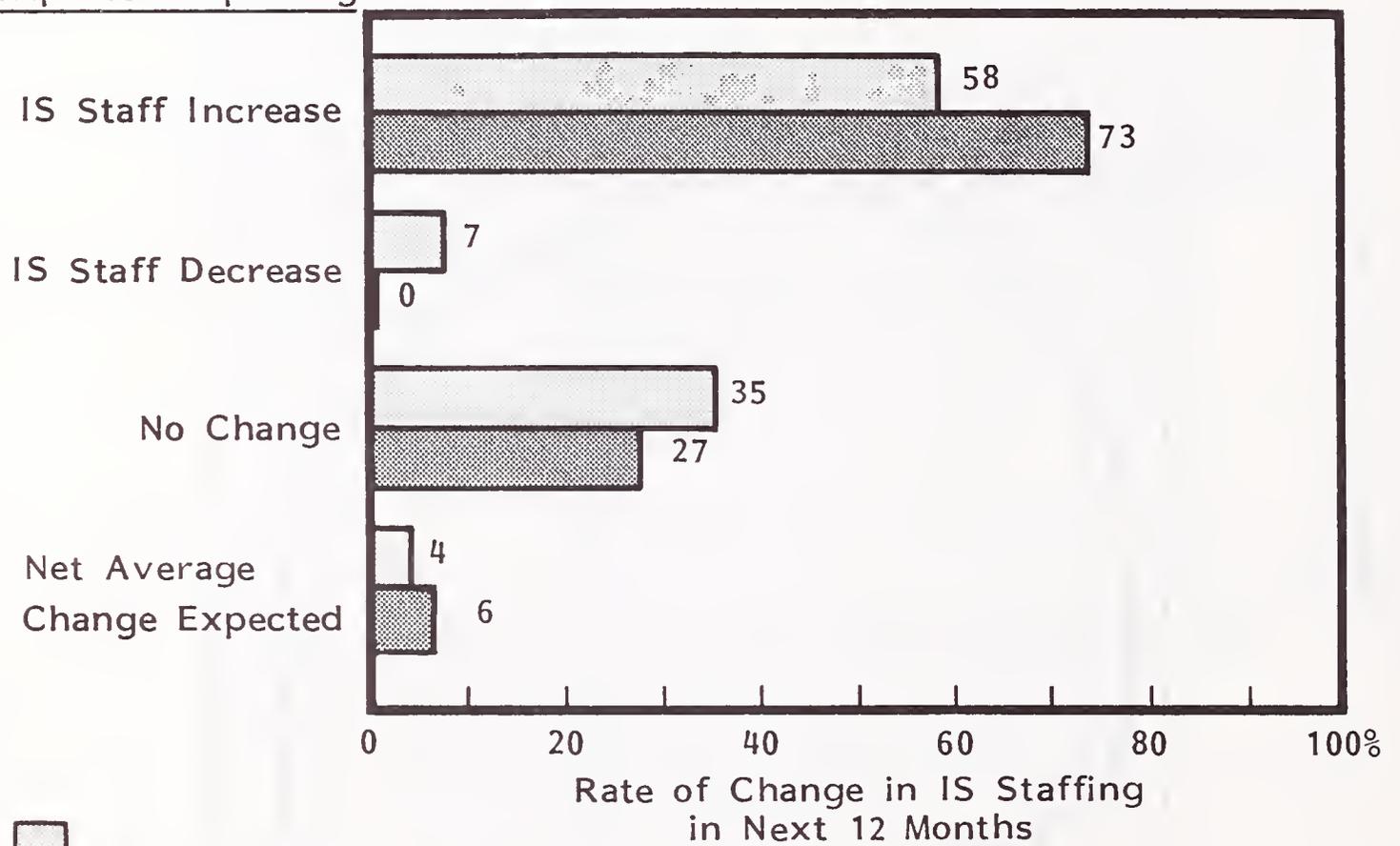
☐ All Industries

▨ Insurance

SOURCE: INPUT Surveys

- 244 -

INPUT
UA82

- Turnover in this sector is expected to be about 60% of the all-industry average in 1983, as shown in Exhibit II-9.

  - Current turnover rates for individual positions are shown in Exhibit III-113. For technical positions the turnover rate is close to the all-industry average.

- Difficulty in recruiting staff in this sector is generally the same as for other sectors, as shown in Exhibit III-114.

- The number of programs to be maintained averages 1,000 in this sector, although the range, both in absolute numbers and based on company size, is quite broad, as shown in Exhibit III-115.

  - Maintenance, as a proportion of total workload, is very close to the all-industry average, as shown in Exhibit III-116.

  - Company size does have an appreciable effect on maintenance loads, with the larger companies reporting considerably higher maintenance loads, as shown in Exhibit III-117.

    - However, the large company maintenance load is supposed to drop by almost 20 percentage points over a two-year period. Many new application packages are expected to be installed during this period.

3. INFORMATION SYSTEMS ISSUES

- Note: please refer to Chapter II, Section D for a general discussion of IS problems, objectives, and initiatives and their interrelationships.

- The insurance industry sees its major problems as hardware, and planning and control issues, as shown in Exhibit III-118.

INPUT

EXHIBIT III-113

INFORMATION SYSTEMS STAFFING CURRENT ANNUAL TURNOVER
IN THE INSURANCE SECTOR
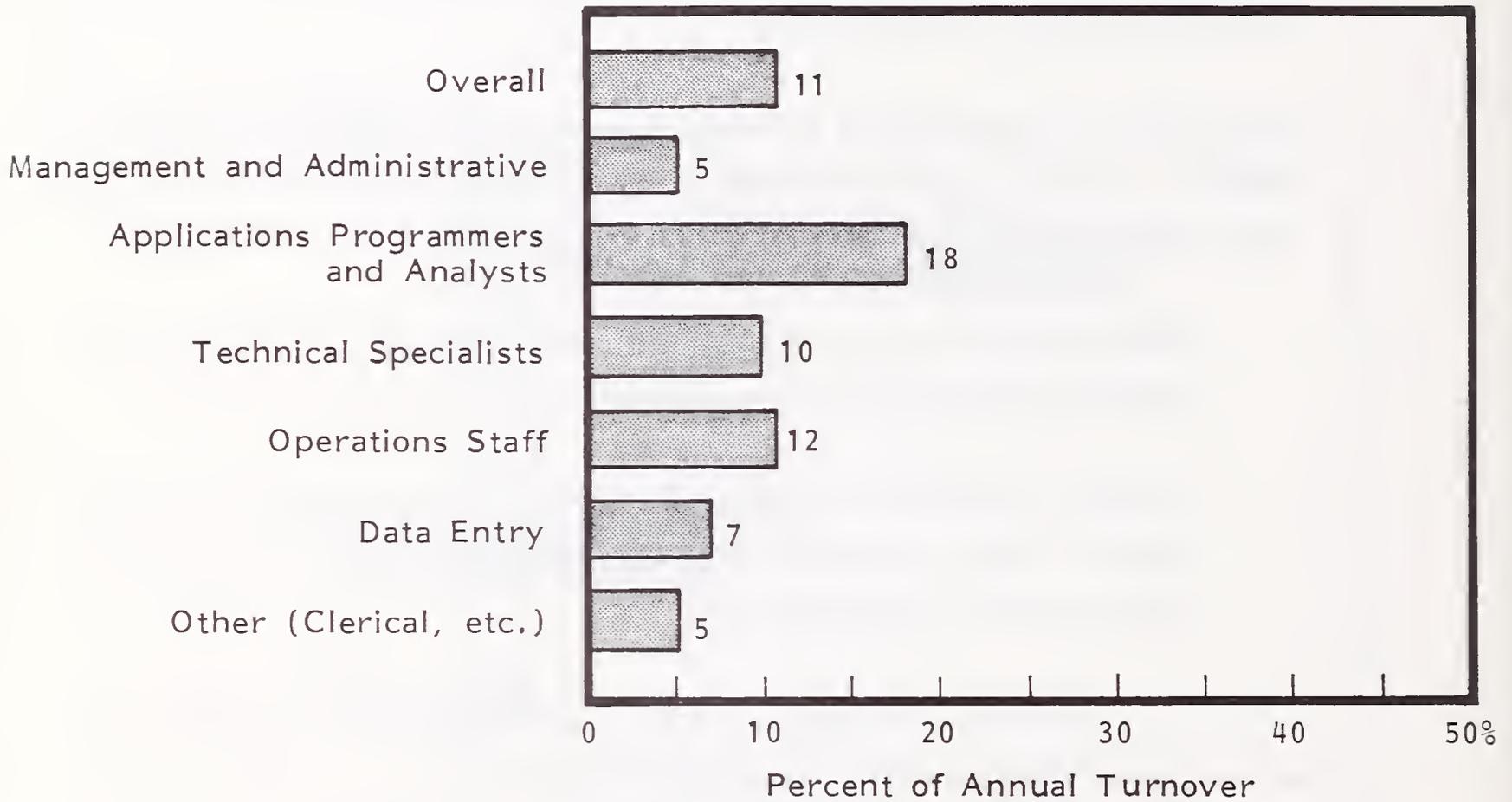
SOURCE: INPUT Surveys

INPUT

EXHIBIT III-114

INFORMATION SYSTEMS DIFFICULTY IN RECRUITING STAFF
IN THE INSURANCE SECTOR
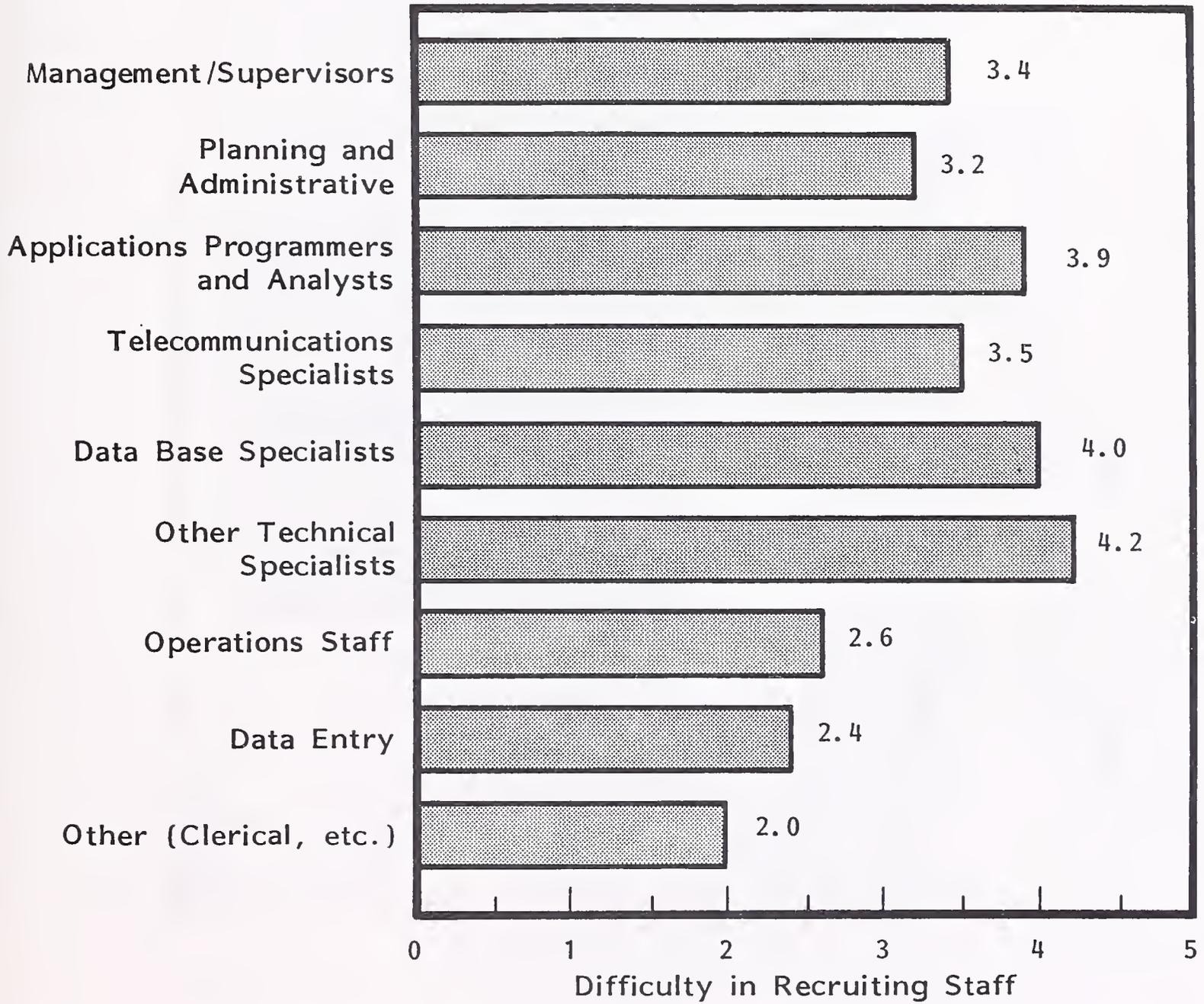
Category	Difficulty
Management/Supervisors	3.4
Planning and Administrative	3.2
Applications Programmers and Analysts	3.9
Telecommunications Specialists	3.5
Data Base Specialists	4.0
Other Technical Specialists	4.2
Operations Staff	2.6
Data Entry	2.4
Other (Clerical, etc.)	2.0

Difficulty in Recruiting Staff

Scale: 1 = Low, 5 = High

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-115

NUMBER OF PROGRAMS BY COMPANY SIZE
IN THE INSURANCE SECTOR

Company Size ($ millions)

Number of Programs
(thousands)

— — — — = Median   SOURCE: INPUT Surveys

- 248 -
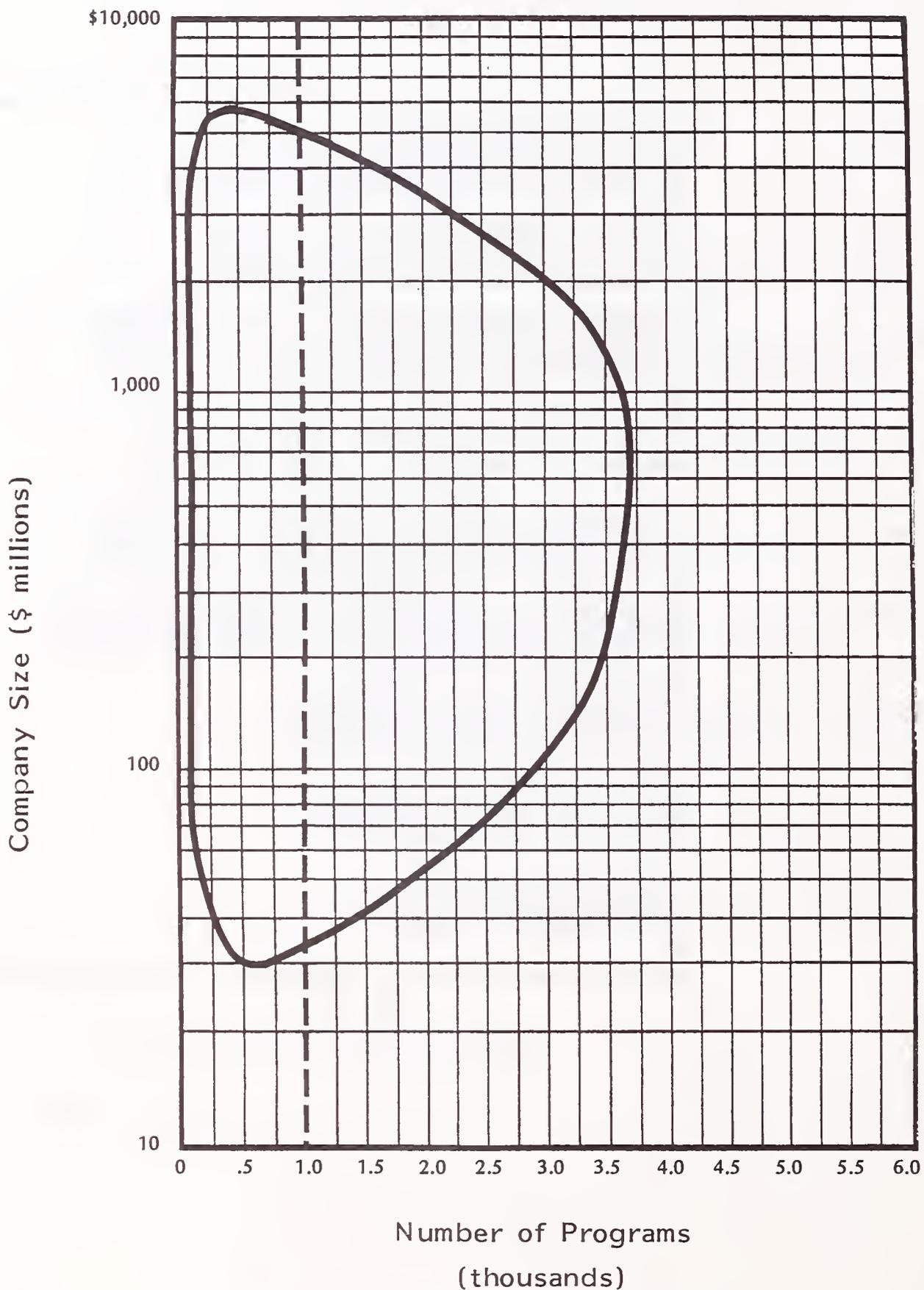
INPUT
UA82

EXHIBIT III-116

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE
IN THE INSURANCE SECTOR, 1981-1983

Percent of Resources
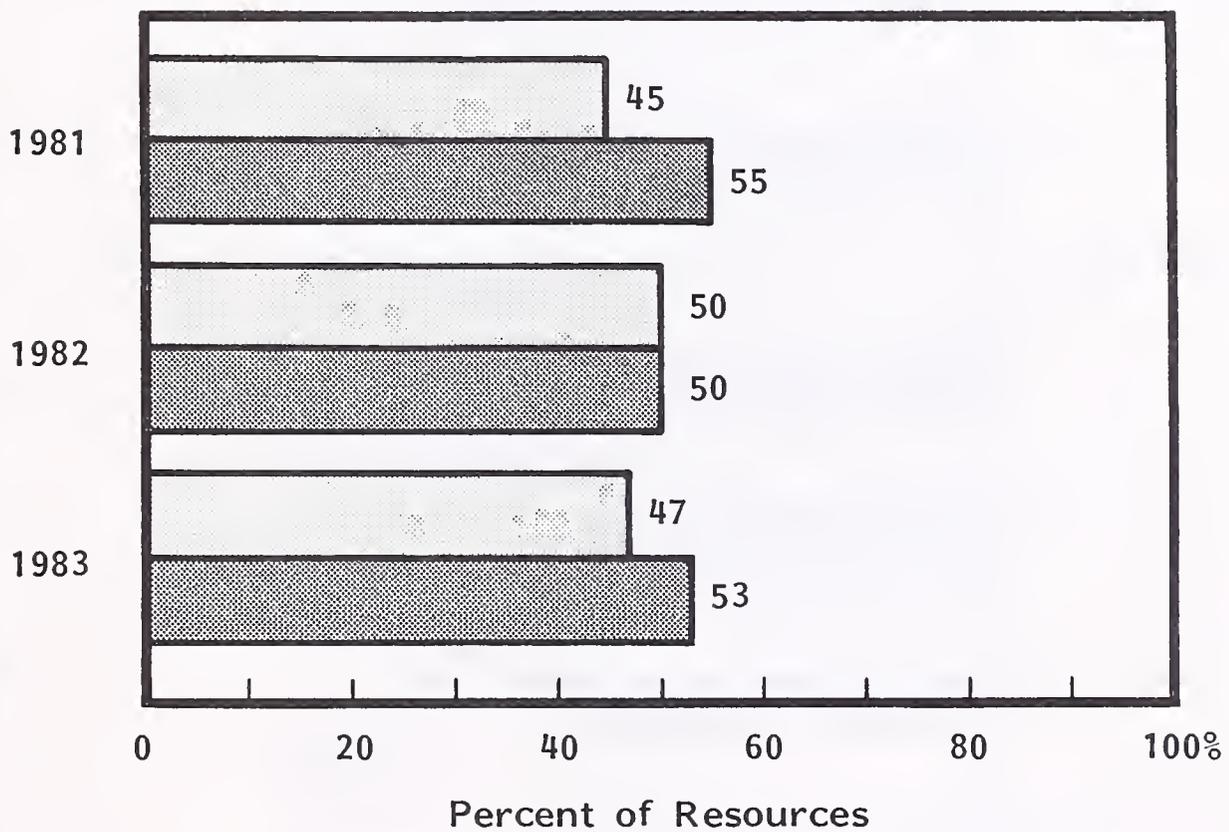
☐ New Development

▨ Maintenance

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-117

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE
IN THE INSURANCE SECTOR, 1981-1983

Company Size

$0-199 Million

1981 43 / 57

1982 48 / 52

1983 44 / 56

$200-999 Million

1981 58 / 43

1982 59 / 41

1983 57 / 43

$1 Billion and Over

1981 28 / 72

1982 38 / 62

1983 47 / 53

Percent of Resources

☐ New Development

▨ Maintenance

SOURCE: INPUT Surveys
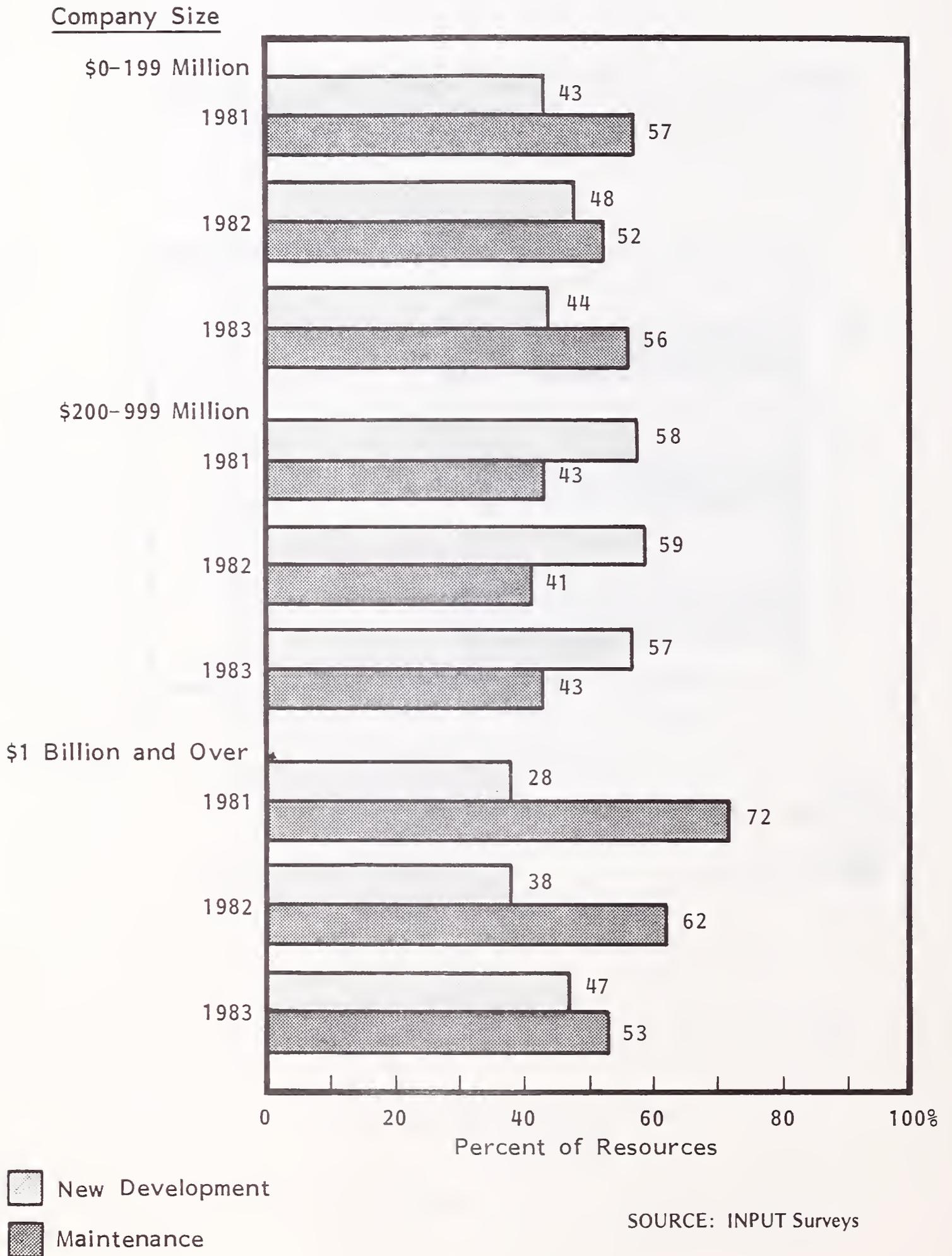
INPUT
UA82

EXHIBIT III-118

INFORMATION SYSTEMS PROBLEMS IN THE INSURANCE SECTOR
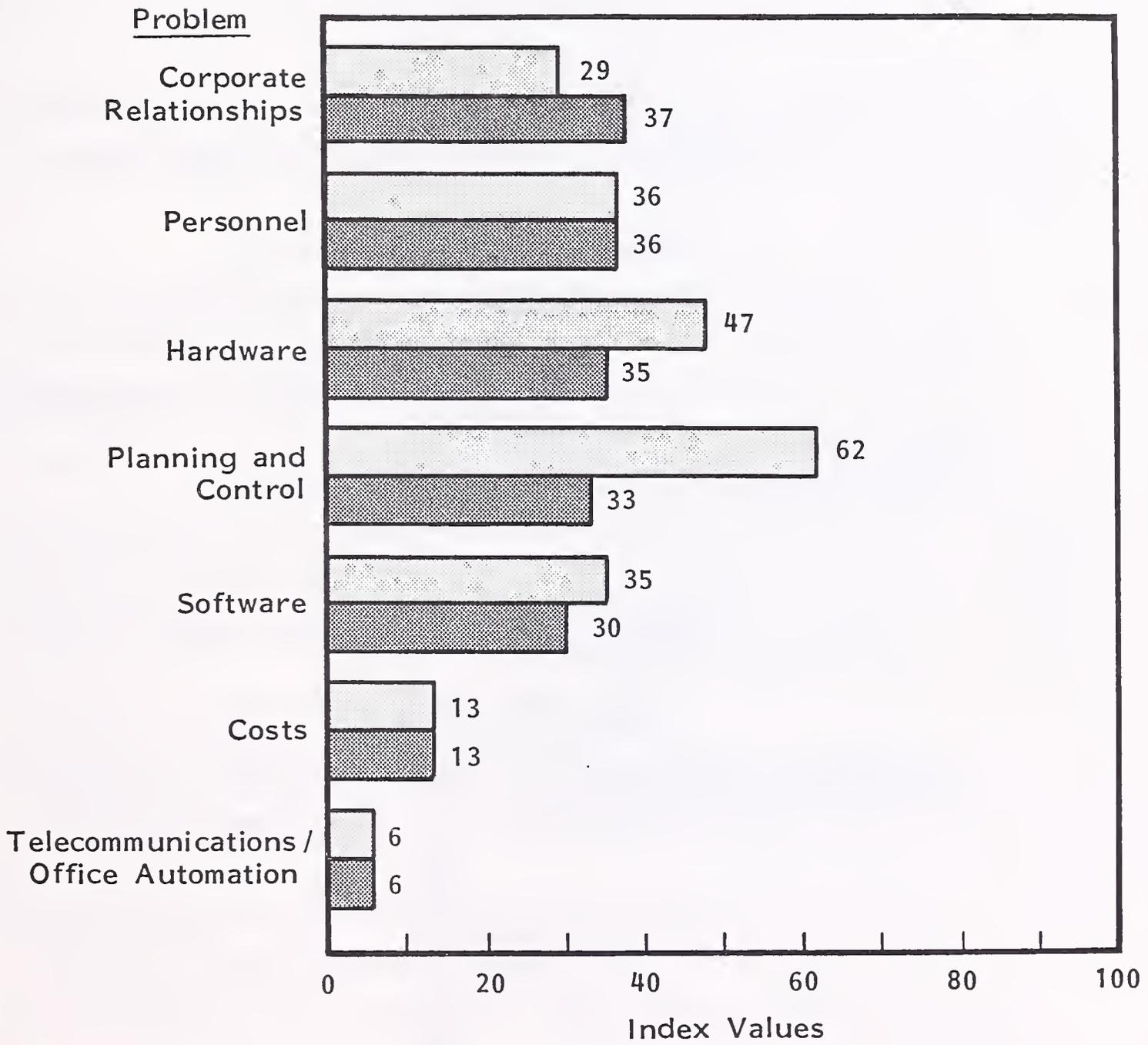
SOURCE: INPUT Surveys

INPUT
UA82

- These are both part of the major decisions that many companies now face in linking together their distribution networks, as shown in Chapter I, Section D.

- More detailed information about specific problem areas is contained in Exhibit III-119. This exhibit shows the percentage of companies in this sector which regard an issue as a major problem.

- The high importance of telecommunications and office automation as a planning objective is directly linked to this distribution planning issue, as shown in Exhibit III-120.

  - More detailed information about specific planning objectives is contained in Exhibit III-121. This exhibit shows the percentage of companies in this sector which have identified particular planning objectives as being of major importance to them.

- However, telecommunications and office automation are still strictly planning issues in virtually all companies. The major initiatives are in the software area; the insurance sector places more emphasis on software than any other sector, as shown in Exhibit III-122.

  - Even companies reasonably satisfied with current software are planning replacements for greater efficiency and to meet competitive offerings.

  - More detailed information about specific areas where an initiative is planned is contained in Exhibit III-123. This exhibit shows the percentage of companies in this sector which plan a major initiative in a particular area.

INPUT

EXHIBIT III-119

INFORMATION SYSTEMS PROBLEMS IN THE INSURANCE SECTOR

Problem	Percent of Companies
Relations with Management	13
Relations with Users	16
Backlog/Workload	23
Planning	19
Cost Constraints	13
Project Control/Management	10
IS Personnel Shortages/Turnovers	36
Other IS Personnel Issues	0
Application System Quality	19
Software Development, Maintenance, Productivity	16
Equipment/Capacity, Computer Operations	34
Network/Telecommunications	3
Hardware	10
OA	3
Other	3

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-120

INFORMATION SYSTEMS OBJECTIVES IN THE
INSURANCE SECTOR

Objective	Index Values
Corporate Relationships	This Sector: 64, All Sectors: 43
Personnel	This Sector: 0, All Sectors: 5
Hardware	This Sector: 16, All Sectors: 16
Planning and Control	This Sector: 32, All Sectors: 32
Software	This Sector: 63, All Sectors: 64
Costs	This Sector: 21, All Sectors: 8
Telecommunications/Office Automation	This Sector: 64, All Sectors: 28

Index Values

☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

- 254 -
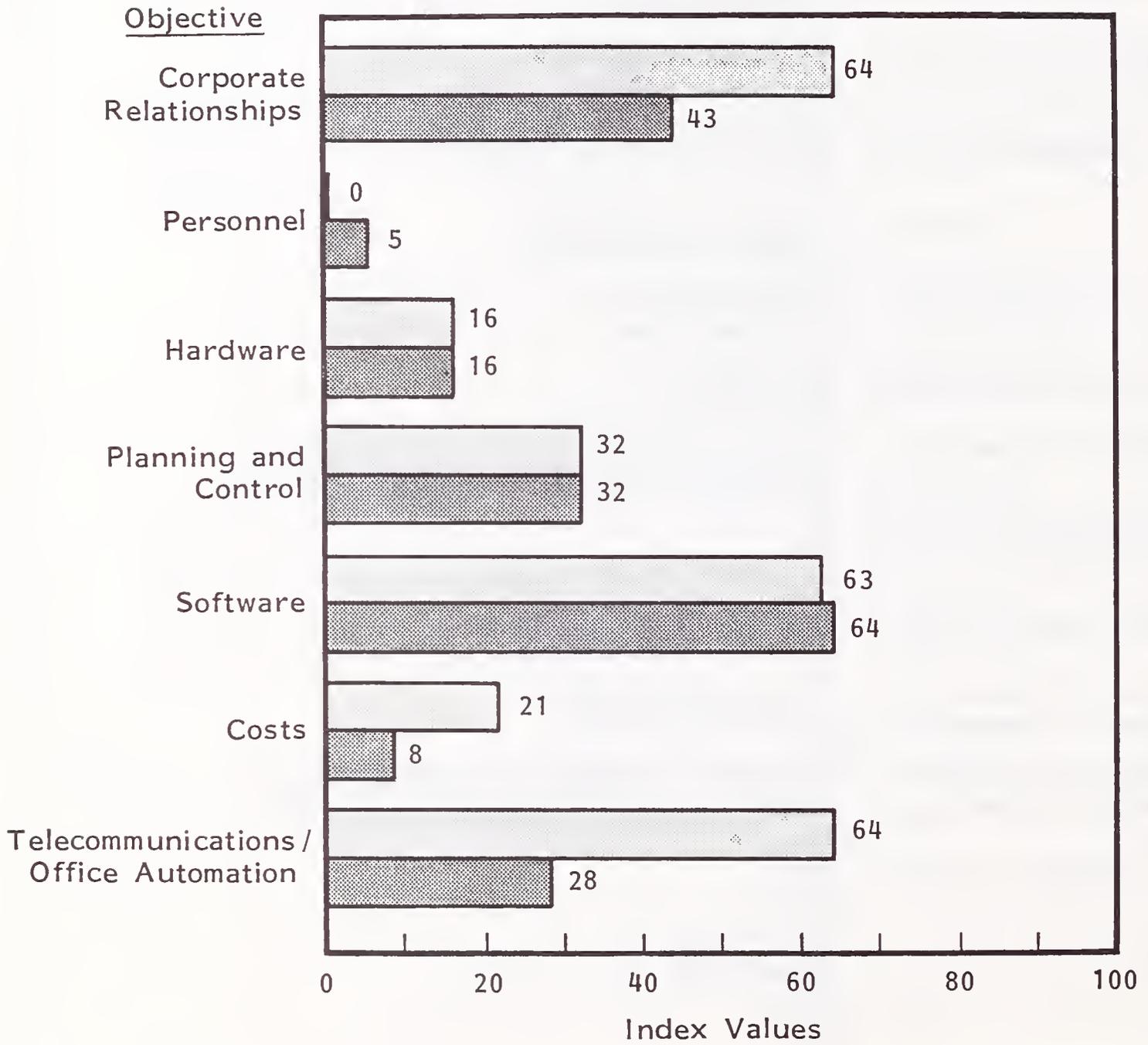
INPUT
UA82

EXHIBIT III-121

INFORMATION SYSTEMS OBJECTIVES
IN THE INSURANCE SECTOR

Objective	Percent
Support Company Objectives	16
Improve User Service/Relations	32
Improve Planning	11
End User Computing	16
Office Automation	32
Improve Management Control	21
Improve Productivity	26
Control Costs	21
Add Staff	0
New/Improved Software	37
New Hardware	5
Network/Telecommunications	32
IS Security/Disaster Recovery	11
Miscellaneous	0

Percent of Companies
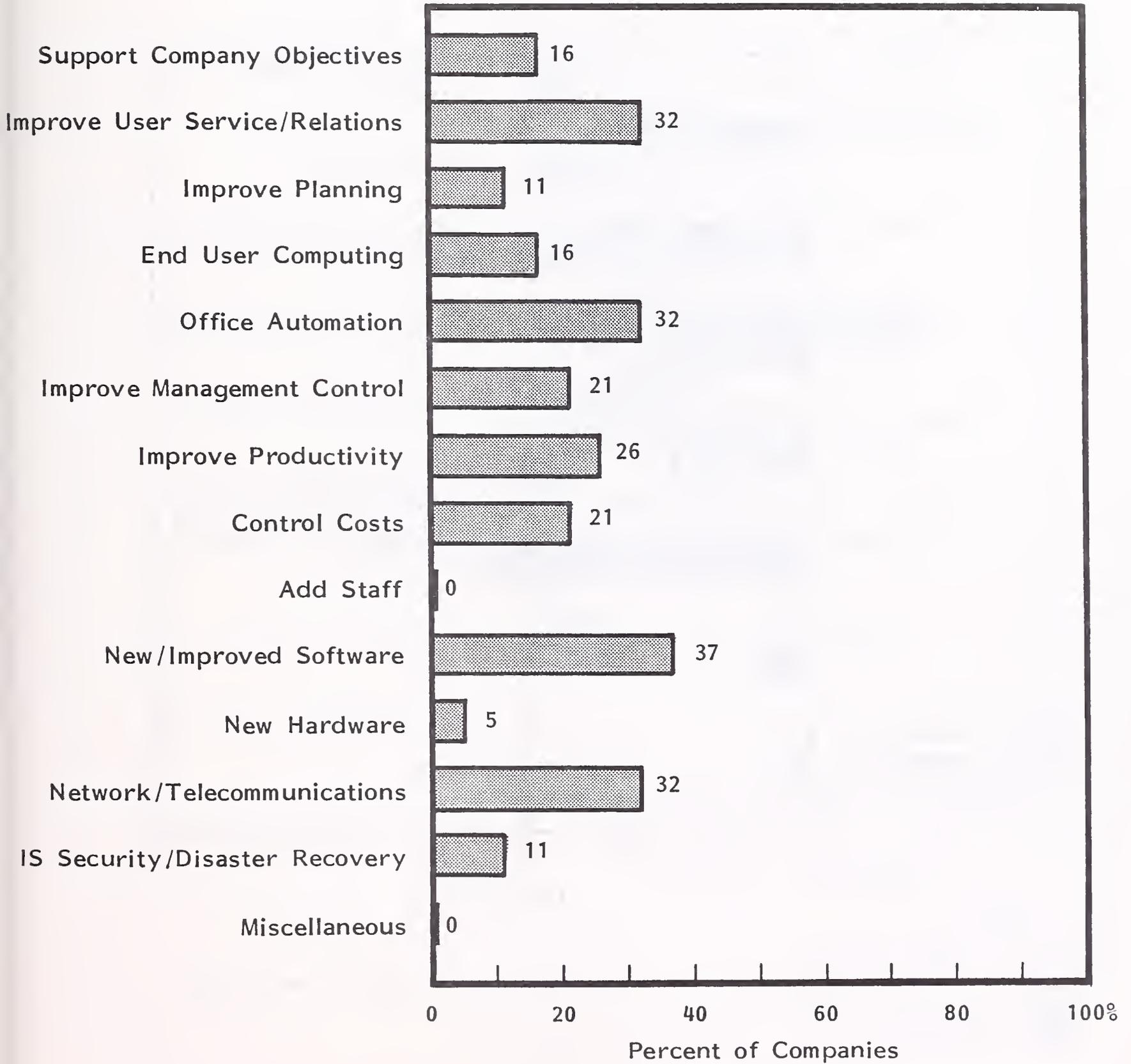
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-122

INFORMATION SYSTEMS INITIATIVES IN THE
INSURANCE SECTOR

Index Values
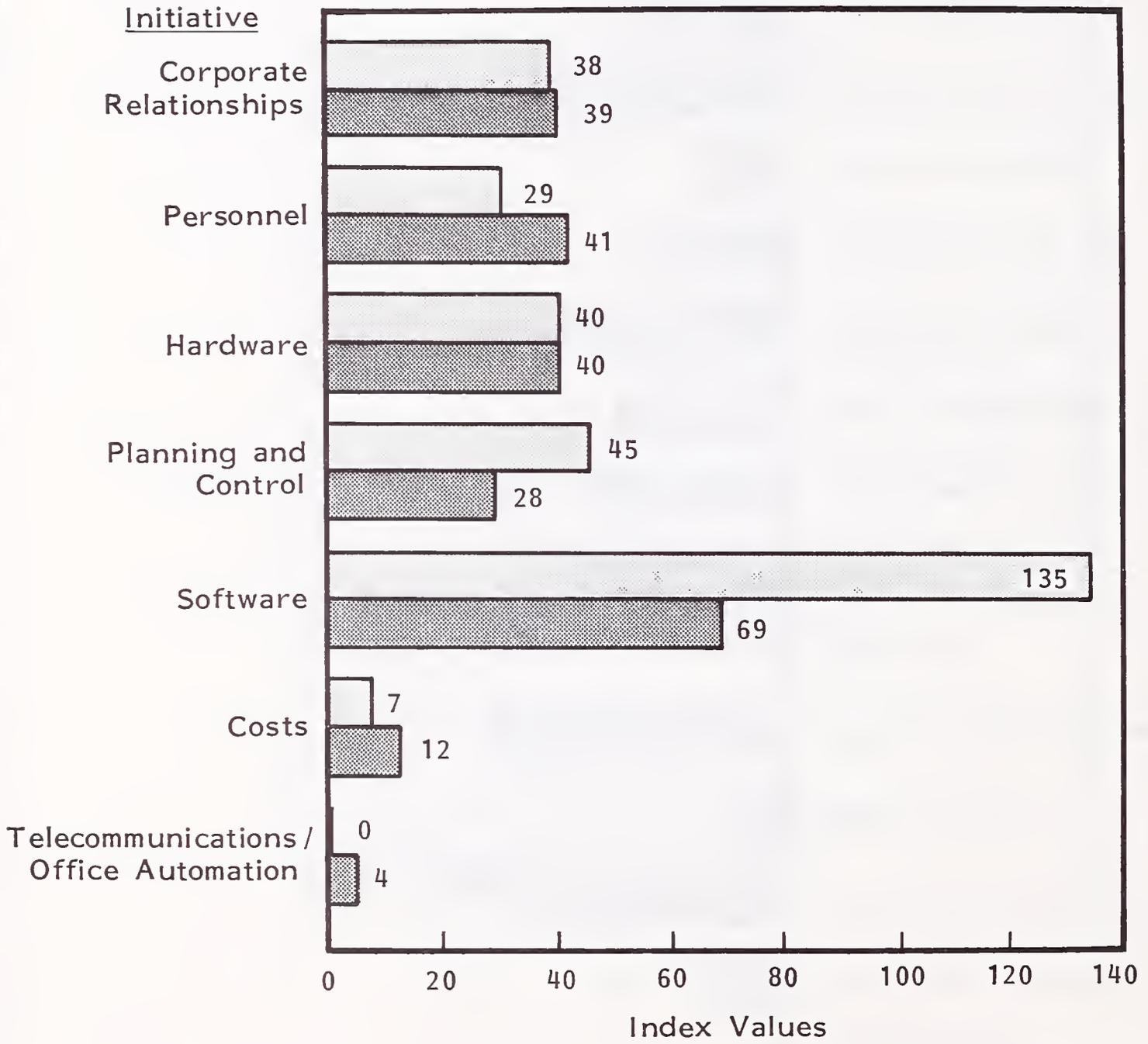
☐ This Sector

▨ All Sectors

INPUT
UA82

EXHIBIT III-123

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE INSURANCE SECTOR

Percent of Companies
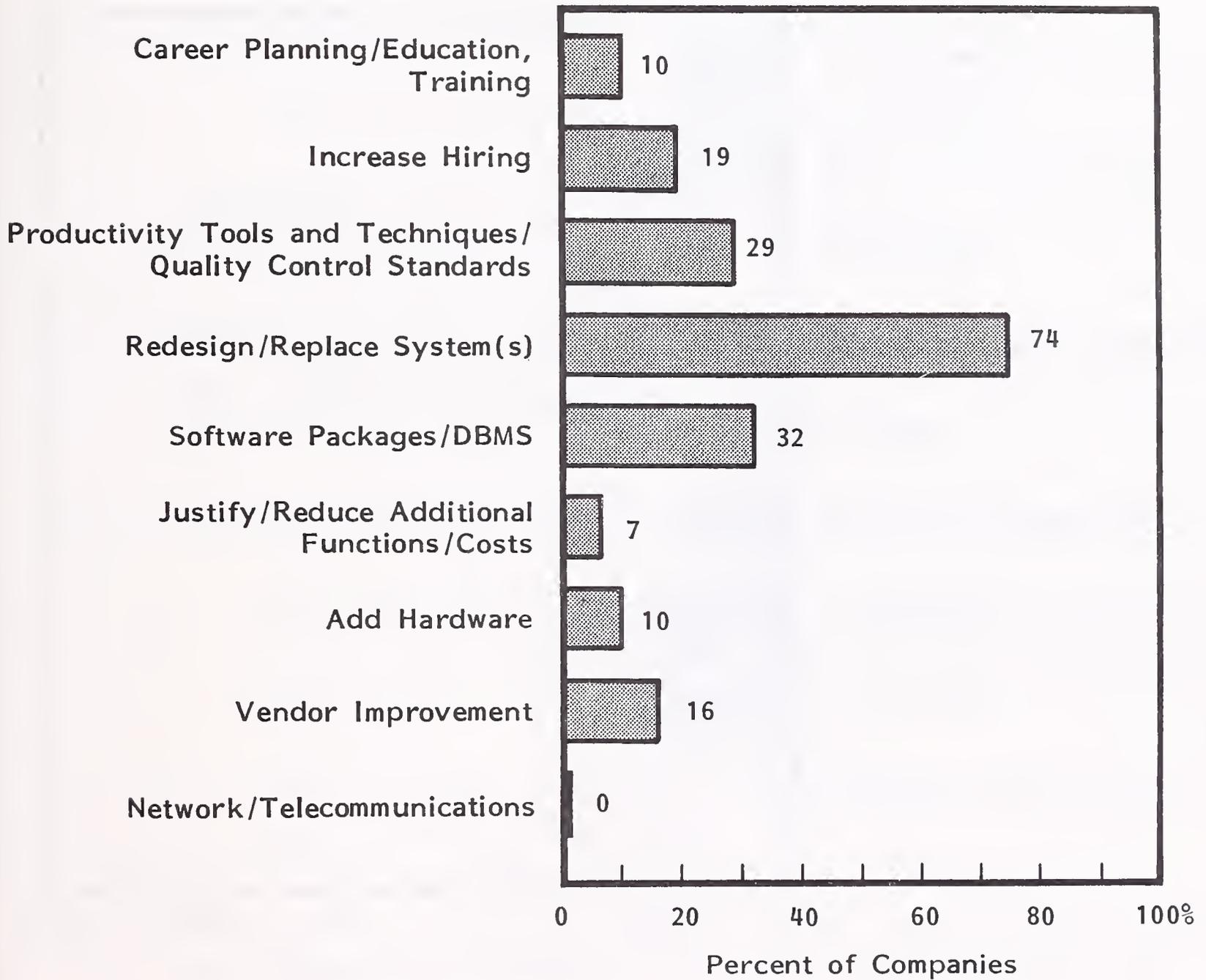
Continued

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-123 (Cont.)

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE INSURANCE SECTOR
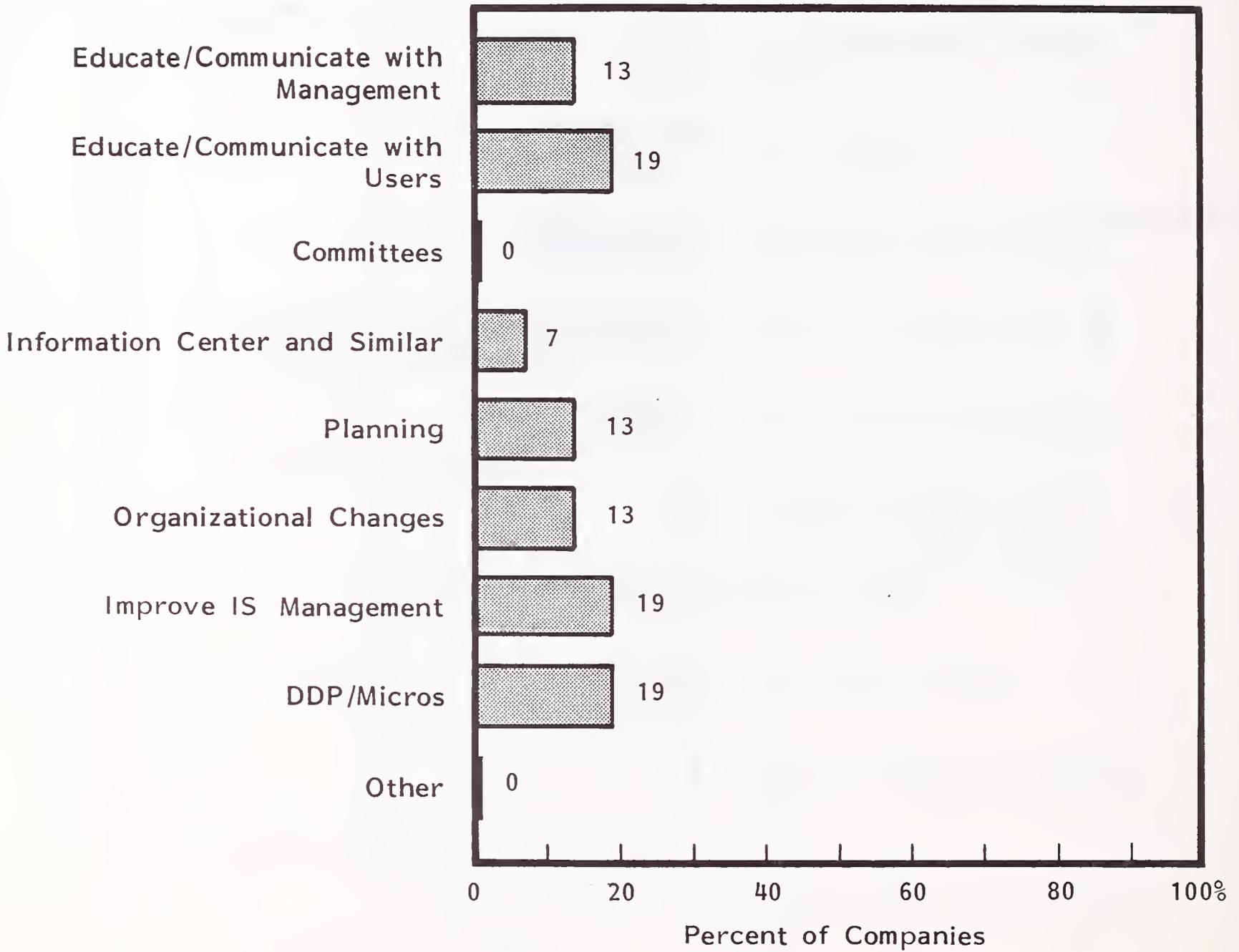
Category	Percent
Educate/Communicate with Management	13
Educate/Communicate with Users	19
Committees	0
Information Center and Similar	7
Planning	13
Organizational Changes	13
Improve IS Management	19
DDP/Micros	19
Other	0

Percent of Companies

SOURCE: INPUT Surveys

INPUT
UA82

4. PERSONAL COMPUTERS

- Plans for the use of personal computers in this sector are shown in Exhibit III-124 and include:

    - The overall level of use in five years.

    - Plans for obtaining additional personal computer software.

    - Plans for obtaining additional personal computer hardware.

- The insurance sector's plans are similar to those in other industries except that much greater reliance on packaged software is anticipated.

- Exhibit III-125 shows the types of personal computer software packages now used. The "Calc" packages are used by every department interviewed; communications software is used somewhat more than average.

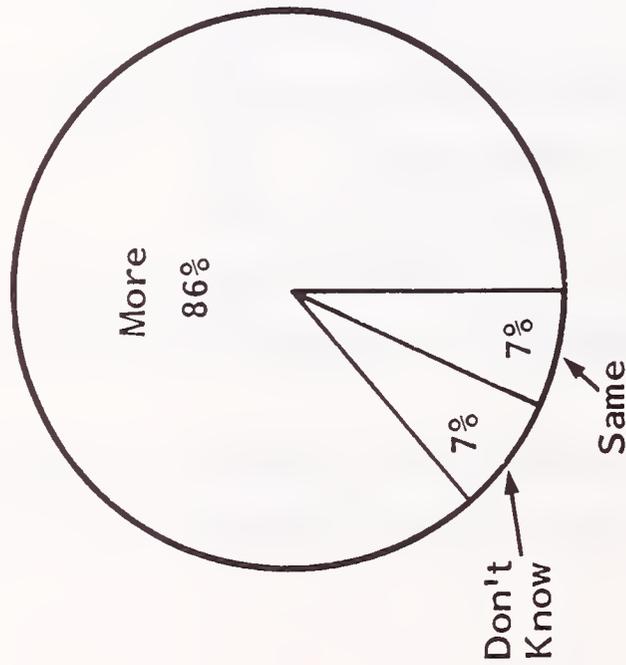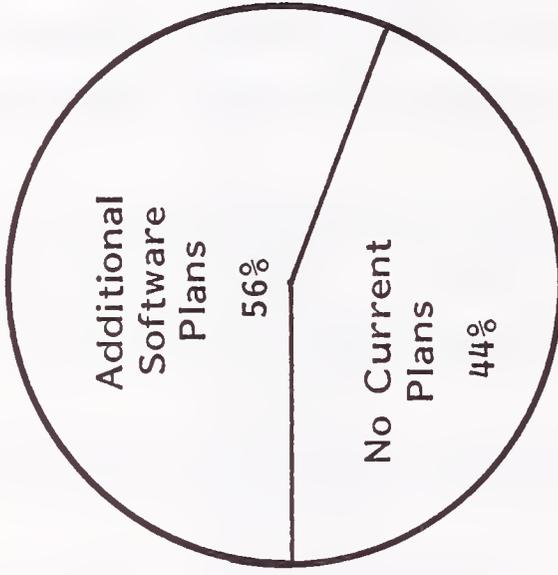- The general categories of applications used are summarized in Exhibit III-126.

    - Specialized financial applications (e.g., actuarial) are the most common. Data base use is much less common than in most other sectors.

    - Exhibit III-127 provides examples of actual personal computer applications in use in the insurance sector.

- Compared to the average user, personal computer users in this sector are likely to rely on the IS department for assistance, as shown in Exhibit III-128.

- In this sector 84% of departments using personal computers have had their installation less than a year, as shown in Exhibit III-129, compared to 78% generally.

INPUT

EXHIBIT III-124

PERSONAL COMPUTER ACQUISITION PLANS IN THE INSURANCE SECTOR

Expected Level of Use
of Personal Computers
in Five Years

More
86%

Don't
Know
7%

Same
7%

User Plans for
Additional Personal
Computer Software

Additional
Software
Plans
56%

No Current
Plans
44%

Source

Package — 100

In-house/
Custom — 0

User Plans for
Additional Personal
Computer Hardware

Additional
Hardware
Plans
67%

No Current
Plans
33%

Hardware
Type*

Additional
PCs — 83

Additional
Peripherals — 25

Other — 8

SOURCE: INPUT Surveys

* Totals more than 100%
because of multiple plans

- 260 -
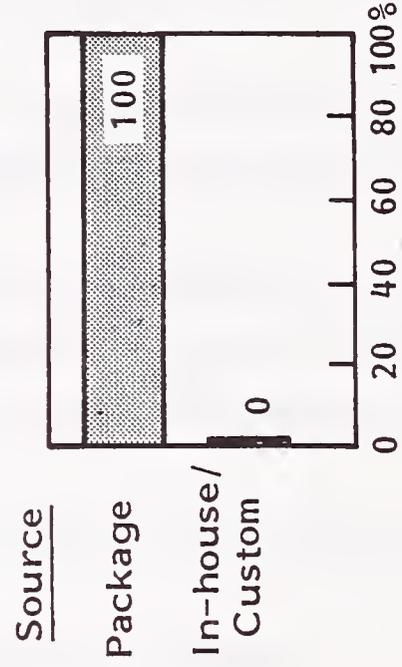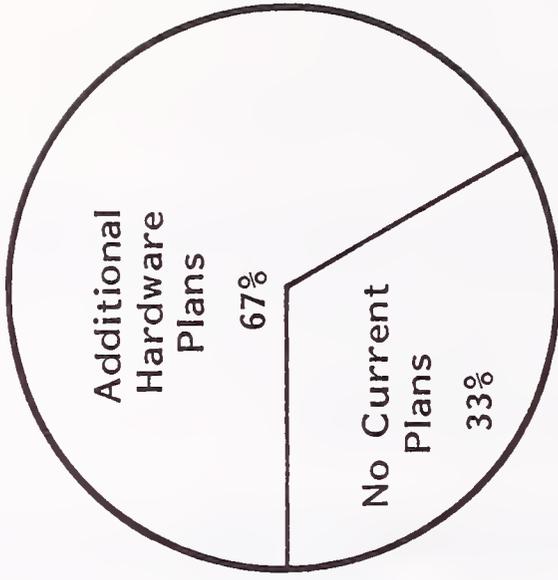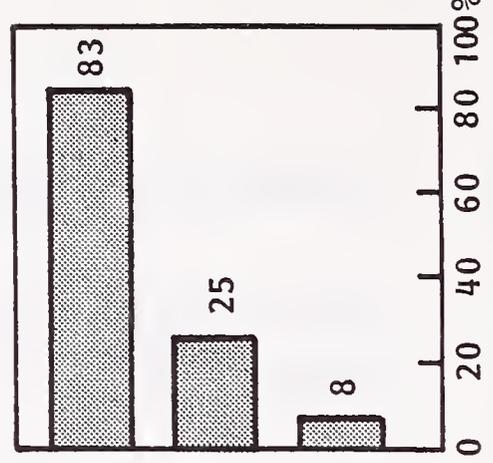
INPUT
UA82

EXHIBIT III-125

TYPES OF PERSONAL COMPUTER SOFTWARE PACKAGES
USED BY THE INSURANCE SECTOR

Type of Package

Percent of Departments Using
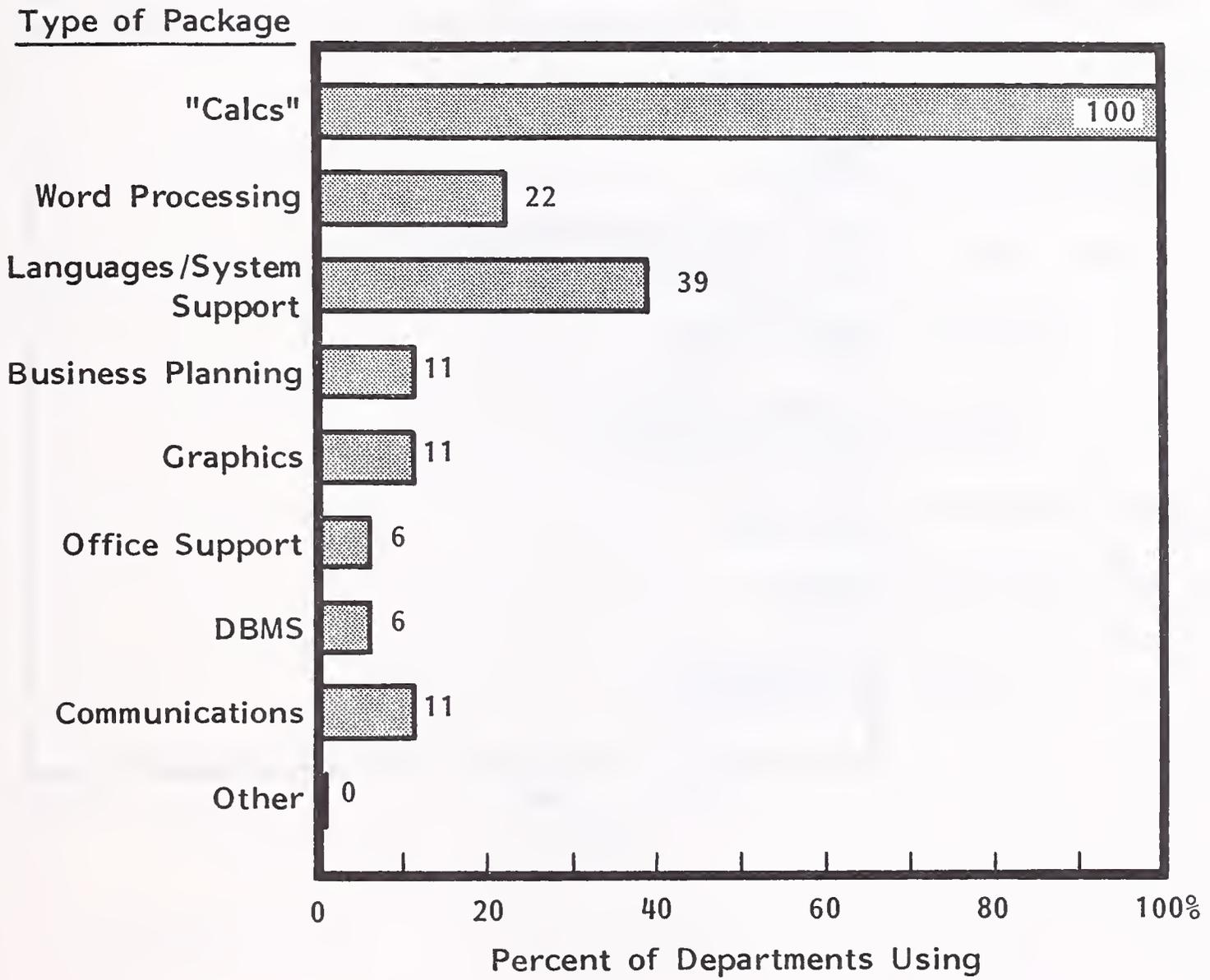
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-126

PERSONAL COMPUTER APPLICATIONS IN THE INSURANCE SECTOR

Application Type

Budgeting/Accounting	17
Modeling/Planning	11
Other Financial	56
Operations	22
Analysis	28
Data Bases, Reporting	17
Word Processing	11
Other	22

Percent of Department Using
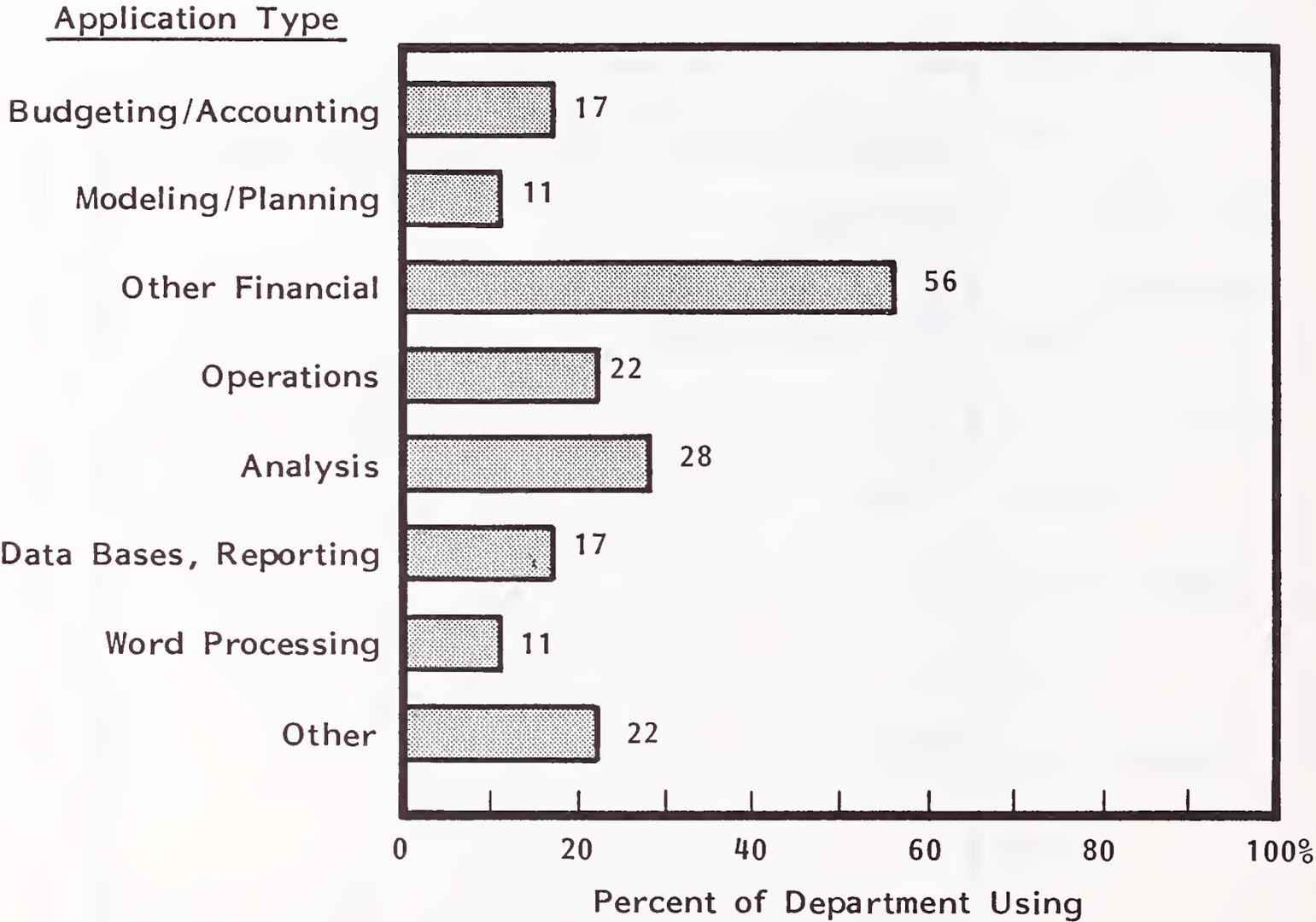
INPUT
UA82

EXHIBIT III-127

PERSONAL COMPUTER APPLICATIONS IN THE INSURANCE SECTOR

Subledger
Yield Projections
Investment Analysis
Financial Modeling and Analysis
Real Estate
Purchasing
Letters
Spread Sheet
Time Management
Word Processing
Tax Calculations
IS Auditing
Financial Statements
Actuarial Analysis
Statistical Analysis
Cash Flow Projections
Performance Statements
Portfolio
Budgeting
Real Estate Analysis
Graphics Presentations
Engineering
Energy Reports

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-128

SOURCES OF ASSISTANCE FOR
PERSONAL COMPUTER USERS IN THE INSURANCE SECTOR
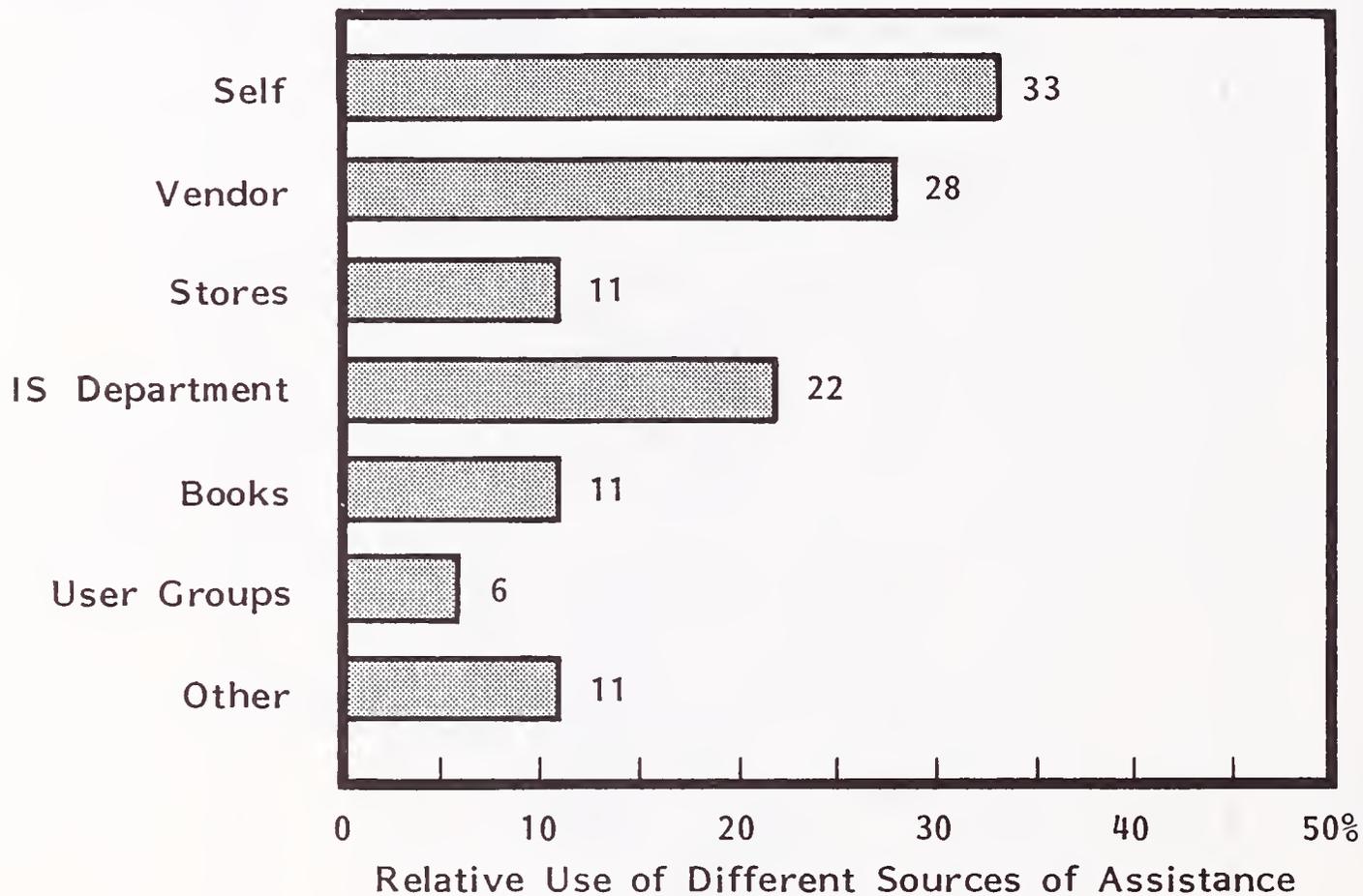
Relative Use of Different Sources of Assistance

Note: Total Is More Than 100% Because of Multiple Sources.   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-129

TIME SINCE FIRST PERSONAL COMPUTER INSTALLED
IN USER DEPARTMENTS IN THE INSURANCE SECTOR

Time Since
First Installed
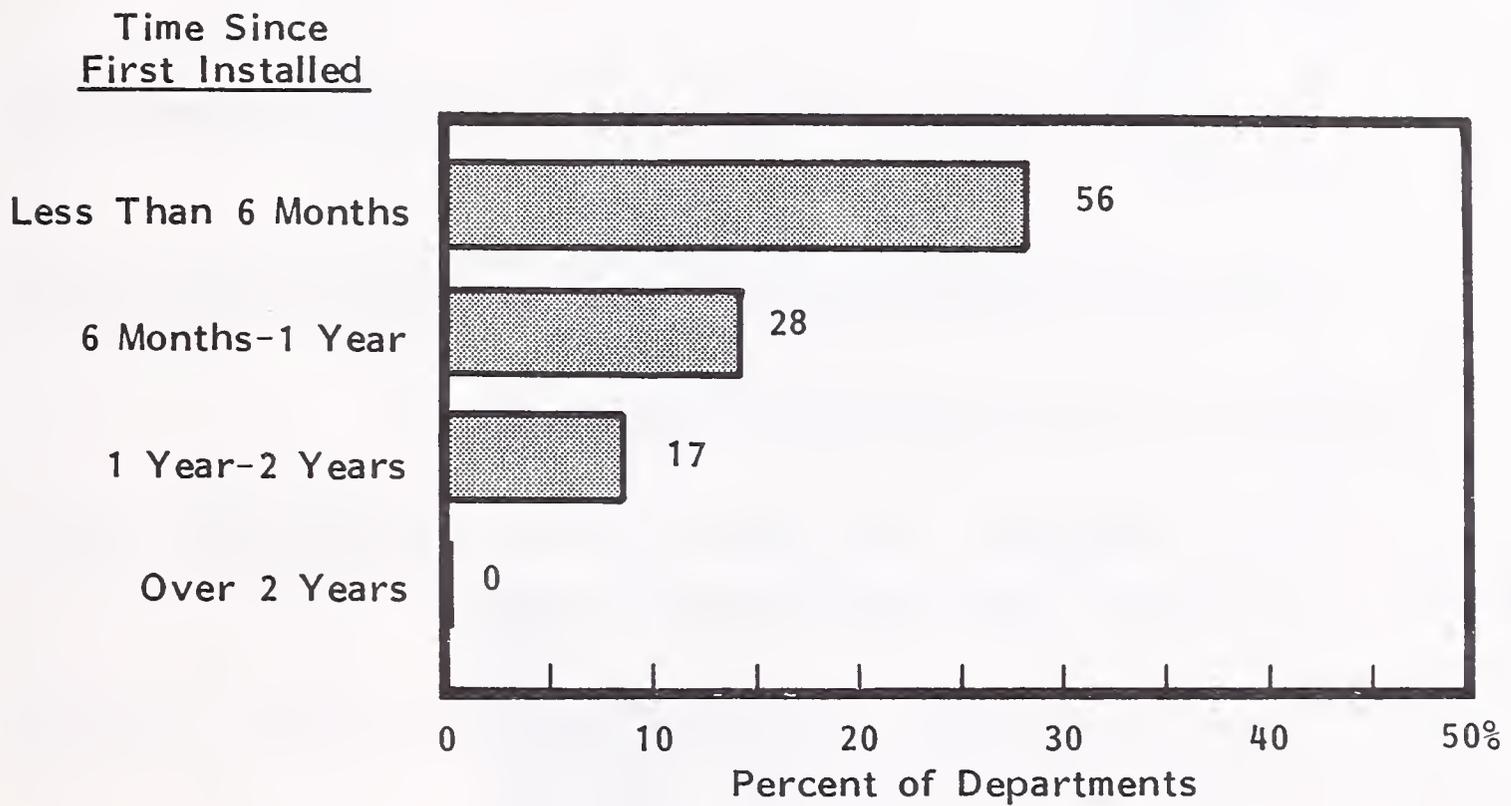
SOURCE: INPUT Surveys

INPUT
UA82

H. DISTRIBUTION SECTOR

I. BUDGETS

- In this sector 58% of the companies expect budget increases in 1983, compared to 61% generally; 8% expect a decrease as do 8% generally, as shown in Exhibit III-130.

    - Companies expecting to increase their budgets foresee an average rise of 16%.

    - Companies anticipating decreases expect their budgets to drop by 12%.

- The budget increases expected vary by company size.

    - Large companies: 57% expect increases in the distribution sector, compared to 63% for large companies generally.

    - Medium companies: 67% expect increases, compared to 63% for medium companies generally.

    - Small companies: 40% expect increases, compared to 57% for small companies generally.

- The average budget growth expected for 1983 in the distribution sector is 9%, compared to 12% in 1982.

    - This represents a decline of 31% in the average rate of growth.

- 266 -

INPUT

EXHIBIT III-130

ANTICIPATED BUDGET INCREASES FOR 1983 IN THE DISTRIBUTION SECTOR
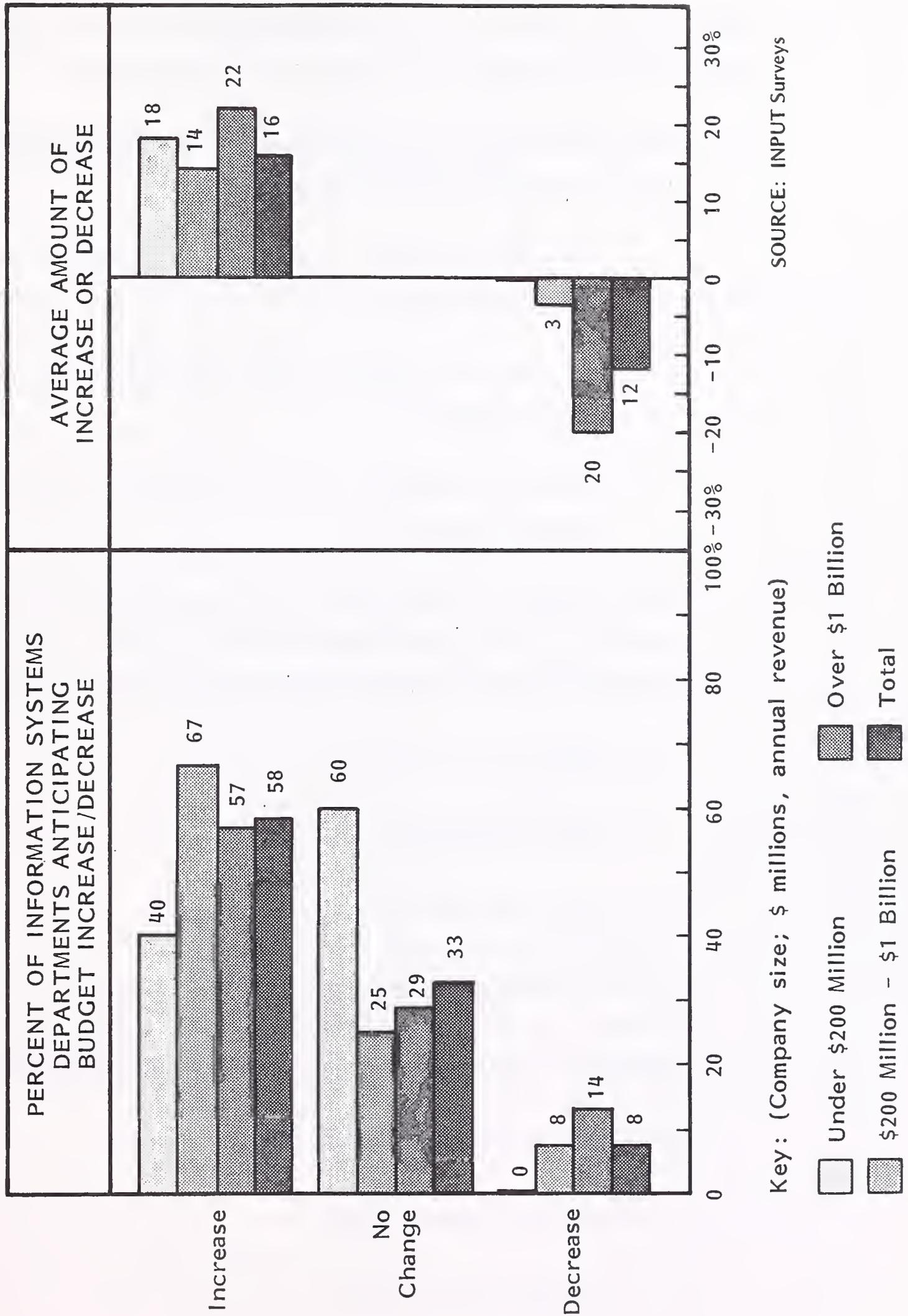
Key: (Company size; $ millions, annual revenue)

- Under $200 Million
- $200 Million – $1 Billion
- Over $1 Billion
- Total

SOURCE: INPUT Surveys

INPUT
UA82

- Exhibit III-131 shows the range of ratios between the IS budget and the company's total revenues which exist in the distribution sector.

  - The IS percentage of total revenues for the average company (i.e., at the 50th percentile) in each size group was:

    - For large companies: 0.3%, compared to 0.55% for this size company generally.

    - For medium companies: 0.8%, compared to 0.8% for this size company generally.

    - For small companies: 0.4%, compared to 1.2% for this size company generally.

  - The companies that spend least on data processing as a percentage of revenues are those at and below the 20th percentile. Taking the 10th percentile as representative, their IS spending percentages were:

    - Large companies: 0.1%.

    - Medium companies: 0.2%.

    - Small companies: 0.1%.

  - The companies that spend the most on data processing as a percentage of revenue are those at and above the 80th percentile. Taking the 90th percentile as representative, their IS spending percentages were:

    - Large companies: 0.9%.

    - Medium compnaies: 1.7%.

    - Small companies: 1.1%.

INPUT

EXHIBIT III-131

INFORMATION SYSTEMS BUDGET AS A PERCENT OF TOTAL REVENUES IN THE DISTRIBUTION SECTOR
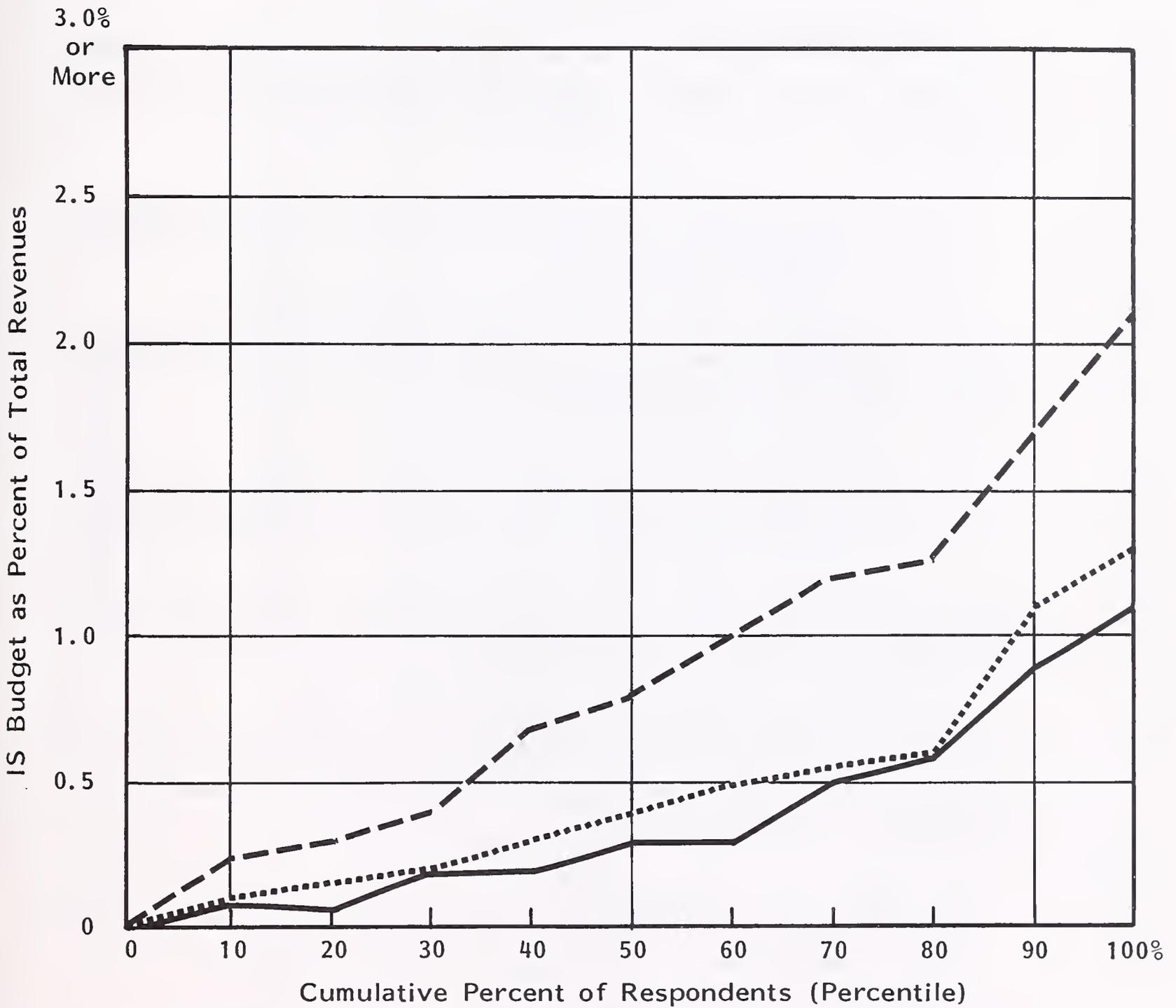
Key - Company Size:

.... $0 - $199 million

– – – – – $200 - $999 million

————— $1 billion and over

SOURCE: INPUT Surveys

INPUT
UA82

- Median spending on IS per corporate employee was $480. However, there was a broad range of spending ratios, as shown in the diagram in Exhibit III-132.

  - The reasons for this variation were discussed in Chapter II, Section B.

2. STAFFING

- In the distribution sector 74% of companies expect their IS staffs to increase in the next 12 months, compared to the industry average of 58%, as shown in Exhibit III-133.

  - The net increase in numbers of staff is expected to be 2%, compared to the all-industry average of 4%.

- Turnover in this sector is expected to be over twice as high as the all-industry average in 1983, as shown in Exhbit II-9.

  - Current turnover rates for individual positions are shown in Exhibit III-134. For technical positions the turnover rate has been especially high.

- Difficulty in recruiting staff in this sector is considerably higher than the all-industry average, as shown in Exhibit III-135.

- The number of programs to be maintained averages 850 in this sector, although the range, both in absolute numbers and based on company size, is quite broad, as shown in Exhibit III-136.

  - Maintenance, as a proportion of total workload, is very close to the all-industry average and is stable, as shown in Exhibit III-137.

  - Company size does play a strong role in maintenance workload, with the small companies having an especially high proportion of maintenance. The large companies are seeing their maintenance percentage

- 270 -

©1982 by INPUT. Reproduction Prohibited.

INPUT

EXHIBIT III-132

INFORMATION SYSTEMS SPENDING PER EMPLOYEE BY COMPANY SIZE
IN THE DISTRIBUTION SECTOR

IS Spending per Employee
($ thousands)
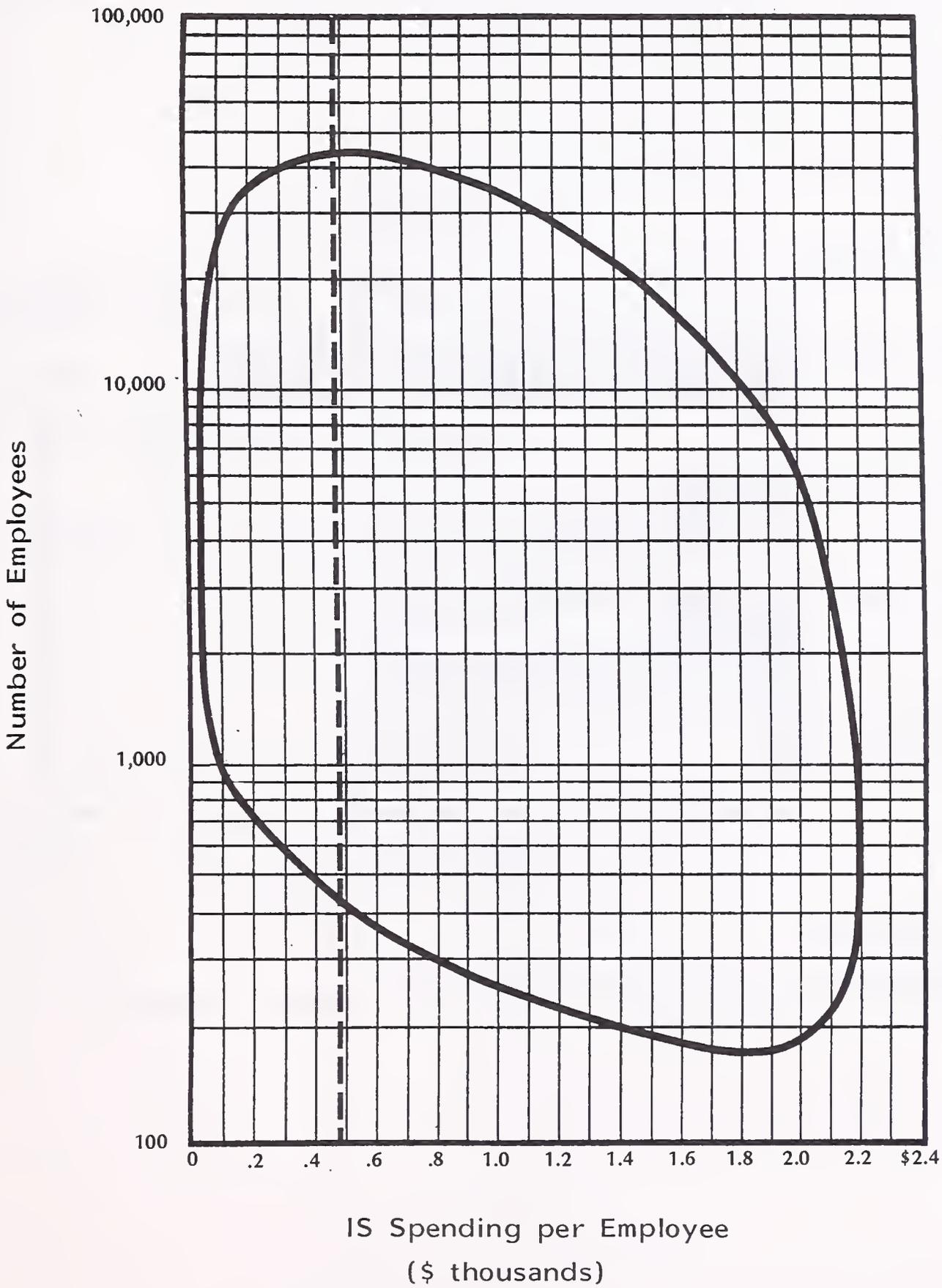
＝＝＝＝ = Median   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-133

INFORMATION SYSTEMS STAFFING CHANGES EXPECTED IN THE
NEXT TWELVE MONTHS IN THE DISTRIBUTION SECTOR

Percent of
Companies Expecting:

IS Staff Increase — 58, 74

IS Staff Decrease — 7, 18

No Change — 35, 18

Net Average Change Expected — 4, 2

Rate of Change in IS Staffing
in Next 12 Months
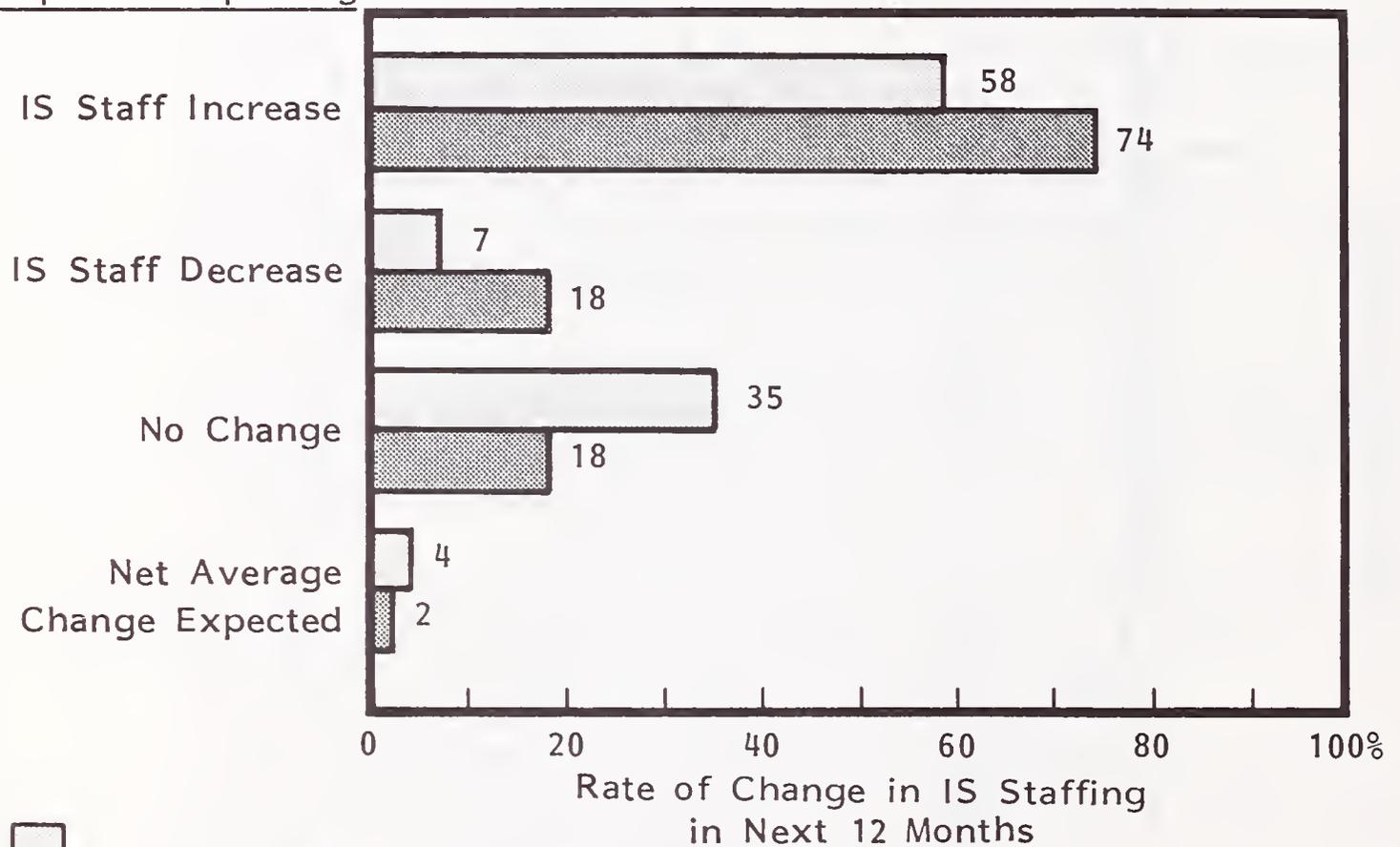
☐ All Industries

▨ Distribution

SOURCE: INPUT Surveys

- 272 -

INPUT
UA82

EXHIBIT III-134

INFORMATION SYSTEMS STAFFING CURRENT ANNUAL TURNOVER
IN THE DISTRIBUTION SECTOR
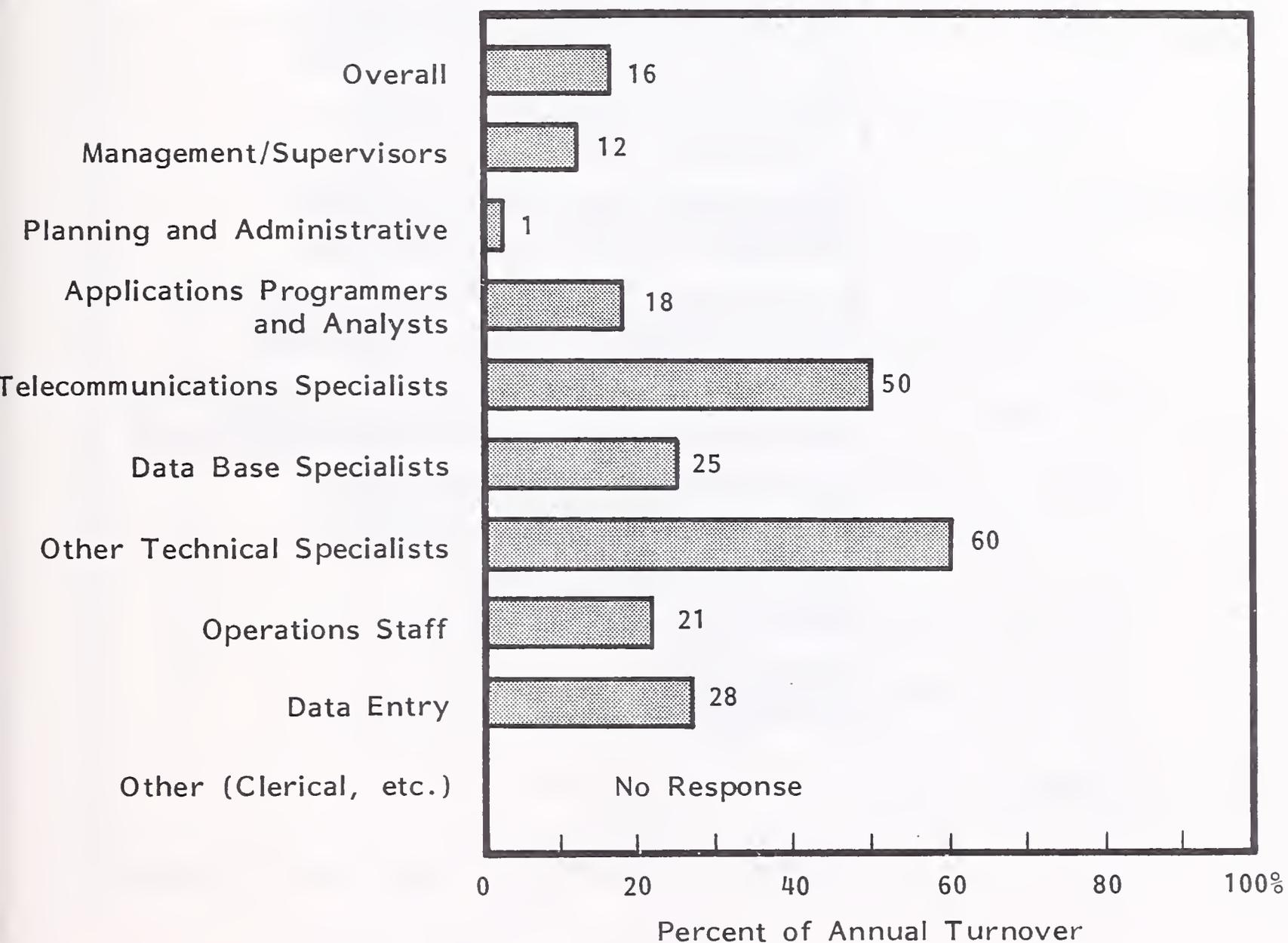
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-135

INFORMATION SYSTEMS DIFFICULTY IN RECRUITING STAFF
IN THE DISTRIBUTION SECTOR
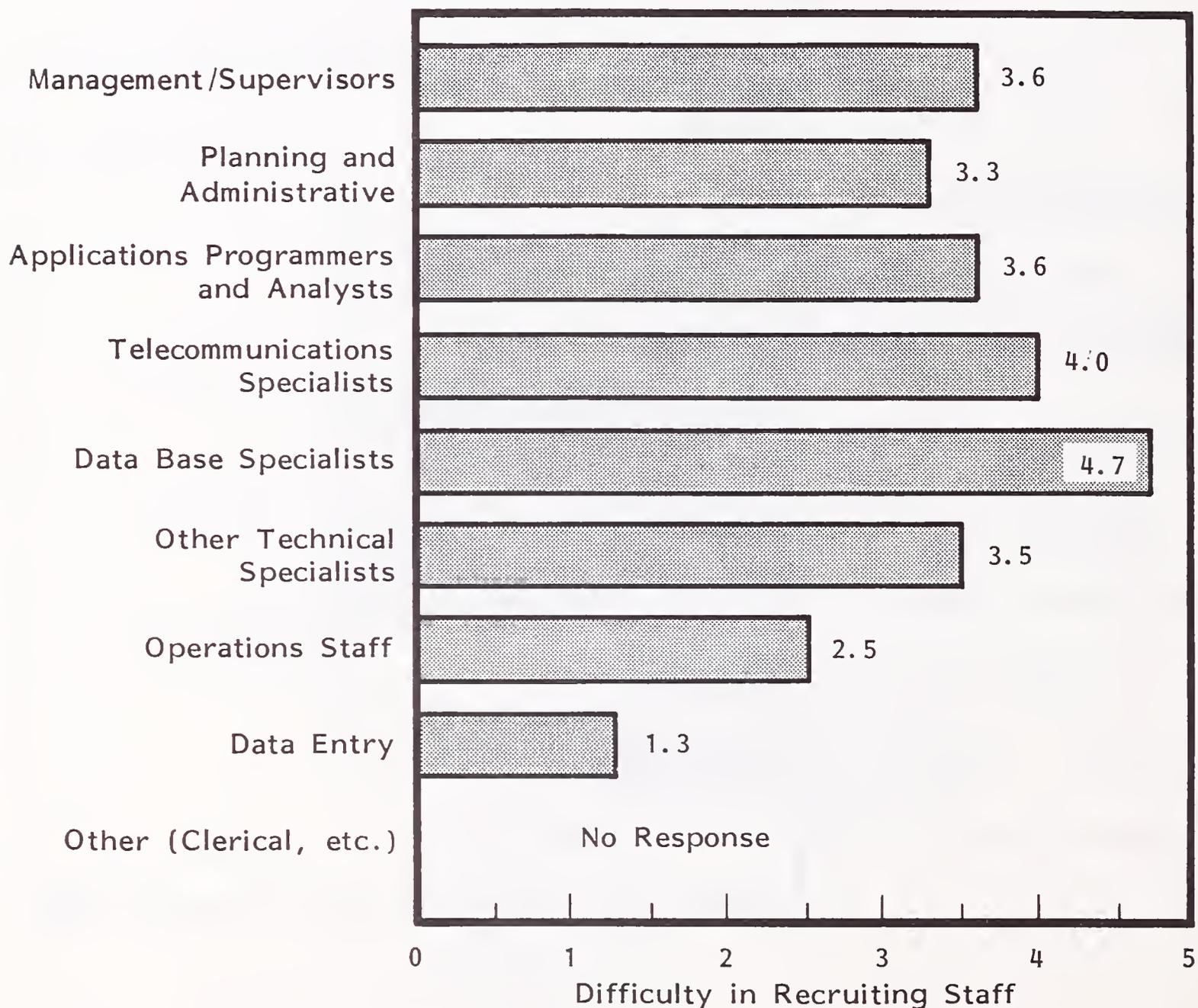
Scale: 1 = Low, 5 = High

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-136

NUMBER OF PROGRAMS BY COMPANY SIZE
IN THE DISTRIBUTION SECTOR
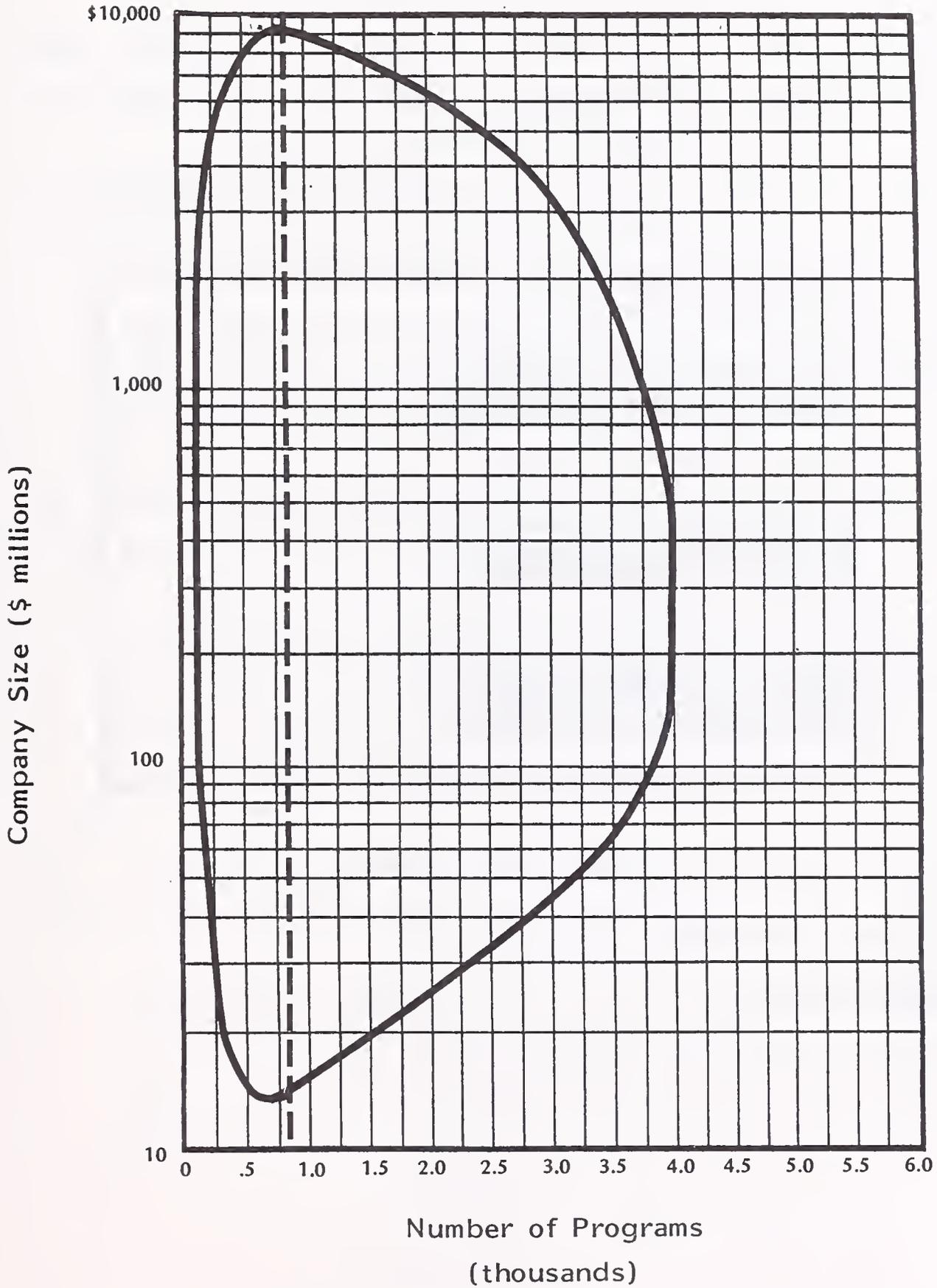
EXHIBIT III-137

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE
IN THE DISTRIBUTION SECTOR, 1981-1983

Percent of Resources
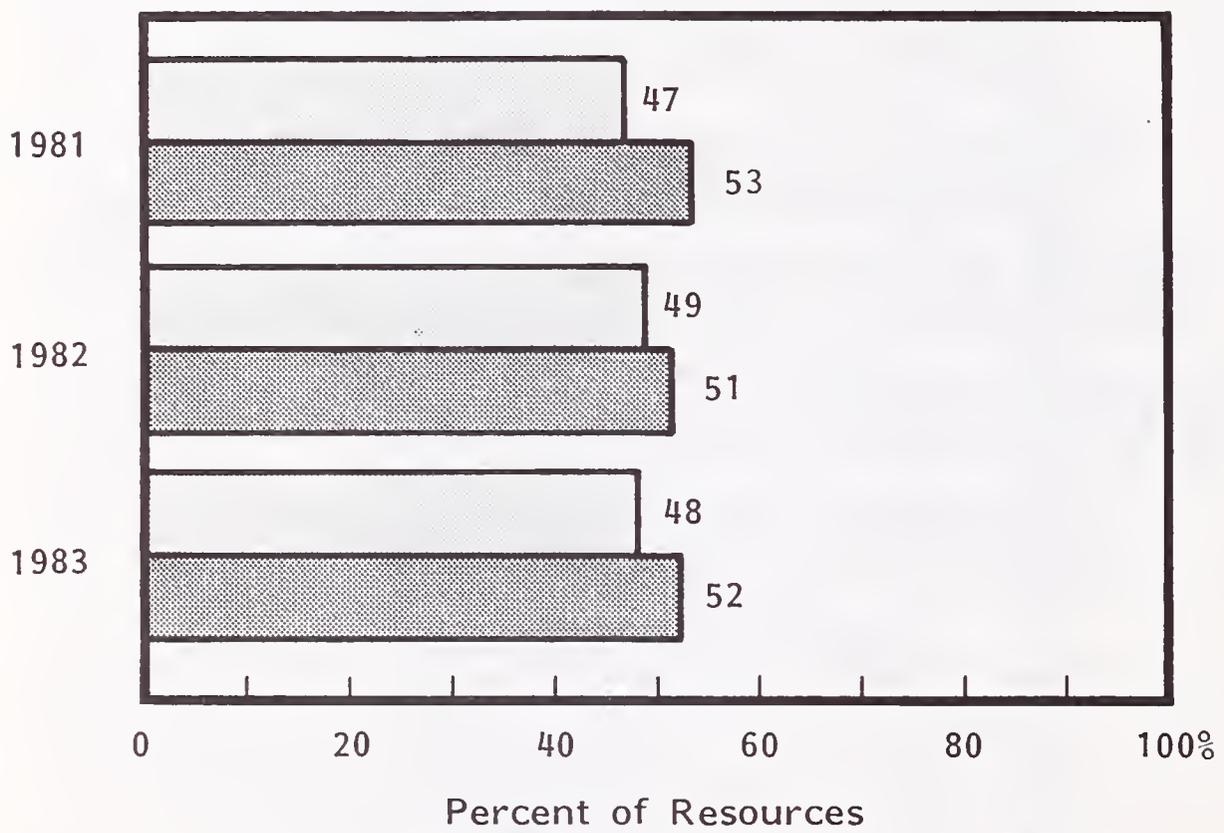
New Development

Maintenance

INPUT
UA82

increase as mature systems respond to new needs, as shown in Exhibit III-138.

3. INFORMATION SYSTEMS ISSUES

- Note: please refer to Chapter II, Section D for a general discussion of IS problems, objectives, and initiatives and their interrelationships.

- The distribution sector sees its major problems in the personnel area, as shown in Exhibit III-139. This is directly related to its significant turnover problems.

  - More detailed information about specific problem areas is contained in Exhibit III-140. This exhibit shows the percentage of companies in this sector which regard an issue as a major problem.

- The distribution sector's objectives are very close to the all-industry norm, as shown in Exhibit III-141.

 - More detailed information about specific planning objectives is contained in Exhibit III-142. This exhibit shows the percentage of companies in this sector which have identified particular planning objectives as being of major importance to them.

- Only in the personnel area does the distribution sector have more planned initiatives than average, as shown in Exhibit III-143.

  - More detailed information about specific areas where an initiative is planned is contained in Exhibit III-144. This exhibit shows the percentage of companies in this sector which plan a major initiative in a particular area.

INPUT

EXHIBIT III-138

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE
IN THE DISTRIBUTION SECTOR, 1981-1983

Company Size

$0-199 Million

1981 — 36 / 64

1982 — 39 / 61

1983 — 43 / 57

$200-999 Million

1981 — 49 / 51

1982 — 52 / 48

1983 — 49 / 51

$1 Billion and Over

1981 — 64 / 36

1982 — 58 / 42

1983 — 52 / 48

Percent of Resources

New Development

Maintenance

SOURCE: INPUT Surveys

- 278 -
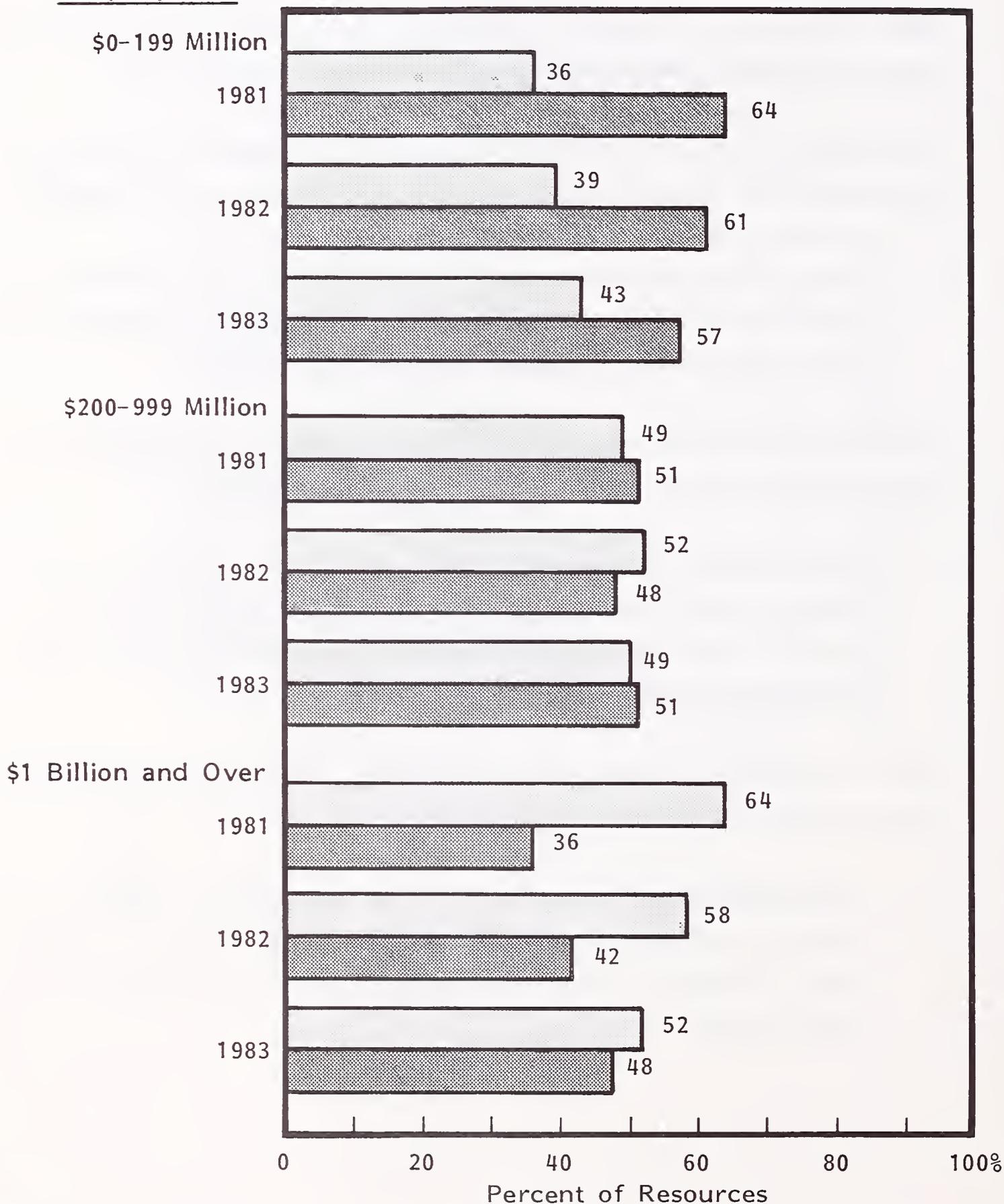
INPUT
UA82

EXHIBIT III-139

INFORMATION SYSTEMS PROBLEMS IN THE
DISTRIBUTION SECTOR

Problem

	Index Values
Corporate Relationships	22 (This Sector), 37 (All Sectors)
Personnel	44 (This Sector), 36 (All Sectors)
Hardware	37 (This Sector), 35 (All Sectors)
Planning and Control	33 (This Sector), 33 (All Sectors)
Software	26 (This Sector), 30 (All Sectors)
Costs	10 (This Sector), 13 (All Sectors)
Telecommunications/ Office Automation	4 (This Sector), 6 (All Sectors)

Index Values
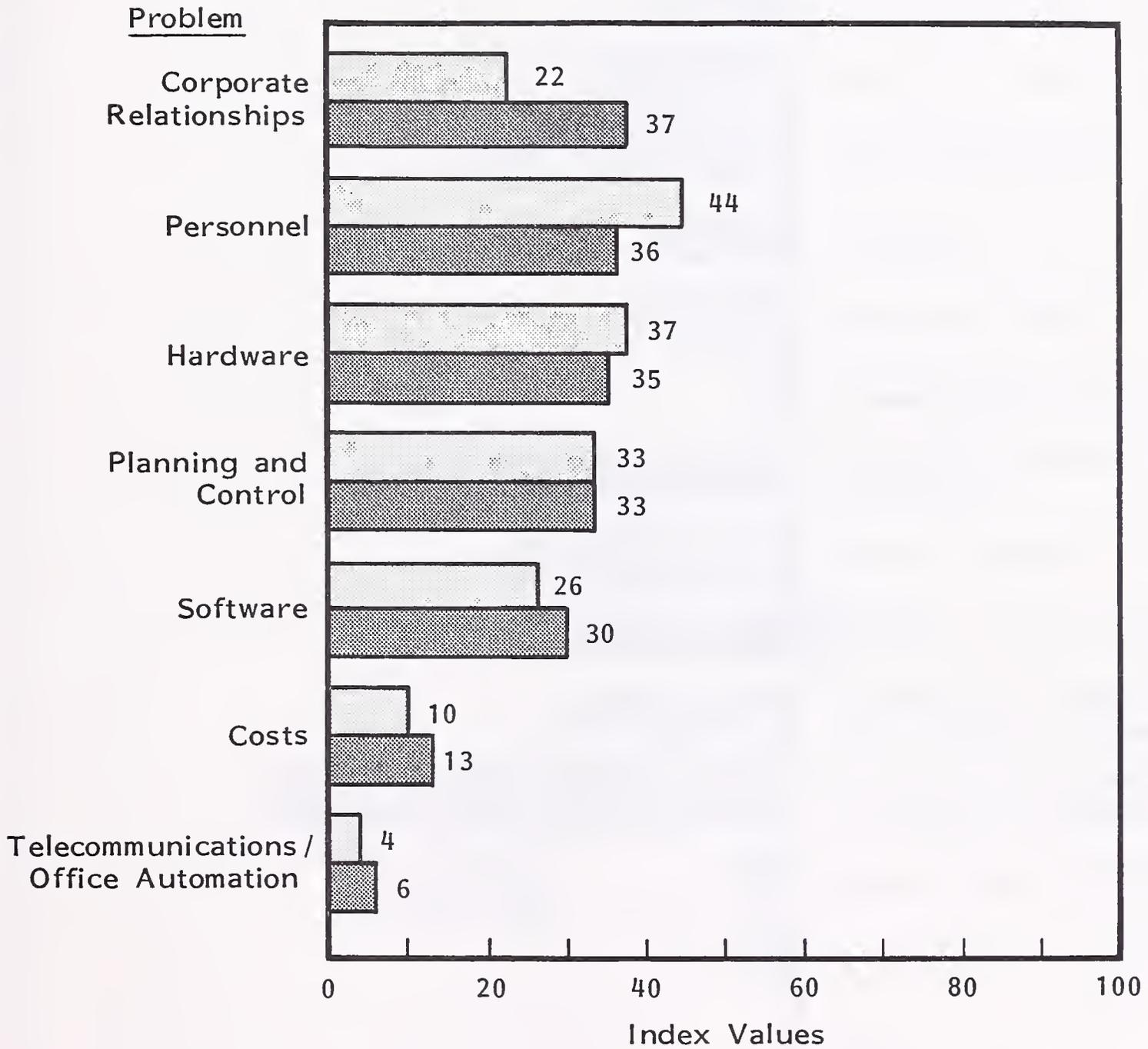
☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-140

INFORMATION SYSTEMS PROBLEMS IN THE DISTRIBUTION SECTOR

Problem

Relations with Management	10
Relations with Users	12
Backlog/Workload	22
Planning	10
Cost Constraints	10
Project Control/Management	2
IS Personnel Shortages/Turnovers	26
Other IS Personnel Issues	18
Application System Quality	12
Software Development, Maintenance, Productivity	14
Equipment/Capacity, Computer Operations	33
Network/Telecommunications	4
Hardware	4
OA	0
Other	8

Percent of Companies

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-141

INFORMATION SYSTEMS OBJECTIVES IN THE DISTRIBUTION SECTOR
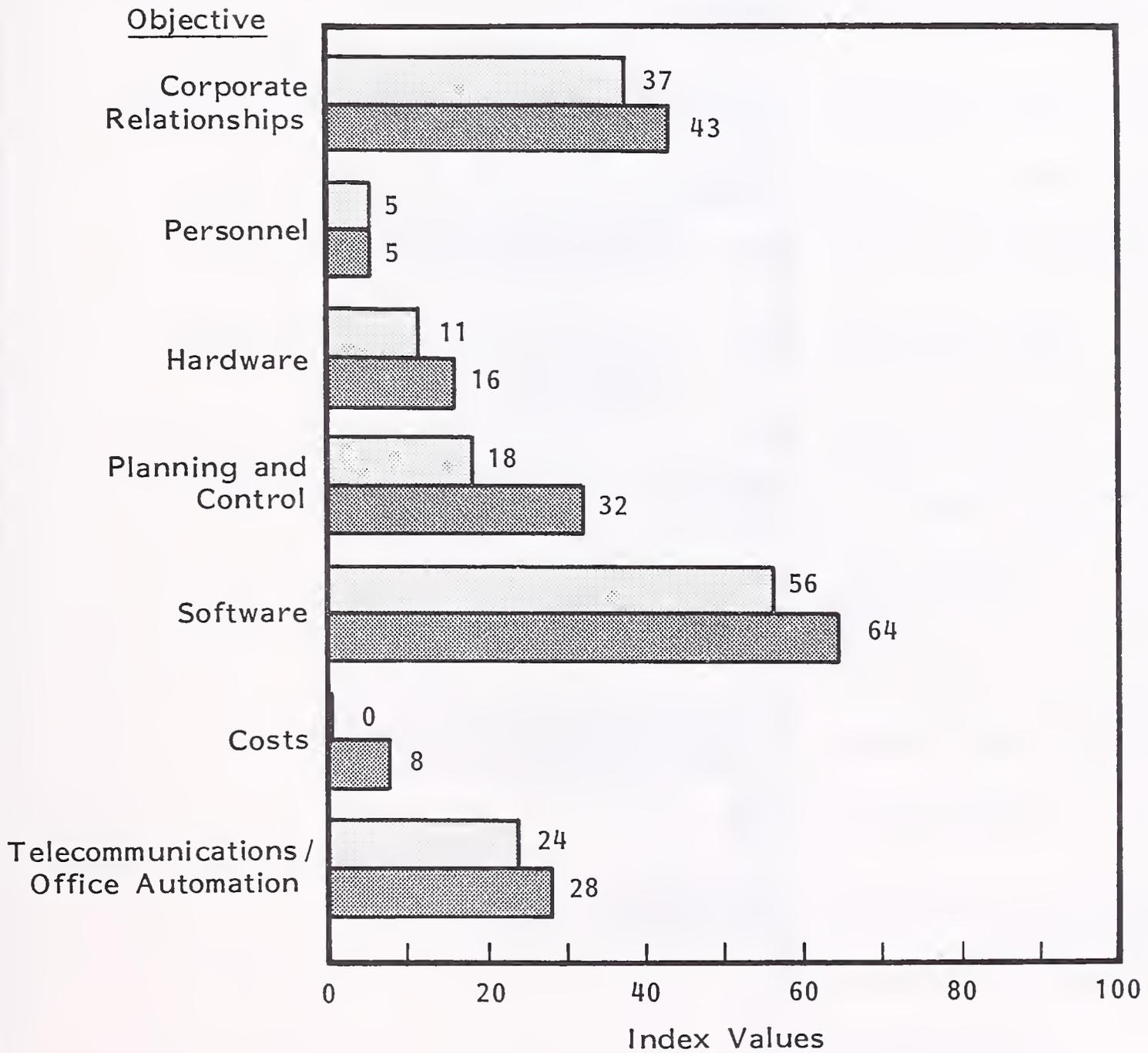
INPUT
UA82

EXHIBIT III-142

INFORMATION SYSTEMS OBJECTIVES IN THE DISTRIBUTION SECTOR

Objective	Percent
Support Company Objectives	11
Improve User Service/Relations	21
Improve Planning	13
End User Computing	5
Office Automation	3
Improve Management Control	5
Improve Productivity	16
Control Costs	0
Add Staff	5
New/Improved Software	40
New Hardware	8
Network/Telecommunications	21
IS Security/Disaster Recovery	3
Miscellaneous	0

Percent of Companies

SOURCE: INPUT Surveys

- 282 -
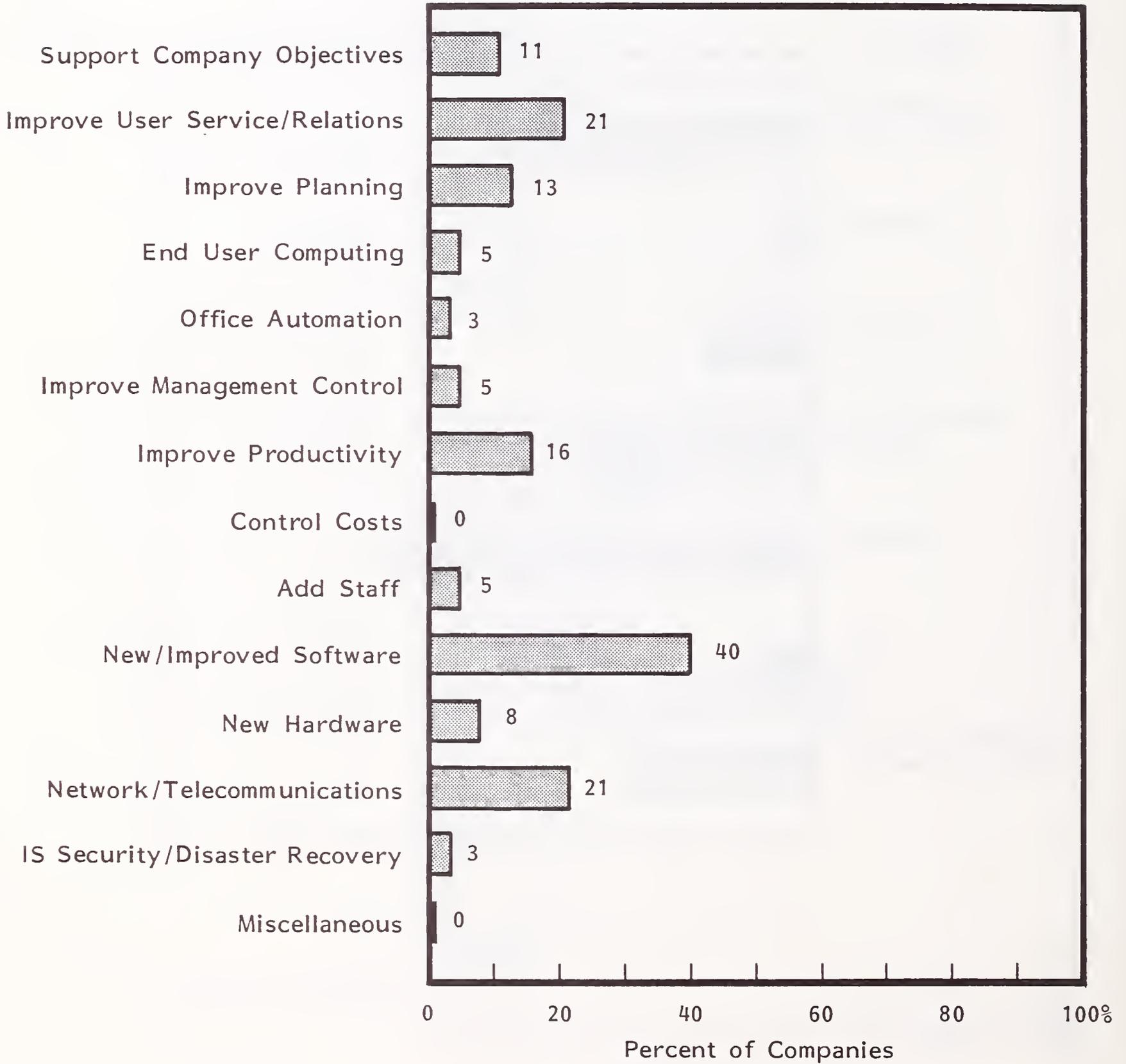
INPUT
UA82

EXHIBIT III-143

INFORMATION SYSTEMS INITIATIVES IN THE
DISTRIBUTION SECTOR
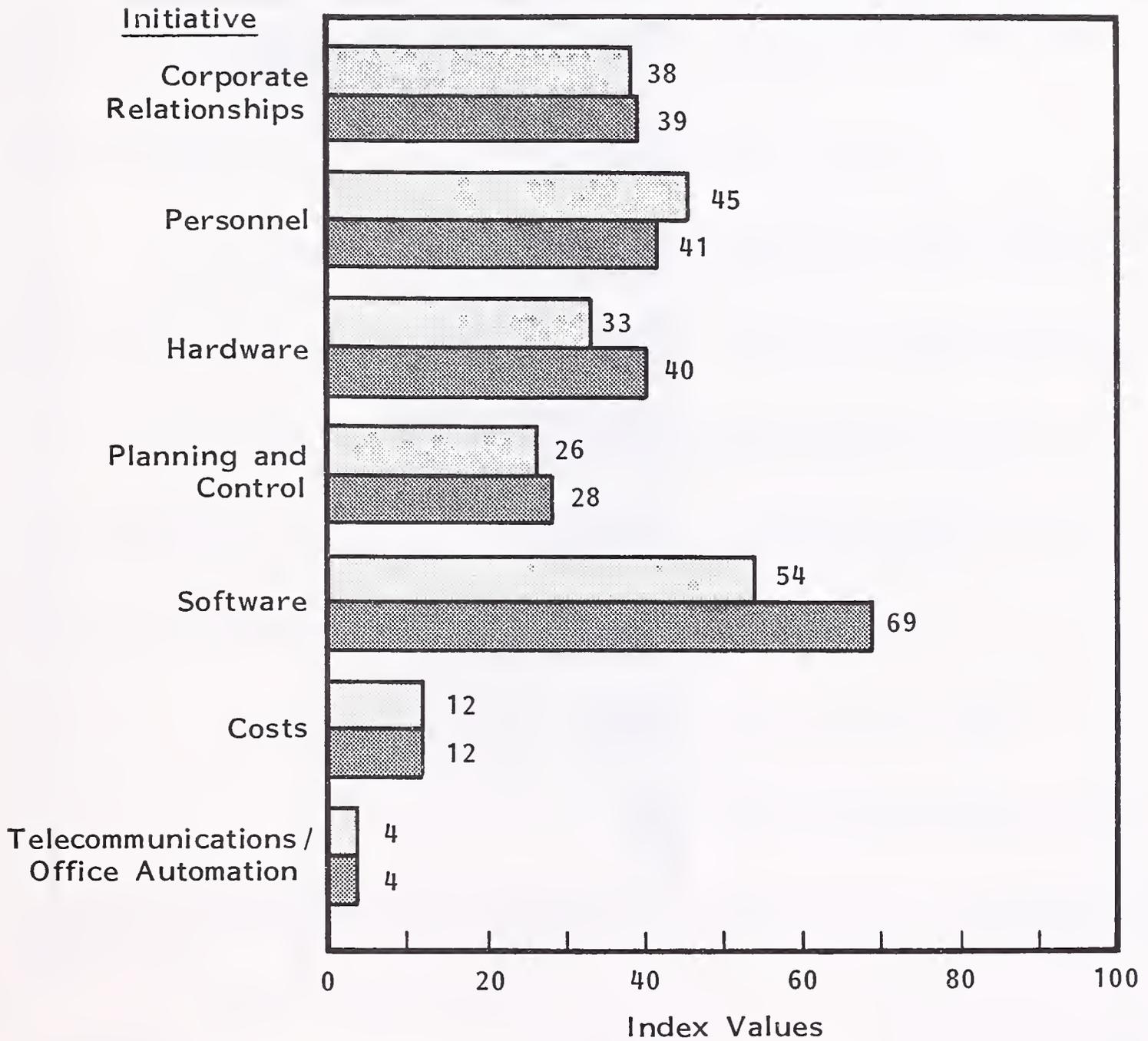
INPUT
UA82

EXHIBIT III-144

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE DISTRIBUTION SECTOR

Career Planning/Education, Training — 33

Increase Hiring — 12

Productivity Tools and Techniques/ Quality Control Standards — 14

Redesign/Replace System(s) — 18

Software Packages/DBMS — 22

Justify/Reduce Additional Functions/Costs — 12

Add Hardware — 20

Vendor Improvement — 8

Network/Telecommunications — 4

0   10   20   30   40   50%
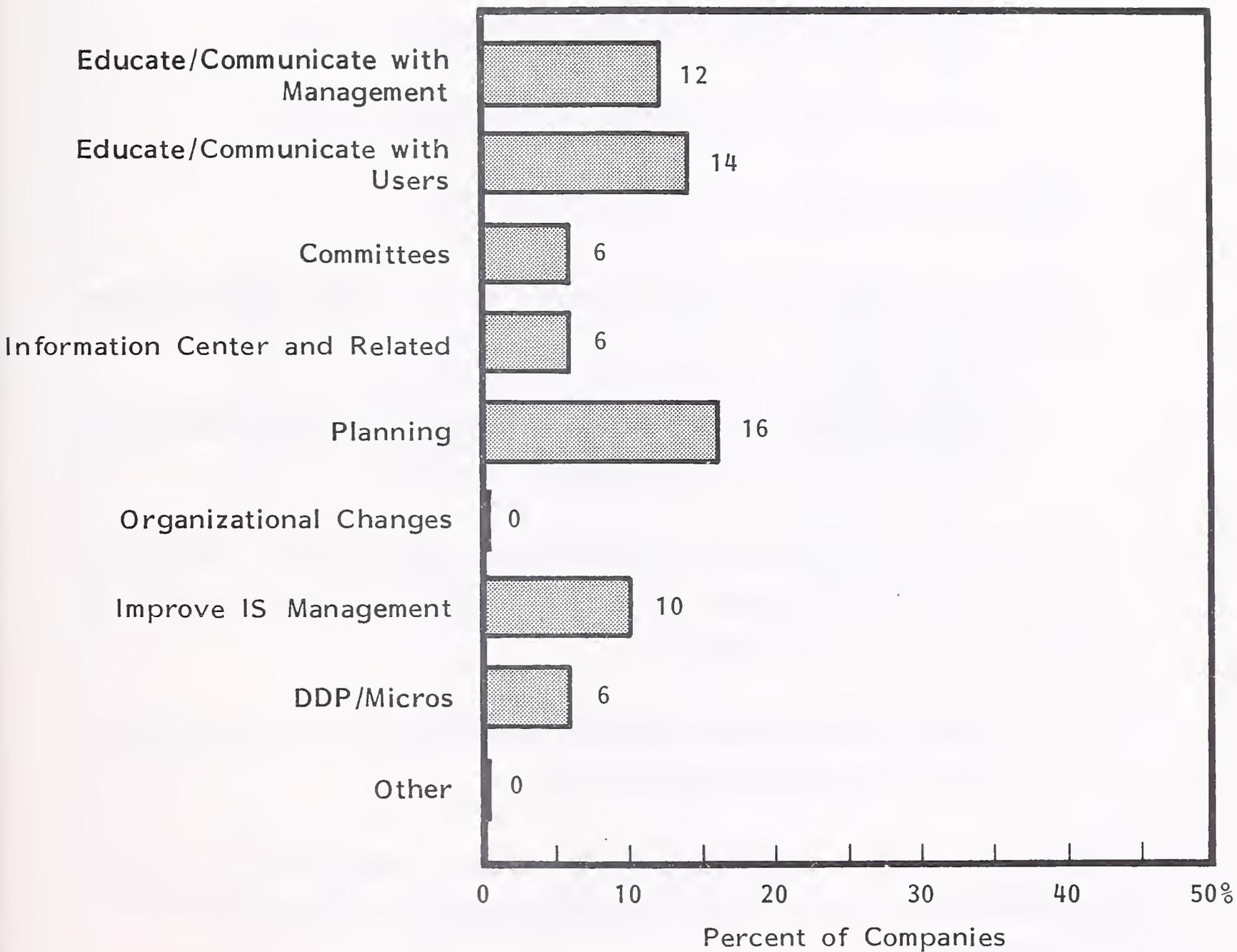
Percent of Companies
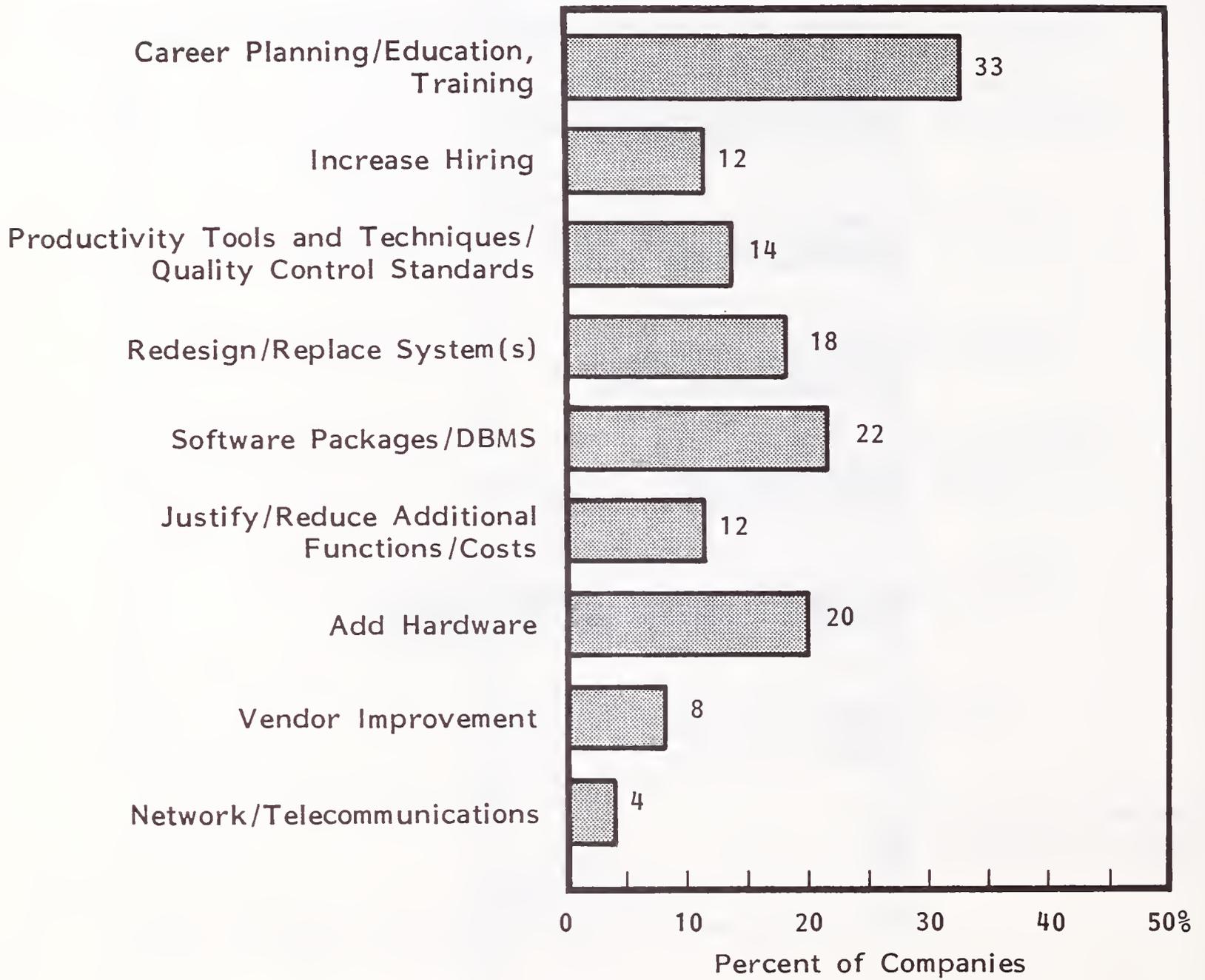
Continued

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-144 (Cont.)

INFORMATION SYSTEMS INITIATIVES PLANNED
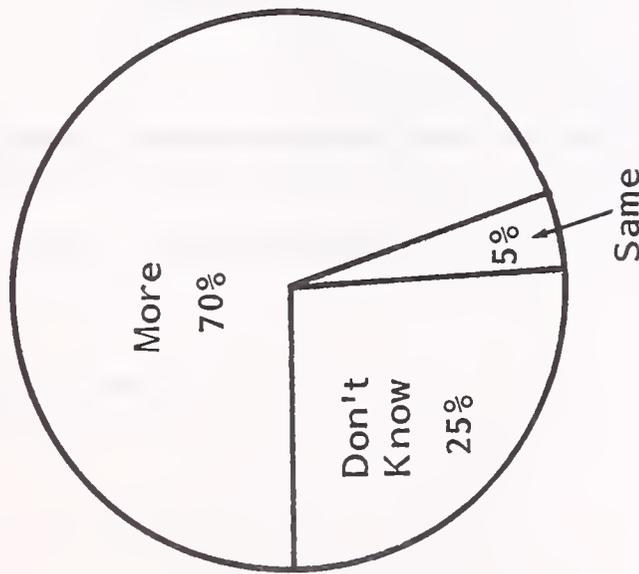## IN THE DISTRIBUTION SECTOR

SOURCE: INPUT Surveys

INPUT
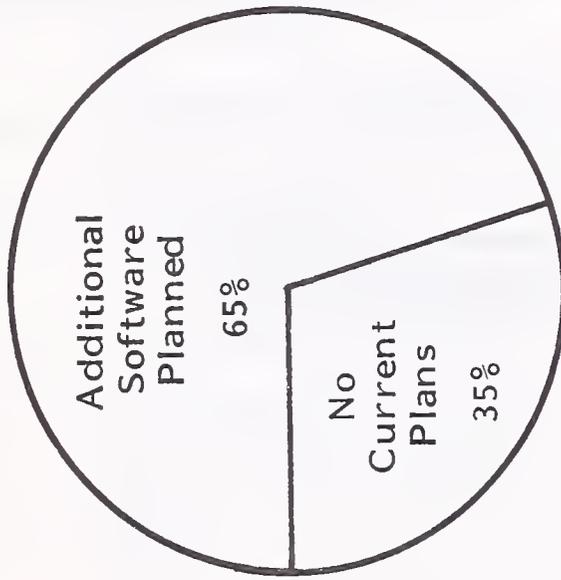UA82

4. PERSONAL COMPUTERS

- Plans for the use of personal computers in this sector are shown in Exhibit III-145 and include:

    - The overall level of use in five years.

    - Plans for obtaining additional personal computer software.

    - Plans for obtaining additional personal computer hardware.

- These plans are similar to the all-industry average.

- Exhibit III-146 shows the types of personal computer software packages now used.

    - The "Calcs" and business planning packages are even more important in the distribution sectors than they are generally.

- The general categories of applications used are summarized in Exhibit III-147. The type of applications that personal computers are being used for is similar to that in industry generally.

    - Exhibit III-148 provides examples of actual personal computer applications in use in the distribution sector.

- Compared to the average user, personal computer users in this sector are somewhat more likely to rely on the IS department for assistance, as shown in Exhibit III-149.

- In this sector 79% of departments using personal computers have had their installation less than a year, as shown in Exhibit III-150, compared to 78% generally.

INPUT

EXHIBIT III-145

PERSONAL COMPUTER ACQUISITION PLANS IN THE DISTRIBUTION SECTOR

Expected Level of Use
of Personal Computers
in Five Years

More
70%

Don't
Know
25%

Same
5%

User Plans for
Additional Personal
Computer Software

Additional
Software
Planned
65%

No
Current
Plans
35%

Source

Package — 57

In-house/
Custom — 43

0 20 40 60 80 100%

User Plans for
Additional Personal
Computer Hardware

Additional
Hardware
Planned
62%

No Current
Plans
38%

Hardware
Type*

Additional
PCs — 44

Additional
Peripherals — 56

Other — 0

0 20 40 60 80 100%
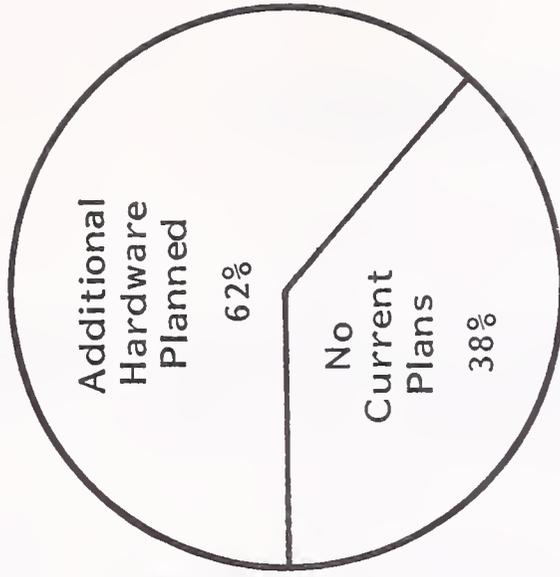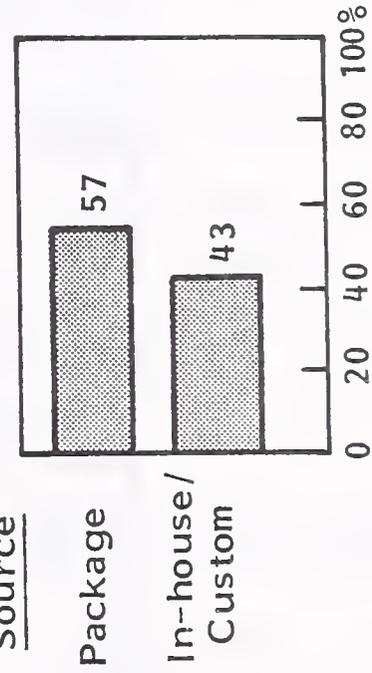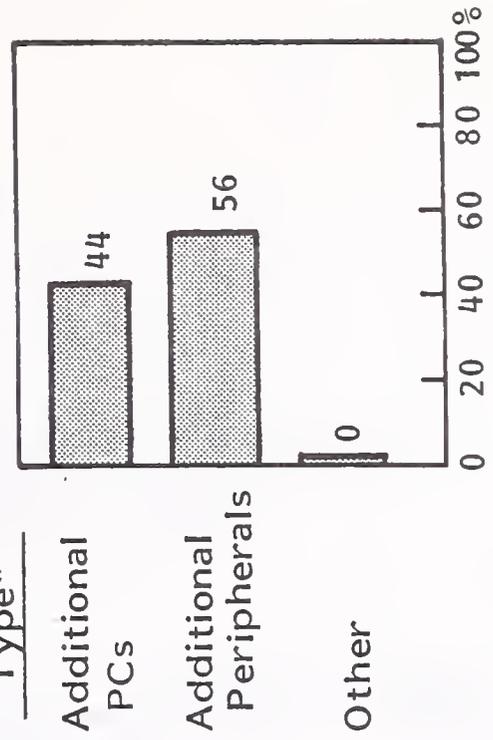
SOURCE: INPUT Surveys

* Totals more than 100%
because of multiple plans

INPUT
UA82

EXHIBIT III-146

TYPES OF PERSONAL COMPUTER SOFTWARE PACKAGES
USED BY THE DISTRIBUTION SECTOR

Type of Package

Type of Package	Percent
"Calcs"	93
Word Processing	14
Languages/System Support	7
Business Planning	57
Graphics	21
Office Support	14
DBMS	7
Communications	0
Other	0

0   20   40   60   80   100%

Percent of Departments Using

SOURCE: INPUT Surveys

- 288 -
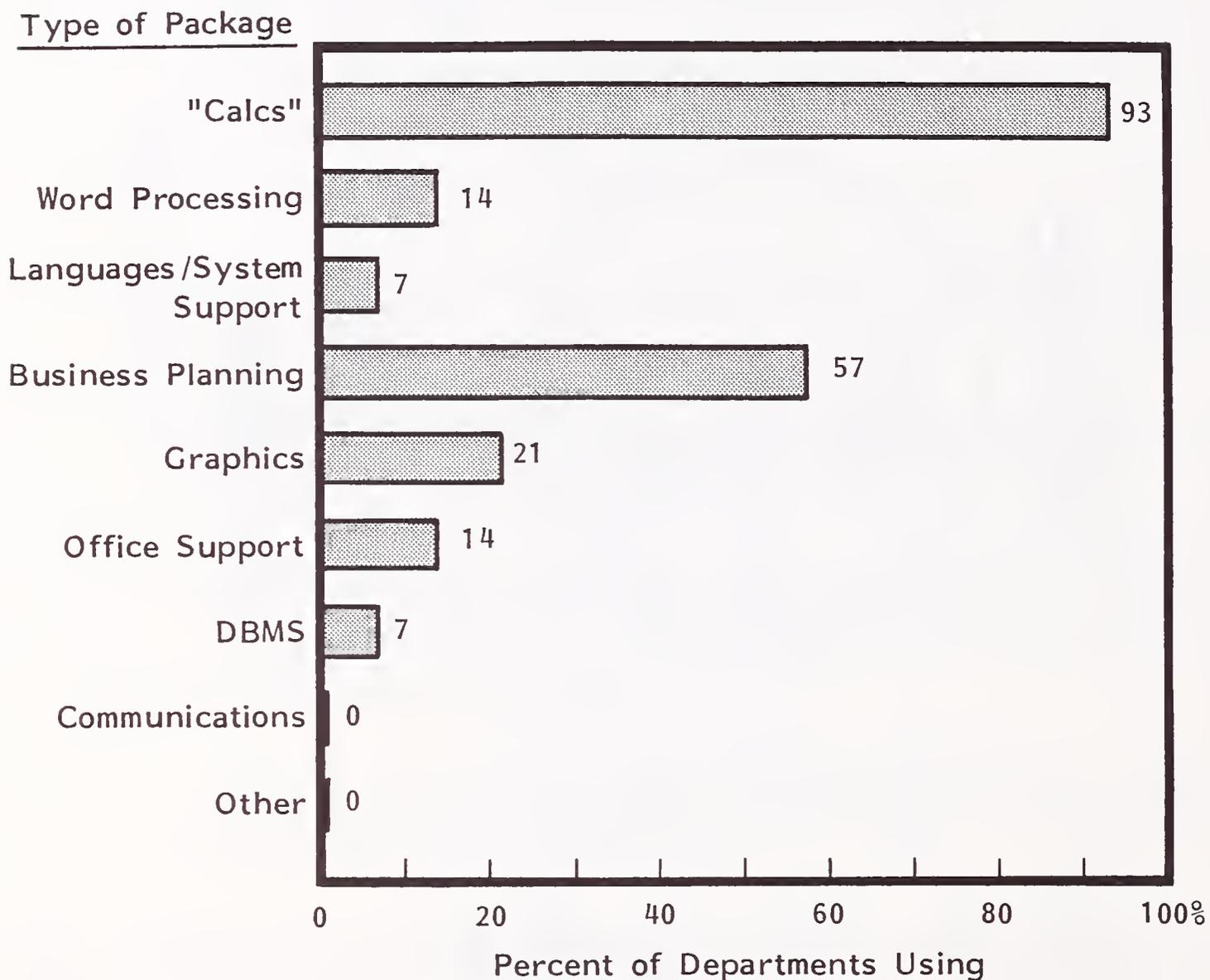
INPUT
UA82

EXHIBIT III-147

PERSONAL COMPUTER APPLICATIONS IN THE DISTRIBUTION SECTOR
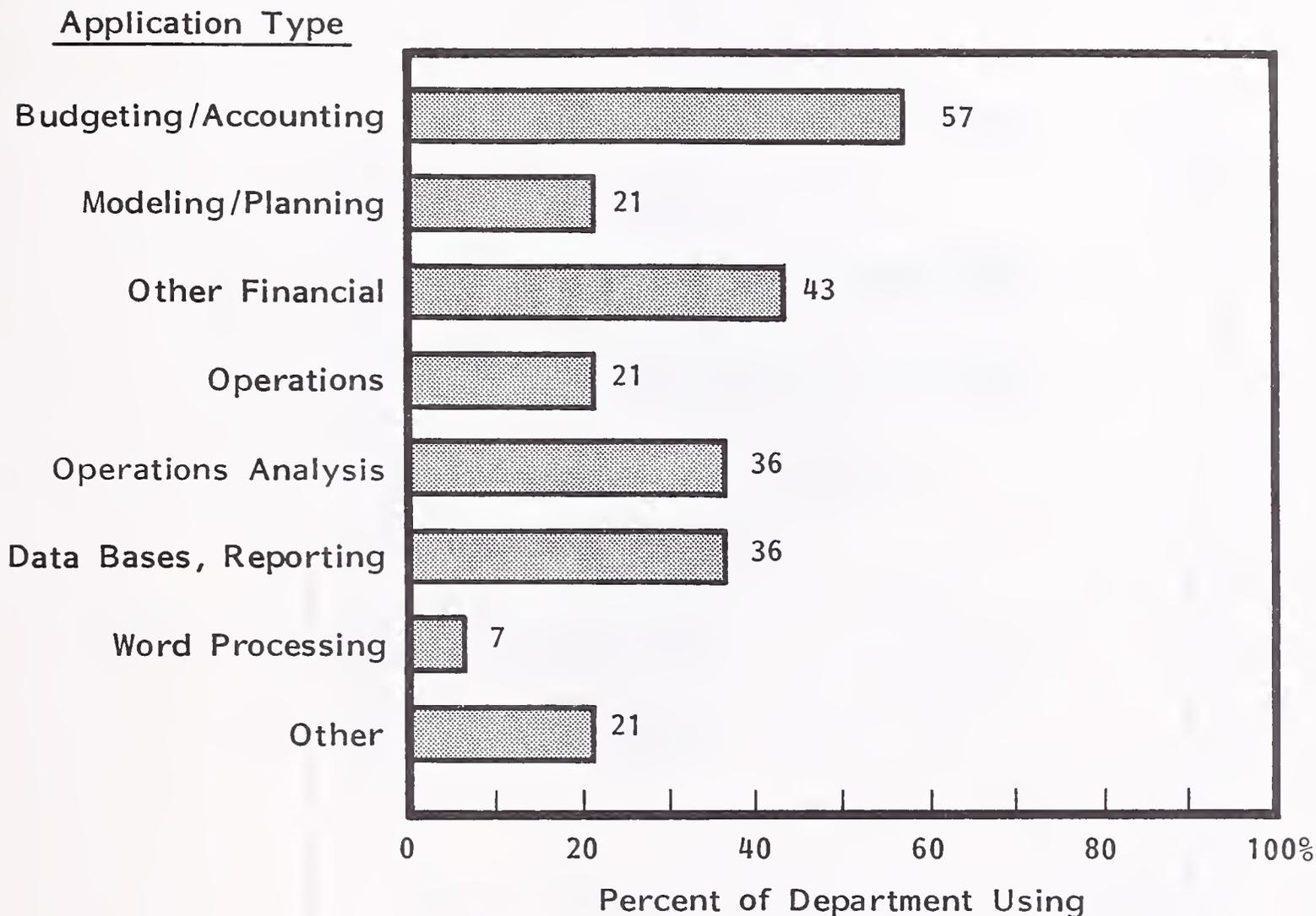
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-148

PERSONAL COMPUTER APPLICATIONS IN THE DISTRIBUTION SECTOR

Accounting Analysis

Sales Journal

Cash Management

Microcomputer Purchase Study

Merchandising

Report Writing

Financial Analysis and Planning

Budgeting

Graphics

Debt Servicing

Comparative Analysis

Sales Analysis

Advertising Accounts

Input/Output Device for Analysis

Operating Expenses Analysis

Consolidations Reports

Price Analysis

Inventory

Advertising Results

Cost Benefit Analysis

General Ledger

Word Processing

Annual Plans

Reforecasting

Income Statements

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-149

SOURCES OF ASSISTANCE FOR PERSONAL COMPUTER USERS
IN THE DISTRIBUTION SECTOR
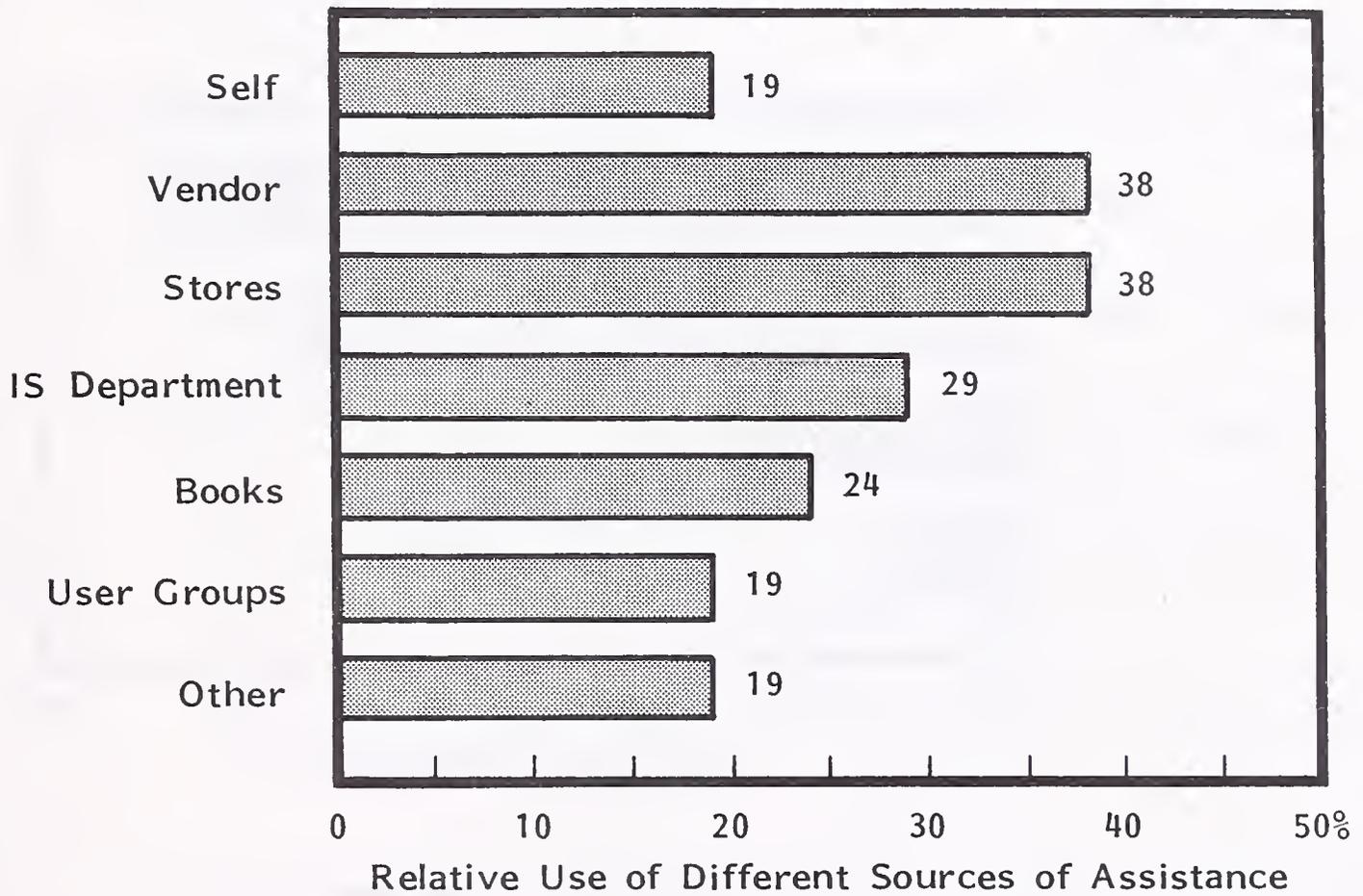
Relative Use of Different Sources of Assistance

Note: Total Is More Than 100% Because of Multiple Sources.   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-150

TIME SINCE FIRST PERSONAL COMPUTER INSTALLED
IN USER DEPARTMENTS IN THE DISTRIBUTION SECTOR

**Time Since
First Installed**

Less Than 6 Months ▨ 43

6 Months-1 Year ▨ 36

1 Year-2 Years ▨ 14

Over 2 Years ▨ 6

0   10   20   30   40   50%

Percent of Departments
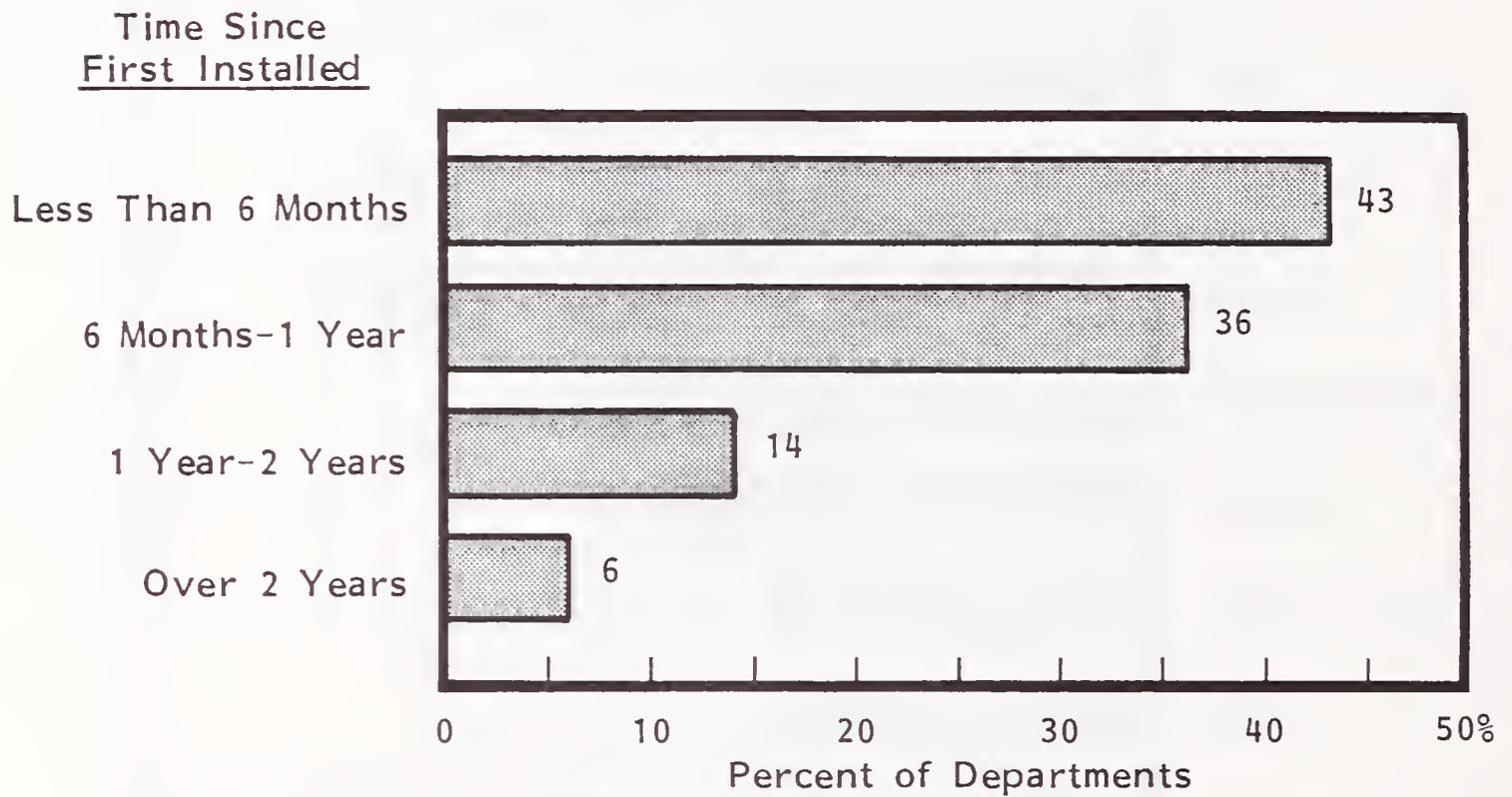
SOURCE: INPUT Surveys

INPUT
UA82

I.   SERVICES SECTOR

I.   BUDGETS

- In this sector, 73% of the companies expect budget increases in 1983, compared to 61% generally. Seven percent expect a decrease compared to 8% generally, as shown in Exhibit III-151.

    - Companies expecting to increase their budgets foresee an average rise of 24%.

    - Companies anticipating decreases expect their budgets to drop by 24%.

- The budget increases expected do not vary significantly by company size.

    - Large companies: 75% expect increases in the services sector, compared to 63% for large companies generally.

    - Medium companies: 71% expect increases, compared to 63% for medium companies generally.

    - Small companies: 72% expect increases, compared to 57% for small companies generally.

- The average budget growth expected for 1983 in the services sector is 16%, compared to 12% in 1982.

    - This represents an increase of 31% in the average rate of growth.

INPUT

EXHIBIT III-151

ANTICIPATED BUDGET INCREASES FOR 1983 IN THE SERVICES SECTOR
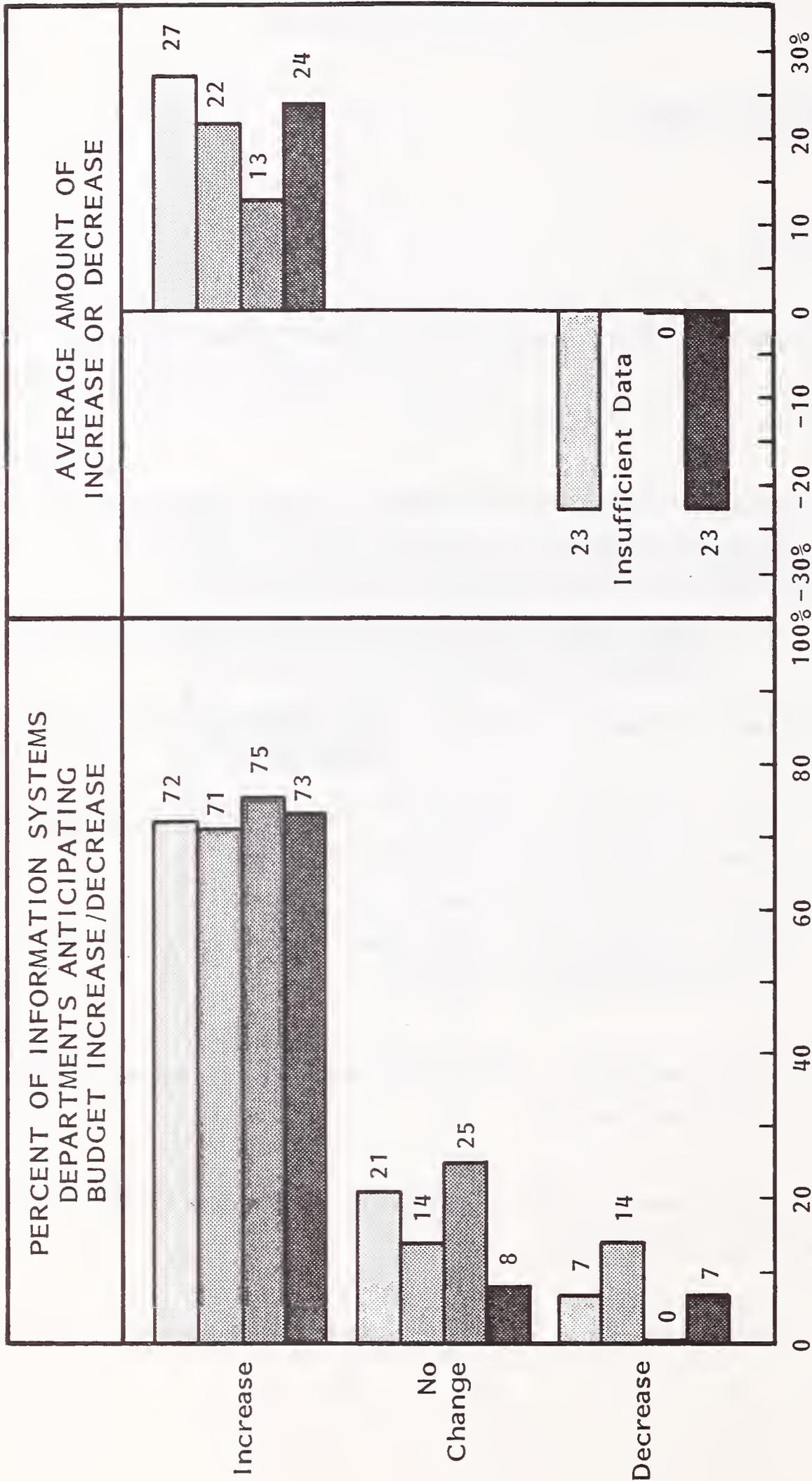
INPUT
UA82

- Exhibit III-152 shows the range of the ratios between the IS budget and the company's total revenues which exists in the services sector.

    - The IS percentage of total revenues for the average company (i.e., at the 50th percentile) in each size group was:

        - For large and medium companies: 0.6%, compared to 0.7% for this size company generally.

        - For small companies: 1.3%, compared to 1.2% for this size company generally.

    - The companies that spend least on data processing as a percentage of revenues are those at and below the 20th percentile. Taking the 10th percentile as representative, the IS spending percentages were:

        - Large and medium companies: 0.1%.

        - Small companies: 1.0%.

    - The companies that spend the most on data processing as a percentage of revenues are those at and above the 80th percentile. Taking the 90th percentile as representative, their IS spending percentages were:

        - Large and medium companies: 2.2%.

        - Small companies: 3.0%.

- Median spending on IS per corporate employee was $950. However, there was a broad range of spending ratios, as shown in the diagram in Exhibit III-153.

    - The reasons for this variation were discussed in Chapter II, Section B.

INPUT

EXHIBIT III-152

INFORMATION SYSTEMS BUDGET AS A PERCENT OF TOTAL REVENUES IN THE SERVICES SECTOR
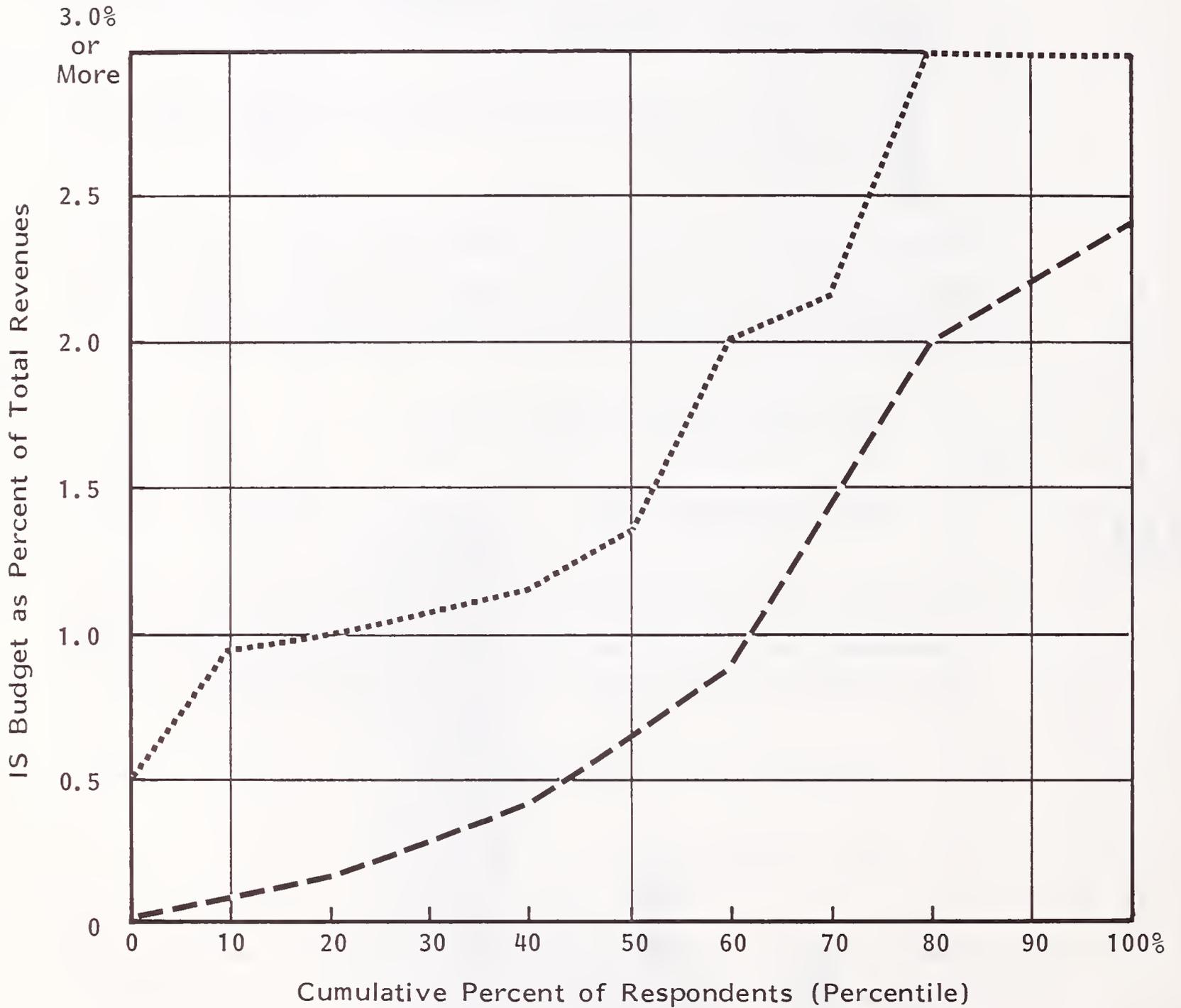
Key - Company Size:

•••••••••••• $0 - $199 million

— — — — $200 million and over

INPUT
UA82

EXHIBIT III-153

INFORMATION SYSTEMS SPENDING PER EMPLOYEE BY COMPANY SIZE IN THE SERVICES SECTOR

IS Spending per Employee

($ thousands)
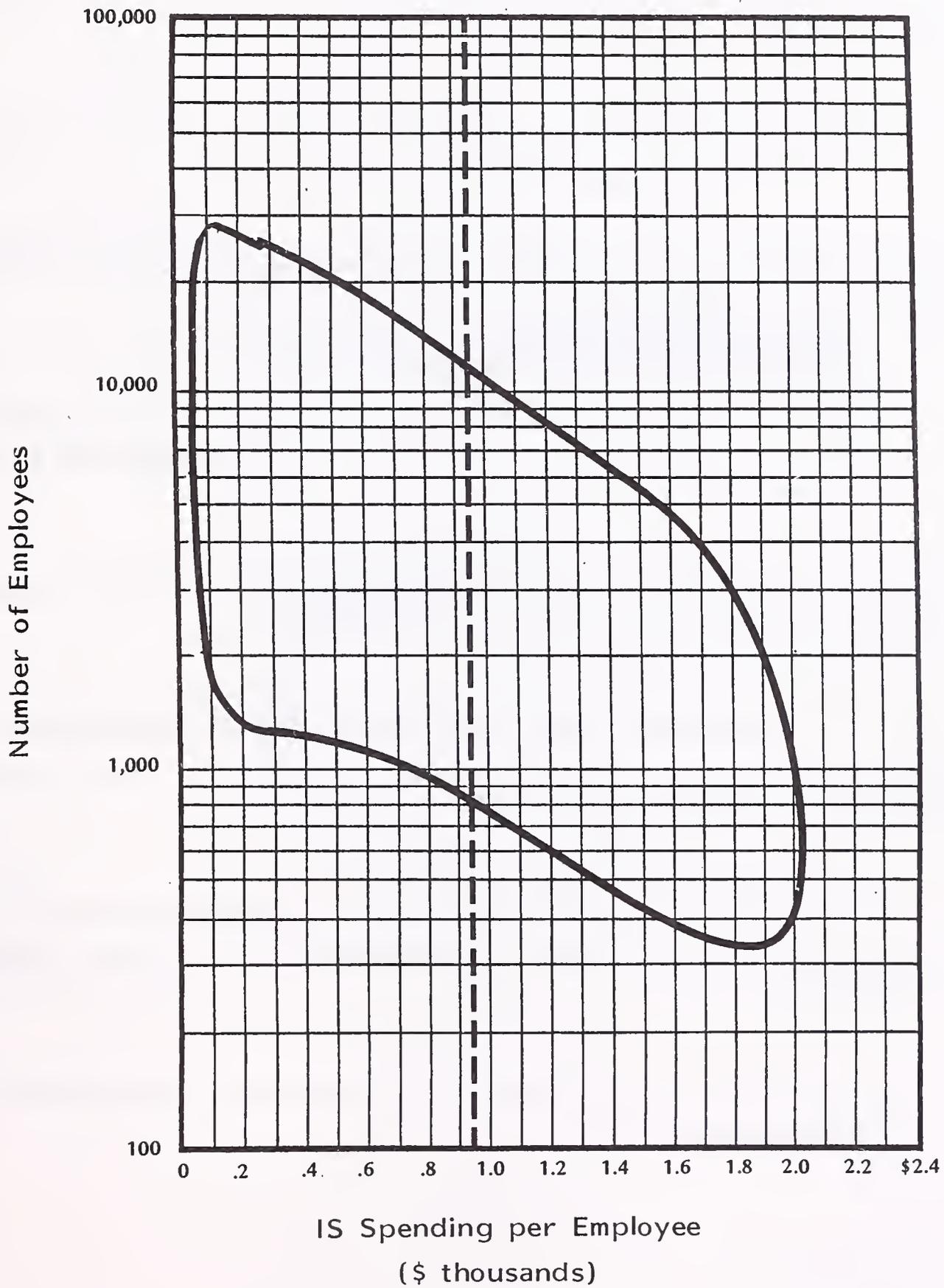
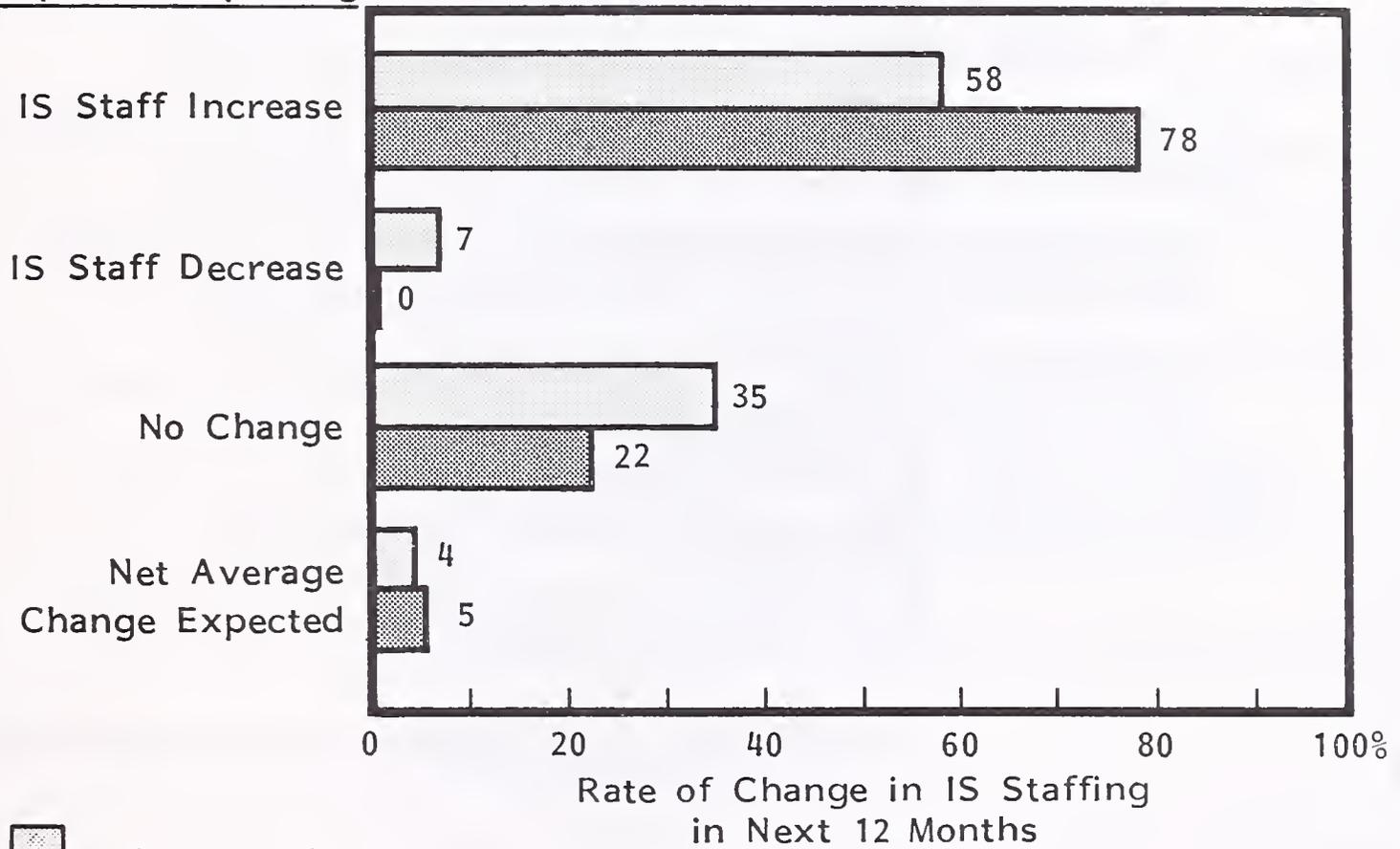- - - - = Median   SOURCE: INPUT Surveys

INPUT
UA82

2.   STAFFING

- In the staffing sector, 78% of companies expect their IS staffs to increase in
  the next 12 months, compared to the industry average of 58%, as shown in
  Exhibit III-154.

  - The net increase in numbers of staff is expected to be 5%, compared to
    the all-industry average of 4%.

- Turnover in this sector is expected to be less than the all-industry average in
  1983, as shown in Exhibit II-9.

  - Current turnover rates for individual positions are shown in Exhibit III-
    155. For technical positions the turnover rate is close to the average
    for other sectors.

- Difficulty in recruiting staff in this sector is the same as it is for companies
  generally, as shown in Exhibit III-156.

- The number of programs to be maintained averages 950 in this sector, al-
  though the range, both in absolute numbers and based on company size, is
  quite broad, as shown in Exhibit III-157.

  - Maintenance, as a proportion of total workload, is less than it is in
    most industries and appears to be declining slightly, as shown in Exhibit
    III-158.

  - Large services companies expect that maintenance will be declining, as
    shown in Exhibit III-159.

INPUT

EXHIBIT III-154

INFORMATION SYSTEMS STAFFING CHANGES EXPECTED
IN THE NEXT TWELVE MONTHS IN THE SERVICES SECTOR

Percent of
Companies Expecting:

IS Staff Increase — 58 / 78

IS Staff Decrease — 7 / 0

No Change — 35 / 22

Net Average Change Expected — 4 / 5

Rate of Change in IS Staffing
in Next 12 Months

☐ All Industries

▨ Services

SOURCE: INPUT Surveys

- 299 -

INPUT
UA82

EXHIBIT III-155

CURRENT ANNUAL TURNOVER IN THE SERVICES SECTOR

Percent of Annual Turnover
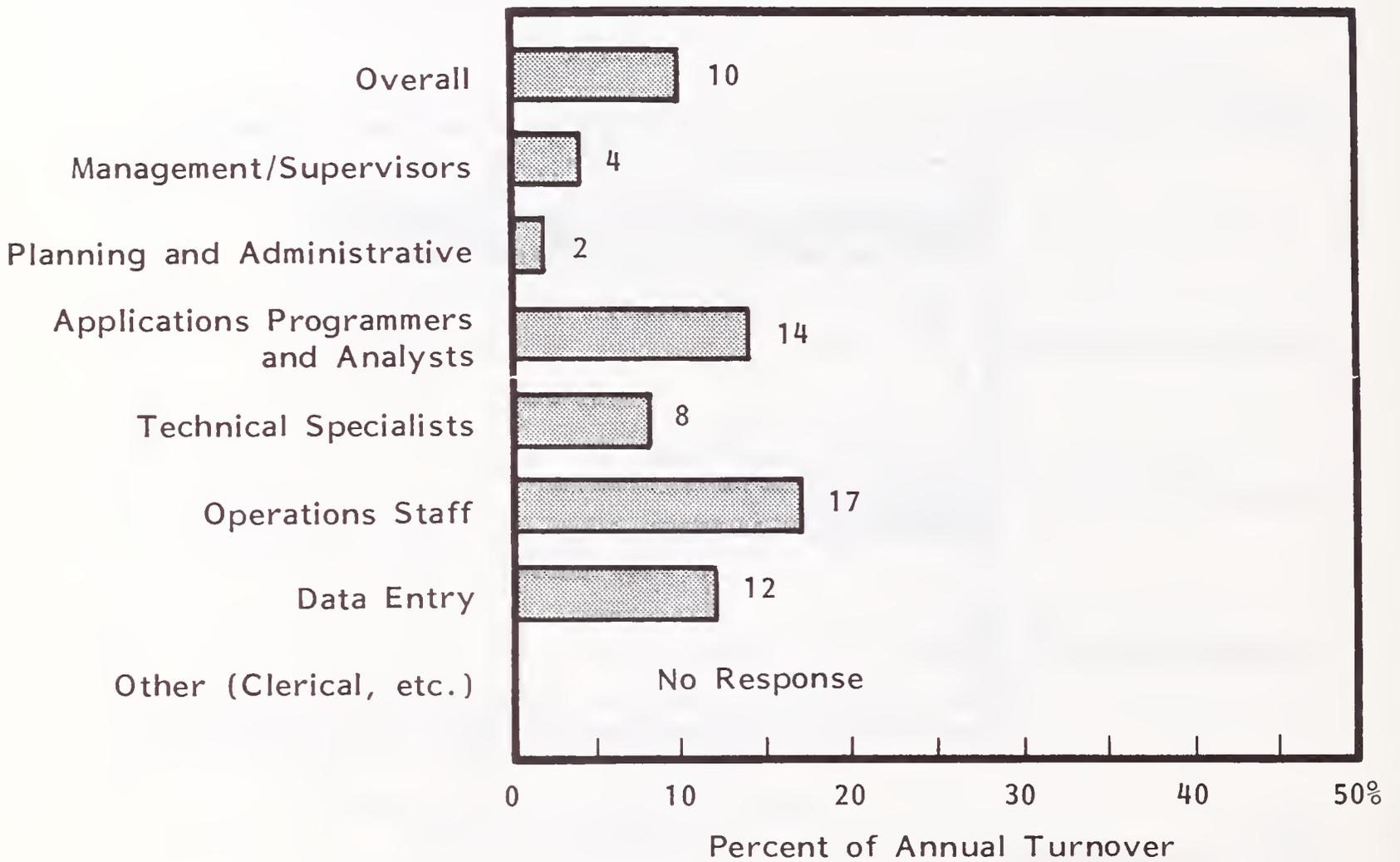
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-156

INFORMATION SYSTEMS DIFFICULTY IN RECRUITING STAFF
IN THE SERVICES SECTOR
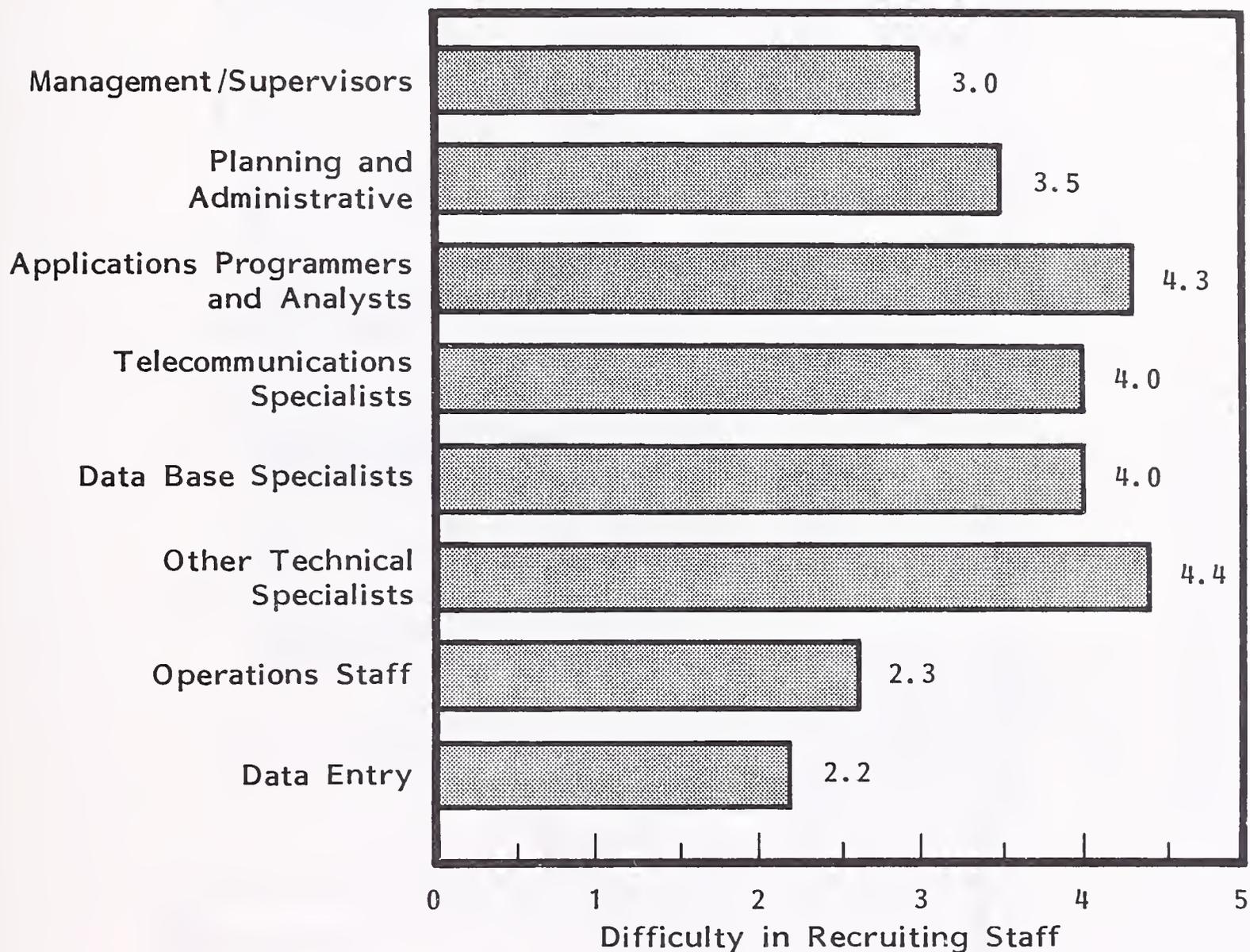
Scale: 1 = Low, 5 = High

INPUT
UA82

EXHIBIT III-157

NUMBER OF PROGRAMS BY COMPANY SIZE
IN THE SERVICES SECTOR
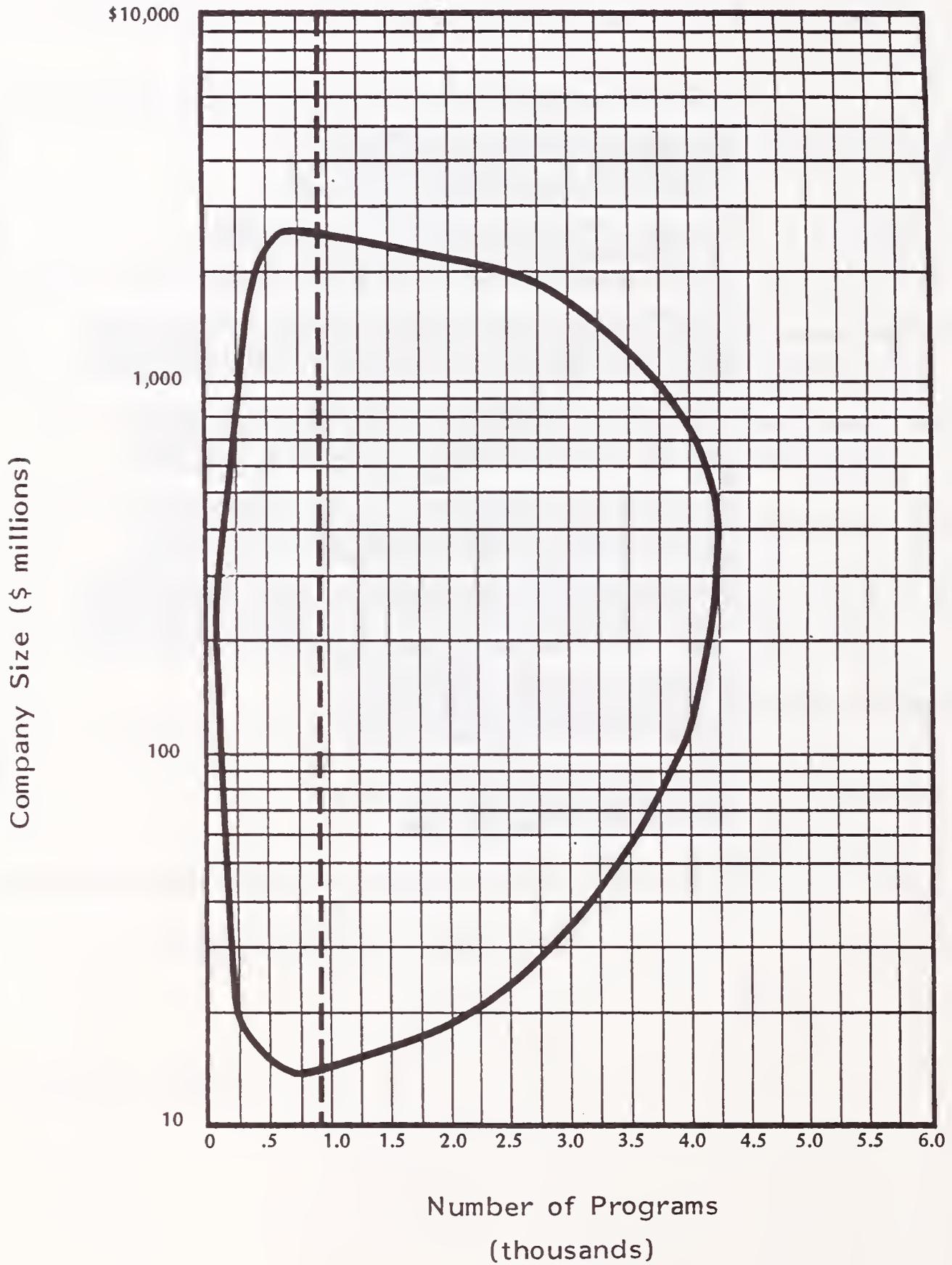
- - - - = Median   SOURCE: INPUT Surveys

EXHIBIT III-158

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE
IN THE SERVICES SECTOR, 1981-1983

Percent of Resources
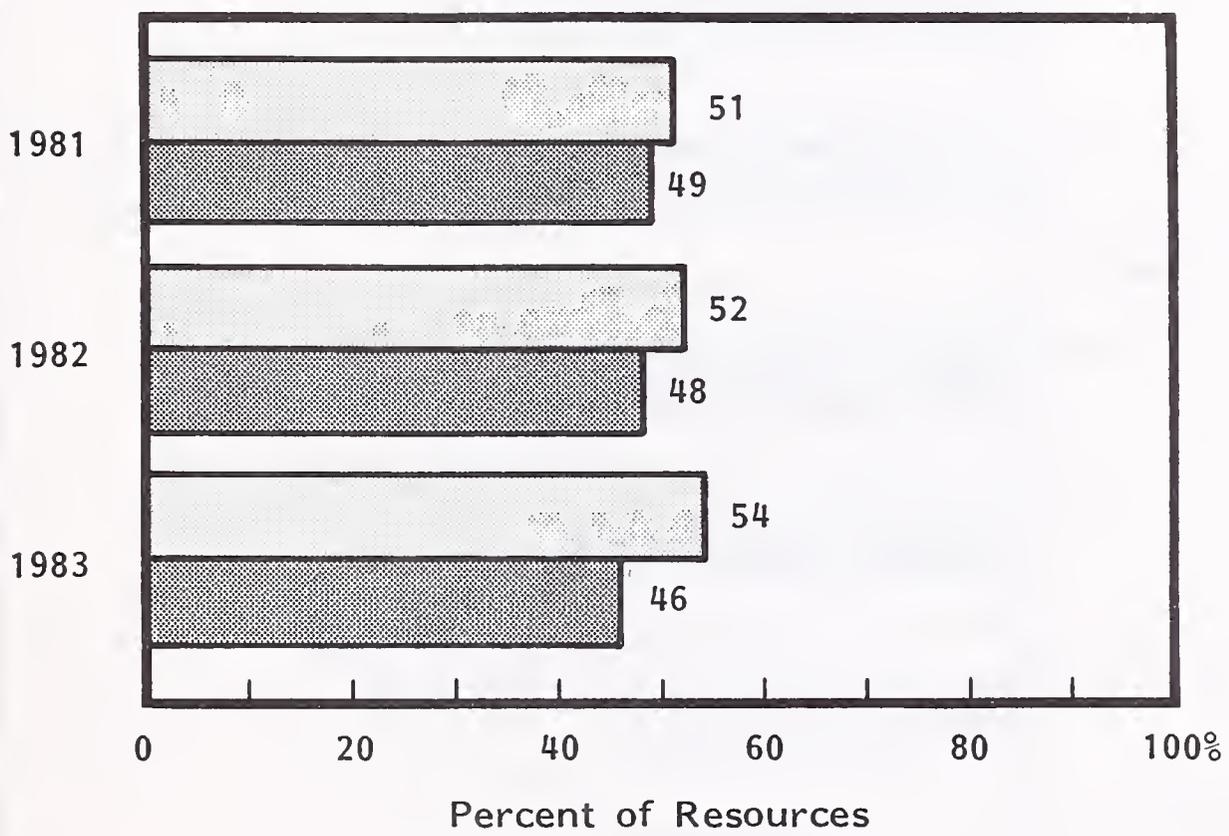
New Development

Maintenance

INPUT
UA82

EXHIBIT III-159

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE
IN THE SERVICES SECTOR, 1981-1983

Company Size
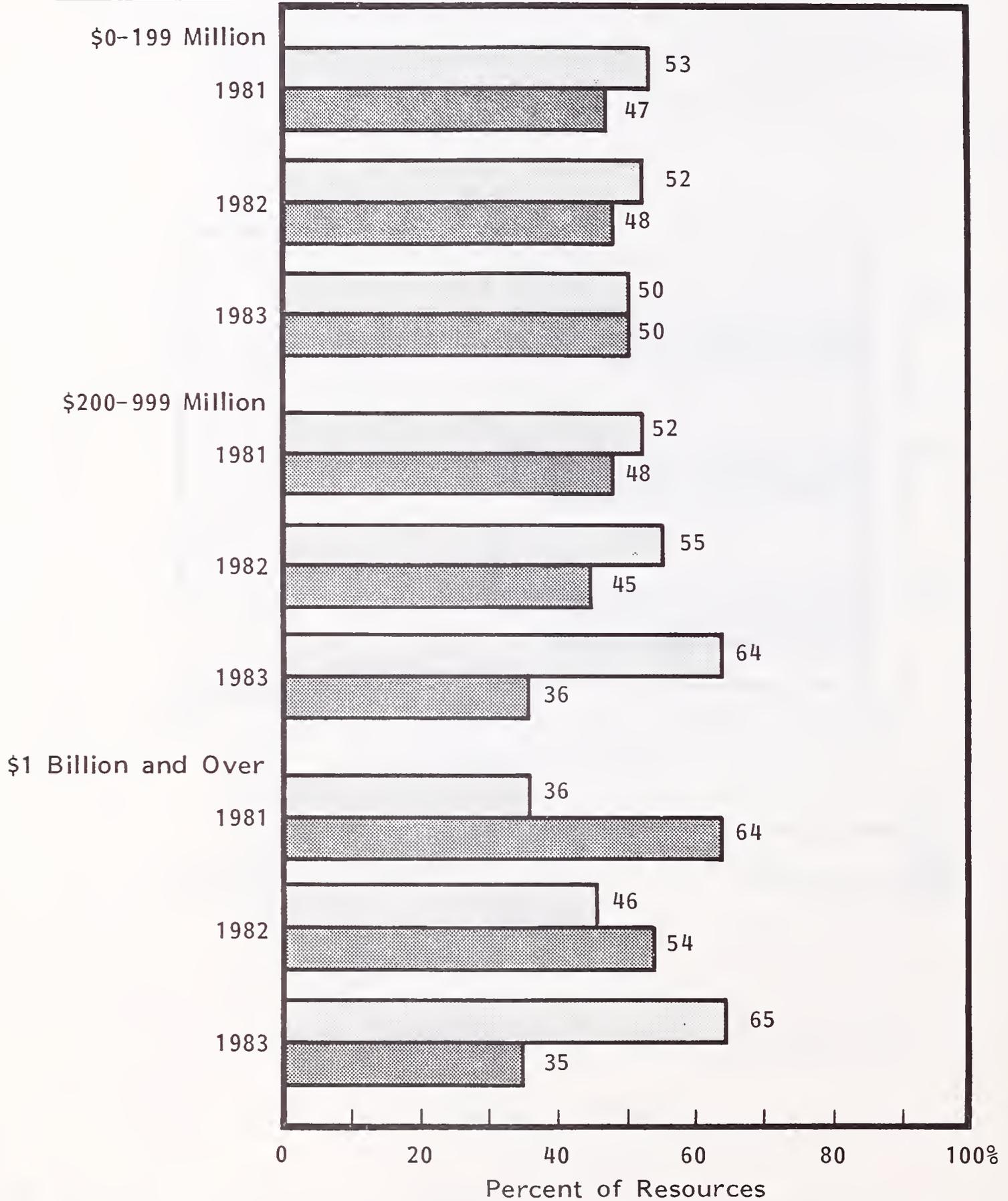
$0-199 Million

1981 — 53 / 47

1982 — 52 / 48

1983 — 50 / 50

$200-999 Million

1981 — 52 / 48

1982 — 55 / 45

1983 — 64 / 36

$1 Billion and Over

1981 — 36 / 64

1982 — 46 / 54

1983 — 65 / 35

Percent of Resources

☐ New Development

▨ Maintenance

SOURCE: INPUT Surveys

- 304 -

INPUT
UA82

3. INFORMATION SYSTEMS ISSUES

- Note: please refer to Chapter II, Section D for a general discussion of IS problems, objectives, and initiatives and their interrelationships.

- The services industry, in its own view, has fewer problems than most other sectors, as shown Exhibit III-160.

  - More detailed information about specific problem areas is contained in Exhibit III-161. This exhibit shows the percentage of companies in this sector which regard an issue as a major problem.

- Similarly, the services industry's objectives follow the same pattern as the all-industry average but with less intensity, as shown in Exhibit III-162.

  - More detailed inforamtion about specific planning objectives is contained in Exhibit III-163. This exhibit shows the percentage of companies in this sector which have identified particular planning objectives as being of major importance to them.

- This sector plans relatively few software and planning and control initiatives, compared to most other industries, as shown in Exhibit III-164. Otherwise, its initiatives are near the all-industry average.

  - More detailed information about specific areas where an initiative is planned is contained in Exhibit III-165. This exhibit shows the percentage of companies in this sector which plan a major initiative in a particular area.

4. PERSONAL COMPUTERS

- Plans for the use of personal computers in this sector are shown in Exhibit III-166 and involve:

INPUT

EXHIBIT III-160

INFORMATION SYSTEMS PROBLEMS IN THE
SERVICES SECTOR
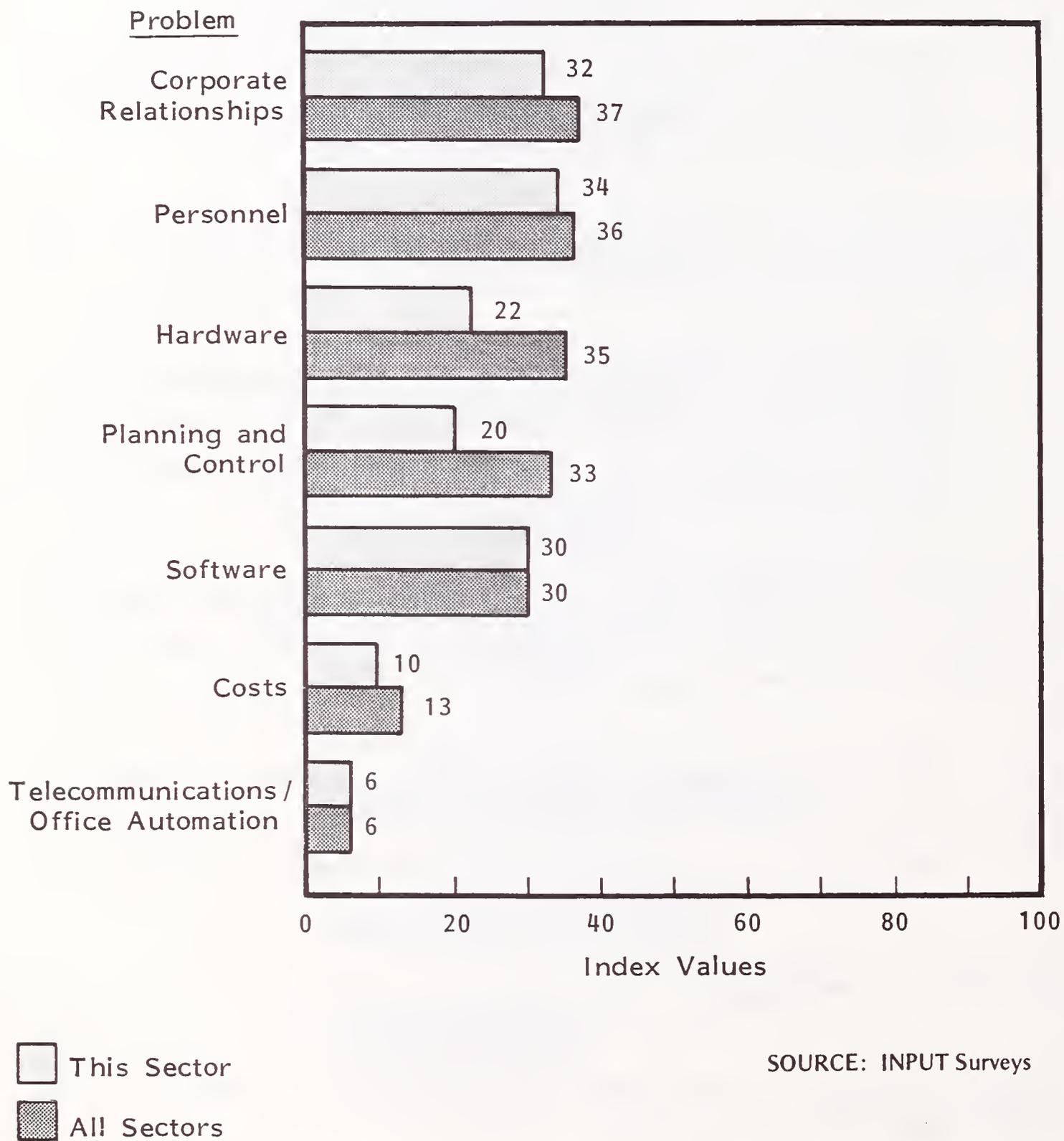
INPUT
UA82

EXHIBIT III-161

INFORMATION SYSTEMS PROBLEMS IN THE SERVICES SECTOR

Problem

Problem	Percent
Relations with Management	12
Relations with Users	20
Backlog/Workload	16
Planning	2
Cost Constraints	10
Project Control/Management	2
IS Personnel Shortages/Turnovers	28
Other IS Personnel Issues	6
Application System Quality	6
Software Development, Maintenance, Productivity	24
Equipment/Capacity, Computer Operations	14
Network/Telecommunications	6
Hardware	8
Office Automation	0
Other	10

Percent of Companies

SOURCE: INPUT Surveys

- 307 -

INPUT
UA82

EXHIBIT III-162

INFORMATION SYSTEMS OBJECTIVES IN THE
SERVICES SECTOR

Objective

- Corporate Relationships: This Sector 34, All Sectors 43
- Personnel: This Sector 6, All Sectors 5
- Hardware: This Sector 14, All Sectors 16
- Planning and Control: This Sector 18, All Sectors 32
- Software: This Sector 52, All Sectors 64
- Costs: This Sector 6, All Sectors 8
- Telecommunications/Office Automation: This Sector 16, All Sectors 28

Index Values

☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

- 308 -
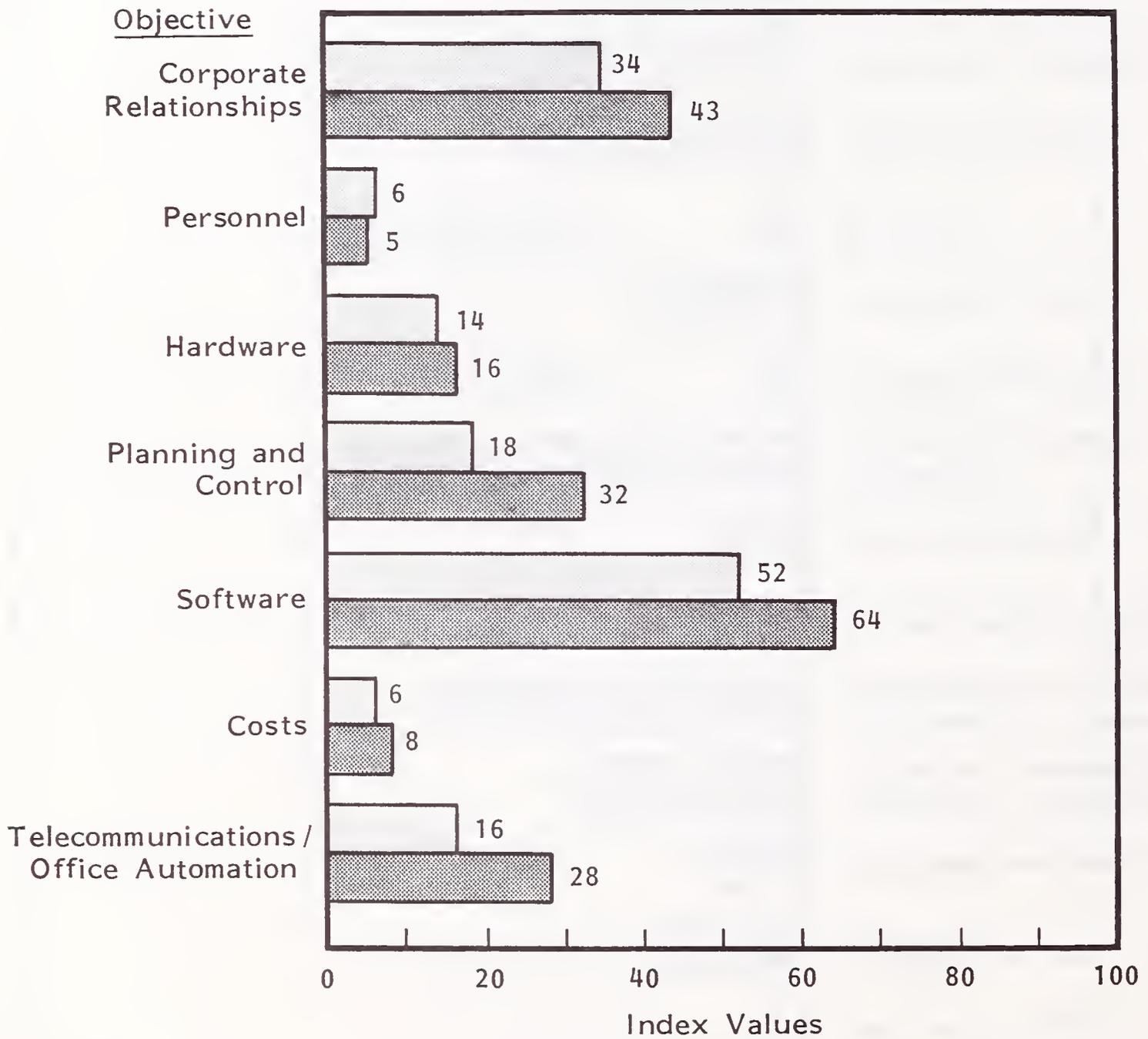
INPUT
UA82

EXHIBIT III-163

INFORMATION SYSTEMS OBJECTIVES IN THE SERVICES SECTOR

Objective	Percent
Support Company Objectives	0
Improve User Service/Relations	15
Improve Planning	4
End User Computing	7
Office Automation	4
Improve Management Control	4
Improve Productivity	4
Control Costs	11
Add Staff	4
New/Improved Software	30
New Hardware	4
Network/Telecommunications	22
IS Security/Disaster Recovery	7
Miscellaneous	0

Percent of Companies
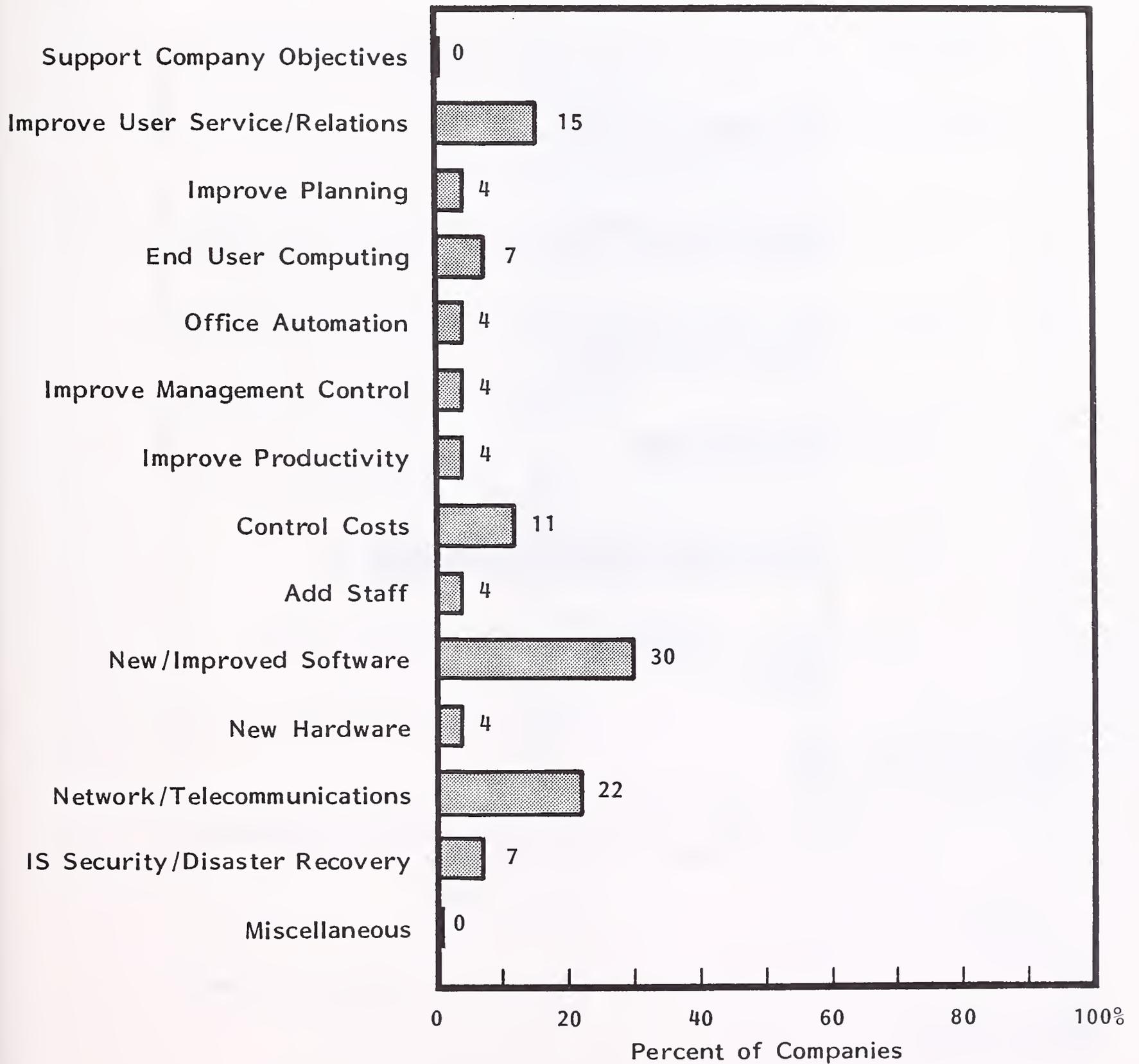
SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-164

INFORMATION SYSTEMS INITIATIVES IN THE
SERVICES SECTOR

Initiative

Initiative	This Sector	All Sectors
Corporate Relationships	36	39
Personnel	36	41
Hardware	40	40
Planning and Control	14	28
Software	44	69
Costs	4	12
Telecommunications / Office Automation	4	4

Index Values

☐ This Sector

▦ All Sectors

SOURCE: INPUT Surveys

- 310 -
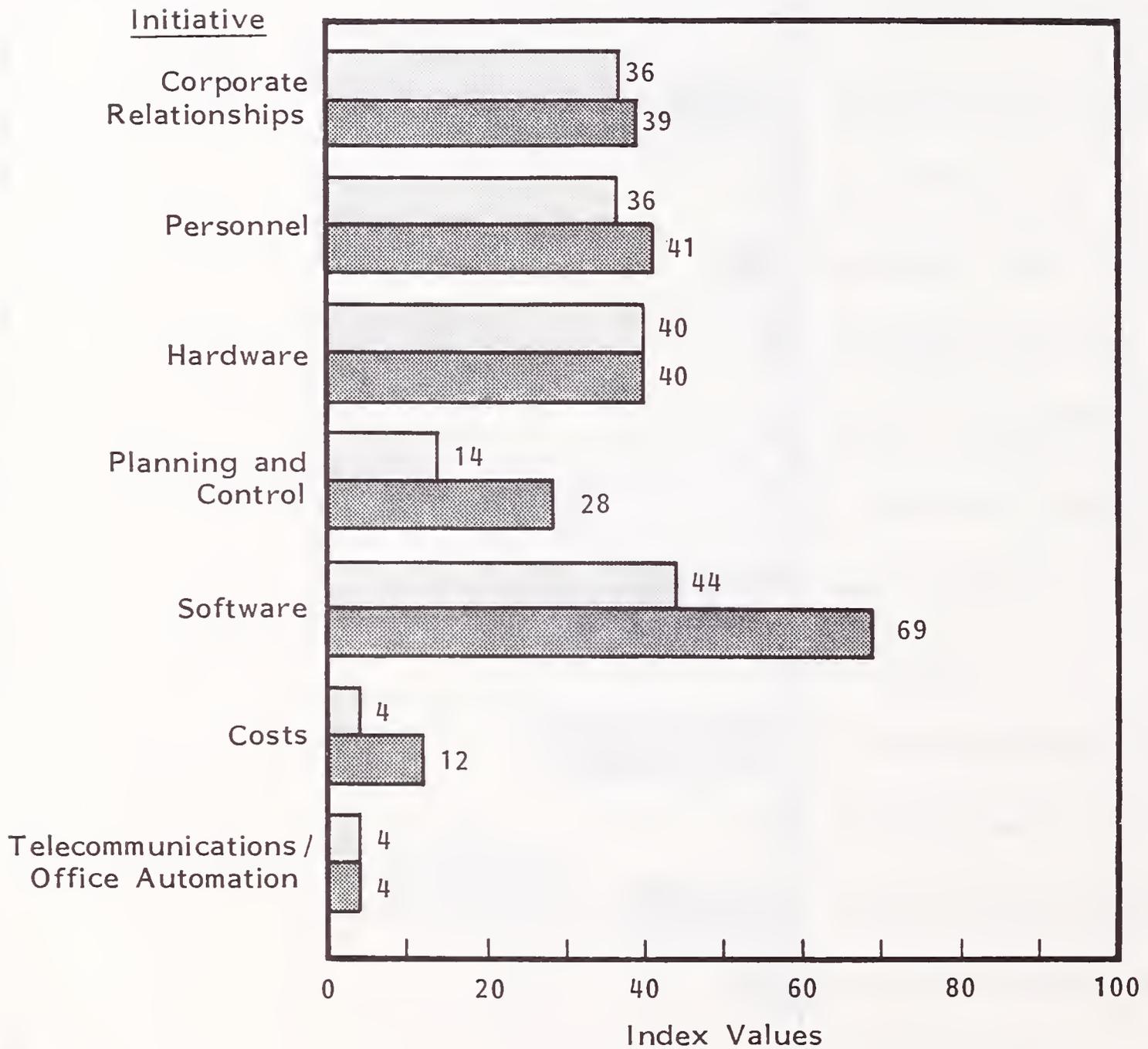
INPUT
UA82

EXHIBIT III-165

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE SERVICES SECTOR

Initiative	Percent
Career Planning/Education, Training	12
Increase Hiring	24
Productivity Tools and Techniques/ Quality Control Standards	24
Redesign/Replace System(s)	10
Software Packages/DBMS	10
Justify/Reduce Additional Functions/Costs	4
Add Hardware	14
Vendor Improvement	16
Network/Telecommunications	4

Percent of Companies

Continued

SOURCE: INPUT Surveys

- 311 -
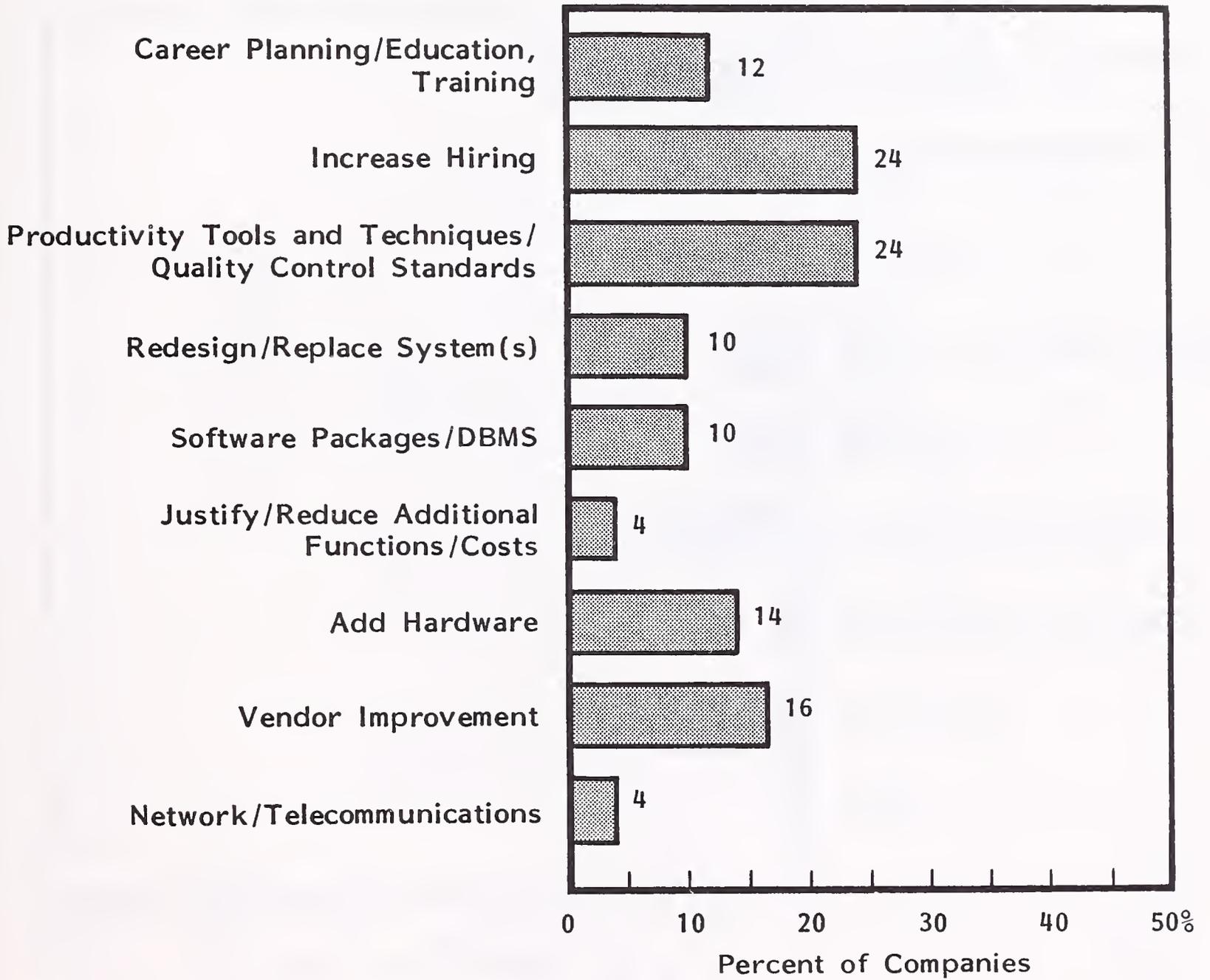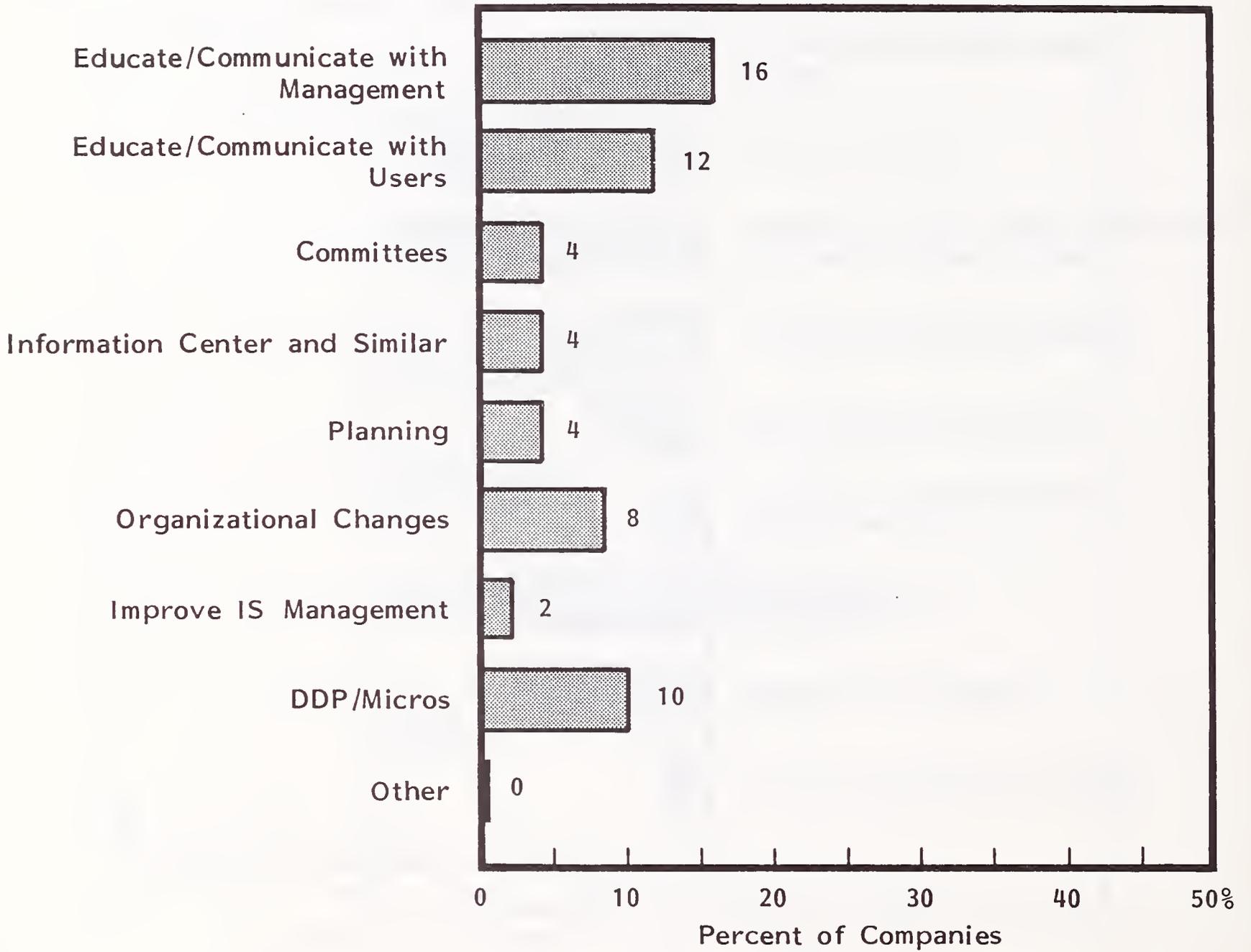
INPUT
UA82

EXHIBIT III-165 (Cont.)

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE SERVICES SECTOR

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-166

PERSONAL COMPUTER ACQUISITION PLANS IN THE SERVICES SECTOR
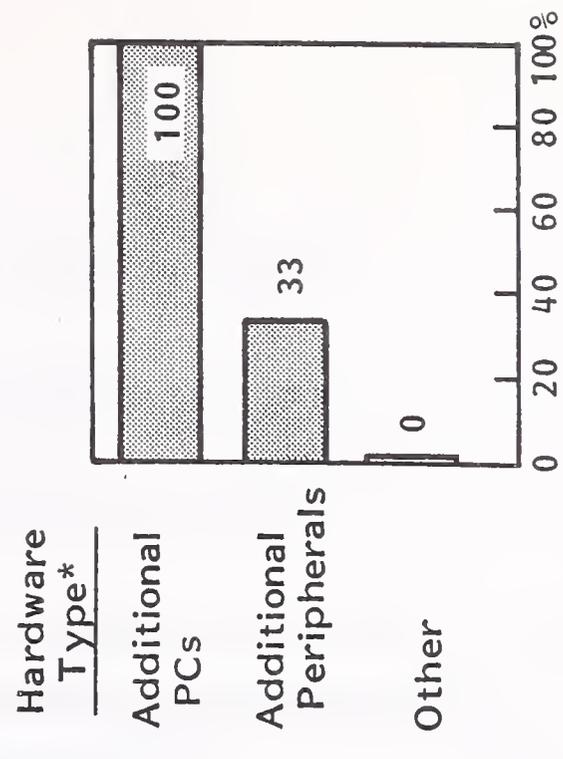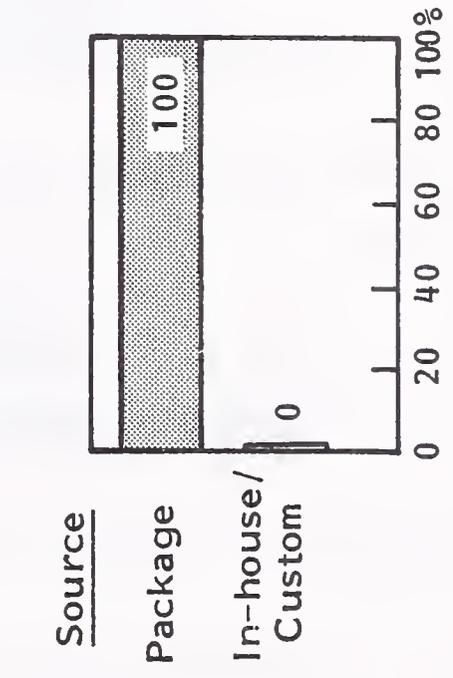

Expected Level of Use
of Personal Computers
in Five Years
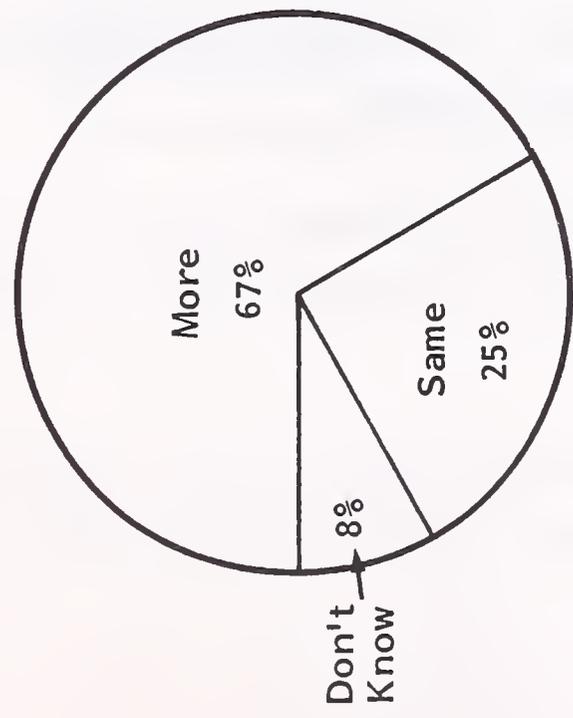
User Plans for
Additional Personal
Computer Software

User Plans for
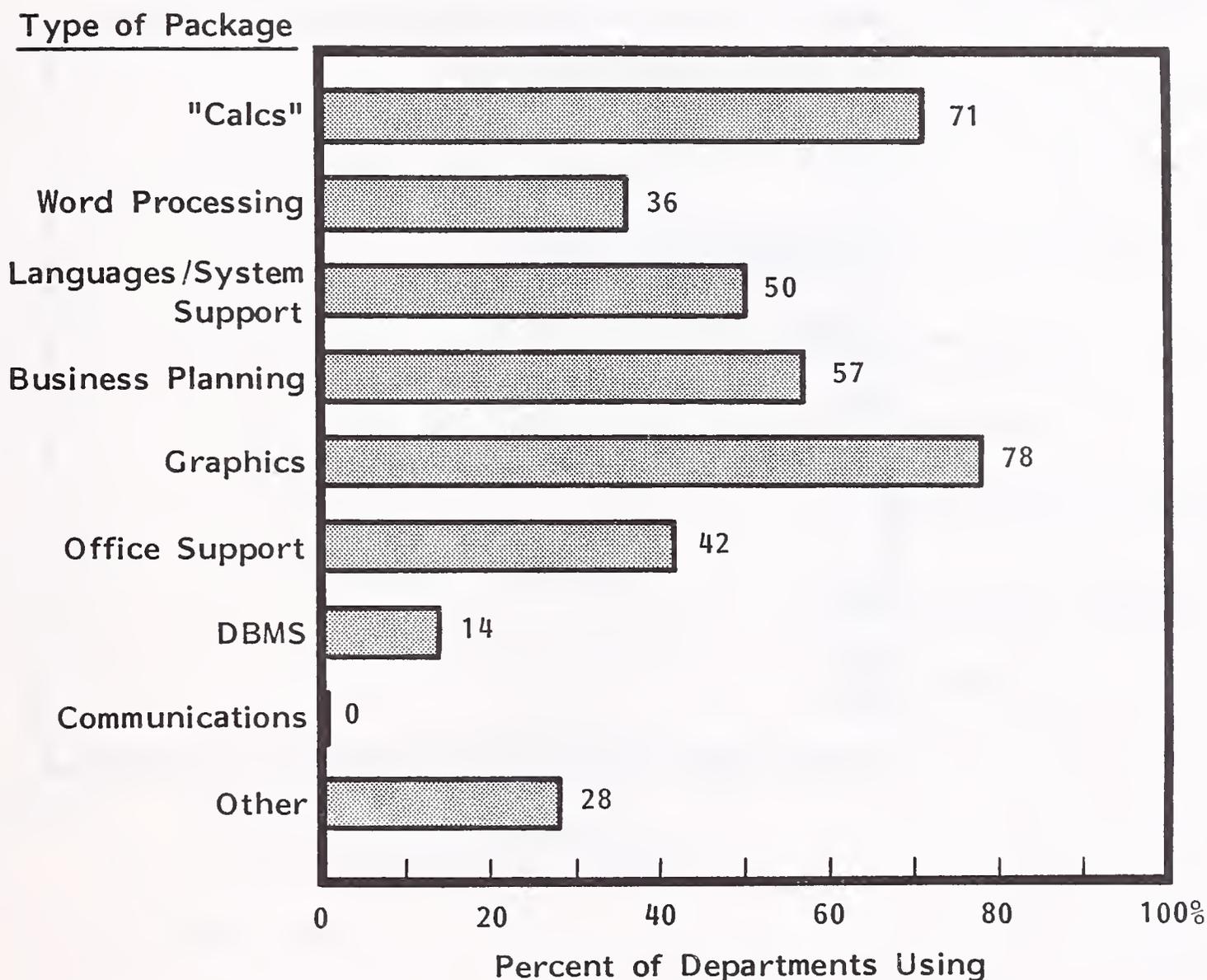Additional Personal
Computer Hardware

SOURCE: INPUT Surveys

* Totals more than 100%
  because of multiple plans

INPUT
UA82

- The overall level of use in five years.

- Plans for obtaining additional personal computer software.

- Plans for obtaining additional personal computer hardware.

- There are considerably fewer plans to obtain additional personal computer hardware in the services sector than by companies generally.

  - Software package acquisition is planned exclusively.

- Exhibit III-167 shows the types of personal computer software packages now used.

  - The service sector is much more involved with graphics and business planning software than other sectors.

- The general categories of applications used are summarized in Exhibit III-168.

  - Financial applications are the primary personal computer focus. Other application areas have, so far, been virtually ignored.

  - Exhibit III-169 provides examples of actual personal computer applications in use in the services sector.

- Compared to the average user, personal computer users in this sector are somewhat more likely to rely on the IS department for assistance, as shown in Exhibit III-170.

- In this sector 72% of departments using personal computers have had their installation less than a year, as shown in Exhibit III-171, compared to 78% generally.
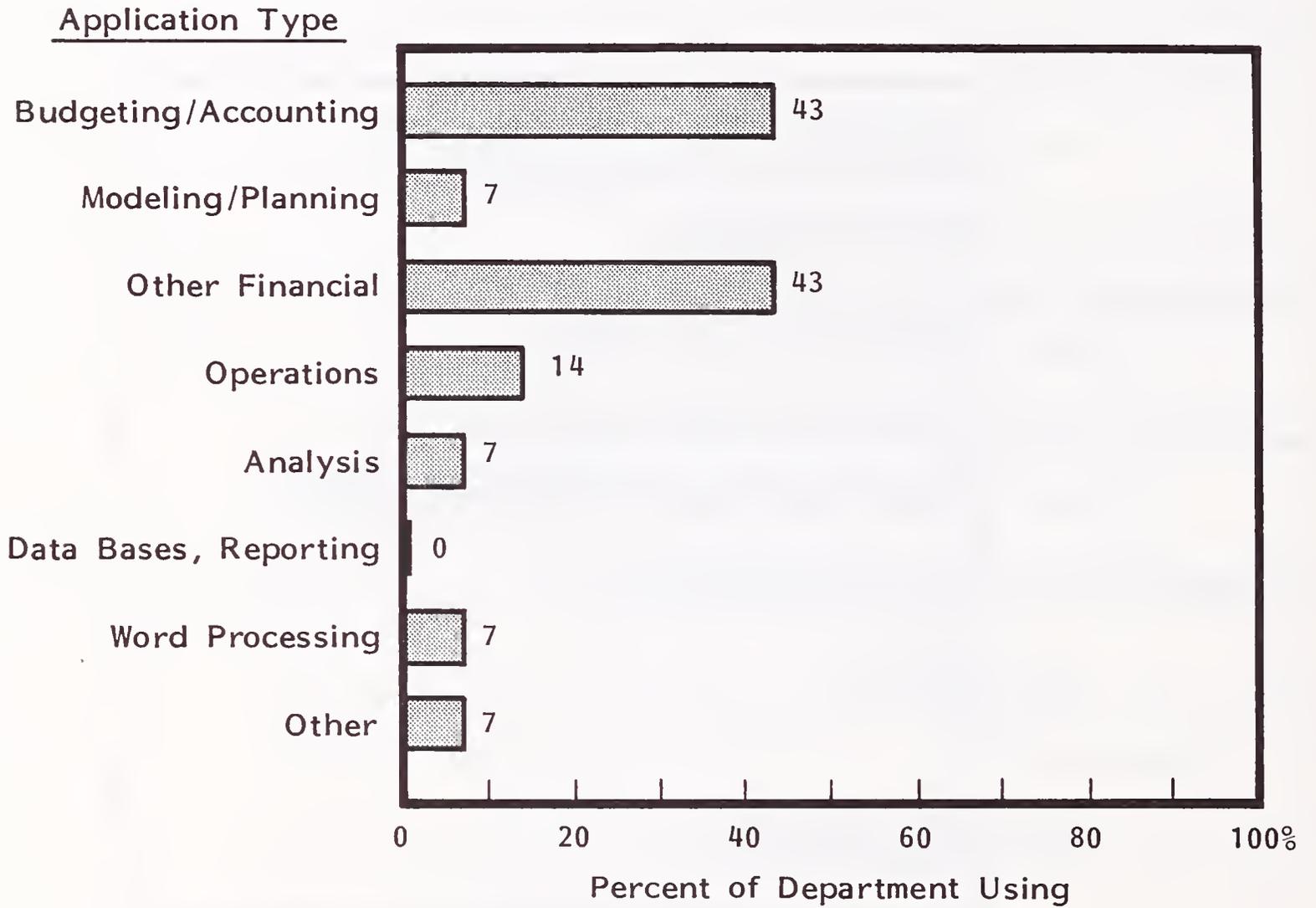
INPUT

EXHIBIT III-167

TYPES OF PERSONAL COMPUTER SOFTWARE PACKAGES USED IN THE SERVICES SECTOR

Type of Package

"Calcs"	71
Word Processing	36
Languages/System Support	50
Business Planning	57
Graphics	78
Office Support	42
DBMS	14
Communications	0
Other	28

0   20   40   60   80   100%

Percent of Departments Using

INPUT
UA82

EXHIBIT III-168

PERSONAL COMPUTER APPLICATIONS IN THE SERVICES SECTOR

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-169

PERSONAL COMPUTER APPLICATIONS IN THE SERVICES SECTOR

Financial Reporting

Financial Modeling

General Accounting

Word Processing

Math Schedule

General Ledger

Cash Flow

Discounts

Accounts Receivable and Accounts Payable

Payroll

Analysis

Statistics Models

Invoices

Inventory

Billing

Processing

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-170

SOURCES OF ASSISTANCE FOR PERSONAL COMPUTER USERS
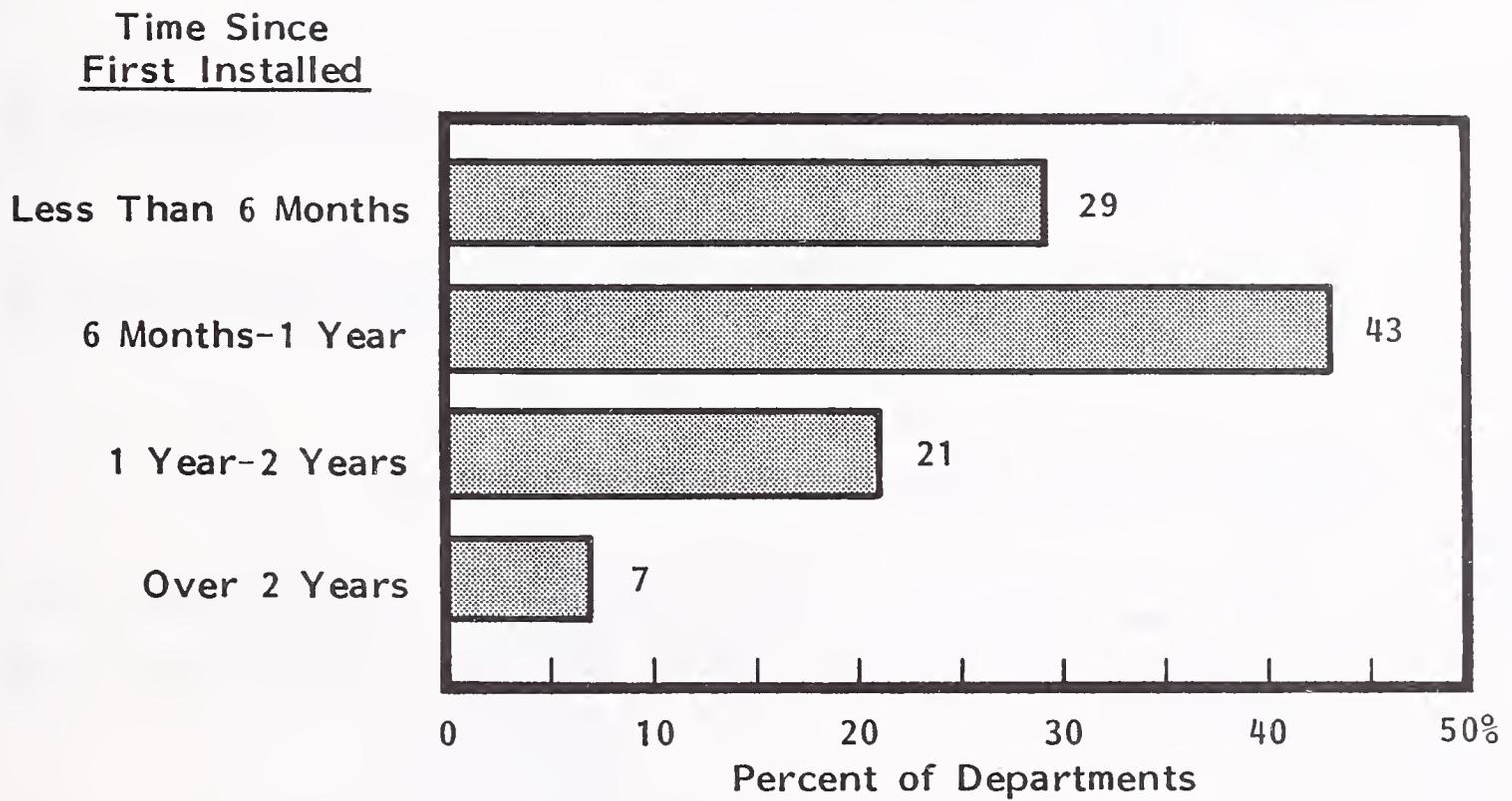## IN THE SERVICES SECTOR
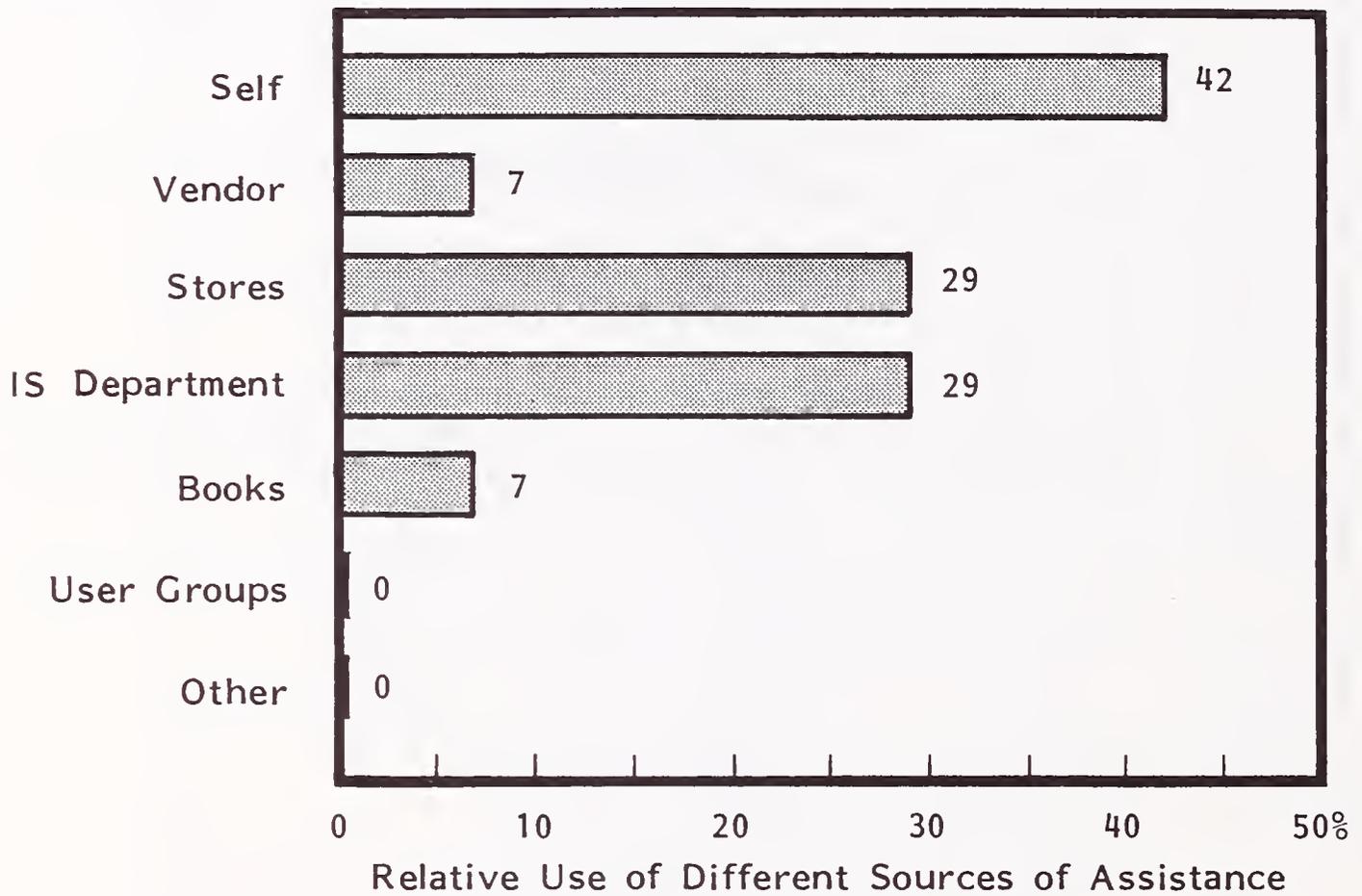
Note: Total Is More Than 100% Because of Multiple Sources.   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-171

TIME SINCE FIRST PERSONAL COMPUTER INSTALLED
IN USER DEPARTMENTS IN THE SERVICES SECTOR

Time Since
First Installed

|	Percent of Departments
Less Than 6 Months	29
6 Months-1 Year	43
1 Year-2 Years	21
Over 2 Years	7

SOURCE: INPUT Surveys

INPUT
UA82

J.   GOVERNMENT AND EDUCATION SECTOR

1.   BUDGETS

- In this sector 73% of the organizations expect budget increases in 1983, compared to 61% generally. Seven percent expect a decrease compared to 8% generally, as shown in Exhibit III-172.

    - Organizations expecting to increase their budgets foresee an average rise of 15%.

    - Organizations anticipating decreases expect their budgets to drop by 20%.

- The budget increases expected vary by organization size.

    - Large and medium-sized organizations: 100% expect increases in the government and education sector, compared to 63% for large companies generally.

    - Small organizations: 60% expect increases, compared to 57% for small companies generally.

- The average budget growth expected for 1983 in the government and education sector is 12%, compared to 9% in 1982.

    - This represents an increase of 33% in the average rate of growth.

- Median spending on IS per government and education employee was $360. However, there was a broad range of spending ratios, as shown in the diagram in Exhibit III-173.

INPUT

EXHIBIT III-172

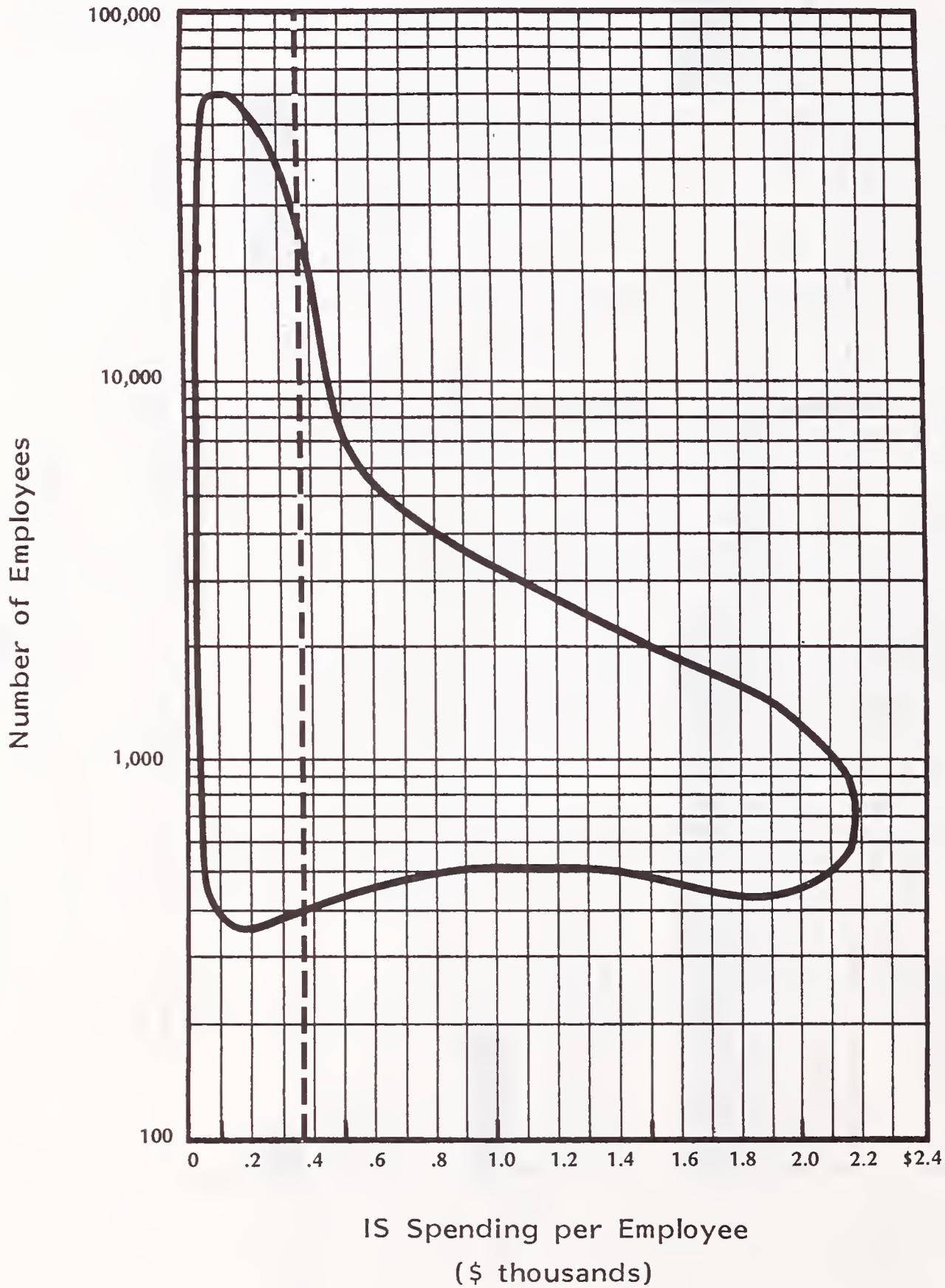ANTICIPATED BUDGET INCREASES FOR 1983 IN THE GOVERNMENT AND EDUCATION SECTOR

SOURCE: INPUT Surveys
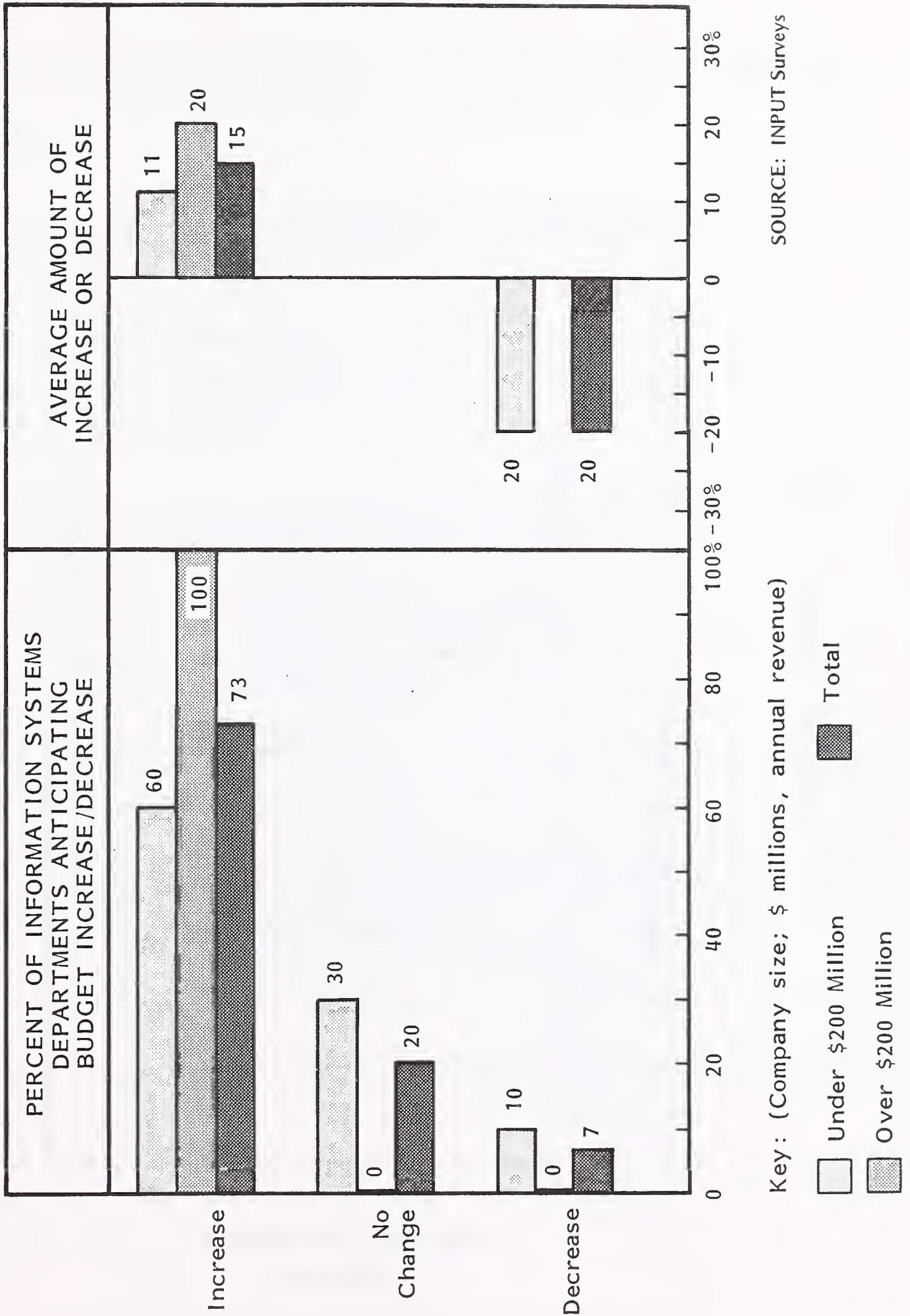
Key: (Company size; $ millions, annual revenue)

☐ Under $200 Million

▨ Over $200 Million

▨ Total

INPUT
UA82

EXHIBIT III-173

INFORMATION SYSTEMS SPENDING PER EMPLOYEE BY COMPANY SIZE
IN THE GOVERNMENT AND EDUCATION SECTOR

IS Spending per Employee

($ thousands)

– – – – = Median   SOURCE: INPUT Surveys

INPUT
UA82

-   The reasons for this variation were discussed in Chapter II, Section B.
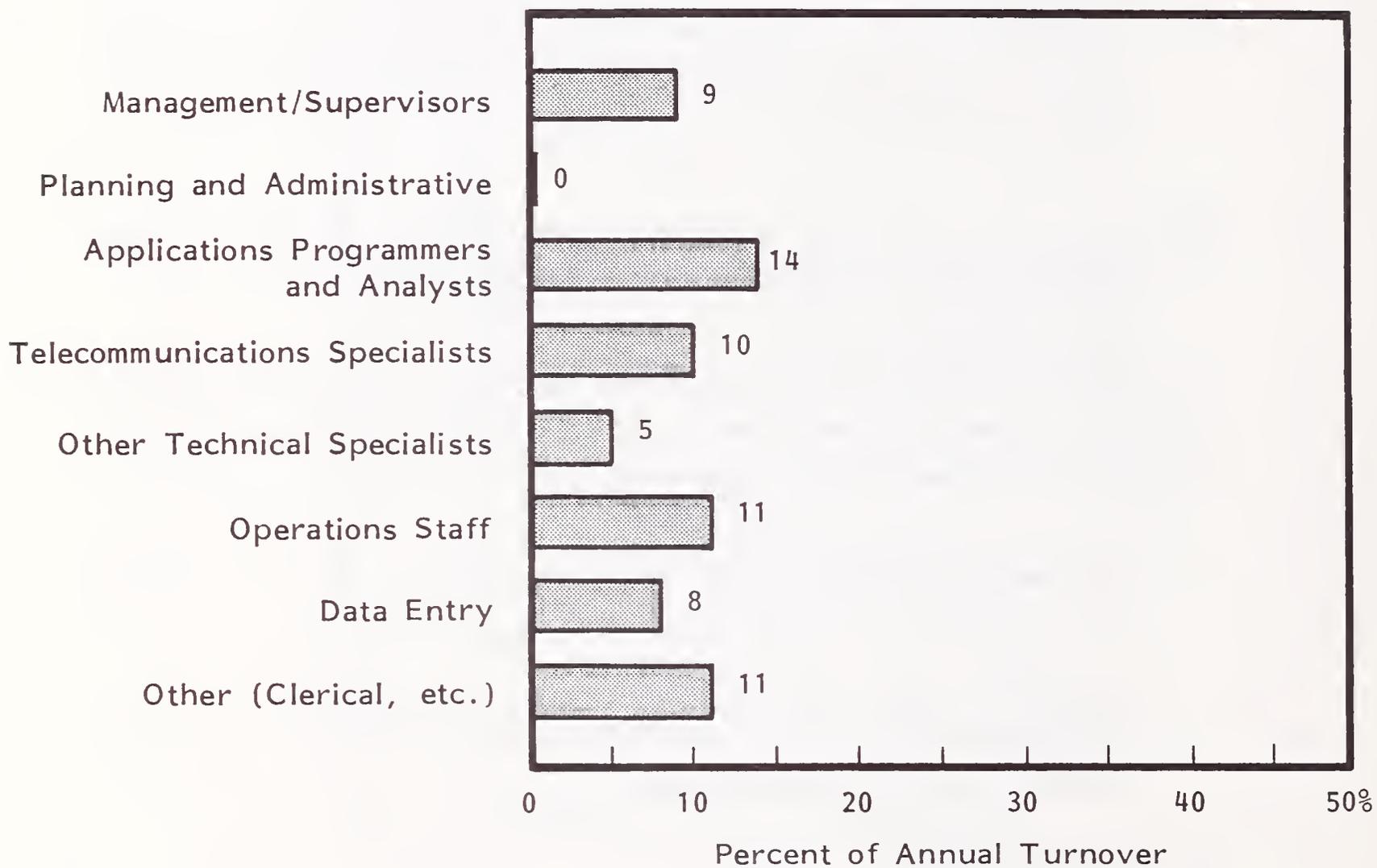
2.   STAFFING

●   Turnover in this sector is expected to be about 10% more than the all-industry average in 1983, as shown in Exhibit II-9.

    -   Current turnover rates for individual positions are shown in Exhibit III-174. For technical positions the turnover rate is equivalent to the average for all sectors.

●   Difficulty in recruiting staff in this sector was somewhat less than average, except for technical specialists, as shown in Exhibit III-175.

●   The number of programs to be maintained averages 1.4% in this sector, although the range, both in absolute numbers and based on organization size, is quite broad, as shown in Exhibit III-176.

    -   Maintenance, as a proportion of total workload, is almost exactly at the norm for all sectors, as shown in Exhibit III-177.

    -   Organization size is not an important factor affecting maintenance loads, as shown in Exhibit III-178.

3.   INFORMATION SYSTEMS ISSUES

●   Note: please refer to Chapter II, Section D for a general discussion of IS problems, objectives, and initiatives and their interrelationships.

●   The problems in the government and education sector are considerably different than those in the commercial sector, as shown in Exhibit III-179.
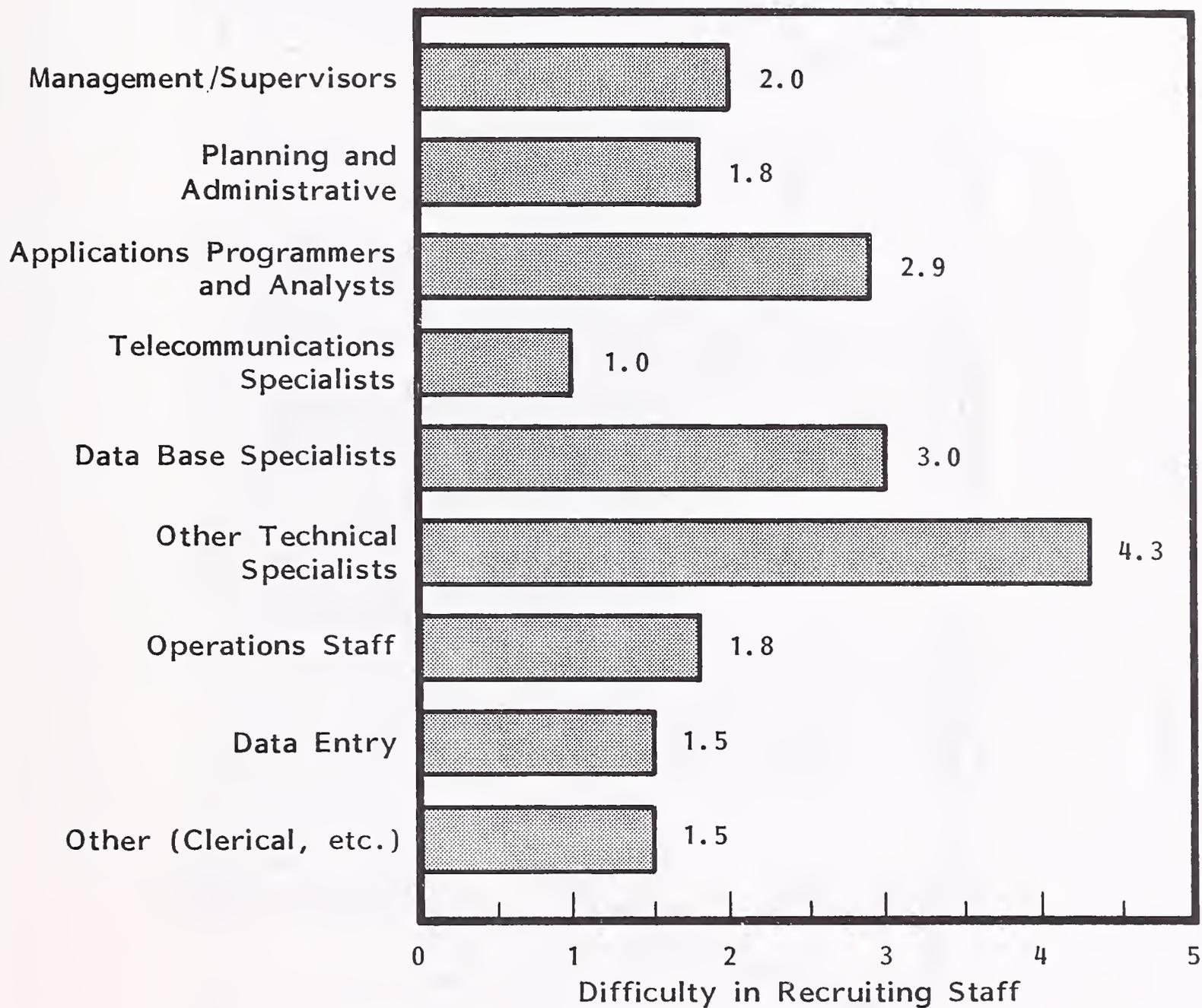
INPUT

EXHIBIT III-174

INFORMATION SYSTEMS STAFFING CURRENT ANNUAL TURNOVER
IN THE GOVERNMENT AND EDUCATION SECTOR

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-175

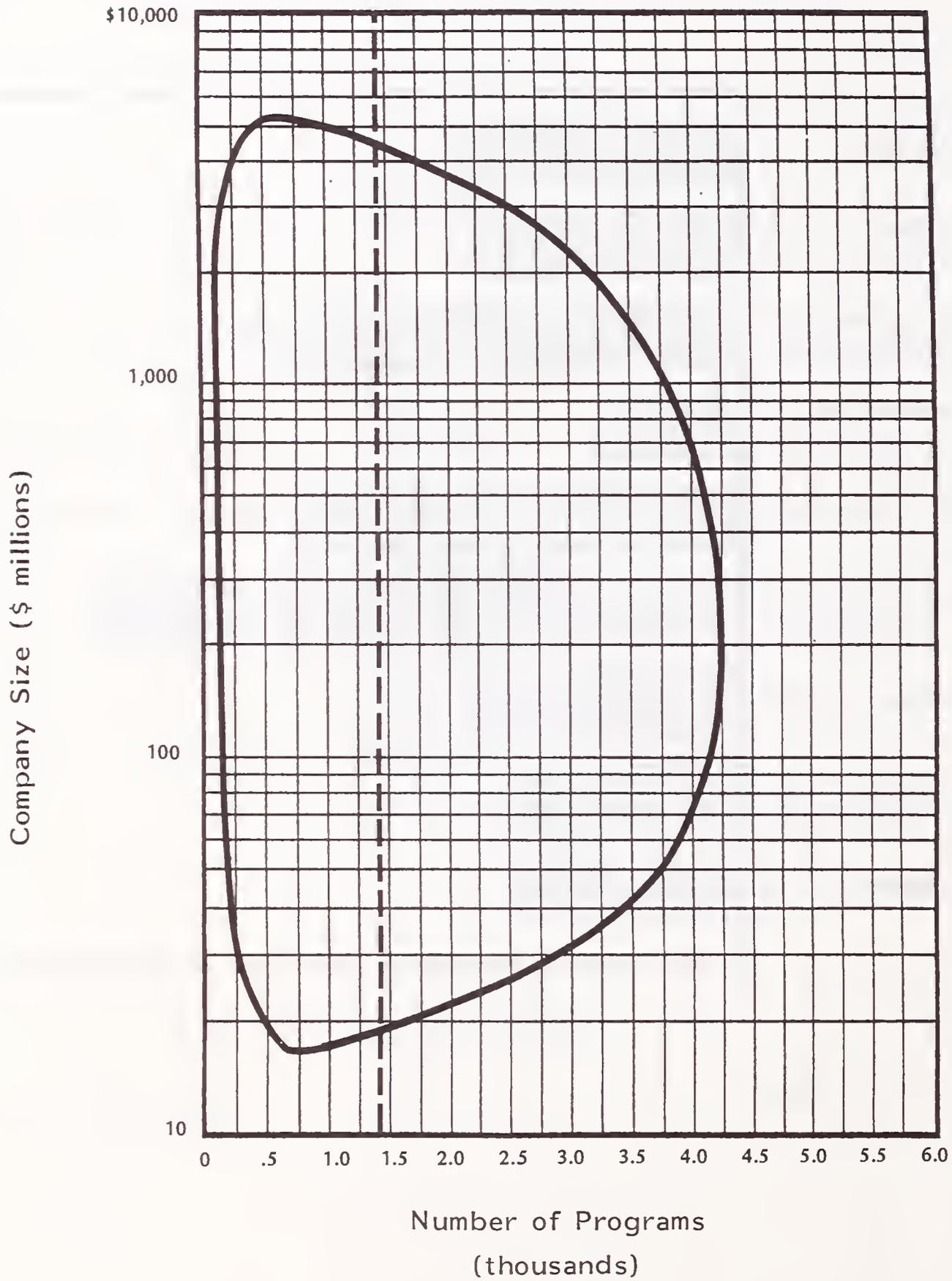## INFORMATION SYSTEMS DIFFICULTY IN RECRUITING STAFF
IN THE GOVERNMENT AND EDUCATION SECTOR

Scale: 1 = Low, 5 = High

EXHIBIT III-176

NUMBER OF PROGRAMS BY COMPANY SIZE
IN THE GOVERNMENT AND EDUCATION SECTOR

Number of Programs

(thousands)

= = = = = Median   SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-177

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE
IN THE GOVERNMENT AND EDUCATION SECTOR, 1981-1983
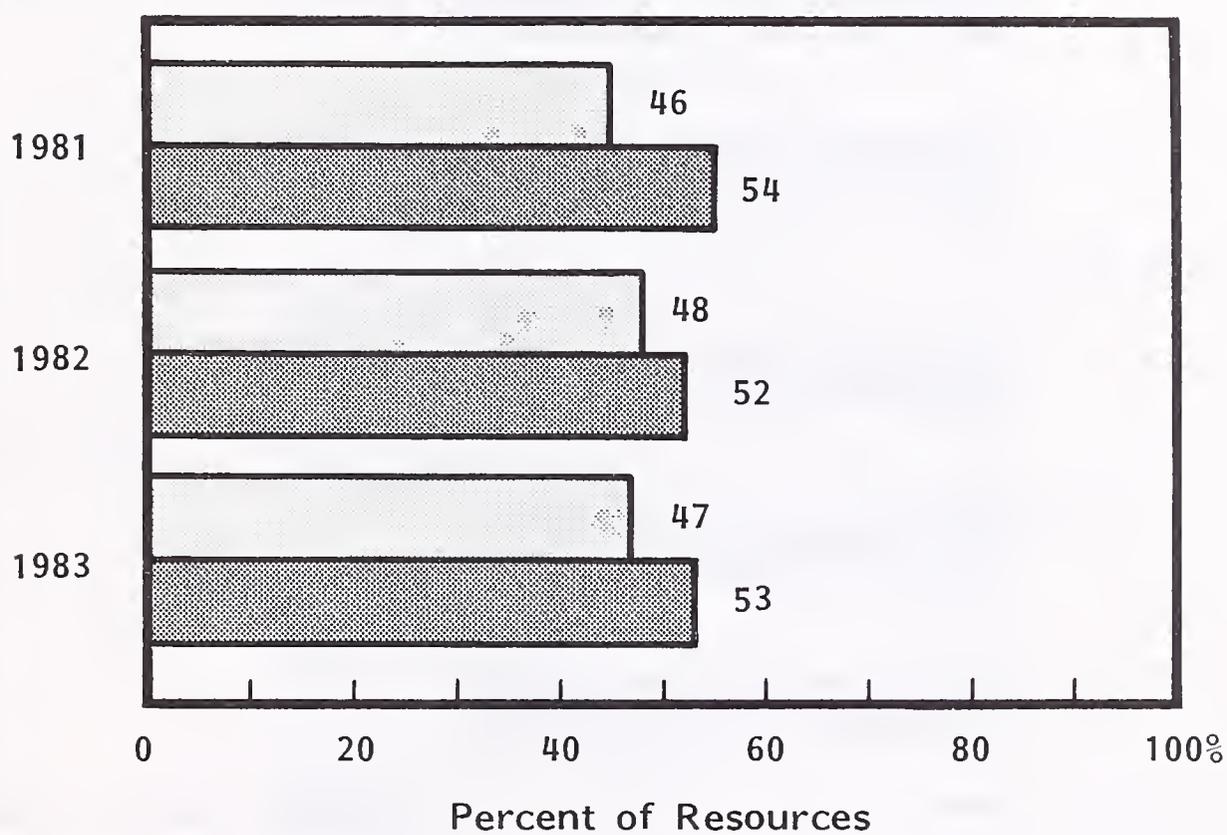

Percent of Resources

☐ New Development

▨ Maintenance

SOURCE: INPUT Surveys

EXHIBIT III-178

NEW PROGRAM DEVELOPMENT VERSUS MAINTENANCE
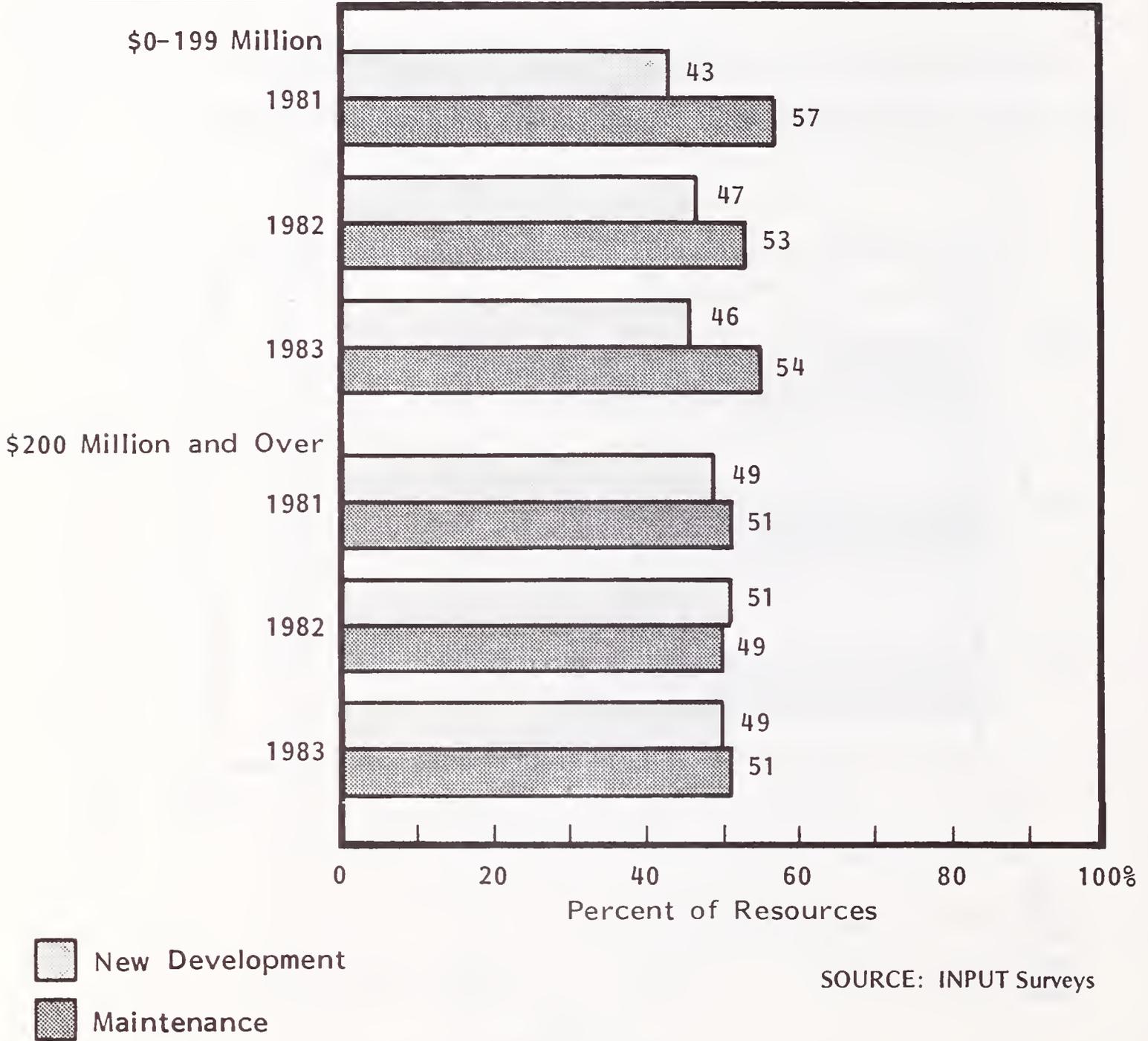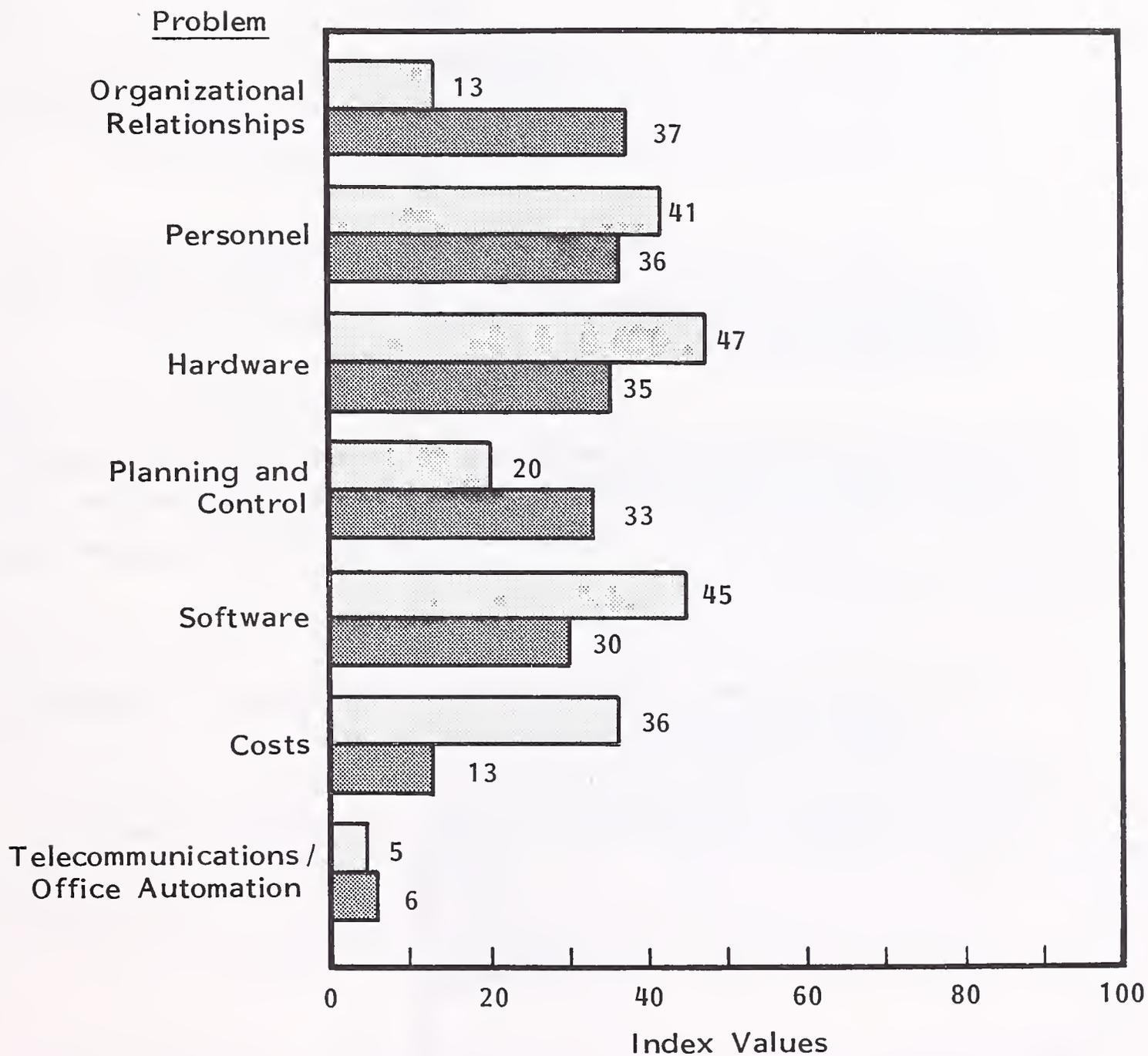IN THE GOVERNMENT AND EDUCATION SECTOR, 1981-1983

Company Size

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-179

INFORMATION SYSTEMS PROBLEMS IN THE
GOVERNMENT AND EDUCATION SECTOR

Problem

- Organizational Relationships: 13 (This Sector), 37 (All Sectors)
- Personnel: 41 (This Sector), 36 (All Sectors)
- Hardware: 47 (This Sector), 35 (All Sectors)
- Planning and Control: 20 (This Sector), 33 (All Sectors)
- Software: 45 (This Sector), 30 (All Sectors)
- Costs: 36 (This Sector), 13 (All Sectors)
- Telecommunications / Office Automation: 5 (This Sector), 6 (All Sectors)
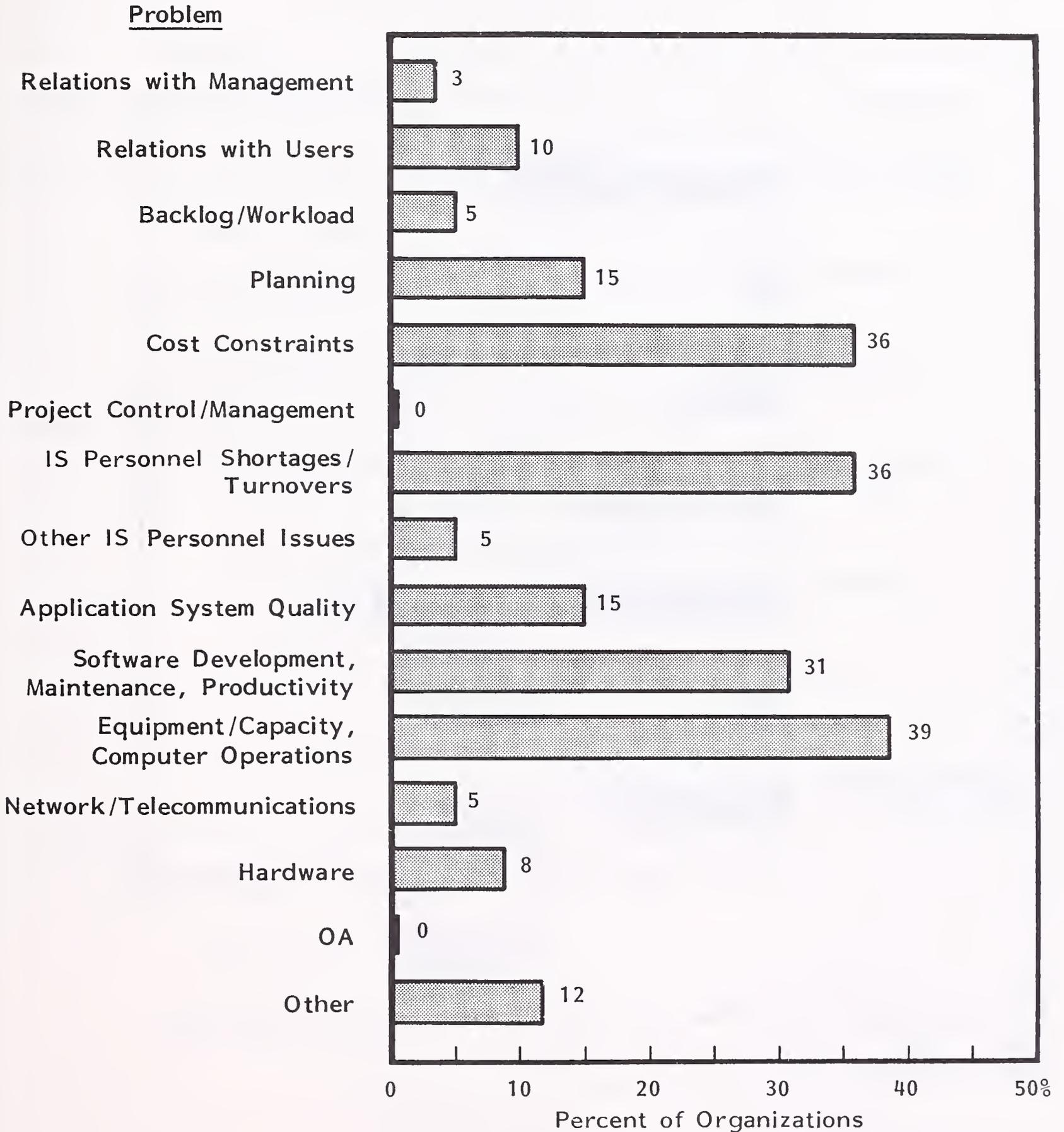
Index Values

☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

- 329 -

INPUT
UA82

- Costs are far more of a problem than in any other sector. This is related to the recession and, what is more important, to the new attitudes toward the public sector.

- Software is also more of a problem than in any other sector. This is caused by the age and/or indifferent quality of many public sector systems.

- Organizational relationships are considered less of a problem here than in any other sector. This is related to the political and/or civil service structure of most of the organizations in this sector.

- More detailed information about specific problem areas is contained in Exhibit III-180. This exhibit shows the percentage of companies in this sector which regard an issue as a major problem.

- It is ironic that while this sector has the most problems with costs, it has no objectives in the cost area, as shown in Exhibit III-181. This is because cost objectives are imposed from the outside; there are no incentives to set cost reduction as an IS goal in this environment.

  - Similarly, there are no objectives involving planning and control. These are also generally imposed from the outside.

  - More detailed information about specific planning objectives is contained in Exhibit III-182. This exhibit shows the percentage of companies in this sector which have identified particular planning objectives as being of major importance to them.

- Not surprisingly, the government and education sector has more cost-related initiatives than any other sector, as shown in Exhibit III-183.
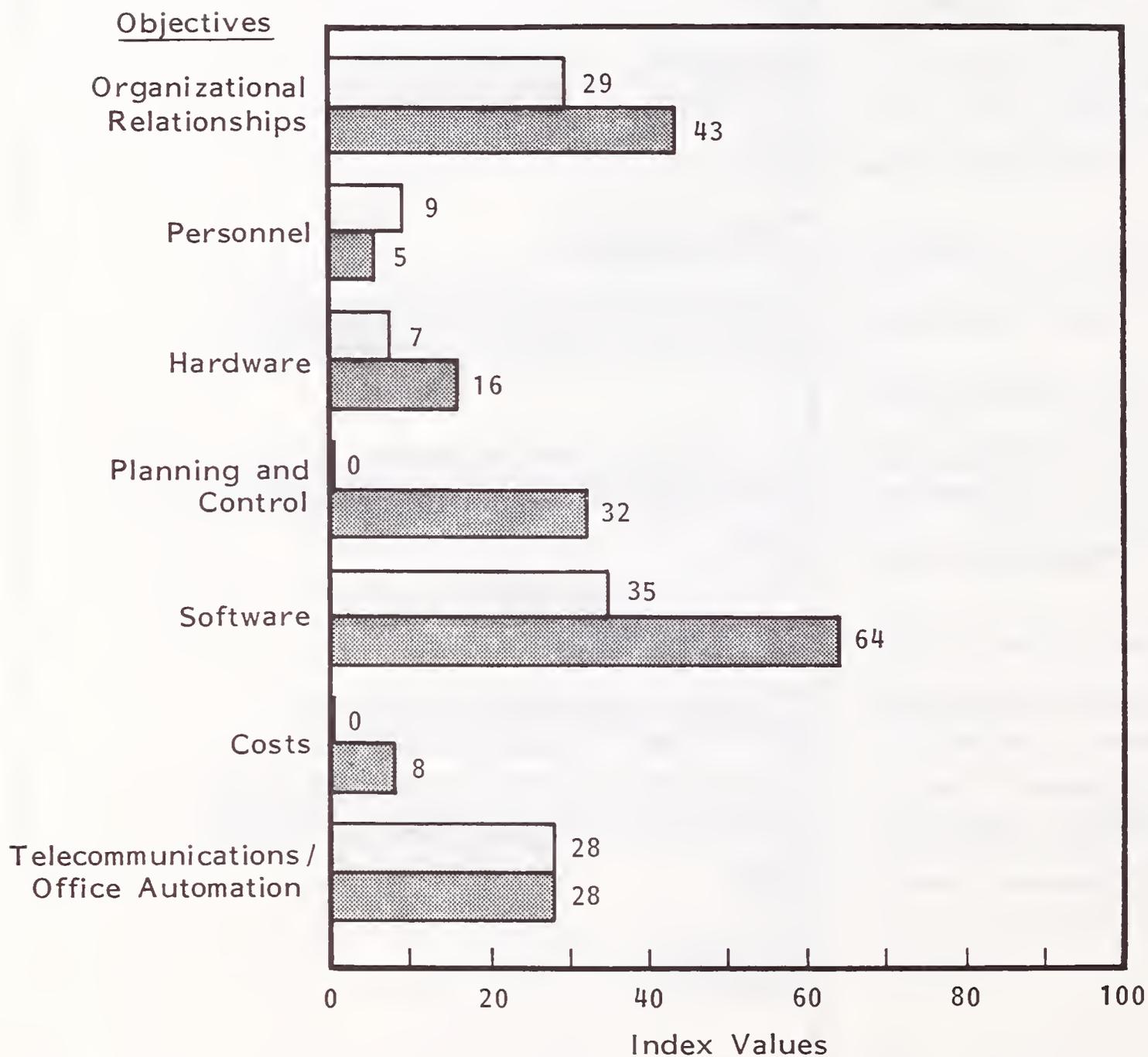
INPUT

EXHIBIT III-180

PROBLEMS IN THE GOVERNMENT AND EDUCATION SECTOR

Problem

Problem	Percent
Relations with Management	3
Relations with Users	10
Backlog/Workload	5
Planning	15
Cost Constraints	36
Project Control/Management	0
IS Personnel Shortages/Turnovers	36
Other IS Personnel Issues	5
Application System Quality	15
Software Development, Maintenance, Productivity	31
Equipment/Capacity, Computer Operations	39
Network/Telecommunications	5
Hardware	8
OA	0
Other	12

Percent of Organizations

0   10   20   30   40   50%

SOURCE: INPUT Surveys

- 331 -

INPUT
UA82

EXHIBIT III-181

INFORMATION SYSTEMS OBJECTIVES IN THE
GOVERNMENT AND EDUCATION SECTOR

Objectives

Organizational Relationships	29 / 43
Personnel	9 / 5
Hardware	7 / 16
Planning and Control	0 / 32
Software	35 / 64
Costs	0 / 8
Telecommunications / Office Automation	28 / 28

Index Values

☐ This Sector

▨ All Sectors

SOURCE: INPUT Surveys

- 332 -

INPUT
UA82

EXHIBIT III-182

INFORMATION SYSTEMS OBJECTIVES
IN THE GOVERNMENT AND EDUCATION SECTOR

Objectives	Percent
Support Company Objectives	0
Improve User Service/Relations	29
Improve Planning	0
End User Computing	0
Office Automation	7
Improve Management Control	0
Improve Productivity	14
Control Costs	0
Add Staff	14
New/Improved Software	21
New Hardware	0
Network/Telecommunications	21
IS Security/Disaster Recovery	7
Miscellaneous	14

Percent of Organizations
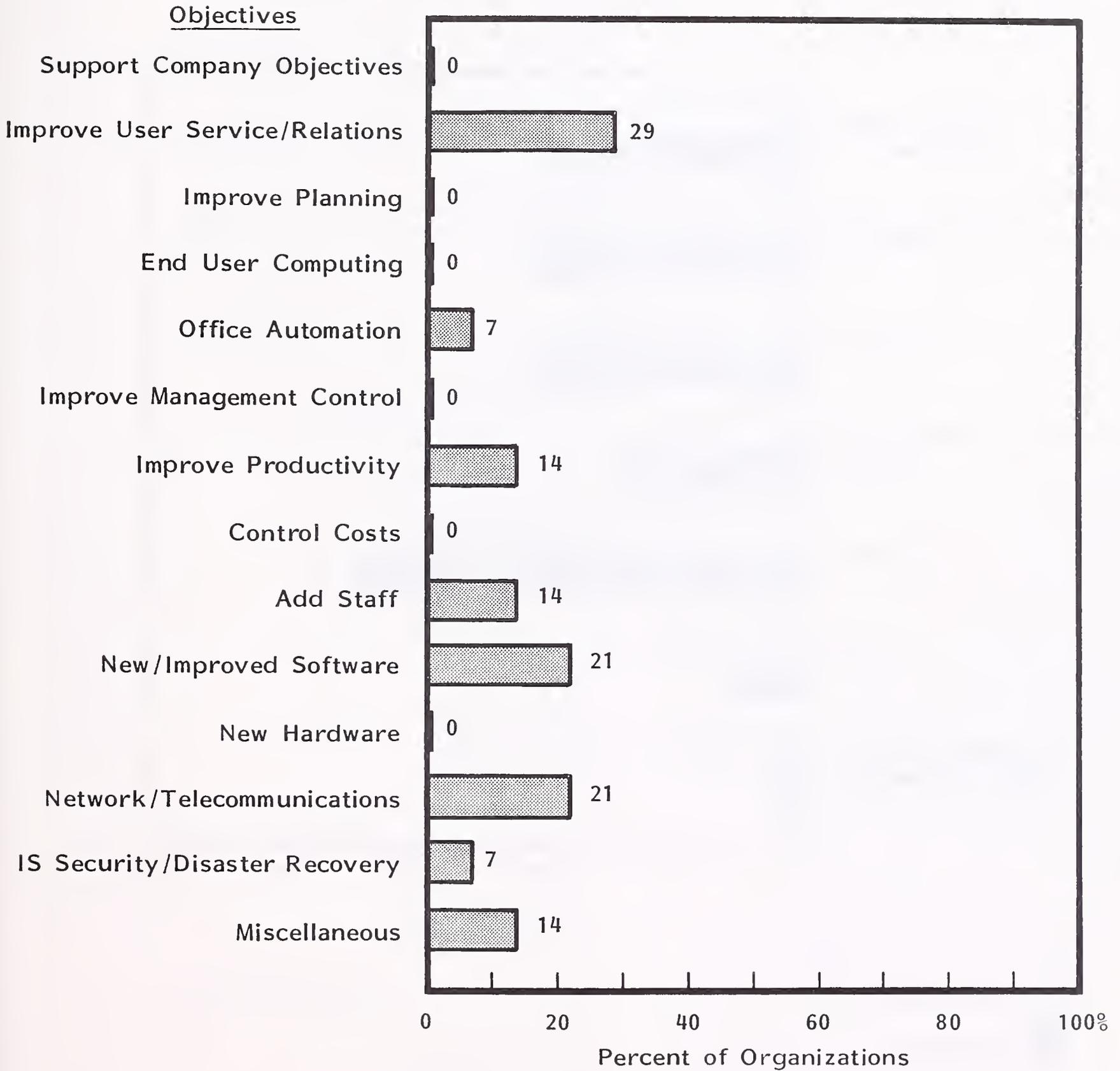
INPUT
UA82

EXHIBIT III-183

INFORMATION SYSTEMS INITIATIVES
IN THE GOVERNMENT AND EDUCATION SECTOR

Index Values
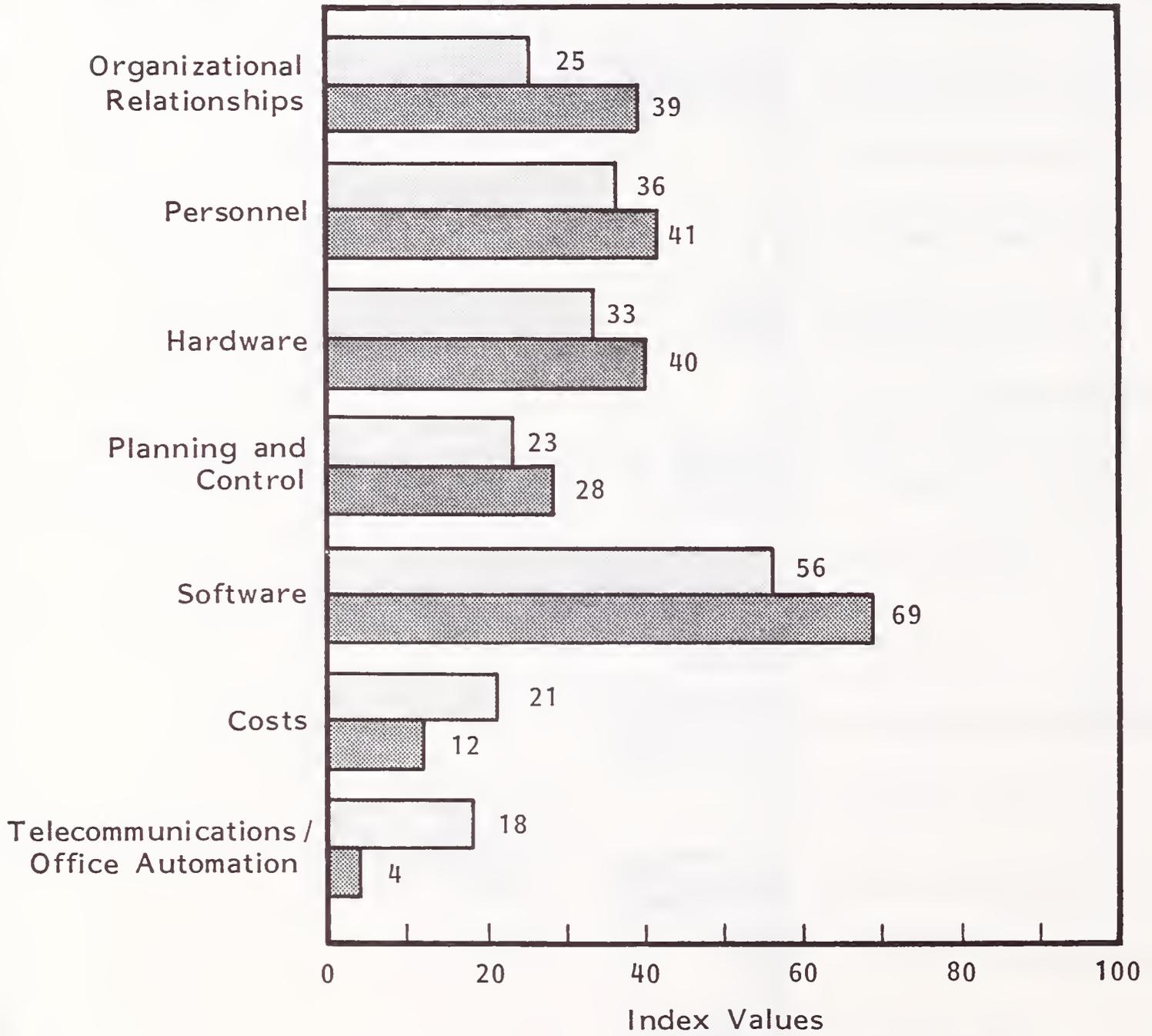
☐ This Sector

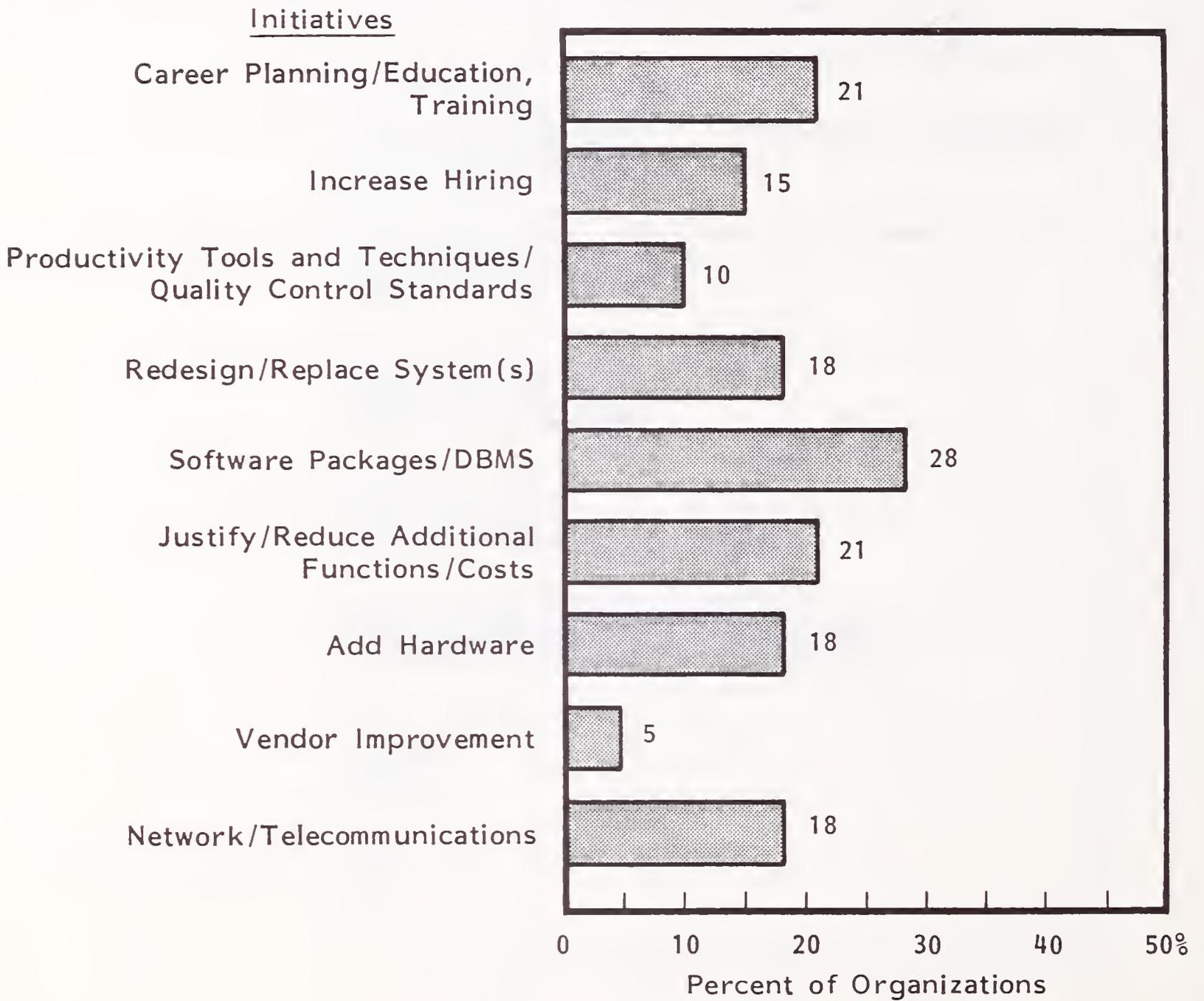▨ All Sectors

SOURCE: INPUT Surveys

INPUT
UA82

- It also has more telecommunications and office automation initiatives. This is related both to cost reduction efforts as well as to the geographically dispersed nature of many government organizations.

- More detailed information about specific areas where an initiative is planned is contained in Exhibit III-184. This exhibit shows the percentage of companies in this sector which plan a major initiative in a particular area.

4.   PERSONAL COMPUTERS

- Note: no separate data is available for the government and education sector.

INPUT

EXHIBIT III-184

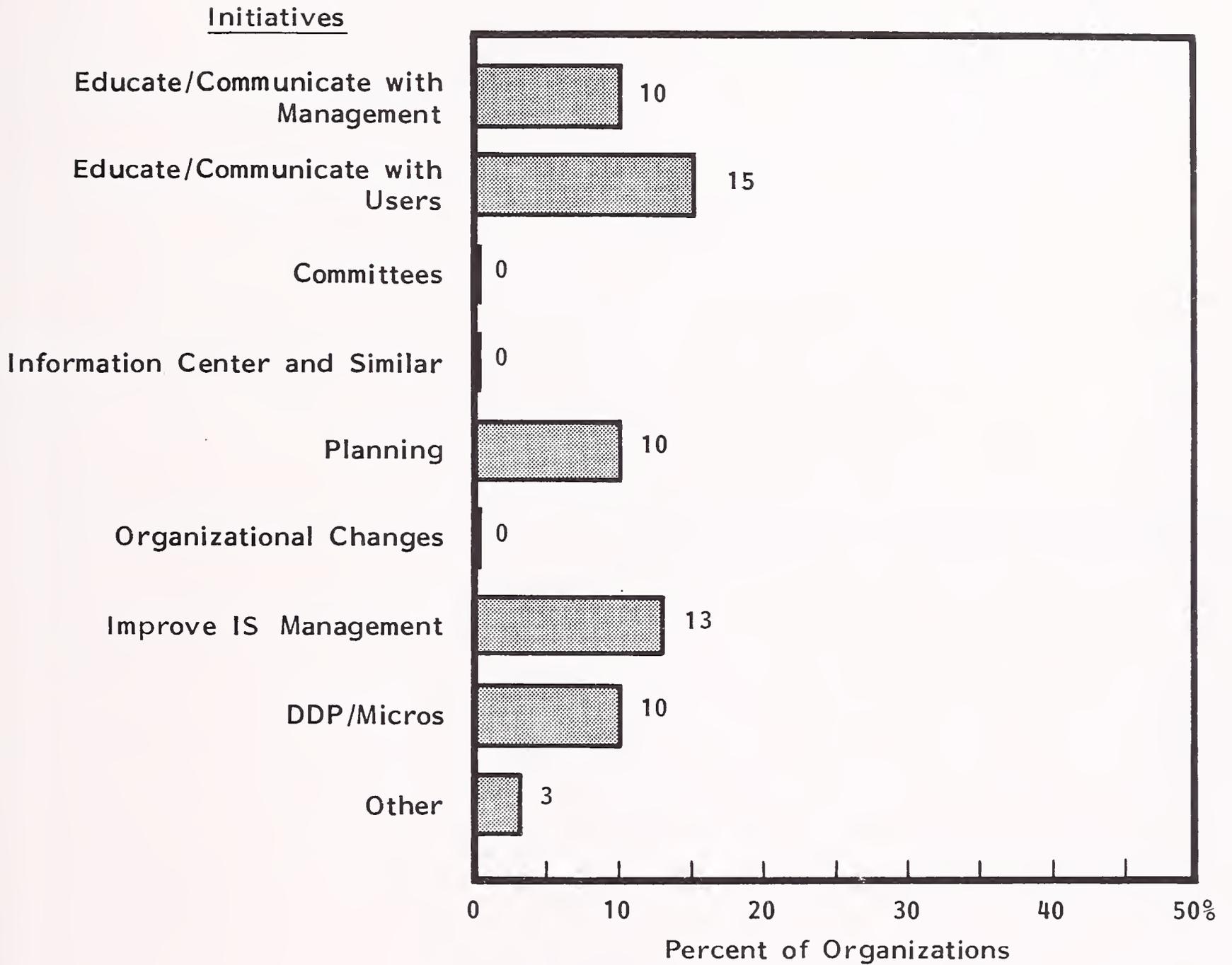## INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE GOVERNMENT AND EDUCATION SECTOR

Initiatives

Initiative	Percent
Career Planning/Education, Training	21
Increase Hiring	15
Productivity Tools and Techniques/ Quality Control Standards	10
Redesign/Replace System(s)	18
Software Packages/DBMS	28
Justify/Reduce Additional Functions/Costs	21
Add Hardware	18
Vendor Improvement	5
Network/Telecommunications	18

Percent of Organizations

Continued

SOURCE: INPUT Surveys

INPUT
UA82

EXHIBIT III-184 (Cont.)

INFORMATION SYSTEMS INITIATIVES PLANNED
IN THE GOVERNMENT AND EDUCATION SECTOR

SOURCE: INPUT Surveys

INPUT
UA82

APPENDIX A: QUESTIONNAIRE

GROUP CODE ☐☐☐–☐   CATALOG NO. U A 8 2 ☐☐☐–☐

INFORMATION SYSTEMS MANAGEMENT QUESTIONNAIRE – 1982

Company Name _____

Division Name (if responding for part of an organization.) _____

Address _____
_____
_____

Address _____
_____
_____

Respondent's Name _____

Mailing Address (if different from either of above) _____
_____
_____

Title _____

Telephone Number _____

Questionnaire received from: ☐ INPUT   ☐ Affiliated organization (give name): _____

Further conditions on prize eligibility:

- Prizes will be awarded by a random drawing of entries received by the indicated dates. No employee or relative of an employee of INPUT is eligible. Winners will be notified by telephone and by certified mail. Odds of winning are dependent on the number of entries received. All prizes will be awarded. Lists of prize winners will be sent to those who inquire in writing after June 30, 1982.

- Each entrant can win no more than one prize. The prize will be awarded to the name or names on this cover sheet. Where there are multiple names on a cover sheet, a single prize will be awarded jointly.

- The name of the organization must be shown on the cover sheet to be eligible for a prize (Note: No data will be associated with the name of a particular respondent or organization).

- Normally, only one questionnaire per organization (the first received) will be eligible for a prize and only from those organizations to whom INPUT has addressed a questionnaire packet. However, note the following exception:

  - Additional copies of the questionnaire and associated material may be made by recipients and directed to affiliated parent organizations or divisions which have their own EDP operations and whose data would not be reflected in the original recipient's reply.

  - Questionnaires received from such affiliated organizations will also be eligible to receive a prize. In such cases be sure to note on the cover sheet whether INPUT or an affiliated organization forwarded the questionnaire.

INPUT

For our information, please complete the following personal computer-related information about yourself.

Age ☐ _____ Sex: ☐ Male ☐ Female

Annual Family Income:

    ☐ Under $25,000   ☐ $60,000 - $79,999

    ☐ $25,000 - $39,999   ☐ $80,000 - $99,999

    ☐ $40,000 - $59,999   ☐ $100,000 and over

● Check as many of the following as apply.

   — I have unrestricted use of a personal computer system

     ☐ At home: Name/Model _____ ☐ Since (year) _____

     ☐ At work: Name/Model _____ ☐ Since (year) _____

   — I share the use of a personal computer system

     ☐ At home: Name/Model _____ ☐ Since (year) _____

     ☐ At work: Name/Model _____ ☐ Since (year) _____

● My hands-on use of a personal computer is approximately_____hours per week.

   — I expect that one year from now my hands-on use will be____hours per week.

● At my direction, others use a personal computer approximately____hours per week.

   — I expect that one year from now this use will be____ hours per week.

INPUT

A. GENERAL INFORMATION

CATALOG NO. | U | A | 8 | 2 | | | – |

GROUP CODE | | | | – | |

Definitions:
- "Division" refers to an entity (i.e., subsidiary, division, operating unit, agency, department, commission, etc.) under a common organizational umbrella.
- "Revenues" are defined as follows in these industries.
  - For banks, use total assets
  - For insurance companies, use premiums
  - For governmental bodies, use authorized budget for the entire governmental unit
  - Otherwise, use your organization's definition and specify what it is:_____

1. What is the primary business or activity of your entire organization?_____
   Annual revenues: $_____million; Number of employees:_____

2. Several questions in this questionnaire refer to EDP staffing levels, budgets, etc. How comprehensive is the quantitative information you will be supplying?
   - ☐ Applicable to the entire organization
   - ☐ Applicable largely to a corporate or headquarters unit, with not all divisional data included. Please note principal exclusions:
   _____
   - ☐ Applicable to a single division. Primary business of division:_____
   Annual division revenues: $_____million; Number of division employees:_____

B. EDP ORGANIZATION

3. Please indicate the current number of EDP employees by position type as well as the net amount you expect this number to increase or decrease twelve months from now (Example: if there is currently a total of ten employees and you expect two departures and three hires, put "+1" under "increase"). Also indicate your current turnover rate and the amount of difficulty you are having in recruiting qualified staff at your salary levels.

POSITION	CURRENT NUMBER OF EDP EMPLOYEES	CURRENT NUMBER OF OUTSIDE CONTRACTORS	NET CHANGE EXPECTED 12 MONTHS FROM NOW EDP EMPLOYEES	OUTSIDE CONTRACTORS	CURRENT ANNUAL TURNOVER PERCENT	DIFFICULTY IN RECRUITING STAFF (circle: 1=low, 5=high)
Management/supervisors						1 2 3 4 5
Planning and administrative						1 2 3 4 5
Applications programmers and analysts						1 2 3 4 5
Telecommunications specialists						1 2 3 4 5
Data base specialists						1 2 3 4 5
Other technical specialists						1 2 3 4 5
Operations staff						1 2 3 4 5
Data entry						1 2 3 4 5
Other clerical						1 2 3 4 5
Other						1 2 3 4 5
Total						

4. Does the central EDP organization supply?	Amount
Applications software development	☐ None ☐ Some ☐ Most ☐ All
Applications software maintenance	☐ None ☐ Some ☐ Most ☐ All
Computer processing	☐ None ☐ Some ☐ Most ☐ All
Planning and standard setting	☐ None ☐ Some ☐ Most ☐ All

5. Please attach an organization chart describing your organization, especially its relationship to top management, other EDP areas (if any) and user departments? ☐ attached

C. EDP PLANNING

6. What do you consider to be your top three problems (with "1" being the most serious)? What action do you intend to take to resolve them?

PROBLEM	ACTION	
1.		
2.		
3.		

- 341 -

©1982 by INPUT. Reproduction Prohibited.

INPUT

7. What are your top three objectives to accomplish in the next three years (with "1" being the most important)? How do you plan to achieve them? (Note: There may or may not be overlap between this and the previous question.)

OBJECTIVE	MEANS TO ACCOMPLISH
1.	
2.	
3.	

8. In your opinion, during the next three years what is the likelihood of there being significantly greater:

	Likelihood In Your Company/Division			Likelihood In Your Industry			Likelihood In EDP Generally		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Software reliability	☐	☐	☐	☐	☐	☐	☐	☐	☐
Use of application software packages	☐	☐	☐	☐	☐	☐	☐	☐	☐
Use of non-procedural languages in EDP departments	☐	☐	☐	☐	☐	☐	☐	☐	☐
Productivity in developing new software	☐	☐	☐	☐	☐	☐	☐	☐	☐
Productivity in maintaining existing software	☐	☐	☐	☐	☐	☐	☐	☐	☐
Programming by end users	☐	☐	☐	☐	☐	☐	☐	☐	☐
Computer operation by end user departments	☐	☐	☐	☐	☐	☐	☐	☐	☐
Expenditures on EDP security	☐	☐	☐	☐	☐	☐	☐	☐	☐
Importance of EDP to top management	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other trends (lists)	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐

9. What research or information would be most helpful to your planning or development efforts?_____ ☐
_____ ☐

D. EDP EXPENDITURES

10. Please categorize your 1982 EDP budget and indicate the expected rate of change for 1983.

CATEGORIES	1982 EDP BUDGET Amount	ANTICIPATED PERCENT CHANGE IN 1983		
		Increase	Decrease	Percent
Personnel salaries	$____,____,000	☐	☐	%
Mainframe processors	$____,____,000	☐	☐	%
Minicomputers	$____,____,000	☐	☐	%
Microcomputers/personal computers	$____,____,000	☐	☐	%
Terminals	$____,____,000	☐	☐	%
Peripherals	$____,____,000	☐	☐	%
Communications hardware and software	$____,____,000	☐	☐	%
Network expense (line cost only)	$____,____,000	☐	☐	%
Other software (purchase or lease)	$____,____,000	☐	☐	%
Software maintenance	$____,____,000	☐	☐	%
Hardware maintenance	$____,____,000	☐	☐	%
Personnel training	$____,____,000	☐	☐	%
Outside processing services	$____,____,000	☐	☐	%
Data security and disaster recovery	$____,____,000	☐	☐	%
Supplies	$____,____,000	☐	☐	%
Utilities	$____,____,000	☐	☐	%
Other	$____,____,000	☐	☐	%
	$____,____,000	☐	☐	%
Total	$____,____,000	☐	☐	%

11. Does the personnel salary amount include fringe benefits? ☐ Yes ☐ No
Fringe benefit rate = _____%

12. Does the personnel salary amount include an overhead charge? ☐ Yes ☐ No
Overhead rate = _____%

13. Do the non-personnel budget categories include an overhead charge? ☐ Yes ☐ No
Overhead rate = _____%

14. To what extent are these figures dependent on your organization's general economic condition? (check as many as apply)
☐ EDP budget will increase if profits increase
☐ EDP budget will decrease if profits decrease
☐ EDP budget will increase if revenues increase
☐ EDP budget will decrease if revenues decrease
☐ EDP budget will not be affected by organizational profitability
☐ Other:_____
_____

15. What was your total 1981 expenditure?
$_____,_____,000.

INPUT

16. Approximately what percentage of your EDP budget do you recover by commercial sales to other organizations? (_____%)
    By allocations/chargeback within your own organization? (_____%)

17. If you allocate/chargeback, what method is used? (check as many as apply) ☐ Division revenue ☐ EDP resources used
    ☐ Transaction/output type ☐ Other:_____ Which costs are allocated/charged back?
    ☐ Application development ☐ Application maintenance ☐ Computer operation ☐ Data entry

18. What is the typical programmer/analyst chargeback rate? ($_____/hr.)

19. Please indicate below EDP expenditures that are not in your budget but are spent
    within the budgets of the end users whom you serve.

| | CATEGORY | 1982 END USER EDP EXPENDITURES | ANTICIPATED PERCENT CHANGE IN 1983 | | |
		Amount	Increase	Decrease	Percent
☐		$____,____,000	☐	☐	%
☐		$____,____,000	☐	☐	%
☐		$____,____,000	☐	☐	%
☐		$____,____,000	☐	☐	%
☐		$____,____,000	☐	☐	%
☐		$____,____,000	☐	☐	%
☐		$____,____,000	☐	☐	%
	Total	$____,____,000	☐	☐	%

20. If the total in question 19 is the "tip
    of the iceberg", please estimate
    what the additional amount might be:
    $_____,_____,000; ☐ Don't know.

21. What is the margin of error in this
    estimate? + or - _____%
    ☐ Don't know

E. EDP OPERATIONS

22. Please indicate the number of mainframe and minicomputer systems installed and on
    order; also indicate current and planned operating systems.

| DO NOT USE | VENDOR NAME | MODEL NUMBER | NUMBER OF CPU'S | | OPERATING SYSTEM(S) | |
			Installed	On Order	Using Now	Planned

23. What network control software
    are you presently using or plan
    to install in three years?

Network Control Software	Now Using (circle)	Install In 3 Years (circle)
Bisync	Y N	Y N
SNA	Y N	Y N
X.25	Y N	Y N
	Y N	Y N
	Y N	Y N
	Y N	Y N

24. Do you have a separate application development computer? ☐ Yes ☐ No, If yes; What model computer?_____
    How many people use it, on an average?_____ How many terminals are connected to it?_____

25. What is the extent of your local network activities?

| | LOCAL NETWORK NAME/TYPE | NUMBER OF DEVICES HOOKED UP | | | | COMMENT |
		1982	1983	1984	1985	
☐						
☐						
☐						

F. EDP APPLICATIONS

26. Accompanying this questionnaire is a representative, but by no means exhaustive, list of applications. Please indicate the five
    most important applications which you will be working on in 1982 (with "1" being the most important).

| Priority | Application | | | Estimated Cost to Develop | Number of People Assigned | Total Lines of Code | Months Duration | Estimated Annual Cost To Run | Developed In-house? (circle) | New System (N) or Enhancement (E)? (circle one) | | On-line? (circle) | |
	Code		Name										
1.				$____,000		____,000		$____,000	Y N	N	E	Y	N
2.				$____,000		____,000		$____,000	Y N	N	E	Y	N
3.				$____,000		____,000		$____,000	Y N	N	E	Y	N
4.				$____,000		____,000		$____,000	Y N	N	E	Y	N
5.				$____,000		____,000		$____,000	Y N	N	E	Y	N

INPUT

27. What percent of your applications analysts and programmers are assigned to:

	1981	1982	1983
New program development	%	%	%
Enhancement/upgrade of existing programs	%	%	%
Maintenance of existing programs	%	%	%
Other	%	%	%
Total	%	%	%

28. What is the most significant event within your industry that affected your applications development in the last twelve months?

_____
_____
_____

29. What is the approximate number of programs being actively maintained?_____
Lines of code?_____

30. What measures are you taking to reduce the time and costs associated with program development?_____
_____
_____ ☐☐

31. What level of improvement (measured in terms of lines of code per man-day) do you estimate these measures will provide?____%

G. MAINTENANCE

32. Where is the equipment located that EDP is responsible for maintaining?

☐ In a computer room _____ %
☐ In a general office environment _____ %
☐ In a plant or factory _____ %
☐ Other _____ %

Total ___100___ %

33. What is your annual hardware maintenance budget for:	CPU		PERIPHERALS		COMMUN. EQUIP. TERMINALS		OFFICE EQUIP./ WORD PROC.	
	Purchased	Leased/ Rented	Purchased	Leased/ Rented	Purchased	Leased/ Rented	Purchased	Leased/ Rented
Internal (in-house) maintenance	$	$	$	$	$	$	$	$
External (vendor) maintenance	$ X X X X	$ X X X X	$ X X X X	$ X X X X	$ X X X X	$ X X X X	$ X X X X	$ X X X X
• Provided by manufacturer	$	$	$	$	$	$	$	$
• Provided by third party	$	$	$	$	$	$	$	$

What type of maintenance plans do you use? (check as many as apply) ☐ Contract ☐ Time and materials ☐ Repair depot
☐ Other:_____

34. In evaluating maintenance, how important is each of the following criteria?

Maintenance For	CRITERIA (Circle: 1 = Low Importance, 5 = High Importance)				
	Cost	Uptime (System Availability)	Response Time to Repair	Vendor Reputation	Other _____
Hardware	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Software	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

35. How much of your purchased software do you maintain yourself? ☐ None ☐ Some ☐ Most ☐ All
Why?_____

36. Do you receive and act on purchasing suggestions by vendor maintenance personnel? (Circle: Y = Yes, N = No, DK = Don't know)

	New Systems	Peripherals	Communications	Software	Supplies
Receive suggestions	Y N DK	Y N DK	Y N DK	Y N DK	Y N DK
Act on them	Y N DK	Y N DK	Y N DK	Y N DK	Y N DK

37. How extensive has your experience been in using third party maintenance (i.e., by an organization other than original vendor) and how satisfied have you been? Do you expect to increase your use of third party maintenance?

	MAINTENANCE AREA (Circle: 1 = Low, 5 = High)					
	CPUs	Peripherals	Office Equip.	Terminals	Communications Equipment	Software
Amount of experience	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Satisfaction	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Likelihood of increased use	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

INPUT

H. PERSONAL COMPUTER/SMALL BUSINESS SYSTEMS (Note: A personal computer or small business systems is defined here as a standalone system costing under $15,000.)

38. How many personal computers/small business systems are or will be installed throughout your organization?

DO NOT USE	Vendor/ Model	Now Installed	To Be Installed In 12 Months	To Be Installed After 12 Months

39. Is it likely that there are significant numbers installed or planned that you are not aware of? ☐ Yes ☐ No, Why?_____

_____

_____ ☐

40. In deciding to purchase personal computers/small business systems how important is each of the following criteria to the EDP department and to user departments? (1 = low, 5 = high)

CRITERIA	IMPORTANCE (Circle)									
	To EDP					To Users				
Hardware cost	1	2	3	4	5	1	2	3	4	5
Software cost	1	2	3	4	5	1	2	3	4	5
Maintenance cost	1	2	3	4	5	1	2	3	4	5
Discounts	1	2	3	4	5	1	2	3	4	5
Service availability	1	2	3	4	5	1	2	3	4	5
Amount of software available	1	2	3	4	5	1	2	3	4	5
Software features	1	2	3	4	5	1	2	3	4	5
Hardware features	1	2	3	4	5	1	2	3	4	5
Hardware reliability	1	2	3	4	5	1	2	3	4	5
Vendor reputation	1	2	3	4	5	1	2	3	4	5
Compatibility with mainframe	1	2	3	4	5	1	2	3	4	5

41. What do you see as the role of the EDP department concerning personal computers/small business systems? (check all applicable)

☐ Initiate ordering and placement of hardware
☐ Fund purchases for user departments
☐ Approve user department purchases
☐ Set firm specifications for purchases
☐ Issue purchase guidelines whose observance is optional

☐ Evaluate personal computer software for user departments
☐ Develop special personal computer software
☐ Make sections of corporate data available to personal computer users
☐ Educate potential users on capabilities of personal computers
☐ Other _____

I. OFFICE SYSTEMS ISSUES

42. Please check which of the office automation and communications services listed below are currently being used or planned within 2 years.

CATEGORY	CURRENT		BY 1984		COMMENT
	Using it Now	Definite Plans	Probable	Don't Know/ No Plans	
Intra-company electronic mail	☐	☐	☐	☐	
Communicating word processors	☐	☐	☐	☐	
Video conferencing – freeze frame	☐	☐	☐	☐	
Video conferencing – full motion	☐	☐	☐	☐	
Sub-minute facsimile	☐	☐	☐	☐	
Intra-building wideband facilities	☐	☐	☐	☐	
Integrated voice/data network	☐	☐	☐	☐	
Dedicated satellite earth station	☐	☐	☐	☐	
Computerized PBX	☐	☐	☐	☐	
Automatic network management systems	☐	☐	☐	☐	
Worldwide data communications networks	☐	☐	☐	☐	
Private packet transmission (X.25)	☐	☐	☐	☐	
Integration of office systems and EDP	☐	☐	☐	☐	

J. NEW SERVICES

43. Has IBM contacted your department concerning the use of their newly-announced processing service? ☐ Yes ☐ No

44. Do you intend to utilize this service? ☐ Yes ☐ No ☐ Don't know, Why?_____

_____ ☐

45. What other new services are you planning to utilize?_____

_____

THANK YOU.

- 345 -

INPUT

APPENDIX B: 1982 RESPONDENTS

APPENDIX B: 1982 RESPONDENTS

- Data for the 1982 Annual Report was obtained from 564 responding organizations, distributed as follows:

NUMBER OF RESPONDENTS BY ORGANIZATION SIZE
(Revenues)

Sector	Under $200 Million	Between $200 Million and $1 Billion	Over $1 Billion	Total
Discrete Manufacturing	21	37	36	94
Process Manufacturing	19	25	54	98
Transportation	9	14	9	32
Utilities	7	15	22	44
Banking/Finance	7	14	45	66
Insurance	20	13	16	49
Distribution	24	27	21	72
Services	44	17	8	69
Government and Education	27	10	3	40
TOTAL	178	172	214	564

- Reporting organizations were for the most part distinct legal entities, but some were self-sufficient divisions of companies.

INPUT