

THE EFFECT OF DOWNSIZING
ON SOFTWARE PRODUCTS VENDORS

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Information Services Market Analysis Program

**The Effect of Downsizing on Software
Products Vendors**

***Information Services Opportunities & Trends
1992-1997 Forecast Update***

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Abstract

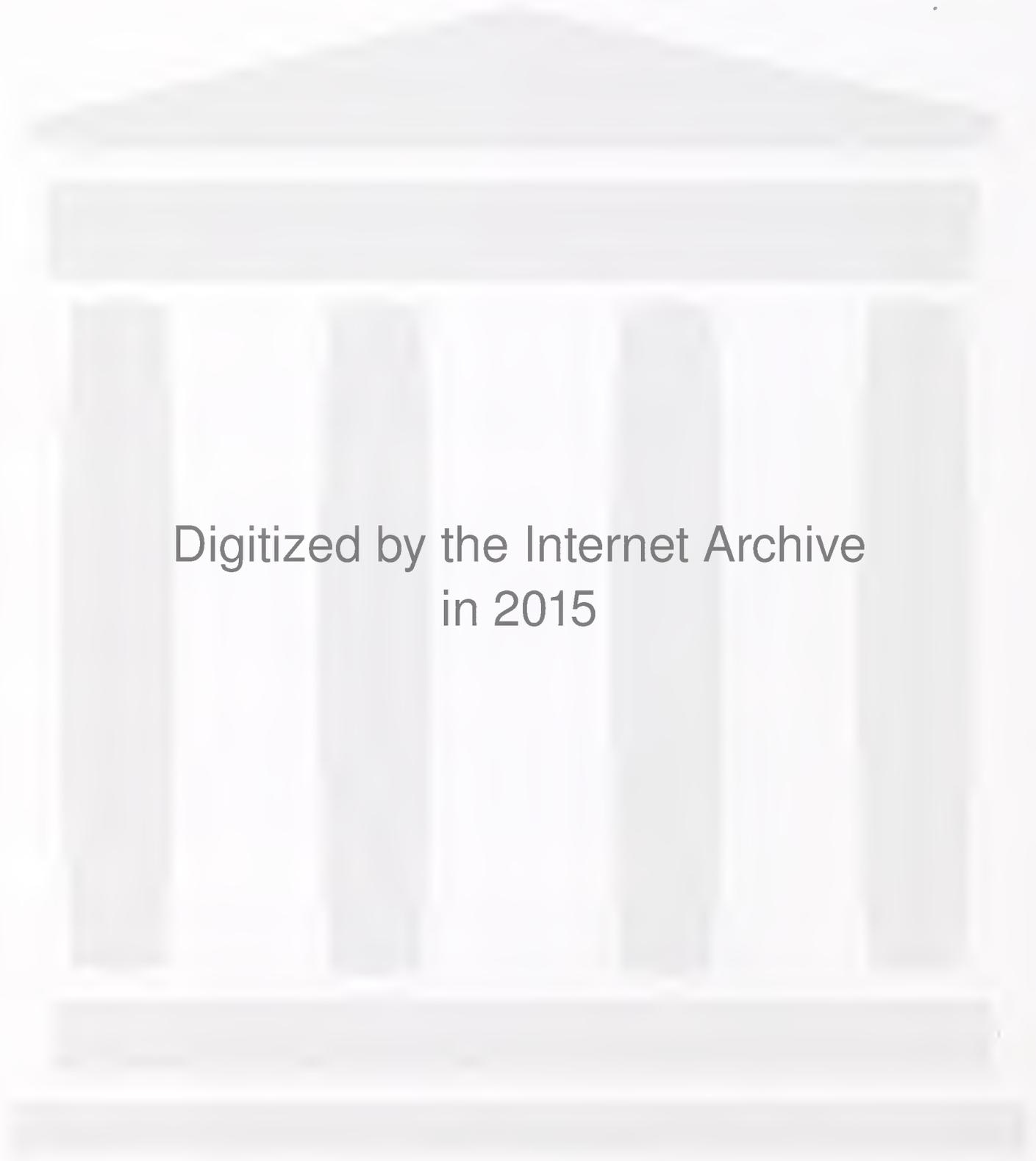
This report discusses the background, motivation, and expected benefits for software products vendors from the current trend towards IS downsizing. In addition, the report offers recommendations for computer systems and software products vendors on how to compete in today's downsizing market environment.

Leading vendors of downsizing product solutions were surveyed by INPUT for this report. Perspectives of IS management on downsizing are also reviewed from prior INPUT studies, which concentrated more on the IS executive perspective, and current dominant downsizing product strategies and potential product opportunities are outlined.

Positives and negatives resulting from downsizing (from the standpoint of both vendors and IS management) are presented. Longer-term downsizing trends are identified, which include more emphasis on enterprisewide solutions as distributed relational data base management systems technology matures.

Although this report builds on the content of INPUT's prior reports in its downsizing series, vendors should view it in conjunction with the other reports to better appreciate the impact of the downsizing phenomenon.

This report contains 40 pages and 13 exhibits.



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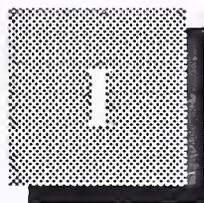
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Introduction

Downsizing has become a predominant theme in the business environment and in information systems technology. One driving force is the pressure to improve corporate efficiency by the savings from distributing data processing to lower the cost of computer systems.

Software products and computer systems vendors must address this phenomenon in order to remain competitive over the longer term. Current vendor models for successfully addressing IS downsizing are evident in shifting market valuations for public companies with downsized product solutions.

This report will review the factors that have been shaping the evolution of downsizing and present product strategies for providing products that can support and enhance the benefits of IS downsizing in software products companies.

A

Objectives

The objectives of this report are:

- To examine interpretations and reactions to downsizing by U.S. software products and services vendors
- To review information systems and software structural changes that preceded the downsizing movement
- To evaluate similarities and differences between IS management and vendor management on the benefits of downsizing
- To place downsizing into the general context of rightsizing within an enterprise IS restructuring environment

- To suggest strategies for software products vendors for successfully addressing information systems downsizing
- To explore the challenges and opportunities presented by downsizing for software products vendors

B

Methodology and Scope

1. Methodology

INPUT offers a series of reports that analyze changes in the information systems architectural structures and the impact on IS management and the information technology industry. Although these reports address downsizing, the term "rightsizing" can also be used to describe the trend towards an orderly distribution of computer processing/applications and to take advantage of the improved price/performance characteristics of minicomputers and microcomputers.

The prior reports in this series have addressed downsizing trends and issues, primarily from the user (IS) perspective, and to a lesser extent, vendor perspectives and product impacts.

Survey responses from a number of IS and vendor executives (over the past year) have been analyzed. The surveys of IS management have identified applications suitable for downsizing, and nearly half of the respondents had already begun some type of downsizing project.

The major objectives of these prior reports, which have addressed downsizing primarily from the perspective of IS management, have been:

- To define downsizing and its associated terminology
- To determine the extent and scope of IS downsizing, and to determine the factors that are prompting and inhibiting its implementation
- To evaluate the relative strengths and weaknesses of primary computer platforms (mainframe, minicomputer, RISC workstations and PCs) for various applications, processing functions, and data base residence
- To provide frameworks for the analysis of various downsizing innovations and their potential benefits and consequences
- To explore the challenges and opportunities, presented by downsizing, for IS management and vendors, with special emphasis on IS management, which seems to be caught in the middle between expectations and reality

- To establish the importance and complexity of data base management in commercial information systems architectures

This report examines the downsizing (or rightsizing) trends and issues from the perspective of U.S. software products vendors, including the comparative perspectives of IS management developed in the earlier reports.

This report is based on questionnaire responses from management and strategic planners from several U.S. software products vendors, which have revenues ranging from twelve million dollars to several billion dollars. All of the vendors who responded to the questionnaire are addressing information systems downsizing trends with their software product and services.

The percentage of vendor respondents by predominant computer platforms supported, include:

- Mainframe - 18%
- Minicomputer - 12%
- Workstation - 6%
- Personal computers - 12%
- Enterprisewide solutions - 24%
- PC/mainframe - 6%
- Mainframe/minicomputer - 12%
- 3-Tiered mainframe/minicomputer/TWSs/LANs - 10%

Successful downsizing software products strategies were also identified from INPUT's extensive vendor profiles of U.S. software products companies. Successful product strategies are defined as those that result from recent company revenue and profit growth in excess of industry growth rates.

2. Scope

This study examines the general competitive environment for U.S. software products companies in the 1990s. The technology, market trends and issues shaping information systems downsizing are considered, current information systems and software product downsizing product directions are examined, and recommendations for future success are outlined.

Various definitions of downsizing are presented, and positives and negatives from downsizing for user and vendor are discussed.

The U.S. software products vendor survey that INPUT conducted is one of the primary analytical tools used to develop the conclusions and recommendations for this report.

C

Report Structure

A brief description of the organization of the report is as follows:

Chapter II, the Executive Overview, provides a brief summary of the research findings, analysis, conclusions and recommendations of the report.

Chapter III, Dimensions of Downsizing, defines the terminology associated with downsizing, origins of downsizing, and conflicting views on the benefits of downsizing.

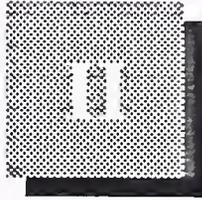
Chapter IV, Systems and Product Models for Downsizing, presents downsizing architectural alternative models and current and future vendor product, distribution and pricing models for addressing downsizing trends.

Chapter V, Conclusions and Recommendations, provides specific product/services recommendations for computer systems and software products/services vendors for successfully addressing downsizing IS trends.

D

Related INPUT Reports

- *Putting Downsizing in Perspective*
- *Case Studies in Downsizing*
- *Client/Server Applications and Markets*
- *Open Systems Opportunities*
- *Systems Architectures for Downsizing*



Executive Overview

A

Background and Methodology

Downsizing has become a predominant theme in the general business environment and in the information systems industry. Driving factors include corporate requirements to reduce costs in an increasingly competitive global environment, and the perception that such cost reductions can come from distributing information systems solutions to lower cost platforms.

INPUT has been focusing on the information systems downsizing phenomenon in a series of reports that have been published over the past year. The focus of the prior reports has primarily been on the perspectives of IS management. This report focuses on the perspectives of software products vendors, and also includes an overview of INPUT's findings on IS executive viewpoints.

This report is intended to be used primarily by software products vendors to help shape their strategic planning on systems and applications product downsizing. Conclusions and recommendations in this report are based upon: a recent survey of leading U.S. software products and services vendors; prior INPUT surveys of IS executives over the past year; and INPUT's research on the total information technology industry over the past several years.

The more recent software products vendor survey included companies that are currently implementing downsizing product strategies. Respondents included mainframe, minicomputer, workstation, PC, and application development software products vendors.

INPUT also reviewed the financial community's relative market valuations of public software and computer systems companies to determine current successful downsizing product strategies.

B**Dimensions of Downsizing**

1. Definitions

INPUT's recent software products survey produced a number of interpretations of IS downsizing. The varying definitions, however, tended to centralize around the concepts distributing applications to more flexible, cost-effective platforms.

2. Positives and Negatives of Downsizing

Vendors were asked to identify what they perceived to be the most important benefits and the principal negatives of downsizing. There was disagreement on the quantitative benefits of cost savings (such as lower hardware and software costs), but considerable agreement on qualitative benefits such as improved data access for decision support and enhanced application development flexibility.

3. Product Development Impact

Changes in product development approaches were also explored. A predominant change in application development for vendors was to increase the number of supported platforms and operating systems. This change also increased the costs and risks of application development for many vendors. As a result, software vendors appear to be looking for greater consensus on industry standards to help reduce the complexity and cost of the applications development process.

4. Factors Driving and Shaping Downsizing

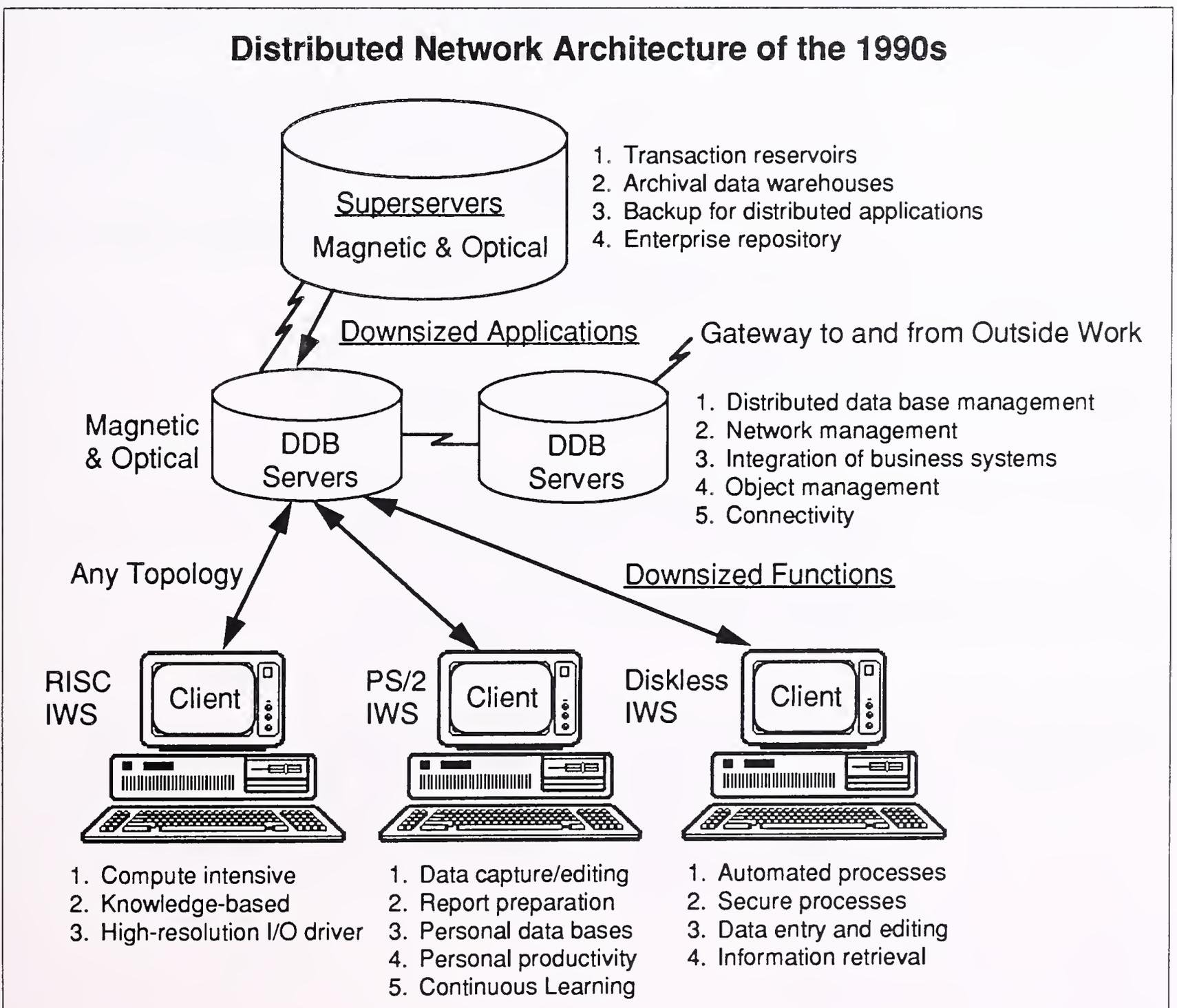
The downsizing trend has multiple origins. Understanding the forces shaping this phenomenon are important for providing superior downsizing product strategies. The principal forces include: lower cost computer systems alternatives; the increasing adoption of relational data base architectures; and the movement towards support of open systems and other standards.

Improved decision support using relational data base report generation tools, and reduced hardware and software costs from lower priced computer platforms, reflect the principal initial driving forces for IS downsizing. However, to date, cost savings benefits for many have proved to be elusive. This has probably caused the implementation pace (to date) of corporate IS downsizing to be evolutionary and somewhat tentative. INPUT's earlier IS executive surveys showed that IS management is not totally convinced of the cost benefits resulting from downsizing, and that much of the current pressure for IS downsizing is probably coming from operations management, who support the concept of cost savings.

An acceleration in the pace of downsizing will occur with the development of more secure distributed data base systems technologies. This should allow more mission-critical on-line transaction and complex data base processing applications to be distributed to lower cost server platforms with enhanced data security through centralized systems and network management solutions. In turn, this will facilitate the offloading of data base processing from the mainframe. To date, much of the data base and file transfer technologies have remained on centralized platforms because of the major security issues. Once these data bases can be distributed, mainframe usage can be reduced. Under many current downsizing scenarios, the mainframe continues to be a costly factor because of the necessity to retain dual IS architectures for maintaining data integrity.

INPUT's view of the proper distributed network architecture for the downsized world of the 1990s is depicted in Exhibit II-1.

EXHIBIT II-1



5. Recent Downsizing Product Directions

In INPUT's survey, software vendors were asked to describe recently introduced product and services that target IS downsizing trends.

Typical product-oriented responses included:

- Multi-platform and data base support
- Client/server implementation, with downsizing to UNIX and PC/LANs
- An increasing support for standards

Other product directional themes include:

- Development of on-line transaction processing-(OLTP) based solutions
- Support for open-server platforms
- Adoption of object-oriented technologies
- Support for distributed data base architectures
- An expansion in operating systems support to include a number of UNIX variations for minicomputer vendors

Changes in product licensing, maintenance and distribution practices to address low priced solutions were also explored. Aside from more emphasis on user-based pricing, it appears that many vendors have not yet made the significant changes that might be required.

Other specific pricing strategies mentioned were:

- Pricing based on concurrent usage
- Open licensing
- Enterprisewide licensing
- Tiered and per-user pricing
- Multisite licensing
- Lower pricing for Windows or standards-based products
- Agreements based on customer requirements—unique to each customer
- Reduced prices and an increase in discounting
- Longer-term licensing/maintenance agreements
- Alternative licensing/maintenance choices

6. Successful Downsizing Products and Services Models

Vendors were asked to identify what they considered to be current successful strategic models, among software products vendors, for addressing the IS downsizing phenomenon. Very few successful models were identified, but there is a strong possibility that vendors did not want to identify successful competitors. The predominant models mentioned were the independent relational data base systems companies.

However, a consensus on successful downsizing product strategies can be extrapolated from examining changes in market valuations of publicly traded U.S. software companies over the past year. This is based on the assumption that downsizing has become an important factor in software vendor financial success.

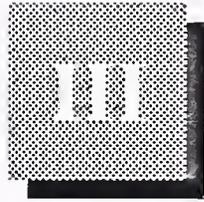
Particular strategies for addressing IS downsizing, for which the investment community appears to be giving high marks, include: a) Independent RDBM companies; b) Applications software products vendors who support the AS/400 minicomputer family; c) companies providing UNIX-based scalable hardware and operating systems architectures; d) Enterprisewide systems management and network management solutions; e) companies providing total solutions for particular vertical markets, such as insurance and health care; f) those companies that have established the "de facto" standards for their industry segments—operating systems, network operating systems, and distributed computer and systems management architectures; g) companies providing application development tools for cross-platform product development; and h) companies that provide sophisticated data modeling software for data analysis applications.

C

Conclusions and Recommendations

- Downsizing is and will continue to be a predominant IS trend in the 1990s.
- A key battle will be amongst alternative distributed data base architectural standards.
- Open systems and forms of standards support will improve cost efficiencies from IS downsizing for vendors and users.
- Lower revenues and profit margins that result from many downsized solutions will have to be addressed by alternative licensing and distribution approaches.
- In addition, increased adoption of standards-based solutions will require vendors to offer value-added products and services to differentiate their products and maximize pricing. Such differentiation could include customizable and scalable products with enterprisewide product solutions.

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Dimensions of Downsizing

INPUT surveys indicate that IS and vendor management are in general agreement that major structural changes are occurring in the information systems infrastructure during the 1990s. These structural shifts involve downsizing from centralized mainframe environments as well as upsizing from the standalone PC into more comprehensive distributed networks.

A

Vendor Definitions

The following selected definitions of downsizing from INPUT's U.S. software products vendor survey indicate a wide variety of respondent interpretation on the nature of IS downsizing:

- "Organizations moving from legacy platforms or utilizing open systems, to improve flexibility of commercial business applications."
- "Segmenting applications to allow appropriate sections to execute on appropriate platforms."
- "Moving business processing to lower cost computing."
- "Moving down to mid-range computers from mainframes and moving up from PC/LANs to midrange computers...currently AS/400 as the target."
- "Migrating products to distributed environments, while protecting client investment in legacy systems."
- "Deploying the information technology solution to support the business enterprise to the most appropriate platform to solve the business problems. Prefer to use the term rightsizing—downsizing has negative connotations."

- “Porting current applications to smaller computing environments, based on PC/Workstation technologies.”
- “Movement to AS/400 and UNIX/LAN.”
- “Offloading host computers to the client/server.”
- “Employing the most cost-effective machine for the application.”
- “Downsizing/rightsizing represents a return to employee empowerment, entrepreneurial initiative, and decisions close to the facts. There is an attendant movement toward distributed information systems at the expense of the older, centralized systems.”
- “Process of bringing what was once mainframe-only applications to PC desktop...not necessarily porting these applications, but providing equivalent functionality on PCs.”
- “The ability for an organization to choose the best platform, operating system, and tools to achieve the financial and competitive benefits which computing can bring.”
- “Rightsizing is a key trend, and we are designing product strategies to meet that market.”
- “The ability to provide standard technology at the lowest possible point in the organization.”

Recurring terms and concepts that appear in these definitions of downsizing include: lower cost platforms and solutions; data and application distribution (based on distributed data base architectures); open systems and standards; employee empowerment; and enterprisewide solutions.

B

Benefits of Downsizing—Conflicting Views

IS and vendor management surveys conducted by INPUT for its downsizing series indicate that the perceived benefits of downsizing for users outweigh the negatives. However, there is disagreement between IS and vendor management on the nature of the benefits. Both groups agree that cost savings is a factor driving downsizing, but disagree as to the extent of the benefits.

Not surprisingly, more agreement exists between the two groups on the intangible benefits of downsizing such as user responsiveness and more flexible/responsive application development.

1. IS Management Perspectives

Prior INPUT reports on downsizing note that IS management often does not see significant cost benefits from downsizing. Factors that mitigate against lower costs resulting from downsizing include:

- An increase in network costs
- An increase in user training/applications maintenance support costs
- Degradation of data quality that can have a costly impact on the quality of company products and services

These comments suggest that much of the pressure to downsize corporate information systems infrastructures may be coming from operations management, who have embraced the cost savings arguments, rather than from IS management.

2. Vendor Perspectives

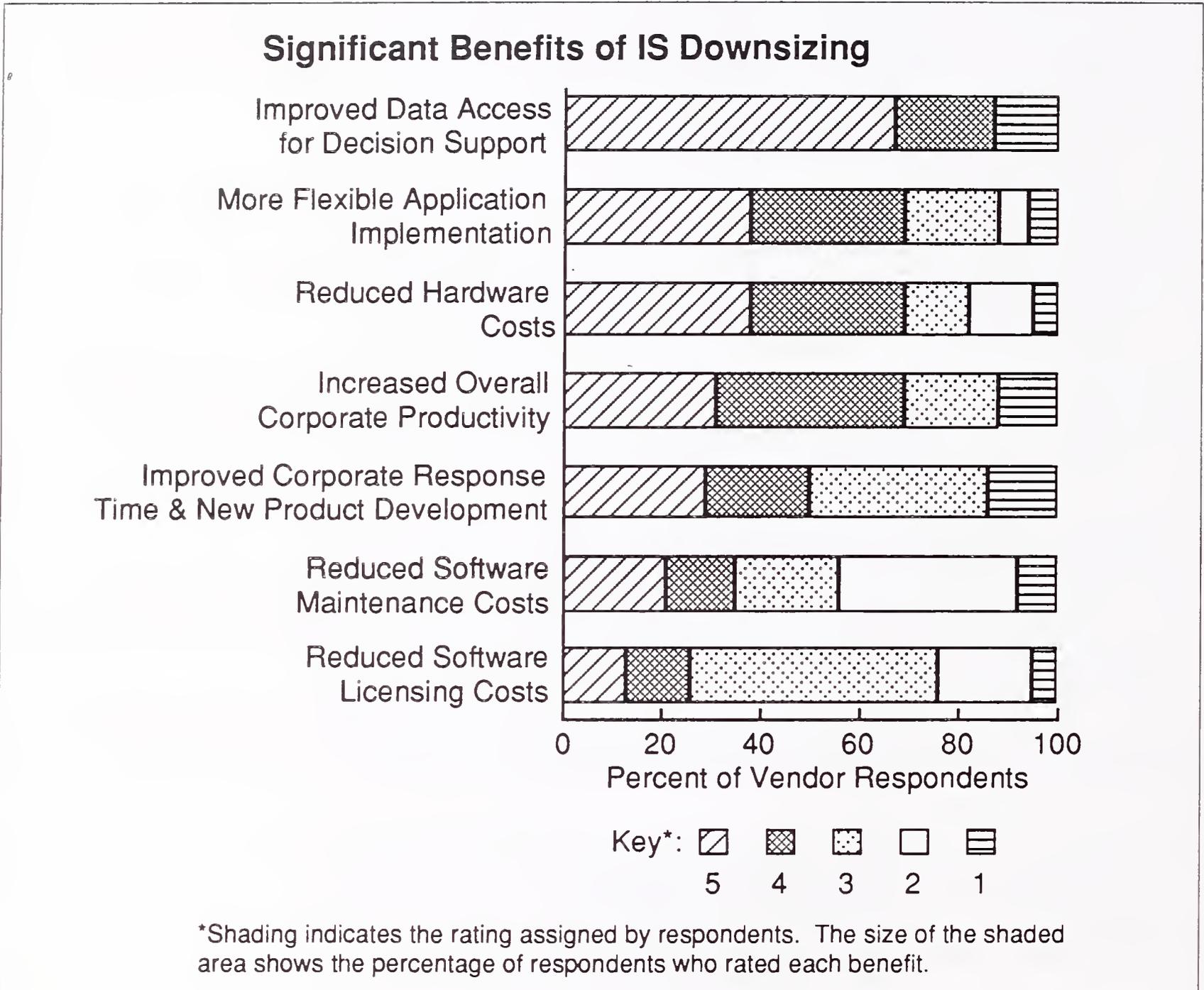
Vendor management has been quite consistent in the past and current surveys, on their perspective of cost savings, viewing it as a primary factor driving IS downsizing and a primary benefit.

INPUT's recent survey of software products vendors reaffirmed earlier vendor statements of benefits expected from IS downsizing, which include:

- More responsive to user information requests
- Faster systems development
- Better products and service
- Improved white-collar productivity
- Better business planning and decision making
- Reduced hardware and IS costs
- Improved bottom line

Exhibit III-1 shows a weighting (5 is most important) of the benefits that vendors state are currently being achieved as a result of IS downsizing.

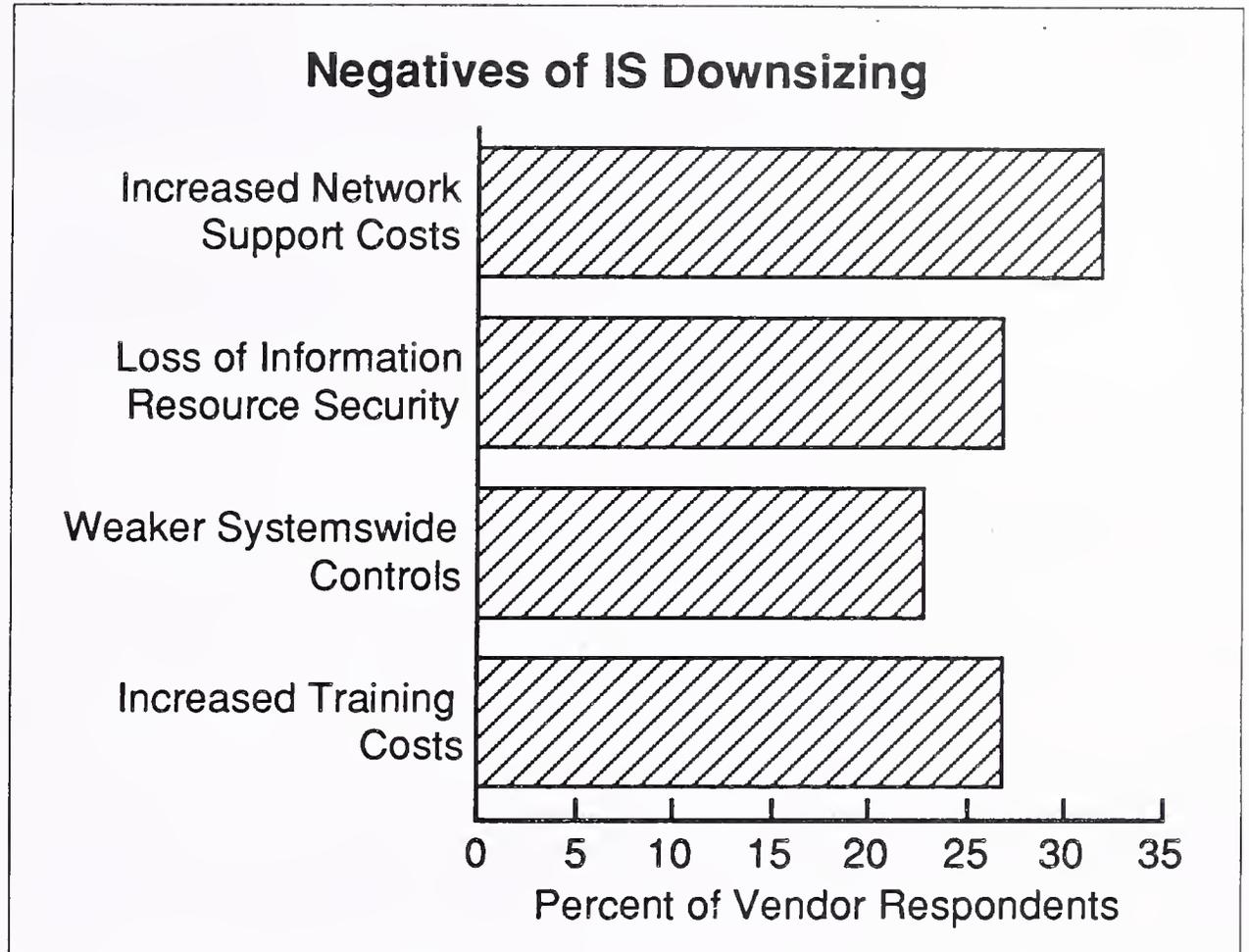
EXHIBIT III-1



These responses reinforce prior survey findings that the primary current benefits of IS downsizing are enhanced data access for management, followed by more flexible/efficient application development and reduced hardware costs. There was some difference in opinion among the vendor respondents as to whether there will be significant savings from reduced costs for software product licensing and maintenance.

The negative results of downsizing, most frequently cited by vendors, are summarized in Exhibit III-2.

EXHIBIT III-2



Increased network support costs and the loss of systemswide controls are two of the most significant downsizing negatives currently perceived by software products vendors. However, addressing these issues with specific solutions also creates vendor opportunities.

One vendor also viewed having to anticipate which longer-term standards will prevail as a negative.

C

Factors Driving Downsizing

The trend towards downsizing has multiple origins. Understanding these origins is important for developing product strategies that will provide longer-term, superior solutions.

1. Lower Cost Information Systems Architectures

The major improvements in the price/performance of CICS and RISC-based individual work stations (IWSs) and PC/LANs contrasts with the price/performance trends of the more proprietary, high-end mainframe systems. In addition, as the functionality of the minicomputer improved, the significant pricing differential between mainframes and minicomputers

has made minicomputers an increasingly inexpensive alternative to mainframes. INPUT defines the price border between minicomputers and IWSs to be around \$20,000 and between minicomputers and mainframes to be at the \$200,000 level.

In addition, the rule-of-thumb for pricing software proportionate to CPU costs has created a major differential, particularly in systems software. Improvements in the smaller format Winchester disk drives, including the newer redundant disk arrays, also represent significant price/performance improvements in storage costs.

Many applications can be run as efficiently on the lower priced platforms as they can on mainframes. In particular, INPUT has seen significant migration to lower priced platforms in recent years for applications in accounting, distribution, purchasing, administration, education, research, engineering, image processing, knowledge/expert systems, text processing, application development tools, and customer support/interface applications.

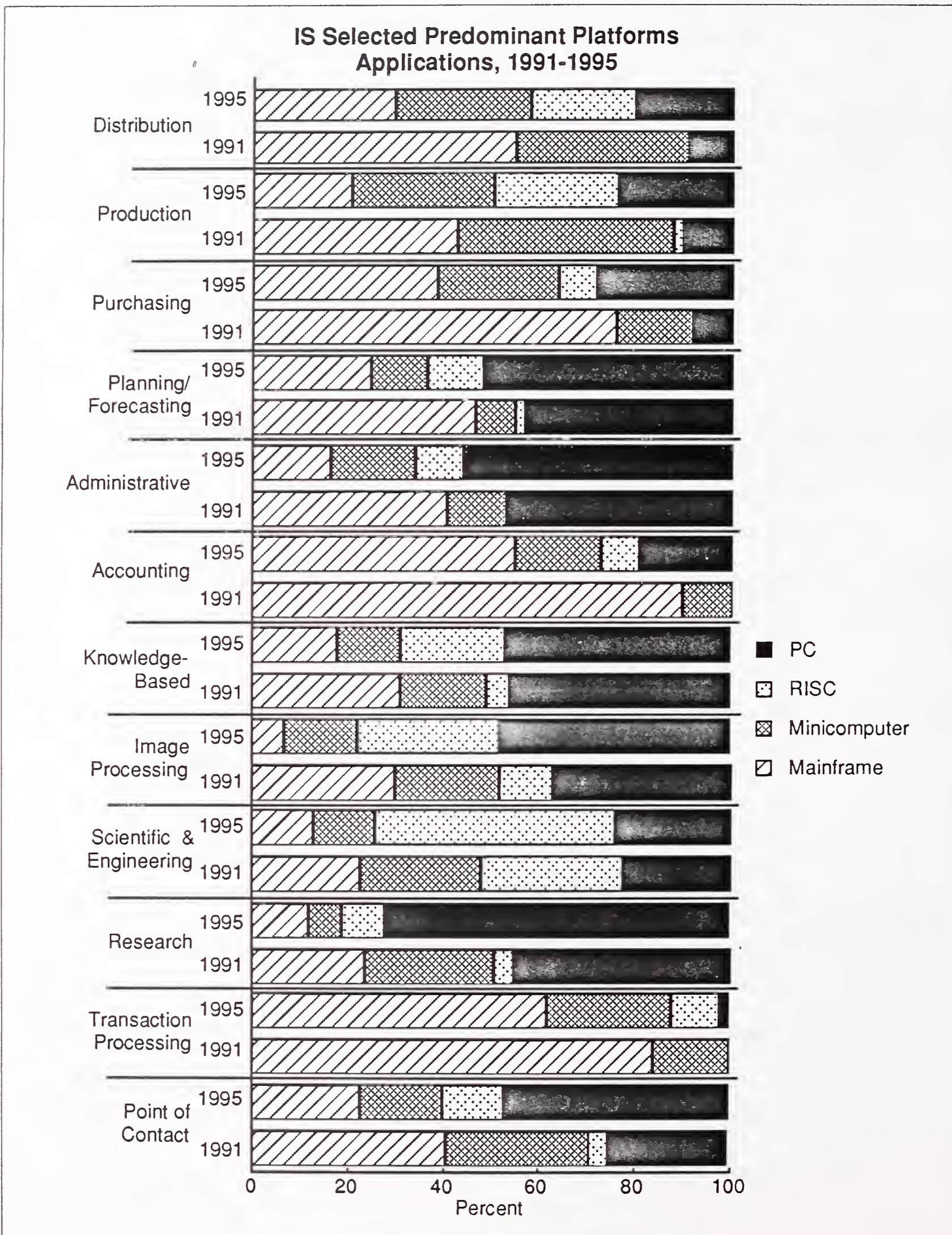
INPUT surveys of IS executives note distinctive attributes of the various computer platforms relative to each other (Exhibit III-3).

EXHIBIT III-3

Processor Architectural Attributes			
	Cost	Terms	#1 Attributes
Mainframes	>\$200,000	Host Superserver	Security Connectivity Commercial applications H/S reliability Data base management Network management Vendor support Applications software H/S architecture Complexity
Minicomputers	>\$20,000	Distributed processor Departmental processor Midrange systems Small business system Server	Distributed data server
RISC	\$20,000 + or -	Intelligent workstation Engineering workstation Server Client/requester	Scientific applications
IWS	<\$20,000	Personal computer Programmable workstation Intelligent workstation Intelligent terminal PC LAN (client/server) Client/requester	Cost effective Easy to program Open architecture "Bargain" Easy to use Easy to operate
Other Microprocessors	<2,000 200 20	Application-specific Integrated circuits Embedded processors	

As noted in Exhibit III-4, the IS management surveyed by INPUT predicted the following directional changes in platform preference for downsizing applications:

EXHIBIT III-4



These surveys indicate that IS executives anticipate that mainframes will lose ground to other platforms in all applications areas. The mainframe's strongest applications retention will be for transaction processing, involving large, complex data bases. Mainframe systems, over the longer term, are expected to move into the newer roles of corporate data base, super server, and corporate data base archives.

IS management anticipates that personal computers will gain in all applications areas, although the gains appear to be negligible in such areas as transaction processing, scientific and engineering, and knowledge-based systems.

Minicomputers will increase in some applications areas and decrease in others:

Increase in:

- Accounting
- Administrative (office)
- Planning/forecasting
- Purchasing
- Transaction processing

Decrease in:

- Production processes (factory and clerical)
- Distribution (warehouse/inventory)
- Point of contact (sales/customer)
- Research, education, training (including libraries)
- Scientific and engineering
- Image processing
- Knowledge-based (expert systems)

The primary cause for the replacement of minicomputers as the predominant platforms for the applications listed above is due to the increased use of RISC-based systems. This is true for most areas, except in research, education and training, where PCs are the primary replacement technology.

IS management expects RISC-based systems to show substantial growth in all applications areas. They will also achieve parity with, or dominance of, other platforms (e.g. being a predominant platform) in the following areas by 1995:

- Production processes (factory/clerical)
- Distribution (warehouse/inventory)
- Scientific and engineering

However, vendor surveys conducted by INPUT over the past year show some significant differences of opinion with IS management in platform downsizing migration, which probably reflects their own development platform choices.

IS management and vendors agree that accounting applications are primarily resident on mainframes and minicomputers at present, but vendors feel that mainframes are less dominant (89% mainframe for IS, and 75% for vendors). By 1995, vendors in INPUT surveys predict a dramatic downsizing of accounting applications, resulting in the following predominant platforms:

- Mainframes - 33%
- Minicomputers - 27%
- RISC - 20%
- PCs - 20%

Vendors believe that minicomputers currently represent a substantially higher percentage of administrative applications than do IS executives (38% for vendors and only 11% for IS). Yet, vendors see minicomputers being completely replaced as a predominant platform for these applications by RISC-based machines and PCs by 1995. However, IS executives see them increasing from 11% currently to 20% in 1995.

Vendors stated that transaction processing applications, now predominantly on mainframes and minicomputers (87% mainframes and 13% minicomputers), will decline to 60% in 1995 (33% mainframes and 27% minicomputers). This compares with IS management, which estimates that 85% of transaction processing applications will remain on mainframes and minicomputers (54% mainframes and 31% minicomputers).

Scientific applications reflect a major downsizing opportunity for RISC-based systems from the IS and vendor management's viewpoint.

Essentially, vendors are more bullish on downsizing from mainframes and minicomputers than are IS executives. Exceptions to the rule are research, education, and training applications.

2. Relational Data Base Management Systems

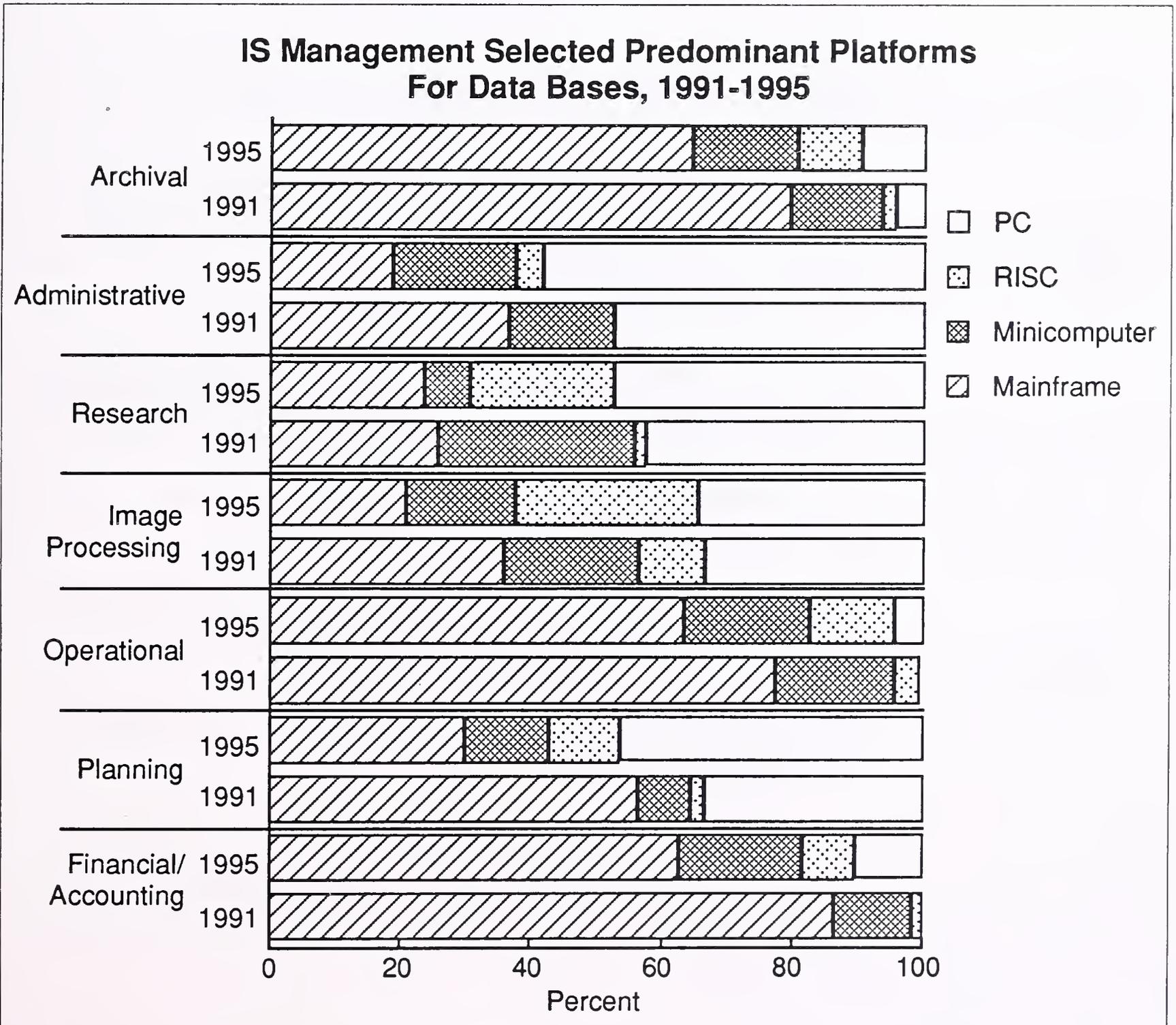
An equally important harbinger of downsizing has been the success of the relational data base management system technology. This technology has been key in allowing the dispersion of applications, vertically and horizontally, throughout an enterprise while facilitating the integration of applications and data base resources throughout the enterprise.

The acceleration of downsizing will be driven by improvements in distributed data base management software. Current weak functional areas are in data base synchronization and security capabilities. Improvement in these areas is allowing for greater usage of dispersed data base platforms/servers for OLTP (on-line transaction processing) applications. This should lead to a greater offloading of mainframe applications (with a heavy data base component) to the smaller platforms that will directly address the reduction of total information systems costs.

The operating systems software and hardware platforms, which predominate as distributed database server platforms, will determine the dominant enterprisewide IS architecture for the 1990s. A move to standardized operating systems and hardware architecture across enterprises should also help to reduce the total IS cost structure.

INPUT surveys of IS management over the past year on downsizing platform directions indicate that the same general observations made about applications also apply to data bases. Depending upon the application, as noted in Exhibit III-5, mainframes will lose ground, personal computers will gain a little (or hold their own), minicomputers will gain a little or lose a little (except for research, in which they lose a lot), and RISC-based systems will show appreciable gains—primarily at the expense of mainframes.

EXHIBIT III-5



Even though it is anticipated that mainframes will lose ground to other data base platforms by 1995, they are projected to remain the predominant platform in over 60% of IS installations for the following types of data bases:

- Financial/Accounting - 63% in 1995, down from 86% in 1991
- Operational (transaction) - 64%, down from 78%
- Archival - 65%, down from 80%

RISC-based systems are projected to replace minicomputers as primary data base servers in research.

Minicomputers were rated as the best distributed data base servers by IS management, where they will remain strong and/or grow in such areas as:

- Financial and accounting - 12% currently, to 19% in 1995
- Planning - 8% currently, to 13% in 1995
- Operational (transaction) - 18% currently, to 19% in 1995
- Administrative (office) - 16% currently, to 19% in 1995
- Archival - 14% currently, to 16% in 1995

Vendor-projected data base platforms for 1995 also reflect the pro-RISC and anti-minicomputer bias of IS management, as illustrated for projections of predominant applications platforms.

3. Open Systems/Standards

Freedom from slavery into proprietary solutions was another downsizing benefit cited by vendors. Applications based on open systems are usually less costly for users because of the increase in competitive alternatives.

INPUT's vendor survey showed the following directional shift in vendor application platform support:

- Respondents offering (primarily) minicomputer-based applications showed the most support for the AS/400, with expansion towards the UNIX-based platforms of Hewlett-Packard and Digital Equipment.
- Mainframe software vendor respondents indicated downsizing platform support at all architectural levels, including minicomputers, a variety of UNIX platforms, and PCs.

Increased implementation costs, however, were attributed to the need to support the many existing alternative standards. Thus, greater industry consensus on standards will be required in order to reduce the current additional costs associated with the support of multiple de-facto standards/alternatives when implementing downsizing programs.

Communications, data base management, and program interface standards most frequently mentioned as currently supported, include:

- TCP/IP
- ANSI/ISO SQL
- IPX/SPX
- X/Open
- Windows

Future standards, or standards to be supported, showed a directional shift away from a broad range of alternatives and towards specific standards (DCE, RPC, ODBC, Posix, OSI, X.500) representing such standards categories as:

- Distributed architectural standards
- Object oriented standards
- Messaging standards

Support for scalable computer architectures and fewer operating systems alternatives across the corporate enterprise will also be required to make downsizing most cost-effective.

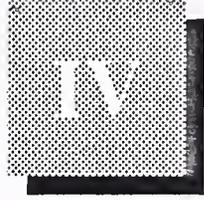
Customized and customizable solutions will be a value-added differentiation for applications software. In addition, applications development tools that create a more flexible development will be increasingly important for the vendor and the user.

4. Economic/Competitive Factors

Another very important factor driving downsizing is the general corporate downsizing movement, frequently to place IS resources where they are most effective, but also to reduce costs. This movement is a logical response to increased technological alternatives and current economic presences, including the global competitive environment, and slower macro economic growth.

Important benefits to be achieved from IS downsizing in this changing competitive environment include more efficient use of capital resources, improved worker productivity, faster new product development, and enhanced of customer support activities.

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Architectural Models for Downsizing

Because downsizing is a broadly interpreted phenomenon, the industry perceives a number of alternative architectures for addressing the downsizing trends.

A

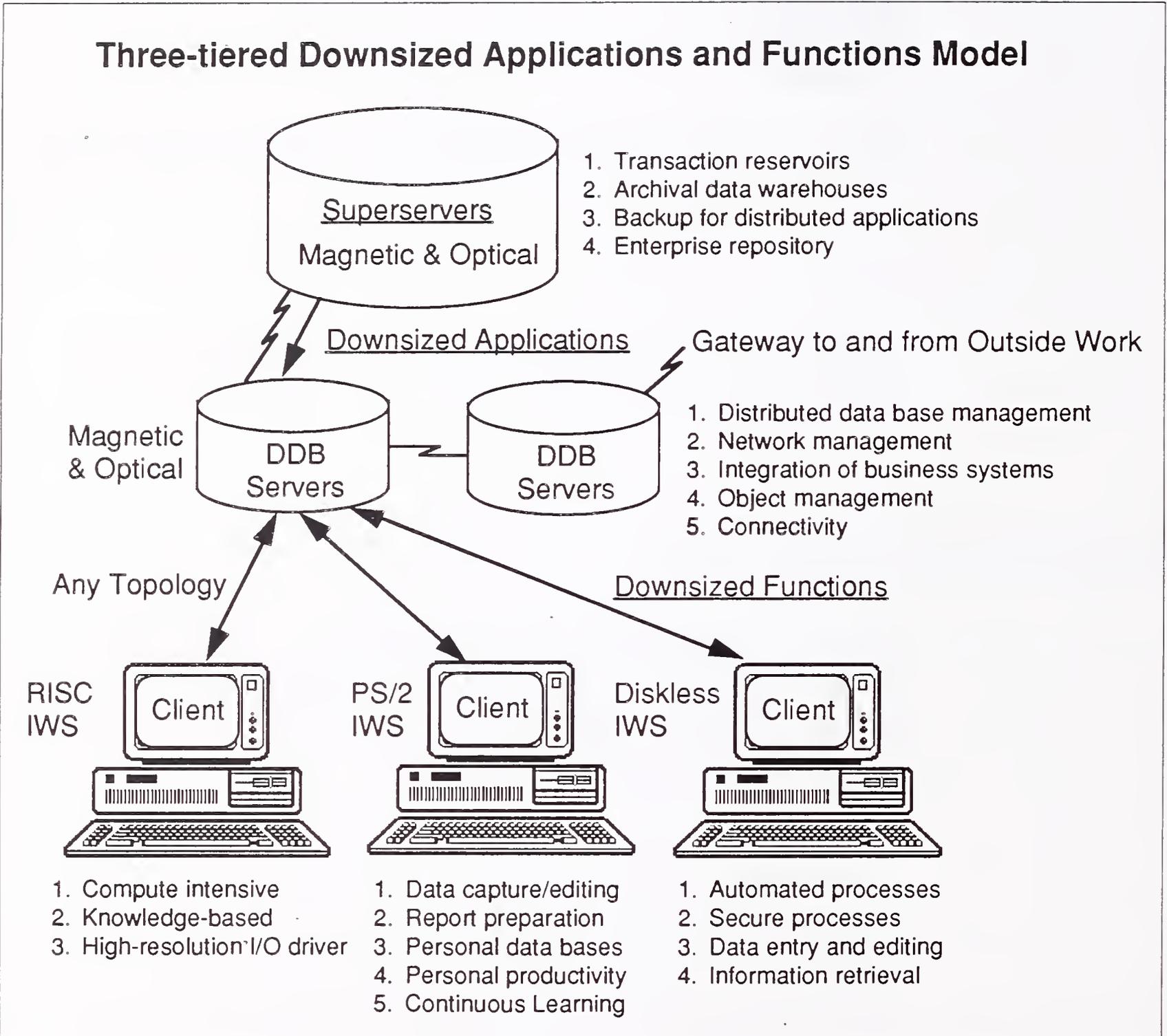
Systems Architectures for Downsizing

Two downsizing umbrella architectures include: two-tiered, with the mainframe distributed to IWSs/LANs or standalone individual work stations (IWSs), and three-tiered, with the mainframe becoming a data base superserver, distributed data servers (which could be minicomputers, UNIX workstations, or PCs), and desktop clients, which could be a RISC IWS, PC IWS or a Diskless IWS.

INPUT concludes in a related report, *Systems Architectures for Downsizing*, that the three-tiered distributed server architecture is the most appropriate network architecture for the downsized world of the 1990s. This is due to the unique benefits, especially for enterprisewide solutions realized at each platform level (see Exhibit IV-1). As previously indicated, INPUT's surveys of IS management suggest a more prolonged life for the minicomputer, which contrasts with a vendor outlook for earlier replacement of the minicomputer by RISC IWSs.

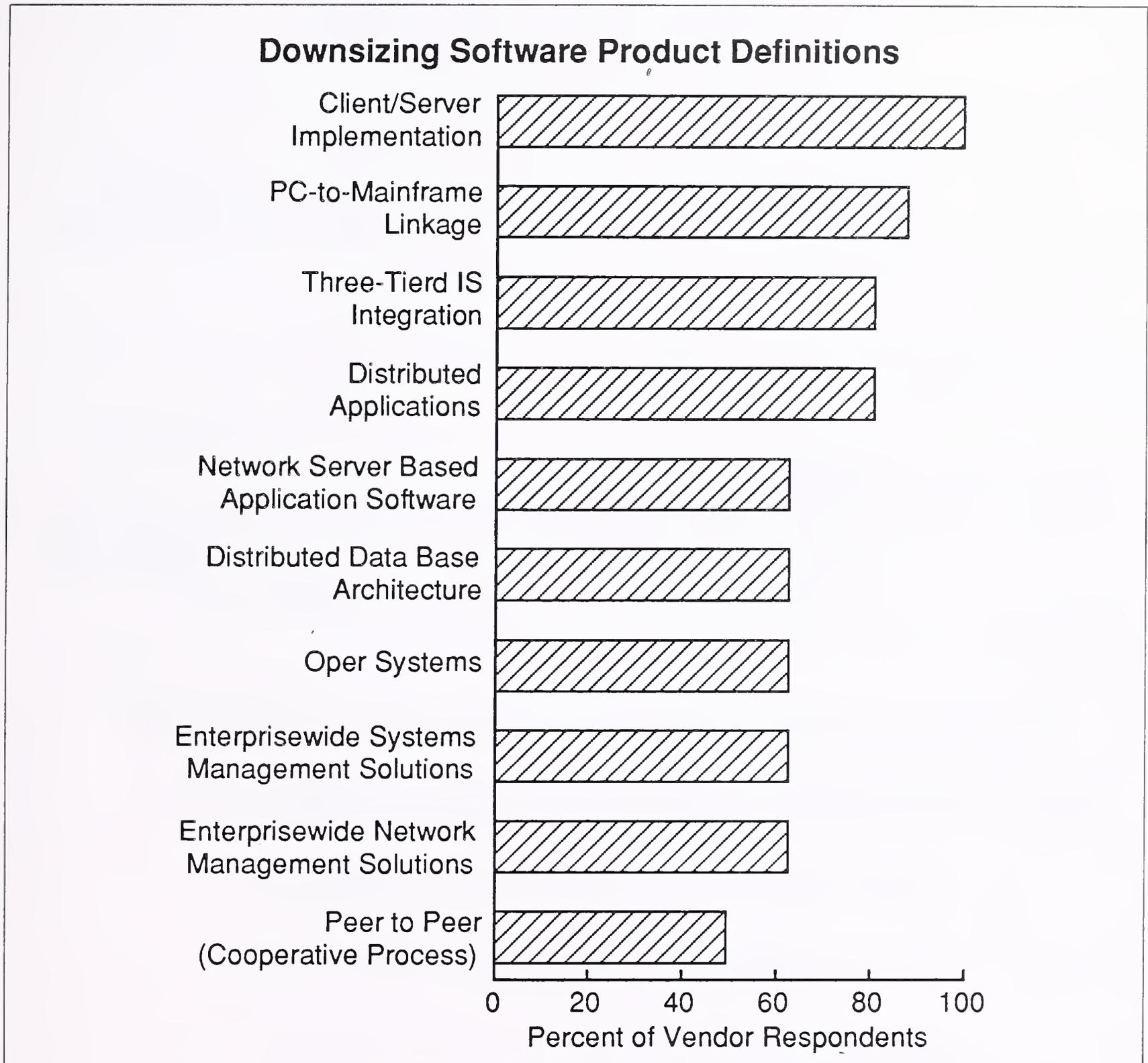
Particular architectural strengths of the minicomputer, in a distributed processing environment, versus the RISC/IWS are in the areas of systems management, network security, and providing cost-efficient integrated applications support.

EXHIBIT IV-1



In addition to the two- and three-umbrella architectures, there are a variety of other definitions for downsizing architectures. Exhibit IV-2 notes the contemporary downsizing architectural phraseology used by software products vendors to describe their downsized products. Also note that multiple descriptions are possible. For instance, 100% of these surveyed has a "client/server" implementation.

EXHIBIT IV-2



Alternative architectures for downsizing applications tend to center around data base management. The key to the future structure of distributed processing, as a significant downsizing solution, is in its ability to effectively and efficiently manage distributed data bases.

Dr. Allan Scherr of IBM, in a presentation in the late 1980s entitled "Distributed Data in the 1990s," referred to truly distributed data processing as "architected cross-system data models." This can also be referred to as a cooperative processing model. Examples of distributed data models (for enterprisewide solutions) are IBM's proposed SAA, OSF's Distributed Computing software architecture, and NCR's OCCA.

Attributes of architected cross-system data base models are:

- Encompass all data types (legacy and relational)
- Consistent data base query/programming interfaces
- Intersystem data integrity and recovery
- Auditability

Such distributed data base management architectures are in an emerging phase. As previously indicated, INPUT believes that the downsizing movement will accelerate rapidly in parallel with the refinement of distributed data base management technology.

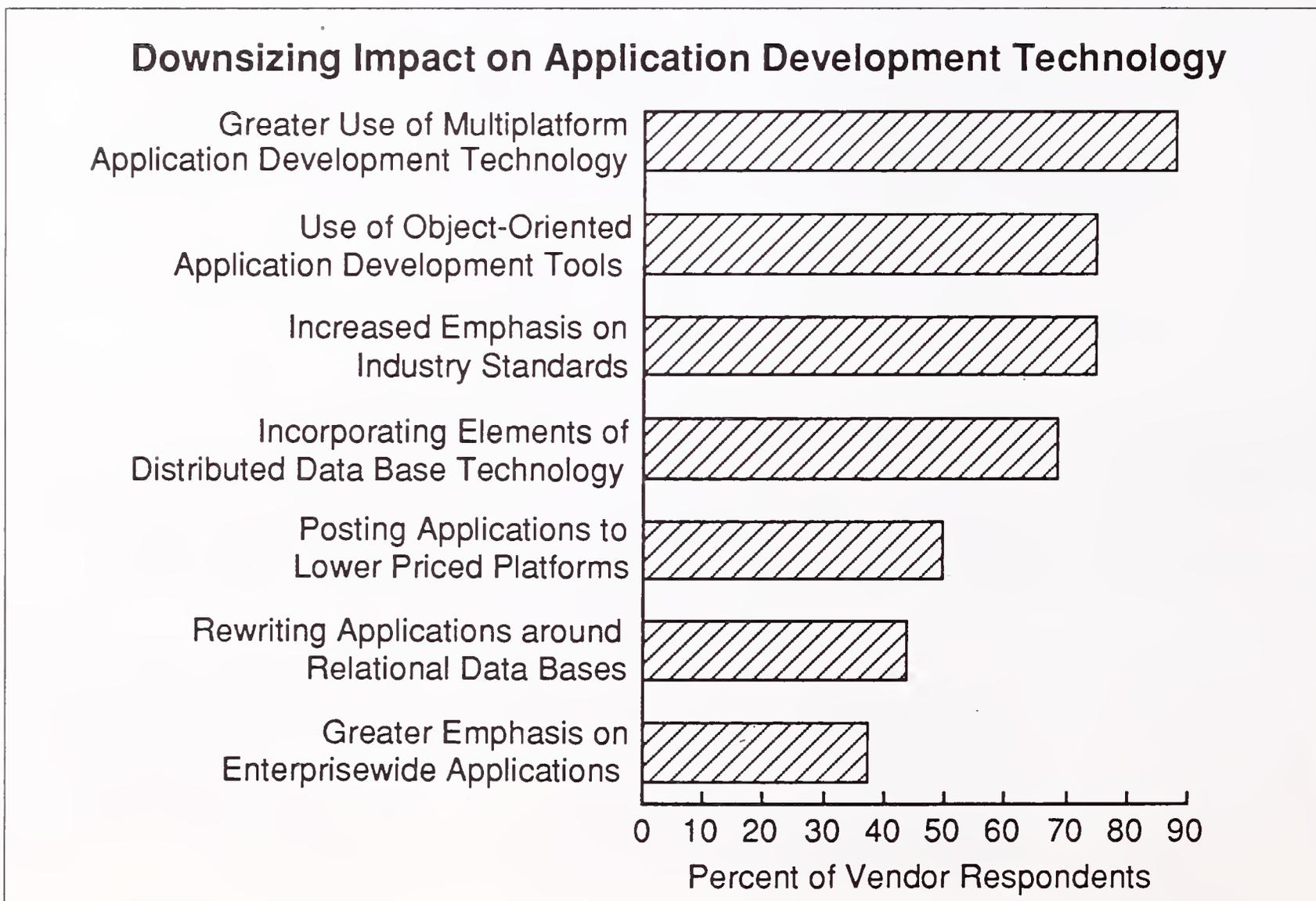
B

Downsizing Product Development, Distribution, and Pricing Models

1. Changes in Product Development Platforms and Applications Development Technologies

In INPUT's survey, close to 90% of the software vendor respondents said that they had changed product development strategy towards greater usage of multi-platform development technology (see Exhibit IV-3).

EXHIBIT IV-3



To accomplish this on a timely and cost-effective basis, many software products vendors are also changing their approaches to product development.

Nearly 70% of the respondents indicated that they are changing application development technology to include distributed data base technology. Less than half of the vendor respondents indicated that the change involved rewriting applications around relational data bases. Because support for integrated, multiplatform-based applications generally involves the use of relational data base technology, this figure could be the result of respondents who have already completed this transition as early adopters of downsizing products change. Also, some respondents indicated that they are writing new applications, which are based upon relational data base, but not rewriting old applications to address the relational model.

Three application development technologies appear to be central to applications development for a downsizing environment: the use of object-oriented application development tools; increased emphasis on industry standard interfaces; and greater emphasis on distributed data bases.

The percentage of vendors (38%) who emphasized enterprisewide applications development, suggests that this is a potential product opportunity direction.

2. Recent Downsizing Product Directions

Software vendor respondents briefly described their more recent product/services introductions that specifically targeted the IS downsizing trend.

Primary or central product themes included the following:

- Multi-platform and data base support
- Client/server implementation—downsizing to UNIX and PC/LANs
- An increasing number of supported standards

Other product direction or implementation themes include:

- Development of OLTP-based solutions
- Support for open-server platforms
- Adoption of object technology
- Support for distributed data base architectures
- Minicomputer-based solutions being ported to a variety of UNIX operating systems

Vendors were also asked which of their products were appropriate for downsized software product solutions. The responses varied between approximately 50% to 100%. New product development, based upon a distributed data base architecture, would reinforce their view that a high percentage of their current applications are appropriate for downsizing, particularly within the context of enterprisewide solutions.

3. Approaches to Product Differentiation

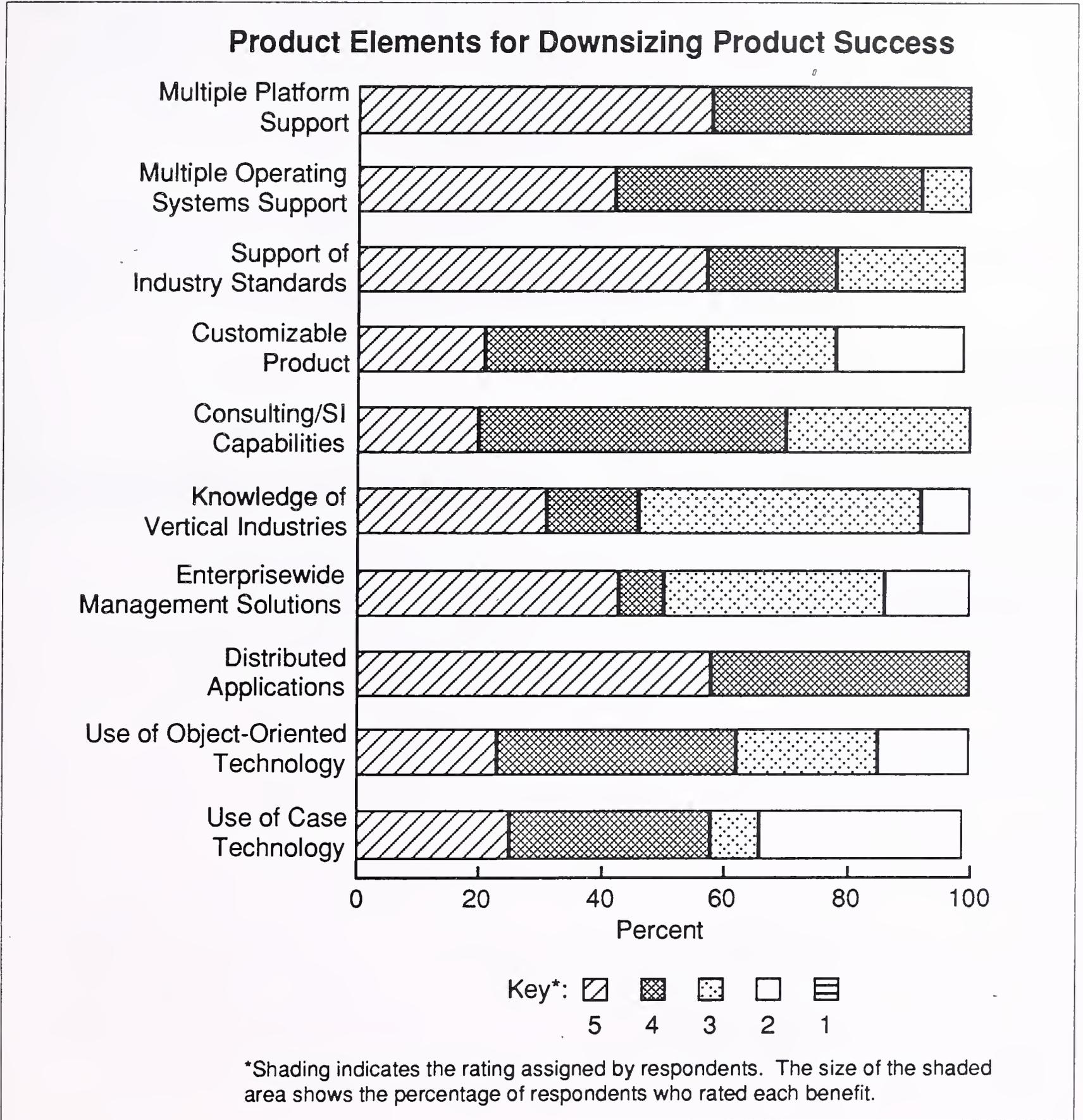
Software product vendor respondents mentioned the following product strategies that allowed them to actually benefit by emphasizing a “standards”-based (as opposed to a more “proprietary”) product approach:

- Solutions selling
- Early adoption of standards as a marketing theme
- Government “wins” based on standards support
- A leader in defining standards
- Differentiate standards by application

Increasing support for various industry standards, however, could have negative implications in terms of less product differentiation and more competitive pricing.

Exhibit IV-4 shows, on a relative basis, specific product and services elements that vendor respondents considered most important for longer-term success in addressing downsizing trends:

EXHIBIT IV-4



Of particular significance in these responses is the fact that a number of vendors apparently do not perceive some of the more significant opportunities (and alternatives) for value-added pricing as they move from proprietary to open systems. From INPUT's perspective, three of these key elements are: customizable solutions (with strong application tool technology); consulting/systems integration capabilities; and knowledge of vertical markets.

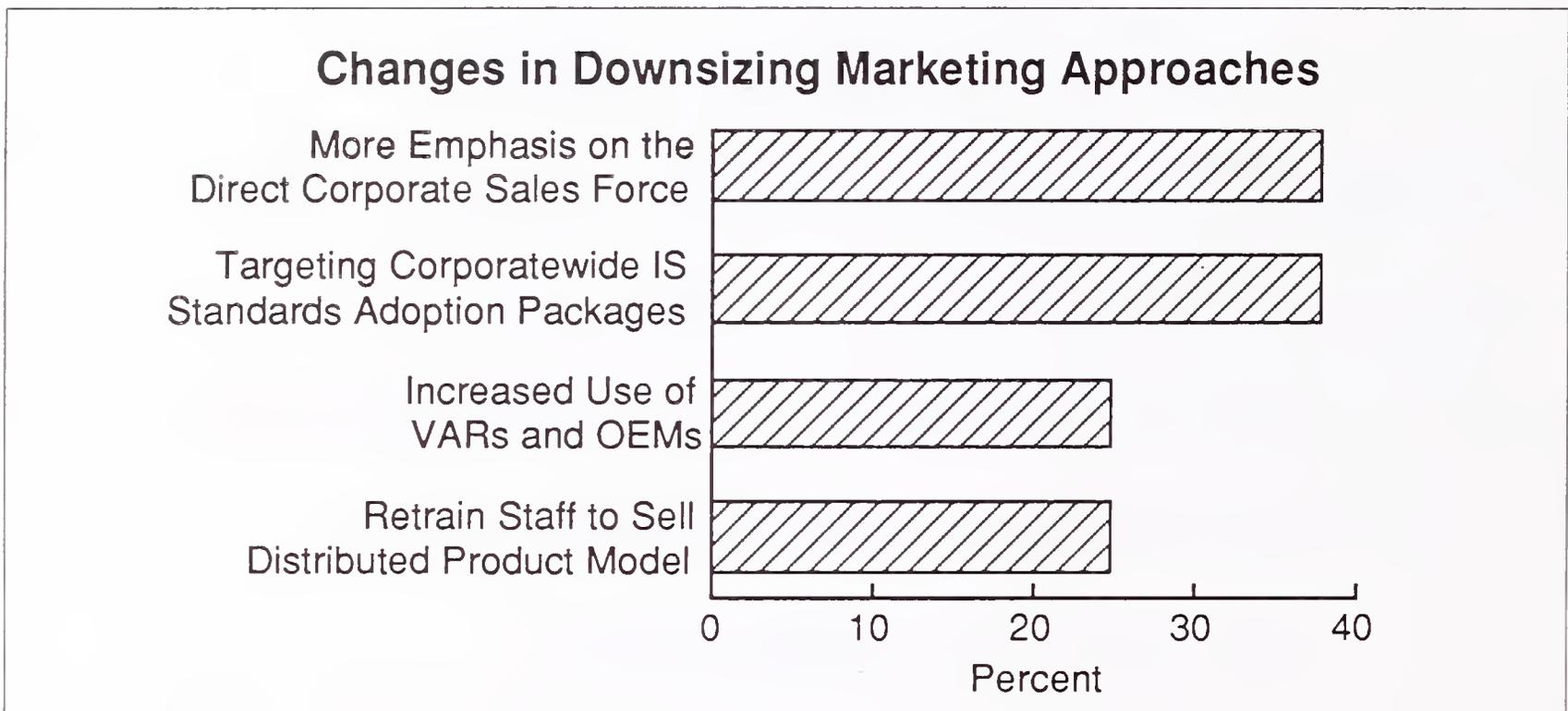
4. Changes in Marketing/Distribution and Pricing Approaches

Downsizing can often require an adjustment to lower priced and less profitable solutions. This adjustment could require significant changes in distribution approaches in order to make downsizing product shifts a positive strategy, with strong revenue growth and healthy profits.

a. Marketing/Distribution Changes

Software product vendor responses indicate how they were changing marketing/distribution approaches to adjust to lower priced solutions and commodity pricing issues. This suggests that reduced revenues/profits per sale have not yet been perceived as a significant negative. (Exhibit IV-5)

EXHIBIT IV-5



As proactive adopters of a downsizing product strategy, these vendors are probably net beneficiaries at this point of incremental revenues. In particular, targeting of corporate enterprisewide standards buying will become increasingly important. However, as more vendors shift to a downsizing product strategy, greater attention will have to be placed on alternative distribution models to reduce marketing and distribution costs.

b. Pricing Alternatives

Vendors described changes in software licensing and maintenance charges to maximize revenues and/or market share resulting from IS downsizing.

A change to user-based pricing was the dominant response. (Vendors, in general, were reluctant to go into detail on their pricing practices). Other specific pricing strategies mentioned were:

- Pricing based on concurrent usage
- Open licensing
- Enterprisewide licensing
- Tiered and per-user pricing
- Multi-site licensing
- Lower for X/windows (standards)-based products
- Agreements based on customer requirements— unique to each customer
- Reduced prices and an increase in discounting
- Longer-term licensing/maintenance agreements
- Alternative licensing/maintenance choices

C

Vendor Views on the Positives and Negatives from Downsizing Product Offerings

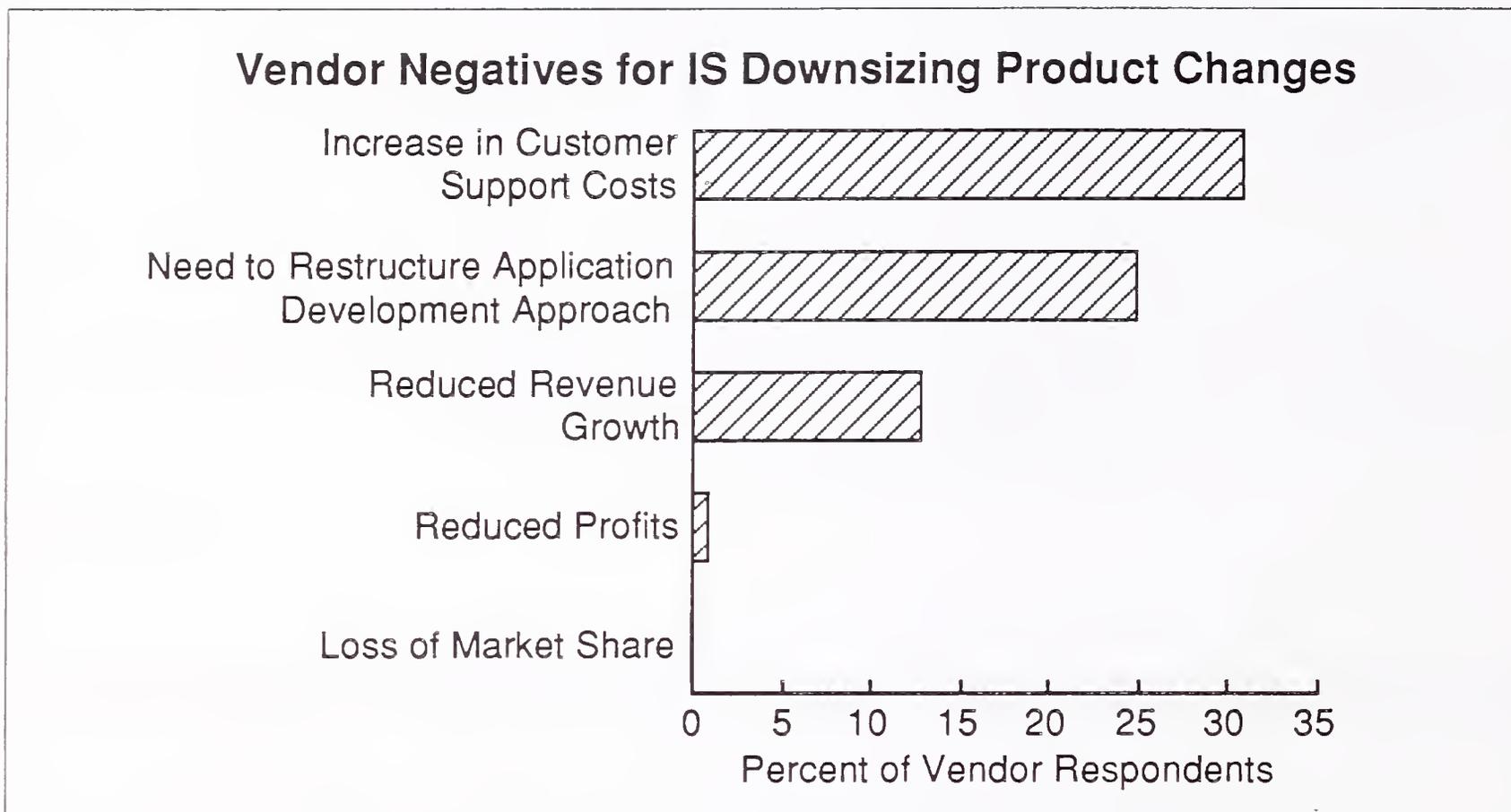
The vendor responses on current positive and negative impacts from downsizing product strategies generally suggest that vendors currently view their downsizing activities as a positive directional change for their products and services.

Some of the positives cited include:

- Ability to sell more applications and services to corporate accounts
- New market penetration opportunities with lower-cost solutions
- Additional product opportunities as customers re-engineer business applications
- Increase in market share from early adoption of downsizing product strategy

Responses to a specific list of potential negatives showed no overriding factor (see Exhibit IV-6), and no single option was noted by more than one-third of the respondents.

EXHIBIT IV-6



Vendor comments on negatives included:

- Higher customer support cost
- Shortage, or lack, of adequately trained development staff
- Requirement for new marketing approaches
- Requirement for more frequent product rollouts
- More platforms create increased support costs
- Sales cycles are longer
- Re-education of personnel required
- Initial development costs for application development will be higher

D

Successful Downsizing Products and Services Models

1. Current Successful Software Products' Downsizing Strategies

Vendor respondents were asked to cite current successful strategic models of U.S. software products and services vendors who are addressing the IS downsizing movement. Most vendors did not want to cite competitors, and, as a result, very few successful models were identified. The predominant ones cited are the relational data base systems management companies.

However, a consensus of successful vendor product strategies for addressing the downsizing trends may be extrapolated by examining changes in market values of publicly traded U.S. software products companies over the past year. Particular strategies for addressing IS downsizing, for which the investment community appears to be giving high marks, include:

- Independent RDBM companies
- Applications software products vendors who support the AS/400
- Companies that provide UNIX-based scalable hardware and operating systems architectures
- Companies providing enterprisewide systems management and network management solutions
- Companies providing total solutions for particular vertical markets— i.e. insurance and health care.
- Those companies that have established the “de facto” standard for their industry segments—operating systems, network operating systems and distributed computer architectures
- Companies providing application development tools for cross-platform development support
- Companies providing sophisticated data-modeling software tools

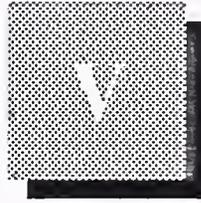
2. Future Successful Software Product Downsizing Strategies

Vendors surveyed described their view of the downsized corporate IS model 3-5 years into the future, and how enterprisewide integration fits into the downsizing trend.

Responses were quite varied:

- “More open systems—proprietary operating systems will merge with open systems standards.”
- “The cross-platform, client/server distributed business model will dominate.”
- “The more sophisticated end user, with higher expectations, will create pressure for standards.”
- “A three-tiered architecture, including the mainframe as superserver, special purpose servers, and end user machines.”

- “The maturation of international standards will encourage more companies to adopt a rightsized model for enterprisewide computing. It will emphasize interfaces, standards, methods, and structure rather than specific products.”
- “Integrated LAN systems—mainframe or large LAN for database and security management.”
- “Much more competitive and will bring about a more defined and mature marketplace.”
- “Greater emphasis on standards. More emphasis on cross-platform and products interoperating”
- “Increased competitive pressures—more mergers, more failures.”
- “Financial resources of vendors for R&D must be significant.”
- “Time to market and quality processes will be key focus.”
- “The marketplace will reflect the maturity of the technologies. Emphasis will be more on flexible, user-centered designs.”
- “More emphasis on features, functions, flexibility and a de-emphasis of platform and operating systems issues.”
- “Price and maintenance charges will be driven lower. New players will enter the market as cost of entry is reduced.”
- “Lots of failures—multi-platform support is investment intensive.”
- “DBMS server players are already well-established. It is a level playing field on the client tools side.”
- “There will be more industry cooperation—with a rethinking of current cooperative strategies.”



Conclusions and Recommendations

A

Conclusions

The latest vendor survey, upon which much of this report is based, reinforces INPUT's earlier findings that downsizing is currently a predominant trend in a rapidly changing information systems infrastructure. However, the rapid diffusion of personal computer technology into the business environment during the 1980s could also be described as upsizing when viewed from the bottom up with the integration of intelligent workstations moving into either client/server or cooperative processing architectures. As such, a more neutral term to describe these changes might be "rightsizing."

There are a number of forces that determine the speed at which downsizing is occurring and the preferred IS systems architectural models and platforms for downsizing.

Cost savings has been a principal driving force, as has improved data access. However, there is considerable disagreement on the magnitude of current hardware cost savings, particularly because mainframes often have to be retained due to corporate data base security issues and because application development costs can increase as additional applicational development platforms are supported.

Data bases, upon which many commercial applications are based, have been developed using mainframe systems software and applications-enabling tools (DBMSs). Current file transfer data models today (among computer platforms) present significant problems for data base integrity, synchronization, and security, which have been identified as primary factors inhibiting downsizing. Thus, many mainframe applications continue to resist downsizing.

Minicomputers, however, are proving to be cost effective alternatives, particularly for many low-end mainframe applications. Minicomputers also have much lower systems software costs than mainframes. Minicomputers (versus UNIX workstations) have more mature (and secure) systems software for systems administration, network management, and relational data base management as well. In a client/server environment, applications transferred to the client tend to be for data input/output, decision support, and general purpose office applications.

Several vendor responses to INPUT's survey indicated that they observed a recent acceleration in IS downsizing interest, but others indicated that they viewed it as still more of an evolutionary phenomenon.

A major driving force for downsizing will be improvements in distributed relational data base management systems. In particular, improvements in systems-wide security and synchronization are required. This will eventually allow for the offloading of more mainframe applications to smaller platforms, which could have a significant impact on the cost benefits of downsizing. In addition, it will allow for more OLTP applications to be downsized.

Workstations/LANs will become the dominant distributed data base server platform, with minicomputers and desktop computers used more for applications processing.

Downsizing has also been accompanied by a movement towards open systems/standards-based architectures, as well as multi-platform based solutions, but greater industry consensus on particular standards is required to gain the cost benefits from "standards" implementation.

In-house (captive) application development and processing services is a tremendously available market for software products vendors. This is also the market in which downsizing is accomplished within the companies themselves. In other words, these companies develop their own systems integration without going to a third party for help. Because many of the required solutions are not appropriate for standard, packaged solutions, customized and customizable product approaches are best suited for this potential market.

The responses in Exhibit IV-4 indicate that vendors could be missing some significant hidden costs resulting from the IS downsizing movement. These include potentially lower revenues and profits from migration to lower-cost platforms and lack of product differentiation from increased support for open systems and other standardized solutions. Vendors will need to look to alternative product strategies, like selling suites of bundled solutions to increase account control and market share, and increasing the number of products that can be provided (for enterprisewide solutions),

either from internal development, or from strategic partnerships or joint ventures. Vendors will also need to emphasize their total solutions capabilities—e.g. one one-stop shopping—and focus on becoming the corporate standardized product solution.

Downsizing often represents the beginning phase of the longer-term implementation of enterprisewide solutions. This will increase the complexity of product requirements for vendors, and will favor vendors with broad product, consulting and systems integration services or capabilities.

Downsizing also is associated with the flattening of the typical corporate hierarchical decision-making structure. The resultant changes require employees with more multi-tasking capabilities. These changes can greatly increase computer skill requirements for employees and require much greater emphasis on computer training, and place more emphasis on such conceptual issues as the types of informational resources that are available and how they are accessed.

B

Recommendations

The following recommendations emphasize the basic product strategies required for capturing downsizing market opportunities. Many could also provide opportunities for value-added pricing.

Computer systems vendors should:

- Develop scalable/extendible hardware and systems software architectures
- Emphasize enterprisewide solutions
 - Provide a development architecture for distributed data base management—with support for open systems
 - Concentrate R&D on enterprisewide, integrated applications and systems management tools
 - Provide one-stop shopping product suites and servicing capabilities (total solutions marketing)
 - Concentrate on becoming the corporatwide standard for corporate accounts

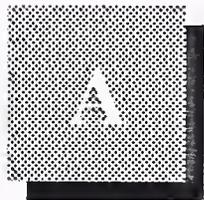
- Emphasize customization capabilities—including consulting, systems integration and application development tool technology—to capture downsizing application implementation revenues
- Provide outsourcing services as a product/service rightsizing strategy
- Make sure an open systems policy is explicit
- Emphasize data security within product offerings
- Provide integrated systems and applications software solutions that maximize systems-wide security and processing efficiencies
- Capture more application software products revenues, like the vertical market expertise of partners, rather than just reference selling through joint ventures with independent software products vendors
- Acquire companies with strong product suites, particularly for cross-platform and cross-industry applications
- Work with standard applications program interfaces (APIs) to encourage independent software developers to work with your systems/network architectures
- Use object-oriented/distributed relational data base management standards to reduce application development costs
- Plan in advance to issue lower-priced solutions—make cost adjustments in advance
- Develop multi-national, globalized solutions

Independent software vendors should:

- Support open systems and scalable architectures
- Work with industry standards
- Concentrate on establishing expertise in vertical markets
- Emphasize software product customization capability—a major market opportunity exists in capturing more of the “in-house” applications development market
- Provide consulting, application development, and systems integrations services for assisting the downsizing process

- Understand that standard solutions will carry lower margins—offer a customized solutions capability
- Be receptive to and develop joint ventures
- Provide total solutions (with value-added pricing capability) by concentrating on becoming an expert in vertical and/or niche markets
- To protect the current customer base and increase market potential:
 - Provide integrated, enterprisewide solutions based upon distributed data base architectures
 - Stress systems-wide management tools
 - Provide/develop suites of software product applications for account control to increase market share
- Work with object-oriented and RDBMS/application development tool standards to maximize applications development cost efficiencies
- Independent software vendors should look more to computer systems vendors as resellers into the corporate market because this leverages their sales and marketing efforts (e.g. Novell, Microsoft, Intel, etc.).

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Vendor Survey Questionnaire

Impact of Information Technology Downsizing on U.S. Software Products Industry

Company: _____

Respondent: _____

INPUT is examining the effect of downsizing of information services on the U.S. software products and services industries.

A copy of the executive summary of the report based on these interviews will be sent to all respondents as our way of thanking you for participating. Questionnaire responses will be kept confidential.

1. Would you summarize your current principal software product and services.

2. Is the corporate information service downsizing trend a strategic market for your product line?
 _____ If not, stop interview.

3. How do you define downsizing in context of your current product strategies?

4. What is your assessment of the pace of the downsizing movement among your customers?

5. What do you consider the most important benefits of IS downsizing for your corporate customers? Scale of 5 (most important) to 1 (least important)

More flexible application implementation	5	4	3	2	1
Reduced hardware costs	5	4	3	2	1
Reduced software-licensing costs	5	4	3	2	1
Reduced software-maintenance costs	5	4	3	2	1
Improved access to data for decision support	5	4	3	2	1
Improved efficiency in use of corporate-information resources	5	4	3	2	1
Increased corporate-response time to new product development	5	4	3	2	1
Increased overall corporate productivity	5	4	3	2	1
Other _____	5	4	3	2	1

6. What do you consider the principal negatives for your customer base from downsizing? (Circle those considered most significant)

- a. Loss of information resource security
- b. Data base corruption
- c. Increased network-support costs
- d. Increased training costs
- e. Weaker systems-wide controls
- f. Other _____

7. Which of the following approaches to Information services downsizing are addressed by your current software product and services?

Yes	No	
___	___	PC to mainframe linkage
___	___	3-tier information system integration, mainframe, minicomputer, PC/Workstation LANs
___	___	Network server based application software
___	___	Enterprise-wide systems management solutions
___	___	Enterprise-wide network management solutions
___	___	Distributed applications
___	___	Distributed data base architecture
___	___	Open systems
___	___	Client/server implementation
___	___	Peer-to-peer processing
		Other: _____

8. Which of the following reflect your changes in product development to more effectively address the downsizing markets? (Circle those most reflective of your changes)

- a. Greater usage of multi-platform application development technology
- b. Porting applications to lower-priced platforms
- c. Rewriting applications around relational data base
- d. Incorporating elements of distributed data base technology
- e. Use of object-oriented application development tools
- f. Increased emphasis on industry standards
- g. Greater emphasis on enterprise-wide applications
- h. Other _____

9. What are your more recent product/services introductions or enhancements that specifically target the downsizing IS trends:

10. What system development platforms do you currently support?

_____, _____, _____, _____

If more than one, will you continue to support multiple development platforms?

Yes ___ No___

Explain _____

11. What industry standards do you currently integrate within your software products? (hardware, operating systems, communications protocols, distributed data base architectures, etc.)

12. What current standards are you likely to support in the future?

13. What future standards are you likely to support? (Other than those identified in item #11.)

14. What are some of the positive benefits of the IS downsizing trend for your product strategy?

15. What are the negatives for your current product strategy from the downsizing IS trend? (profitability, etc.)

16. If increased adoption of standards is a necessary corollary for maximizing the market potential of downsizing, how do you plan to benefit from such a trend?

17. Which of the following most directly reflect changes in your marketing approach to adjust to lower priced solutions and greater commodization of product? (Circle those most reflective of your changes.)

- a. More emphasis on a direct corporate sales force
- b. Targeted IS buying of corporate-wide standard solutions
- c. Increased use of VARs and OEMs to reduce marketing costs
- d. Reduced size of over all sales staff
- e. Retrain sales staff to sell a distributed product model
- f. Other _____

18. What are current impacts on your company from the current downsizing market trends?

Positives (such as increased market share, greater account control, ability to sell more product to a single account, etc.)

Negatives (lower revenues, lower gross and/or operating margins, etc.)

19. Which of your products and services are currently most appropriate for downsized software products solutions?

20. Which of your products are not appropriate for downsizing?

21. What are the negatives for your company from the IS downsizing trend?
(Circle those most significant)

- a. Reduced revenue growth
- b. Reduced profitability
- c. Loss of market share
- d. Increase in customer support costs
- e. Need to restructure application development approach
- f. Other _____

22. What changes have you have made in software product licensing and maintenance charges to maximize revenue and or market share from the IS downsizing trend?

- a. Price Changes _____
- b. Discounts Offered _____
- c. Alternative licensing/maintenance choices _____

23. Which of the following product and services elements do you consider most important for longer-term success in addressing the downsizing trends? (rank 5 (most important) to 1 (least important))

Multiple platform support	5	4	3	2	1
Multiple operating systems support	5	4	3	2	1
Support of industry standards	5	4	3	2	1
Customizable product	5	4	3	2	1

Consulting/Systems integration capabilities	5	4	3	2	1
Knowledge of vertical industries	5	4	3	2	1
Enterprise-wide management solutions	5	4	3	2	1
Distributed applications (client/server-peer to peer solutions)	5	4	3	2	1
Use of object oriented development tools	5	4	3	2	1
Use of CASE technology	5	4	3	2	1
Other _____					

24. Could you cite current successful strategic models of U.S. software products and services vendors for addressing the IS downsizing movement?

25. What is your view of the downsized Corporate IS model 3-5 years into the future?

25. How will enterprise-wide IS integration, as part of the downsizing movement, impact the competitive environment of the U.S. software products industry?

We thank you very much for your cooperation. An executive summary of this report will be available sometime in February of 1993.

