

ANALYSIS OF CORPORATE USER NEEDS

INPUT



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ABSTRACT

The corporate purchaser has emerged as a potent force in the microcomputer industry. In order to maintain past growth rates, the PC industry must shift from a focus on individual buyers to an emphasis on the corporate market. These corporate users have distinct product and usage requirements. It is vital that vendors be responsive to these needs because these leading edge users are the driving force in the software industry.

The primary needs of corporate users are connectivity, standardization, and finding products that are appropriate for a wide range of end users. There are a number of new product opportunities in this market, including artificial intelligence technologies incorporated into existing business applications, group productivity tools, downsized versions of mainframe packages that are user friendly, and text data management systems.

This report contains 113 pages, including 40 exhibits.



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I INTRODUCTION

I INTRODUCTION

A. REPORT SCOPE AND OBJECTIVE

- This study was produced by INPUT as part of the Personal Computer Software Program in the 1985 Market Analysis and Planning Service (MAPS) for the information services industry.
- INPUT's objective is to analyze current market conditions and vendor activities in order to identify key issues and trends that require vendor action. Specific recommendations are included in this report to provide vendors with a framework for further analysis and investigation.
- The large corporate market has emerged as the driving force in the personal computer industry. Because of the large size of this market, together with its collective purchasing power, corporate users now have a correspondingly strong influence on vendors in shaping both the direction of the market and the types of products that are offered. Moreover, large corporations have their own distinct needs when it comes to buying, using, and managing micro-computer software.
 - Corporations typically have not been well served by microcomputer software vendors.

- Consequently, to succeed, software vendors must be more responsive to corporate users' needs.
- This report will focus on identifying the needs and wants of microcomputer software users and microcomputer managers in the large corporate market. The following areas are covered:
 - Identification of product and usage needs.
 - A discussion of innovative products or technologies with special appeal to the corporate market.
 - Recommendations for new product opportunities in this market.
- For an analysis of the needs of integrated software users, refer to the report entitled The New Generation of Integrated Software.
- For an analysis of the micro-mainframe market, refer to the report entitled Micro-Mainframe: Personal Computer Market Opportunities.
- For an analysis of corporate microcomputer software support requirements, refer to two reports: Micro Software Support Strategies and Software Support Requirements: Office Products.
- For an analysis of corporate user needs as they relate to developing marketing strategies in addition to product strategies, refer to the report entitled Selling PC Software to Corporate America.

B. REPORT METHODOLOGY

- For this report the following research was conducted:

- Twenty vendor interviews with leading microcomputer software companies were completed. The titles of the people interviewed include: Director of National Accounts, Manager of Corporate Accounts, and Vice President of Marketing.
- Fifty interviews with IS department managers in Fortune 1000 companies were conducted. The titles of these corporate decision makers include: Micro Manager, PC Coordinator, and Manager of DP/MIS.
- Eighty-five end users in companies with sales greater than \$100 million responded to a mail questionnaire.
- Copies of the questionnaires used are provided in Appendices A and B.
- In addition to the interviews, a review of trade press literature and previous INPUT research was done along with a search through INPUT's extensive vendor and industry files.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

- This Executive Summary is designed in a presentation format to:
 - Help the busy reader quickly review key research findings.
 - Provide a ready-to-go executive presentation, complete with a script, to facilitate group communication.
- Key points of the report are summarized in Exhibits II-1 through II-5. On the left-hand page facing each exhibit is a script explaining the contents of the exhibit.

A. SATISFYING CORPORATE USER NEEDS VITAL

- The corporate purchaser has emerged as a potent force in the microcomputer industry. These corporate users have distinct software product and usage requirements.
- It is clear that one of the major trends in the corporate market that has been driven by the corporate purchaser is the standardization on IBM PCs and compatibles for hardware and certain leading applications for software. This increased standardization, in terms of buying only a select few products, stems from a corporation's desire to get volume discounts and save on training and support costs.
- In addition, large companies want to realize the additional productivity gains made possible if their company's computers are connected to one another. Networking is inevitable in large corporations.
- In large companies, a high percentage of users desire access to the critical company information that is stored on centralized mainframe data bases. Users want to be able to download information, primarily to avoid re-keying it.
- Micro managers want to be able to customize the front end to a product. They would like to take a standard program and set up their own macros, prompts, menus, and help screens. This way they can simplify complex software products so that less sophisticated end users can use the product easily.
- In a corporation, high value is placed on being able to share information and to access other people's information. This is accomplished much more readily if everyone has the same programs; i.e., Lotus 1-2-3.

SATISFYING CORPORATE USER NEEDS VITAL

- **Standardization of Hardware and Software**
 - **Connectivity of Computers**
 - **Access to Host Data Bases**
 - **Customizable Software**
 - **Sharing Spreadsheet Analyses and Results**
-

B. MICRO MANAGER CONCERNS

- Large corporations have made a sizable investment in microcomputer hardware and software. Getting the most out of this significant investment has become a major challenge for the micro managers of these corporations.
- Users are flexing their corporate purchasing muscle. They want increased vendor responsiveness to corporate user needs. Groups such as the Micro-computer Managers Association (MMA) are forming to articulate these needs. As a group, they can bring some leverage to bear because they represent multimillion dollar sales.
- In many companies, micro managers are responsible for training the end users, but often require vendor assistance in "training the trainers."
- Large companies, in many cases, have set up a centralized support group within their company to handle most hardware and software support questions. Because these companies feel they are shouldering some of the support burden that the vendor would otherwise have to bear, they feel justified in demanding priority support services from the vendor.
- Micro managers want the personal computers installed in the company to fit into the existing computer base, which includes numerous minicomputers and mainframes. This requires improved communications capabilities and new software.
- Micro managers, like users, want to find power and ease of use in one program. Since corporations have users with a wide range of experience and ability in using a computer, they would prefer to find one product that fulfills the needs of this wide range. Finding one product to fit all needs simplifies support, allows users to exchange files, and lowers training costs.

MICRO MANAGER CONCERNS

- **Efficiently Training Large Numbers of End Users**
 - **Supporting End Users**
 - **Connecting PCs to the Larger Computing Environment**
 - **Finding “One-Size-Fits-All” Programs**
-

C. BUYING CRITERIA MOST IMPORTANT TO MICRO MANAGERS

- IBM compatibility, product performance, and features are the top criteria micro managers use for selecting micro software. Micro-mainframe links and multi-user versions are not of critical importance yet, but they will clearly rise in importance in the future. Because performance is so critical, there will always be room for a few new entrants with innovative, truly useful applications software products.
- Ease of use can be carried too far. Micro managers prefer software that not only makes it easy for people to get started, but also offers the potential for fast, complex, and powerful operations that a user may grow into after continued use.
- Many micro managers are now insisting on better documentation. In the past, the consensus has been that since all of the vendor's documentation was bad, it was not an important factor. As less sophisticated users need to be trained on computer usage, the demand for clear documentation has increased.
 - However, there is an inverse relationship between support and documentation. The higher the level of support provided, the less important the documentation.
- Vendor reputation is important. The more software a company buys, the more important vendor reputation becomes. Once a company makes a sizable investment in a software package, they are also making an investment in the vendor.
- Price was only a secondary consideration for the Fortune 1000 customers when selecting software. However, price becomes important once a company establishes a standard. In other words, when initially evaluating a product, price is a low criterion, but after a commitment has been made to a product, then negotiating the best price becomes very important.

BUYING CRITERIA RATED HIGHEST BY MICRO MANAGERS

- **IBM Compatibility**
 - **Software Performance**
 - **Software Features**
 - **Ease of Use**
 - **Documentation**
 - **Vendor Reputation**
-

D. NEW OPPORTUNITIES IN MICRO SOFTWARE

- Although there is limited opportunity to develop "blockbuster" products, there are certainly solid opportunities left in the microcomputer software market.
- The applications requirements of departments and work groups in large companies are largely unmet. As businesses continue investing in personal computing to boost employee productivity, their considerations focus increasingly on groups of workers rather than individuals. New multi-user applications designed to facilitate group activity will drive the next phase of growth in the corporate market.
- Artificial intelligence techniques will be used for a number of different applications. Successful products will be those that incorporate artificial intelligence techniques into existing business applications in order to make the program more "intelligent."
- There is a clear need for a product that allows PCs to link with different types of mainframes with different applications. A generic link that allows a user to access all types of data resident on a mainframe is both a major need and vendor challenge.
- Indexing and retrieval systems, such as the system underlying Borland's Turbo Lightning, will make it possible for computer users to have instant access to spelling checkers, thesauruses, dictionaries, and many other types of text-based reference material.
- Text data management systems are data base managers that can handle text documents much more effectively than the leading data base programs. These systems are capable of searching for and finding documents based on keyboard searches of existing files.

NEW OPPORTUNITIES IN MICRO SOFTWARE

- **Group Productivity Applications**
- **Artificial Intelligence Incorporated into Business Applications**
- **Generic Micro-Mainframe Links**
- **Text Indexing/Retrieval Systems**
- **Text Data Management Systems**

E. CONCLUSIONS AND RECOMMENDATIONS

- Standardization can be a problem for developers because it limits the potential for innovative, non-standard products. Currently, most users seem more interested in refinements to the leading software packages on which they have standardized than in new applications.
- Attention to the customer is vital in today's market. Developing new applications requires attention to what people actually do with their computers.
- Presently, the incremental value of most new software is minimal. To be successful, future products must offer sizable increases in productivity over existing products or techniques. Offering an immediate productivity boost is the only way micro managers can justify retraining users on a new package. The benefits must be tangible or people are not going to bother with a new program. New products must be both easier to use and more powerful than the standard product. In addition, replacement products must be able to use data and programs developed under the existing software.
- Vendors are not going to unseat a standard product with one that is only marginally better. Leading vendors are firmly entrenched; consequently, the remaining avenues are to develop add-ons to existing products or to pioneer new categories. Vendors will need to wait for a new generation of hardware and other technology advances before they can expect to displace the market leaders.
- The primary "pen and pencil" applications, such as word processing, accounting, and spreadsheets, have been automated. To be successful in this maturing market, developers need to create new applications that help people think and communicate better.

CONCLUSIONS AND RECOMMENDATIONS

- **Standardization Is Retarding Innovation**
 - **Attention to the Customer Is Vital**
 - **New Products Must Provide Measurable and Tangible Benefits**
 - **Very Difficult to Displace Market Leaders**
 - **Must Automate Activities Other Than “Pen and Pencil” Ones**
-

III CORPORATE USER NEEDS

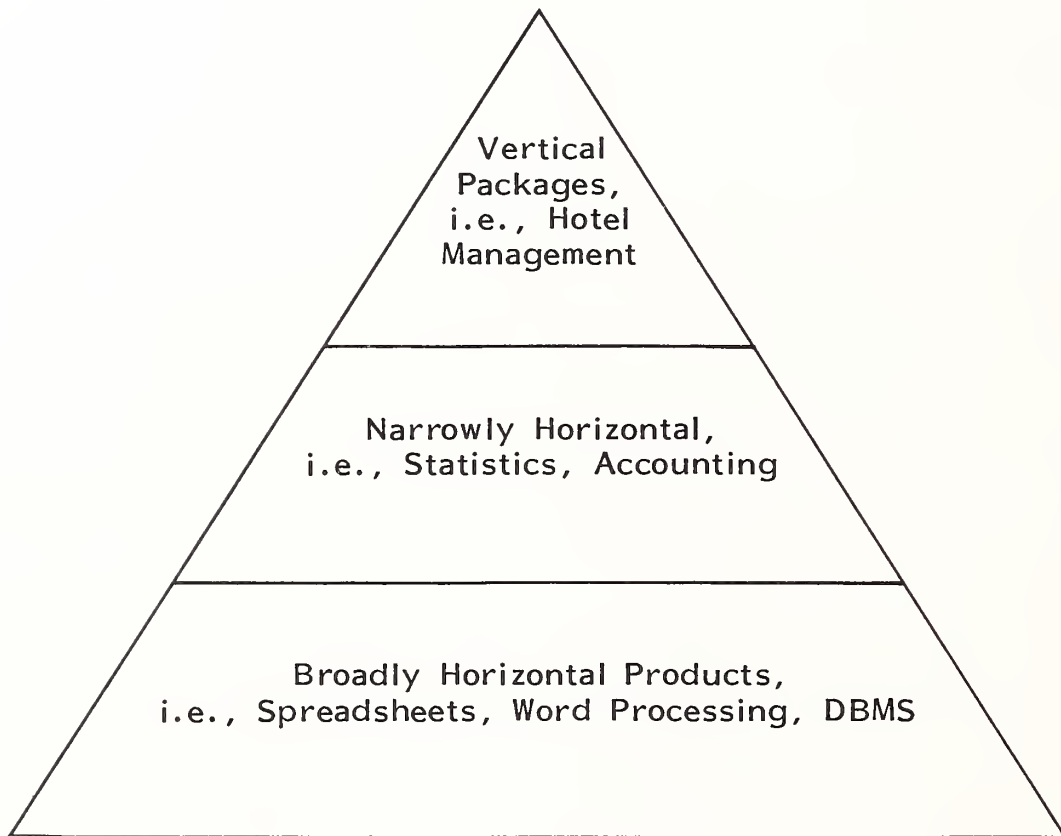
III CORPORATE USER NEEDS

A. MARKET CATEGORIES OF SOFTWARE PRODUCTS

- The market categories in large corporations are varied and range in size and the market potential is like a pyramid. This relationship is shown in Exhibit III-1.
 - The largest category is the broadly horizontal products that the majority of PC users have a need for. These include spreadsheets, word processors, and data base management systems.
 - The next largest category, narrowly horizontal, are those general purpose packages that are used by only a small percentage of corporate PC users, such as statistics and accounting programs.
 - Finally, there are the even more specialized packages which are used by the smallest number of users, the vertical packages.
 - Traditionally, large corporations have run vertical applications on mainframe computers exclusively. Some companies, however, are using microcomputers to run these strategic applications, such as hotel management applications that allow a hotel chain to run its business more effectively.

EXHIBIT III-1

MARKET CATEGORIES IN LARGE COMPANIES



B. MICROCOMPUTER SOFTWARE SELECTION CRITERIA

- Three separate groups were interviewed to determine the most important selection criteria that are used in the microcomputer software selection process. The groups interviewed include marketing and sales managers of vendors that sell micro software to the Fortune 1000, micro managers with Fortune 1000 companies, and end users in companies with sales greater than \$100 million.
 - All three groups were in accordance on the main selection factors. Software performance, features, and ease of use all ranked at or near the top of the scale, as shown in Exhibits III-2, III-3, and III-4.
- Price is not important for just one or two copies. Price becomes important once a company establishes a standard. When initially evaluating a product, it is a low criterion. After a commitment has been made to a product, then it is very important.
 - For sophisticated corporate users with the resources to handle support and training in-house, price becomes a more important consideration.
 - As users become experienced, they do not need dealer support (when buying their 100th copy of Lotus, for example); thus, they begin to buy on the basis of price.
 - In many quantity purchases, what is important to buyers is the discount, not the price, because the discount makes purchasers look good to their bosses.
 - Customers in the Fortune 1000 getting a high-end product with a large amount of productivity benefits are willing to pay a high price because they will benefit from the full functionality.

EXHIBIT III-2

MICROCOMPUTER SOFTWARE VENDORS' RATINGS
OF THE FACTORS CONSIDERED MOST IMPORTANT IN BUYING SOFTWARE

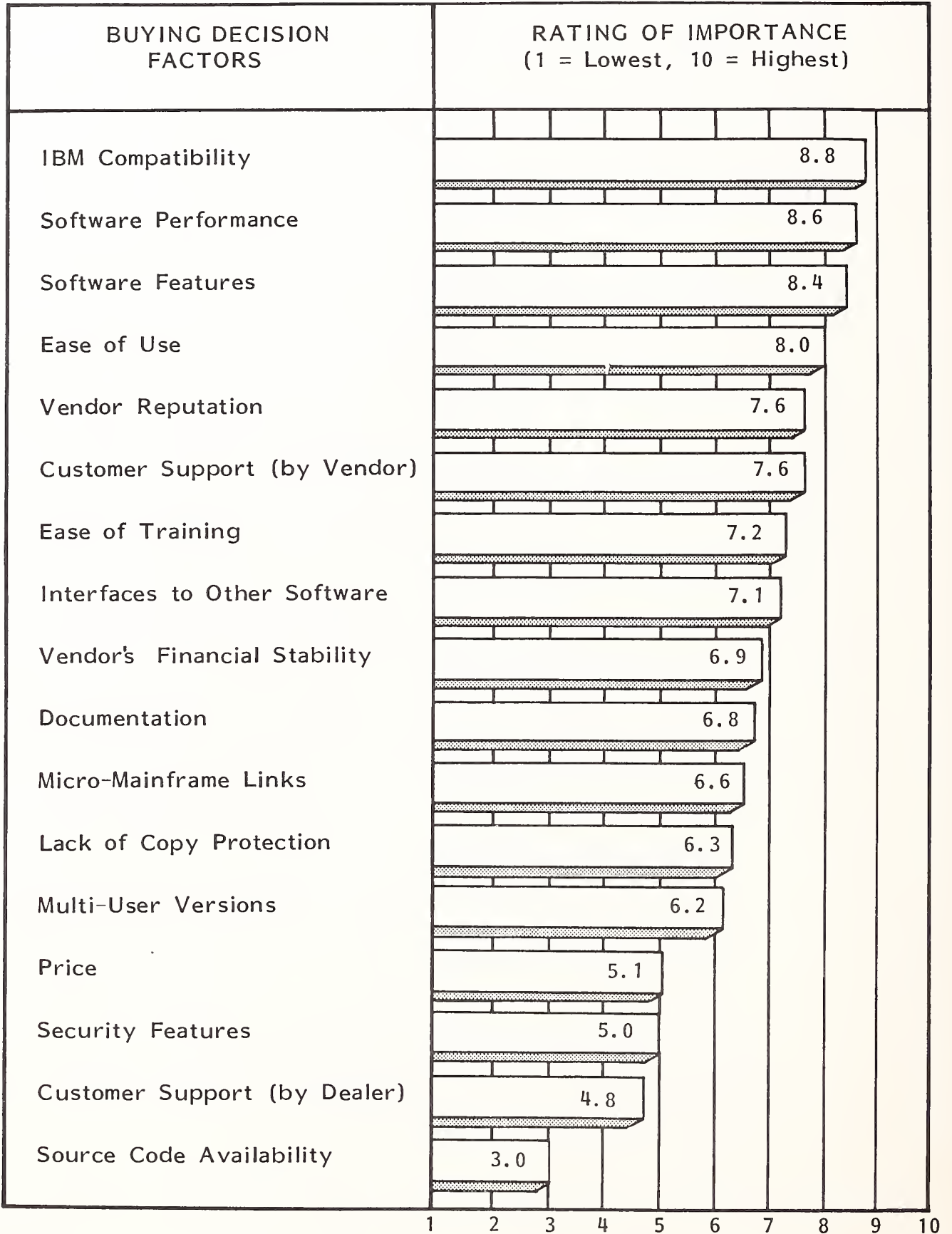


EXHIBIT III-3

I.S. MANAGERS' RATINGS OF THE FACTORS
CONSIDERED MOST IMPORTANT IN BUYING SOFTWARE

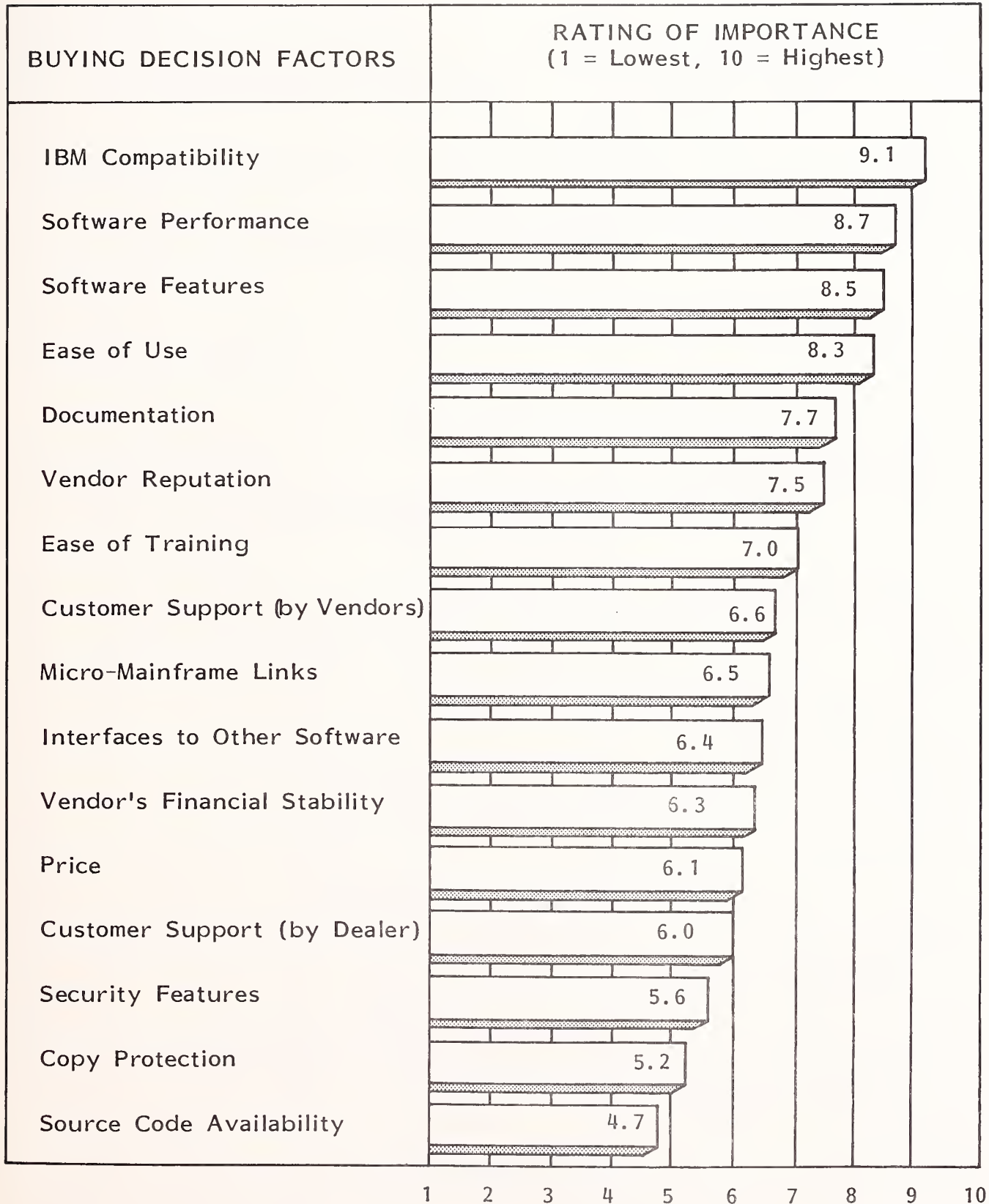
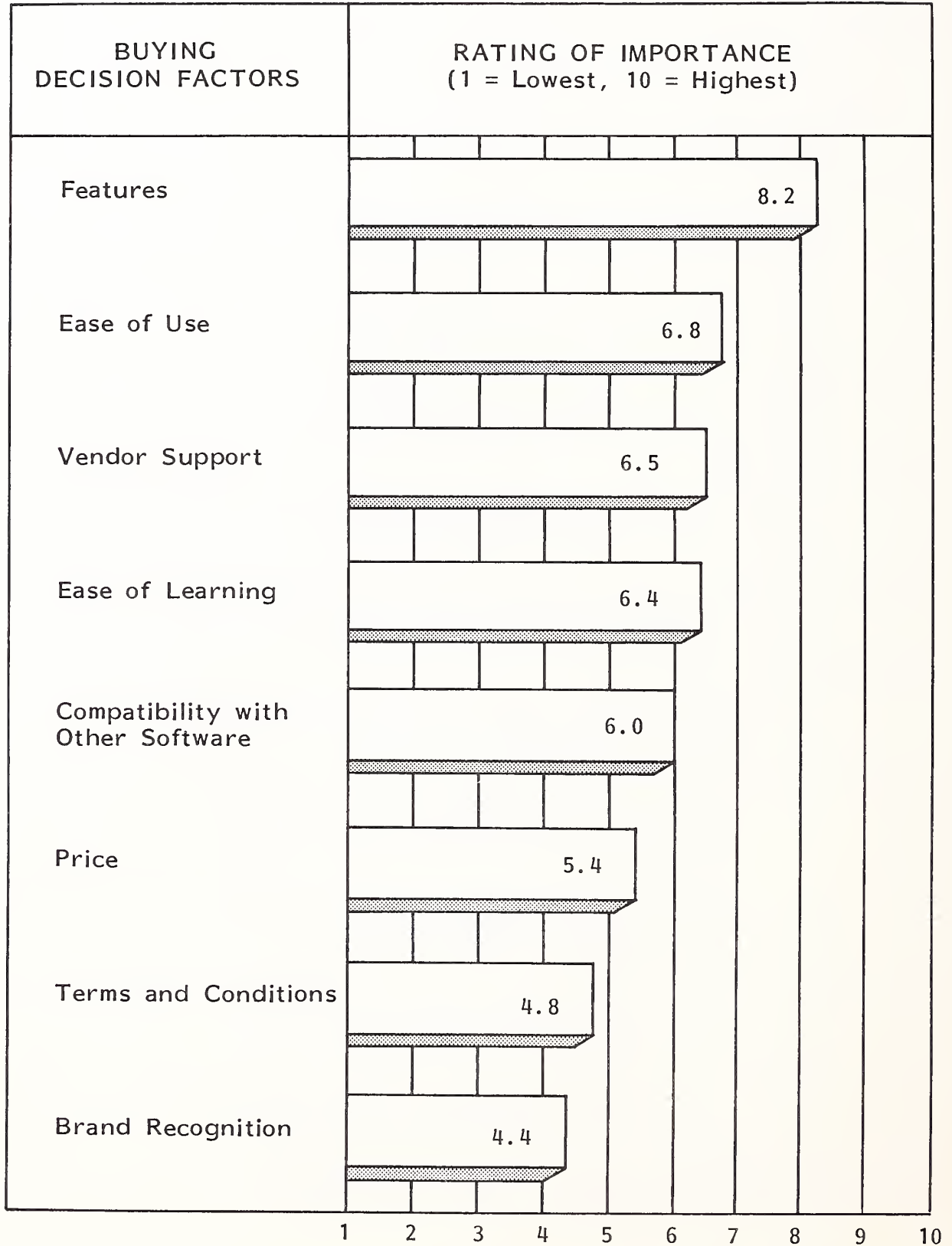


EXHIBIT III-4

END USERS' RATINGS OF THE FACTORS CONSIDERED MOST IMPORTANT IN BUYING SOFTWARE



- Vendor Reputation is important. The more software a company buys, the more important is vendor reputation. Once a company makes a sizable investment in a software package, it is also making an investment in the vendor.
- Software Features are important because capabilities need to meet applications requirements.
- Ease of Use depends on the market segment. There are some very sophisticated users in large corporations who will want the more complex products, but the majority of users require ease of use.
- Ease of Training is an important consideration for micro managers because many companies are doing their own training of end users.
- Interfaces to Other Software are necessary. Lotus 1-2-3 is the only product with the critical mass to have an impact. You have to live in the environment, and Lotus is the environment in large companies.
- Documentation is still important to some. Although the consensus seems to be that since everyone's documentation is bad it is not an important factor, some people are starting to insist on better documentation.
 - There is an inverse relationship between support and documentation. The higher the level of support provided, the less important is documentation.
- Security Features are not important yet because only single-user packages are commonplace today.
- Source Code Availability is generally only important if a company goes out of business. Most customers are only interested in source code if they think the

vendor will not survive; however, some customers want to be able to customize the programs for their own particular applications and so require the source code.

- Lack of Copy Protection is becoming a big issue. Most copy protection schemes hinder operation on a hard disk which is a significant problem in the Fortune 1000 where there are a sizable number of hard disk-based computers.
 - The impact on sales depends on the product. Copy protection does not seem to hurt Lotus 1-2-3, but Wordstar 2000 sales were hurt by a cumbersome copy protection scheme.
- The selection criteria which will increase in importance over time, as indicated by numerous vendors, micro managers, and end users, are listed in Exhibit V-4.
- There were several buying criteria which both vendors and micro managers indicated would definitely increase in importance. These are shown in Exhibit III-5.

C. SOFTWARE USAGE NEEDS

- End users were asked to rate the problems that they were experiencing with microcomputer software; the results are shown in Exhibit III-6. The survey results indicate that the primary demand from users in large corporations is for the software packages they use to be compatible with each other.
- Micro managers and end users are sometimes at odds as to what is most important to them when selecting and using software. These points of contention are shown in Exhibit III-7. Consequently, vendors must take these sometimes conflicting needs into account when developing and selling software.

EXHIBIT III-5

BUYING CRITERIA WHICH WILL INCREASE IN IMPORTANCE

- LAN Versions Available
- Site License Availability
- Micro-Mainframe Link Availability
- Copy Protection Removal
- Ability to Interface with Other Software
- Security Features Available

EXHIBIT III-6

USERS' MICROCOMPUTER SOFTWARE PROBLEMS

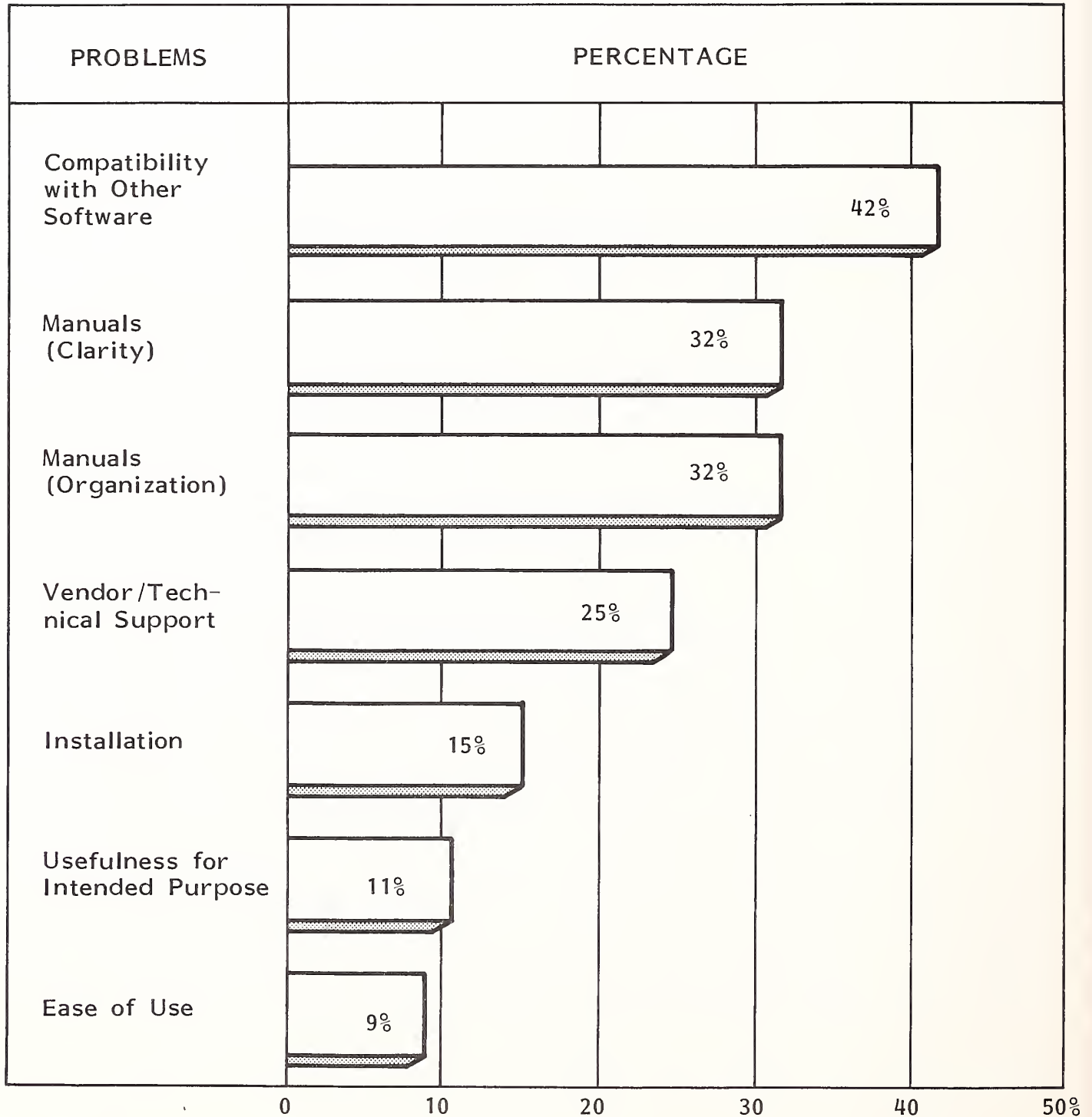


EXHIBIT III-7

I.S. DEPARTMENT VERSUS END-USER NEEDS
FOR MICROCOMPUTER SOFTWARE

I.S. DEPARTMENT

- Fits into Existing Computer Environment
- Ease of Training
- Standardization of Software Used
- Protect Mainframe Access

END USER

- Provides Solutions to Business Problems
- Ease of Use
- Flexibility in Choosing Software Used
- Obtain Mainframe Access

- Recently, two national groups have been organized to represent corporate microcomputer user needs: the MMA (Microcomputer Managers Association) and TASC (Technology Assessment through Strategic Cooperation). These two groups, made up primarily of micro managers in large corporations, hope to provide a forum in which corporate users and vendors can negotiate solutions to problems such as site licensing, copy protection, and software upgrade policies.
 - The MMA has released a list of needs for using micro software in their corporations, shown in Exhibit III-8. While this list was compiled with a site license in mind, these needs are relevant to other licensing agreements for software use as well.
- Large corporations have made a sizable investment in microcomputer hardware and software. Getting the most effective use from this significant investment has become a question not of hardware but of software management. When multiplied by the thousands, downtime due to poorly designed software programs, limited program compatibility, confusing documentation, and spotty training can turn out to be costly indeed.
- Customers who make large investments in a particular product tend to be more demanding regarding support and also future product developments. Many large corporations are interested in working with vendors of products on which they have standardized to ensure that future releases meet their needs.

D. SOFTWARE PRODUCT NEEDS

- Micro managers were interviewed to determine what improvements they desired in microcomputer software. The most frequent responses are listed in Exhibit III-9. These include:

EXHIBIT III-8

NEEDS EXPRESSED BY MICRO MANAGERS ASSOCIATION FOR AN IDEAL SITE LICENSE

- The right to modify software for internal use, including serialization and the embedding of employee identification numbers to help MMA members keep track of software.
- The right to incorporate the vendor's software into a package that the firm is using internally.
- The right to receive regular notification of enhancements, service, product bugs and fixes.
- The right to have source code held in escrow to protect the user in case the vendor goes bankrupt.
- The right to documentation updates for all users on-site.
- An end to copy protection for software sold to corporations.

EXHIBIT III-9

IMPROVEMENTS WANTED IN MICRO SOFTWARE

(Most Frequent Responses to Survey)

- Better Documentation
- Support of Laser Printers
- Increased Power and Ease of Use
- More Timely Response From Customer Support
- Improve User Interface Via Icon-Oriented Software
- Multi-User Versions of DBMS
- File Structure Standards
- Better Micro-Mainframe Connections

- Better documentation. One respondent remarked, "Currently, documentation addresses one of two audiences--either very technical or it's all things to all people. Vendors should come up with two versions of the manual--one that is easy to use and one that is more technical."
- Support of laser printers. Most current packages do not support laser printers; new device drivers need to be added to the software. Users want to be able to take advantage of the flexibility a laser printer provides. Laser printers are becoming increasingly popular in corporations, especially for in-house publishing.
- Increased power and ease of use. Respondents, naturally enough, desired that the product's ease of use be increased along with its power so that it is suitable for both power users and beginners.
- More timely response for customer support. Micro managers are responsible for supporting large numbers of end users and they are insistent upon receiving preferential treatment from vendors on those occasions when they need support. Micro managers usually provide the majority of support within their company so they feel justified in demanding better support from the vendor.
- Improved user interface via icon-oriented software. The awareness of the ease of use of software developed for the Macintosh is creating a demand of equivalent software on the IBM PC.
- Multi-user versions of data base management systems. These are discussed in Chapter VII.
- File structure standards so that data can be shared among other programs.

- Better micro-mainframe connections. Users want links of a universal nature; that is, ones that can access different types of mainframe data bases and are transparent to the user. Numerous respondents requested the capability to download mainframe extracts to hard disks on a network instead of connecting all of the PCs directly to the mainframe.
- The micro managers were also asked what features were missing in micro software. The most popular answers are shown in Exhibit III-10.
- User interface needs for micro software users are listed in Exhibit III-11.
 - Many corporate users would like to be able to customize a package to tailor the product to specific uses.
 - Micro managers would like to take a standard program and set up their own macros, prompts, menus, and help screens. This would simplify complex software for the occasional user and thereby increase the productivity of, for example, a business manager by providing for the consolidation of information from a number of files created by other people without using complex commands.
 - As users become more experienced, they want the ability to bypass the menus and use commands in order to speed up their program use. Friendly menus and prompts can prove to be a hindrance once a user is proficient with the program.
 - Products for this market should have a hierarchical interface-- one for new users and one for experienced users. This way the product will have greater appeal to corporate buyers because it will be appropriate for a wide range of users. Flexibility is the

EXHIBIT III-10

FEATURES MISSING IN MICRO SOFTWARE (Most Frequent Responses to Survey)

- **Consistent User Interface Across All Products**
- **Better Communications Between Software Packages**
- **Generic Micro-Mainframe Links**
- **Expandability Features to Allow for Upgrades**
- **More Support for Peripheral Devices**
- **Portability (System Independence of Software)**

EXHIBIT III-11

USER INTERFACE NEEDS

- **Should Be Able to Be Customized**
- **Experienced Users Need to be Able to Bypass Menus**
- **Supporting "Windows" Will Become Important**
- **"Push Button" Approach to Data Inquiry and Analyses**

key, enabling users to choose the interface that is right for them.

- A high quality, bit-mapped graphic interface is the wave of the future. Microsoft Windows and the anticipated release of IBM's Topview are the leading examples of this type of interface. However, because of hardware limitations and a dearth of packages that are written to work with them, it will take some time before these operating environment products become widely used in corporations. Consequently, it is not important to support Topview or Windows at this point, but Microsoft Windows will be the user interface of choice on the IBM AT in the next two years. For additional information on operating environments, please see the report entitled The New Generation of Integrated Software.
- Many users would like an interface that employs a "push button" approach to data inquiry and analysis. This approach would effectively eliminate the use of the keyboard, replacing it with a mouse or light pen that would be used to point at menus, building blocks, and icons on the screen in order to select the information desired. Metaphor is providing workstations and software that provides for this; however, these systems are currently very expensive.
- Micro managers were also asked what types of new products that they wanted. The most frequent responses are listed in Exhibit III-12.

EXHIBIT III-12

TYPES OF NEW PRODUCTS WANTED (Most Frequent Responses to Survey)

- Phone/Computer Integration
- AI Package That Determines What Needs to be Done
- Better Project Management Software
- More Freeform Data Bases
- Multi-User Lotus 1-2-3
- Downsized Versions of Mainframe Packages
- Better Presentation Graphics Products
- System Development Productivity Aids
- Speech Recognition Capability
- Improved Thought Processors
- Multi-User DBMS

IV SPREADSHEETS

IV SPREADSHEETS

A. INTRODUCTION TO SPREADSHEETS

- There are at least two types of spreadsheet users, as shown in Exhibit IV-1. These two categories have had most of their needs met by one package--Lotus 1-2-3. One of the major reasons for this product's success is that a company could standardize on the product knowing that it would meet the needs of the majority of its users, both beginners and advanced.
- As users have become more experienced with spreadsheets, they have started to encounter problems. Typically, those users who have reached the upper limits of a product such as Lotus 1-2-3 and desire to do more sophisticated analyses have had to make a significant investment in time to learn the much more difficult financial modeling languages. Most have not been willing to make the transition.
- A very critical factor working in Lotus 1-2-3's favor is that it has built up a critical mass of users in large corporations. It is no longer a powerful tool for an individual, but instead a powerful tool for the company because with it information can be shared.

EXHIBIT IV-1

CATEGORIES OF SPREADSHEET USERS

TYPES	DESCRIPTION	PRODUCTS
Irregular User, i.e., Manager	Wants Results Quickly and Accurately	1-2-3; Multiplan; pfs: Plan
Power User, i.e., Financial Analyst	Wants More Power in Order to Build Ever More Complex Applications	1-2-3; Javelin; Financial Modeling Programs

B. PROBLEMS WITH SPREADSHEETS

- The major spreadsheet problems that are encountered most frequently in large corporations are shown in Exhibit IV-2.
- A spreadsheet model can be based on erroneous assumptions or formula errors. These errors can be compounded as the spreadsheet grows.
- Analysts are slowly awakening to the dangers of relying too heavily on spreadsheets.
- Users can be so impressed with the output that they overlook questioning the quality of the analysis.
- The problems with spreadsheets are exacerbated by the following factors:
 - If co-workers exchange spreadsheet templates, errors in a template can be perpetuated throughout a company. If the person who developed the model leaves, it will be difficult for others to understand how the model works.
 - Spreadsheet dangers are magnified if users exchange templates and data. Mistakes can occur when one person tries to adapt a spreadsheet built by another, perhaps without fully understanding the model's structure.
 - Extended memory which allows for the creation of even larger and more complicated spreadsheets also increases the possibility of errors that are more difficult to locate.
- Companies are trying to share information about specific applications developed by other employees. Some companies maintain an application library containing program files and documentation of financial models.

EXHIBIT IV-2

PROBLEMS WITH SPREADSHEETS

- **Errors are Easy to Make, Yet Difficult to Locate**
- **Spreadsheet Model Logic is Hard to Follow**
- **It is Hard to Communicate Results to Others**
- **It is Hard to Change the Model Once it is Set Up**
- **It is Hard to Consolidate Separate Files**
- **Spreadsheets Have Greater Credibility and Implied Accuracy Than They Deserve**
- **It is Time-Consuming to Properly Document a Model**
- **It is Hard For a Second Person to Use Model**
- **Relations Must be Expressed in Complex Mathematical Formulas Rather than English**
- **Spreadsheets Become Confusing and Unreadable as They Grow in Size**

- But getting users to share information on their applications is not always easy. Workers are often too busy to properly document their applications for others.
- Without proper documentation, all work that goes into a program may be wasted because nobody can figure out how it works.

C. NEEDS OF SPREADSHEET USERS

- The needs of corporate spreadsheet users are shown in Exhibit IV-3. They include:
 - Consolidation of worksheets from different divisions, product lines, etc. In order to consolidate, users need to standardize on a system throughout the organization. Thus, individual analysis can be shared, maintained, and controlled.
 - Access to data residing on mainframes. Corporate users may want to work with data contained in programs that exist on the mainframe.
 - Sharing of spreadsheet models. In corporations, spreadsheet templates are often shared among a number of users. For example, a spreadsheet can be used to prepare a departmental budget; once created, the budget framework is stored in the form of a template so it can be shared with others for their use in preparing budgets.
 - An understanding of the reasoning behind recommendations. "What-if" analysis is no longer good enough--users want "how-come" analysis as well. The assumptions that underlie a model are not normally displayed on either the PC screen or the printout. That makes it easy for an invalid assumption to become embedded in the model.

EXHIBIT IV-3

NEEDS OF CORPORATE SPREADSHEET USERS

- **Consolidating Worksheets from Different Divisions, Product Lines, etc.**
- **Accessing Data Residing on Mainframes**
- **Sharing Spreadsheet Models**
- **Building Custom Templates**
- **Understanding the Reasoning Behind Recommendations**
- **Storing Large Worksheets on a Mainframe**
- **Networked Versions**
- **Audit Trail Capability**

- Storage of large worksheets on a mainframe. Having a spreadsheet stored on a mainframe facilitates the sharing of corporate data because the mainframe can serve as a large central depository of spreadsheet worksheets.
 - . Oracle Corporation has introduced SQL*CALC, which is a spreadsheet/DBMS that lets you use SQL routines within your spreadsheet and manipulate DBMS and spreadsheet data simultaneously. With this product a data base call or even an entire file can be embedded within a cell on a spreadsheet and the file then manipulated with spreadsheet functions.
 - . Mainframe-based spreadsheets are especially good at consolidation, which is a high priority among corporate users. Consolidation allows spreadsheets to be created by different groups, then merged into a departmental summary spreadsheet.
- Networked versions of spreadsheets. There is quite a demand for versions of 1-2-3 that can be shared on a network. In response to this demand, Lotus is developing a multi-user version of 1-2-3 that is based on a multi-user data base.
 - . In many cases, users will work on the same spreadsheet at the same time. With a networked version, several managers could each work on their own part of the departmental budget and then consolidate their results.
 - . However, current spreadsheet products are ill-suited to being networked because it is difficult to share spreadsheets developed by another person. The assumption embedded in a spreadsheet are sometimes interpreted differently by different users, leading to erroneous results in their work.

- . Because of these problems in sharing and communicating spreadsheet models and results, networked spreadsheets only compound the problems.
- Audit trail capability. An audit trail provides a means of identifying changes made to data files or actions taken during the processing of data.

D. PROBLEMS MANAGERS HAVE WITH SPREADSHEETS

- Managers in large corporations typically do not use spreadsheets; instead, they delegate the computer work. Many feel that their job is to review computer output, not to operate the machines. Thus, managers frequently depend on the results of a spreadsheet analysis prepared by their staff. Consequently, managers of spreadsheet users have their own set of needs and problems when it comes to spreadsheet use in their corporation, as listed in Exhibit IV-4. These include:
 - Need to make changes in someone else's spreadsheet. Managers will frequently want to look at alternatives based on changing certain assumptions or variables--changing finished reports on a spreadsheet is difficult to do.
 - Capturing management expertise, which is difficult to do.
- Managers have a need to impart their management understanding about the business to an analyst who then builds realistic budgets, forecasts, and projections. They do not want the management team to be separated from the people using the computers.

EXHIBIT IV-4

PROBLEMS MANAGERS HAVE WITH SPREADSHEETS

- **Need To Make Changes in Someone Else's Analysis**
- **Capturing Management Expertise is Difficult**
- **Need to Make Decisions with Confidence, But Have Little Faith in the Validity of Spreadsheet Results**
- **Difficult For a Manager to Review or Approve a Subordinate's Spreadsheet**

- With natural language and automatic documentation of the logic, an analyst on a keyboard can present a model to management and have a very meaningful discussions about the assumptions underlying the model. This allows the business knowledge of the manager, who may never touch the keyboard, to be properly integrated into the model.
- Managers need to make decisions with confidence, but have little faith in the validity of spreadsheet results. They are concerned, and rightfully so, about the validity of the logic and assumptions behind spreadsheet numbers.
- The process of validating a spreadsheet is time-consuming. Consequently, it is difficult for a manager to review, approve, or change a subordinate's spreadsheet. Verifying results is difficult for a manager who cannot read the underlying assumptions or find the calculations.
- The analysis process goes far beyond the use of the keyboard. Typically, the analysis will go from the staff to middle management to senior management and then back down to the staff level analyst for revision.
- This is a problem because there is a gap in the two centers of knowledge: the senior level people have all the business knowledge, yet the people using the computer are at the staff or analyst level. The senior level management has a need and a responsibility to impart their knowledge about the business to other parts of the organization, both to produce the best business analysis possible and to prepare younger members of the organization for management roles.
- Today's computer analysis tools do not address this issue because they only focus on calculating and formating numbers. What is needed is a technology that can move up and down the organization so that all levels of people and knowledge can understand it.

- Managers need a product that allows senior management to guide and understand the analysis because only then can their knowledge be communicated to the staff and transferred to the computer. With such a product the analysis can be shared among the people who must vitally understand the activity.
- The mechanical problems that have been reported in regard to spreadsheets are just the tip of the iceberg. Compounding these problems are errors in judgement because spreadsheets are unable to keep junior persons' judgements in line. A sizable number of spreadsheets would be proved invalid if checked by senior management who were able to identify the assumptions and relationships used in the model.
- Today, a manager in effect detaches himself from the analysis. Managers have to rely on faith that the staffer is doing an increasingly complex task correctly.
- Management would feel far more confident if they were more certain that the spreadsheet accurately reflected their understanding of the business. To make a good business decision, a manager has to know what underlies spreadsheet results.
 - Upper management relies on reports from subordinates, yet is skeptical of the numbers in a spreadsheet. They want meaningful analysis to go along with the numbers.
 - Senior managers are frustrated that they cannot get to the guts of the analysis. They are afraid that their organizations are misguided by the numbers.
 - If the senior management of a company is going to propose to a corporate board that the company launch a new product, merge with another firm, or reorganize its structure, the presenters have to be confident that their recommendations are based on accurate data.

E. FEATURES OF FINANCIAL MODELING PACKAGES

- Lotus users tend to get very enthusiastic using the spreadsheet tool and start to think that they can use this tool for all of their analyses. However, many financial models are too large and complex for spreadsheets like Lotus 1-2-3 to handle properly.
- Javelin, released in 1985, is a financial planning tool which is easier, faster, and more capable than a spreadsheet. It is especially appropriate for financial projections and other time-dependent analyses. The program is easy to use because the models are constructed by defining relationships rather than cells and it provides an audit trail to help the user find errors.
 - Javelin will carve out a niche in the spreadsheet market among sophisticated users who are reaching the upper bounds of Lotus 1-2-3's capabilities.
- The advantages Javelin and other financial modeling tools have over spreadsheets are listed in Exhibit IV-5.
- A financial modeling program affords several major advantages over a spreadsheet program. It is more readable, can accommodate larger data files, performs functions such as goal seeking, and makes it easier to consolidate files.
- Decision support software (DSS) programs are high-performance financial modeling and analysis tools that are used for such tasks as budget preparations, corporate reports (such as cash flow statements, balance sheets, and ratio analysis), consolidations, investment analysis, capital budgets, merger and acquisition analysis, and project appraisal.

EXHIBIT IV-5

ADVANTAGES OF NEW FINANCIAL MODELING PROGRAMS

- **Make Large Spreadsheets More Manageable**
- **Reduce Errors Made When Users Exchange Worksheets**
- **Make it Easier to Consolidate Files**
- **Are Easier to Modify**
- **Make it Easier to Demonstrate the Validity of the Model**
- **Make it Easier to Share and Present Results to Others Throughout the Company**
- **Help Management Participate in Analysis**
- **Give Management Confidence in Analysis and Plans**

- There is an important difference between spreadsheets and financial modeling programs--spreadsheets store mathematical and logical formulas along with data in columns and rows while financial modeling languages store formulas and data separately and accept queries in English-language statements.
 - Storing data and formulas separately makes it easier to view and approve the logical assumptions and formulas that are behind the model's results. This procedure also promotes the assembly of large and complex models that include consolidations from a number of corporate divisions.
 - Decision support software contains sophisticated statistical functions not found in spreadsheet software, such as multiple regression, linear regression, and least-mean square and goal-seeking routines that economists and financial planners look for when constructing complex financial models.
- DSS products are for people who have outgrown their spreadsheets or need access to mainframe data files. Although DSS packages and financial modeling programs have a very solid niche in the Fortune 1000, these sophisticated products will never take over the market because although they may provide more power, the majority of computer users have become very attached to products such as Lotus 1-2-3. In a corporation, high value is placed on being able to share information and to access other people's information. This is accomplished much more readily if everyone has the same program; i.e., Lotus 1-2-3.

F. FUTURE TRENDS IN SPREADSHEETS

- Over the past few years the sophistication of spreadsheet users has increased tremendously, but the spreadsheet itself has undergone little improvement.

However, significant improvements in the basic spreadsheet were released in the second half of 1985 (Javelin, HAL), and this trend will continue in earnest in 1986.

- The major trends and developments in spreadsheets are shown in Exhibit IV-6. These include:
 - Incorporation of financial modeling features, such as using English instead of cell references to define relationships, storing data and formulas separately, and incorporating sophisticated modeling functions like multiple regression. These new packages will retain the ease of use of a spreadsheet, but offer greater functionality, flexibility, and sophistication.
 - More graphically oriented, primarily to simplify the user interface. This trend is best exemplified by the spreadsheets being developed for the Macintosh, such as Excel from Microsoft and Crunch from Paladian Software.
 - Incorporation of voice annotation of text. Users will be able to add a voice-over that will become an integral part of the document. The voice-annotated document would then be forwarded through an SNA network, much as a text document is now, and viewed by a recipient at any other appropriately equipped workstation. This would simplify documenting spreadsheets.
 - Expert system combined with spreadsheet. An example is a software system that would help with the preparation of a five-year business plan. Besides computing the figures, the software would suggest partial and best case scenarios and strategies based on the extensive knowledge stored in the data base of the expert system. Examples of the information to be stored include guidelines for business plans, information on mergers, and a history of product life cycles. The

EXHIBIT IV-6

TRENDS IN SPREADSHEETS

- **Incorporation of Financial Modeling Features**
- **More Graphically Oriented**
- **Incorporation of Voice Annotation of Text**
- **Expert System Combined With Spreadsheet**
- **Natural Language Interface**
- **Voice Recognition Systems**
- **Better Integration With Other Applications**
- **Context-Sensitive Help Screens**

program would be able to associate this information with the data in the spreadsheet.

- . A drawback to the implementation of this is that expert systems typically capture one person's decision-making process and focus on one particular application area. The problem is that business situations are unique and must depend not on an outside expert but on the knowledge and experience of the business person doing the analysis.
- Natural language interface. HAL from GNP Software (recently purchased by Lotus) is one of the best examples of a natural language interface. HAL translates every Lotus command into English words.
 - . Along with simplifying 1-2-3 for novice users, this software is the first application of natural language that actually speeds up operation of the program for the experienced user.
 - . Natural language interfaces currently fit spreadsheets more easily than data base managers. A spreadsheet is a more contained environment than a data base; consequently, it's easier to define all the words that can be used and their context.
 - . Not even experienced users remember all of the commands all the time. The technology in HAL provides a way for the occasionally used commands and utilities to be accessed more easily.
 - . The software industry is going to have to embrace natural language if it is to penetrate the large number of people who do not know how to use a computer.

- Voice recognition systems. Managers do not want to type, so a system that would allow them to input data and changes to a spreadsheet via voice would ease things considerably.
 - . In addition, speech output, which is found in Super Crunch, can be useful for proofreading or prompting the user for an action.
- Better integration with other applications, such as word processing, graphics, and DBMSs.
- Context-sensitive help screens. With the advent of expanded memory, the context-sensitive help screens, as found in HAL, will become very successful. HAL promises a breakthrough in context-sensitive help screens by offering examples on screen of how the user can proceed in any situation.

V NETWORKED APPLICATIONS

V NETWORKED APPLICATIONS

A. CONNECTIVITY NEEDS

- Personal computing is evolving beyond its original role of performing stand-alone computing. The focus of the next wave of personal computers will be on connecting them, easing the process of getting information from the main-frame and exchanging information over a local area network.
- The connectivity needs of large corporations for microcomputer software are listed in Exhibit V-1.
- Local area networks represent the obvious next step for large corporations to take in making their machines more productive and more useful.
 - Companies are standardizing on hardware and software because any incompatibilities would hamper efforts to move users onto LANs.
 - In many companies, the PC will emerge as a multipurpose terminal tied to departmental minicomputers which in turn will be tied to the corporate data bases. In such a setup, the PCs would be used for spreadsheets and local data base work, yet have transparent connections through information directories to departmental and corporate data.

EXHIBIT V-1

CORPORATE CONNECTIVITY NEEDS

- **Communications Standards to Handle Document Interchange**

- **Inexpensive and Easy-to-Install LANs**

- **Interfaces to Mainframe Software**

- **Access to Mainframe Data**

- **Ability to Connect to Corporate Network**

- **Access to On-Line Data Bases**

- In large corporations, standalone software will decline in popularity--most future applications will be multi-user. As microcomputers become workstations tied into the larger computing environment, products will either tie into or reside on mainframes, minicomputers, and file servers.
- In most companies there is a big demand for access to mainframe data. Users need something easier and more broadbased than the proprietary systems available today. There is a clear need for a product that allows PCs to link with different types of mainframes with different applications. A generic link that allows a user to access all types of data is a daunting challenge, but should not prove to be impossible.
 - Users would like to store information on the mainframe and download it as necessary to PCs for manipulation. Putting PC software on the mainframe and downloading it to the PC is desired by some because it eliminates backup problems, ensures that everyone has the same version of the PC software, and lowers support costs.
 - The three important features for future links are that they be generic, have uploading capabilities, and have adequate security.
- Companies will prefer growing into a large network one PC at a time rather than committing to a complete multi-user system. Since none of the multi-user systems vendors have developed the perfect hardware and software solution yet, these multi-user system products will not dominate the market. Corporate purchasers want to retain the flexibility to purchase the best available products from different vendors rather than being tied into proprietary system.
- Connectivity rather than compatibility is the key. What users really want to do is to share data, not applications. People will want their computers to talk to Lotus, for example, not to run it.

B. FUTURE TRENDS IN GROUP PRODUCTIVITY TOOLS

- The current generation of products has gone a long way toward boosting individual productivity. The next generation of products will focus on improving the productivity of groups of people by helping them work together better.
- Future products should be designed for use by work groups and not individuals because the majority of people in large corporations work in groups. Group productivity applications that are being developed for the corporate marketplace are shown in Exhibit V-2. These include:
 - Electronic messaging, similar to electronic mail, whereby users can exchange messages electronically. An interesting variation to basic electronic messaging systems is seen in two products being developed by Network Technologies called DocuForum and eForum. These products allow a number of users to get together and co-edit a document or contribute electronic mail comments to a roundtable discussion.
 - Electronic bulletin boards, useful for listing information that is of interest to a number of people.
 - Shared phone directories which can be viewed as electronic rolodexes that allow groups of users to share their lists of contacts.
 - Global calendars which automatically find open times on a group's on-line calendar in order to schedule meetings.
 - Group contribution to a single document or project. What is needed is a program that will make it easy to coordinate the work of a team of people contributing to the same document.

EXHIBIT V-2

NETWORKED APPLICATIONS

- **Electronic Messaging**
- **Electronic Bulletin Board**
- **Shared Phone Directories**
- **Global Calendar**
- **Shared Access to Data Bases**
- **Group Contribution to a Single Document or Project**
- **Combined Computer Conferencing and Outliner**
- **Process Management**

- Data generated by users tends to get shared among users or departments, but often not in an efficient manner. These products will not automate but rather support or facilitate group activity.
 - An example would be a product to help a group of people prepare a budget. Typically, many people contribute to the budget. Rather than have each person work on their part of the budget separately with their own program and worry about consolidating the information later, a better solution is to coordinate the activity initially. This can be accomplished by giving each person on the network a part of the program so that they are sharing the program, not just the data, and designing the program so that all of the pieces come together naturally and easily.
- Combined computer conferencing and outliner. The benefits of such a program are:
 - Outliner tools would become much more powerful by being able to capture many people's thoughts at the formative stage of analysis and decision making.
 - Members of a work group could work on a common project, adding pieces to the same module or linking separately prepared modules.
- Process management. FCMC in Denver is developing a product named Staffware that provides process management rather than project management. Staffware controls the flow of work and the disposition of tasks among a group of users on a network. The program can move electronic forms from one station to another on the network; users can

be asked to fill out these forms and the sender can instruct the network to give users daily gentle reminders to complete the work. If the recipient does not respond within a set period, the system can alert the sender.

- The benefits to the users of these group productivity tools are shown in Exhibit V-3.
- The application requirements of departments and work groups in large companies are largely unmet.
- Lotus is aware of this and is actively addressing these needs. According to Mitch Kapor, "A . . . problem is when you have groups of people working on projects over an extended period of time and they build up a heterogenous set of documents. For instance, in developing a software project there are specifications, design papers, weekly progress reports, schedules, correspondence, marketing plans, test site reports, bug reports, and other kinds of status reports. These documents are originated by many different people. There is no effective way of coordinating, integrating, and querying a heterogenous set of documents on related issues."
- Improving the effectiveness of the work group is part of many vendors' strategies because in all businesses people work together and little has been done to automate the time users spend together.
 - One caveat to developing these applications is that it is likely that the leading multi-user applications are going to be sold by the vendors of the leading single-user applications because customers are not going to want to retrain their users on a completely new package. So vendors who are currently not the leaders will have to develop multi-user products for new applications categories.
 - Also, multi-user systems require much more forethought and expertise on the part of designers.

EXHIBIT V-3

BENEFITS OF GROUP PRODUCTIVITY TOOLS

- **Improved Communications**
- **Increased Efficiency of Group Projects**
- **Reduced Duplication of Effort**

VI WORD PROCESSING

VI WORD PROCESSING

A. NEEDS OF WORD PROCESSING USERS

- Word processing users have the largest list of desirable product features of the major microcomputer software categories. There are no programs today that have every potential feature because if they did the program would be too large and unmanageable for existing microcomputers. Unfortunately for developers, customers often insist on a long list of features even if they do not use them all. Moreover, users want these features and functions, but not at a higher price.

- This long list of desired new features that word processing users in large corporations are asking for is shown in Exhibit VI-1. Features include:
 - Line and box drawing for drawing organizational charts.

 - Multi-column layout capability for in-house publishing.

 - Multiple font capability, a must for handling laser printers.

 - Integrating graphics with text, another capability driven by corporate users' interest in in-house publishing.

EXHIBIT VI-I

NEW FEATURES DESIRED IN WORD PROCESSING PROGRAMS

- Line and Box Drawing
- Better Mail Merge
- Table of Contents Generation
- Index Generation
- Multi-Column Layout
- Automatic Hyphenation
- Outlining Features
- Spelling Checker
- Multiple Font Capability
- Integrate Graphics with Text
- Better Cut and Paste Capabilities
- Support for Document Exchange
- Support for Laser Printers

- Cut-and-paste capability for pulling things from other programs and cutting and pasting them into documents being created with the word processor.
- The needs of corporate word processing users are listed in Exhibit VI-2.
- Traditionally, word processing programs were designed to meet the needs of serious typists. Over the last two years this has changed considerably. The market has been segmented into three markets:
 - Serious writers and typists, such as secretaries, word processors, and writers.
 - Analysts who spend several hours each day writing and editing, such as consultants, managers, and professionals.
 - Occasional users.
- To meet the needs of these users, leading companies have released several versions of their programs. For example, Multimate and MicroPro are offering downsized versions of their premier products, which provide greater ease of use at the sacrifice of some functionality but without sacrificing compatibility with the higher-end package used to produce final documents.
- Many corporations desire to have the same word processor on every size computer. Consequently, they would like a package to run on micros, minis, and, to a lesser extent, mainframes. These companies are looking for a "one-size-fits-all" word processing package to fulfill the needs of the entire company.
 - However, since word processing packages are more subject to personal preference than any other package, IS departments are often forced to support more packages than they wish.

EXHIBIT VI-2

NEEDS OF CORPORATE WORD PROCESSOR USERS

- **Avoid Retraining**
- **DCA Compatability**
- **Wang Compatability**
- **Avoid Re-Keying Data**
- **Multi-User Versions**

- Because large companies usually already have a sizable number of dedicated word processing machines when they make the switchover to personal computers, avoiding retraining the former word processing users on the new package is a major issue. This factor is the primary reason for the success of Multimate, for Multimate emulated the Wang word processor, allowing former Wang users to start using Multimate immediately.
- Users are looking into ways in which word processing can better fit into the overall corporate computing environment. Compatibility with larger computers and dedicated word processing equipment is a central issue in corporate word processing.
 - As microcomputers become linked as part of larger business networks, corporations need word processing software that can communicate with the other software, hardware, and peripherals in the system.
- The key to compatibility among IBM products is IBM's document interchange standard, DIA/DCA (Document Interchange Architecture/Document Content Architecture). This standard was designed for the interchange of text between IBM systems, including mainframes and minicomputers. Numerous personal computer software vendors are already supporting DCA, including Lifetree Software, Satellite Software International, Multimate, MicroPro, and Microsoft.
- Actually, not many corporate customers are currently using DCA, but they realize it will be a standard. Consequently, in many cases DCA compatibility is a requirement because it allows the vendor to be considered in the evaluation.
- The problems with implementing DCA compatibility are:
 - Supporting DCA compatibility is extremely complex.

- There is a wide variance in the quality of implementation of DCA compatibility.
- DCA installations are not present in sufficient numbers yet.
- Wang compatibility remains important. Wang is the leader in the installed base of dedicated word processing systems.
- The need for document interchange goes beyond the simple passing of documents from one word processor to another. Instead, the need is for cleaner integration between word processors and other packages such as spreadsheets.
- MicroPro will release a transfer program for converting IBM mainframe-generated DCA files. This will allow users to transfer Wordstar, Wordstar 2000, and Easy documents between IBM mainframes.
- The DCA conversion program will provide users with bidirectional, revisable-form DCA, which means that transferred documents can easily be reviewed by a user of DCA software.
- IBM's strategy with the DisplayWrite series and their office automation products is to offer corporate users a common user interface and data interchange systems for all its computers, reducing training time and simplifying the transfer of documents among otherwise incompatible systems.
- Multimate (recently acquired by Ashton-Tate) is developing a mainframe version of its Multimate product that will be oriented toward occasional word processing users who want IBM PROFS electronic mail facilities but do not want to use DisplayWrite or IBM's Xedit or Script text editors. The importance of the product is not in the amount of mainframe revenues it will generate, but rather in the associated business the company hopes to reap by convincing corporations to standardize on Multimate products.

B. FUTURE TRENDS IN WORD PROCESSING

- Future trends in word processing are listed in Exhibit VI-3. They include:
 - CD-ROMs which will make it possible for users to have instant access to spelling checkers, thesauruses, dictionaries, and other reference materials, all of which can be contained on one disk. This capability will be provided by newly developed indexing and retrieval systems such as the engine underlying Borland's Turbo Lightning.
 - Video, voice, and graphics integrated with text would be of use primarily for presentations, conferencing, and communications.
 - Idea processors. The next generation of products will actually help create documents by marshalling the ideas, jottings, and reference material people use when they write.
 - Hypertext, a new word processing concept being developed at Brown University. Hypertext would not be limited to a linear writing structure but would provide an unstructured writing environment. That is, words could be linked to other words or to references to other pieces of information. There would be multiple levels of information that could be connected to a piece of text.
 - Multi-user versions. Networked versions of word processing packages will need to be developed. It is easier for word processing packages to be tailored for a network than it is for a spreadsheet or a data base since the word processing vendor does not have the problems of file and record locking.

EXHIBIT VI-3

FUTURE TRENDS IN WORD PROCESSING

- **CD-ROMs**
- **Video, Voice, and Graphics Integrated with Text**
- **Idea Processors**
- **Hypertext**
- **Multi-User Versions**

VII DBMS

VII DBMS

A. NEEDS OF DBMS USERS

- Corporate users of micro data base management systems have extensive needs, as listed in Exhibit VII-1. They include:
 - Remove the reliance on a computer specialist. There are not enough computer specialists to meet the demand for application development. Consequently, there is a need to do away with the traditional requirement of having an "expert" assist in developing the data base application. One method of doing this is to provide easy-to-use application generators that allow novice users to build applications without programming.
 - Easier ways to get information out of data bases. Artificial intelligence techniques that provide for easier extraction will be welcomed by users. Previously, users had to know not only what they wanted to extract from a data base, but how to go about doing it. Artificial intelligence techniques will help users in both areas, thus allowing less sophisticated users to use data bases.
 - Artificial intelligence-assisted DBMS programs will blossom with the next generation of personal computers. Eventually, users will interact with their data bases by voice.

EXHIBIT VII-I

DATA BASE MANAGEMENT SYSTEM USER NEEDS

- Remove the Reliance on Computer Specialist
- Easier Ways to Get Information from Data Bases
- Programs That Grow with the User
- Enhancements to Current Products
- Programmers' Ability to Prototype a Software Solution Quickly
- Faster Querying and Sorting
- Integration with Other Applications
- Help for Novice Users in Learning How to Design a Data Base

- Programs that grow with the user as the user gains computing experience. Successful products are those that not only allow a user to get started using a program quickly, but also provide power in reserve as the user gains experience.
- Enhancements to current products. Users want a clear, upwardly compatible product development path to secure their application development investment.
- Programmers' ability to prototype a software solution quickly. Application developers want to put something on the screen for the client to see. Once the prototype is set up, the client can adjust it and the developer can fill in the rest of the application.
- Programs to meet the needs of computer specialists as well as average users. Until Paradox was released, no data base product had emerged that met the needs of the entire spectrum of users. A widely successful product must be so easy to use that it makes data base management accessible to the masses, and simultaneously powerful enough to program sophisticated, turnkey applications. This is the market Ansa, with Paradox, is planning to satisfy.
- Faster querying and sorting provides clear productivity improvements.
- Integration with other applications, such as spreadsheets, graphics, and statistics, to provide devices for analyzing and presenting information contained in or calculated from a shared data base.
- SQL capabilities for computer professionals. In the mainframe data base environment, SQL (Structured Query Language) is a de facto standard for querying data bases. Offering SQL on a microcomputer data base increases the familiarity level and thus the productivity of programmers already familiar with mainframe data bases.

- Help for novice users in learning how to design a data base. It is not just that data base products are hard to use, but that the concepts related to data bases are difficult, too. Many people do not know how to structure and store information so it can be stored on a computer--nor do they know how to design a data base. Users need a data base product that helps them set up the design of a data base.
- Paradox from Ansa, released in the second half of 1985, is attractive because a micro manager can use it to supply the entire range of end users from novice to experienced, cutting support and training costs. Paradox is both easy to use and fully featured.
 - Paradox allows novice data base users to set up a data base application, something that is not possible with dBASE II. This allows the user to satisfy his/her needs better than if a programmer designed the data base. Paradox is also very interactive, much the same way Lotus 1-2-3 is. It is so fast and flexible that the user can do "what-if" types of analyses with the data base, similar to "what-if" analyses done on a spreadsheet.
- Users would like a quick way to discover their data base needs without having to go through a lot of training, trial and error, and consulting costs.
- The importance of ease of use in a data base manager depends on the needs of the user. To the novice, advanced features that are hard to understand will go unused. A programmer or power user, however, will not only understand the basics but will demand the more advanced features.
 - In the middle stands the average business user who wants the functions of higher-end products but the ease of use of lower-end products.

B. FUTURE TRENDS IN DBMS

- Features that will be included in new data base management products are listed in Exhibit VII-2.

EXHIBIT VII-2

FEATURES OF NEW DATA BASE PRODUCTS

- **Import Mainframe Information**
- **Manipulation of Freeform Text and Graphics**
- **Easy-to-Use Interface that Allows Novices to do Sophisticated Queries**
- **File and Record Locking for Multi-User Access**
- **Security at all Levels**
- **Greater Interactivity**
- **Graphically-Oriented User Interface**
- **SQL Capabilities for the DP Environment**

VIII ELECTRONIC MAIL

VIII ELECTRONIC MAIL

- Personal computer-based electronic mail which allows users of personal computers to communicate over local area networks has been the single most attractive dedicated software for networks. Electronic mail speeds up the communications process, thereby increasing everyday productivity.
- Electronic mail will develop slowly as the number of workstations on people's desks increases; it will not have much of an impact until there are more workstations installed. Applications such as electronic mail and electronic calendaring are not of much value if the person you are trying to reach does not have a microcomputer.
- Features that are currently being included with micro-based electronic mail systems are shown in Exhibit VIII-1. However, no one product incorporates all of these features, which include:
 - Voice store and forwarding. On some systems such as IBM's mail program, a user can only send mail to users who are active on the network at the time. A voice store-and-forward system will allow mail to be stored for inactive users at the file server to be read at the user's convenience.
 - Integration of graphics and text. Users need ways to easily transmit entire pages of text and business graphics to make the personal computer a visual aid in long distance conferences.

EXHIBIT VIII-I

DEVELOPMENTS IN MICRO-BASED ELECTRONIC MAIL

- **Voice Store and Forwarding**
- **Integration of Voice and Text**
- **Integration of Graphics and Text**
- **Gateways to Connect to Other In-house Systems and to External Systems**
- **Capability of Transferring Files and Documents**
- **Read and Respond to Incoming Messages Without Exiting the Current Application on the Screen**
- **Share Recalculable Spreadsheets**

- Gateways to connect to other in-house systems and to external systems. The future of electronic mail lies in systems that allow users to communicate with equipment from several vendors and at several locations.
- Capability of transferring files and documents from various applications to other users on the network, rather than being limited to sending electronic messages.
- Read and respond to incoming messages without exiting the current application on the screen. Most products (Network Courier from Consumer's Software is an exception) do not possess this capability, but it is clearly one of great convenience to the user.
- Share recalculable spreadsheets. This allows users to share their applications more fully, rather than merely sharing data which cannot be manipulated by the receiver.

IX ARTIFICIAL INTELLIGENCE

IX ARTIFICIAL INTELLIGENCE

A. FUTURE TRENDS IN ARTIFICIAL INTELLIGENCE

- Rather than being a product, artificial intelligence is a collection of technologies. Artificial intelligence techniques incorporated into software products will be used for a number of different applications, as shown in Exhibit IX-1. Techniques include:
 - Accessing corporate mainframe data bases. Retrieving data from mainframe data bases is difficult and frustrating for most users. The personal computer user may not even know what information is available there. With a natural language system a user would be able to query the data base much more easily and get the appropriate answers.
 - Helping users improve quality of work and make better decisions. Expert systems are being developed that advise users on best course of action to take.
 - Accessing data bases on CD-ROMs. A natural language front end will make accessing the vast amounts of data that can be stored on a CD much more easily accomplished.
 - Incorporation into existing business applications to make them more intelligent. Rather than trying to create all new applications to meet

EXHIBIT IX-1

FUTURE MICRO SOFTWARE ARTIFICIAL INTELLIGENCE TRENDS

- **Access to Corporate Mainframe Data Bases**
- **Improved Quality of Decision**
- **Access to Data Bases on CD-ROMs**
- **Improved User Interface**
- **Existing Business Applications Enhanced**
- **Software that Learns and Adapts to the User**

some hidden needs, it may be better to improve existing applications to make useful software also easy to use. An example would be a word processing package that had a knowledge base of the secretarial handbook and could advise on letter formats or report formats.

- Software that learns and adapts to the user. This more intuitive software is a possibility, but has been hampered by hardware limitations and the problems of creating "smart" software. These programs will adapt to users by remembering the commands and sequences that the user has taken. Examples of applications for "smarter" software include:
 - . If the user makes the same mistake more than once, the computer can prompt with a suggestion. This is similar to an intelligent error message.
 - . Expert systems that contain knowledge about the type of data or information that is meaningful to the user.
 - . Software that will track what the user does with the program, analyze actions, and start proposing solutions, such as report formats, shortcuts, etc.
 - . Software that will prevent users from deleting all of their files unintentionally.
 - . Software than can tailor itself to users' needs.
 - . Software that can install itself on the computer.
 - . The provision of automatic data backup.
 - . Software that tells the user what the options are for proceeding in the program.

- Another example of "smart" software is a product Lotus is currently developing for managers. Most managers spend more time manipulating words and concepts than crunching numbers. For them, the most important job is to organize the flow of ideas. They need a program that can automatically collect and categorize all the bits of information that they collect in a day.
 - These bits of information include a list of appointments, a list of things to do, the notes from a meeting, or something about who said he would do what and when.
- What is needed is a complete solution to the management of these loose bits of information. So far there have only been partial solutions.
- This software will primarily organize lists, ideas, notes, and schedules. The program will prioritize this clutter of information and determine in what order and in what form the user should handle the jobs.
- Voice recognition is another application of artificial intelligence.
 - Applications for voice recognition systems are listed in Exhibit IX-2.
 - However, the drawbacks to current voice recognition products are several. They are listed in Exhibit IX-3.

B. EXPERT SYSTEMS

- Expert system shells are programs that provide the framework that allows users to develop their own expert systems.
 - Characteristics of successful expert systems shells are listed in Exhibit IX-4. These are characteristics users desire even though presently no one product has them all.

EXHIBIT IX-2

APPLICATIONS FOR VOICE RECOGNITION SYSTEMS

- **People Sharing Spreadsheet Worksheets**
- **Executives Who Want to Dictate Changes to Word Processing Documents**
- **Adding Help Messages**
- **Explaining the Logic of a Model**
- **Explaining Error Messages**
- **For Data Entry of Numbers**

EXHIBIT IX-3

DRAWBACKS TO CURRENT VOICE RECOGNITION PRODUCTS

- **Can Only Understand a Limited Vocabulary**
- **Must be "Trained" to Understand Each User**
- **Voice Quality from Speech Synthesizers Remains Generally Poor**
- **High Cost of the Technology**
- **High Demands It Imposes on Memory**
- **Lack of Widespread Practical Applications**
- **Current Programs Were Not Written with Voice in Mind**

EXHIBIT IX-4

CHARACTERISTICS OF SUCCESSFUL EXPERT SYSTEM SHELLS

- **Must Interface with Existing Business Computer Systems**
- **Should Not Depend on LISP or Prolog**
- **Must Use Existing Hardware**
- **Should be Inexpensive**
- **Must be Easy to Use and Learn**
- **Should be Able to Handle "Fuzzy Reasoning"**
- **Must be Capable of Explaining the Reasoning Process Used**
- **Should be Able to Learn from Experience**

- It is a bit premature to be specific as to the roles expert systems will play for such workers as ordinary department managers. Right now, expert systems are limited to isolated cases in large corporations such as banks and oil companies.
 - Expert systems are aimed at finite problems. Examples might be evaluating an applicant's potential for a loan or sorting out the problems of a drilling rig. In such cases, the knowledge of a specific domain of expertise is codified. However, general business procedures are not that focused.
- What many businesses would like to see are expert systems that they can buy "off the shelf" and use at once. But, by definition, an expert system must contain knowledge unique to a specialized domain and the collected expertise of the firm that will be using it.
- There is a need to be able to link separate knowledge bases or expert systems. Currently, the knowledge and rules compiled in one expert system cannot be shared with another expert system. Once companies have developed a number of expert systems, they will need to develop an intelligent librarian to index the systems in order to be able to guide the person to where the relevant knowledge is.

X RECOMMENDATIONS

X RECOMMENDATIONS

- Users are starting to look at the second stage of computing--that of using the computer to provide better, not just faster, solutions. Users are beginning to master the computers that they have obtained over the past few years and are starting to look for new applications besides spreadsheets. So far the emphasis has been on doing with the machine what the user did on paper. Now users are looking for new things to do that were not always possible in the "pen and paper" age.
- Although there is limited opportunity to develop "blockbuster" products, there are certainly solid opportunities left in the market. The new opportunities that have the strongest appeal in large corporations are listed in Exhibit X-1. These include:
 - Multi-user data base management systems. While multi-user data base management systems are one of the key products corporate users are demanding, this market will be dominated by the current leading vendors, such as Ashton-Tate, Microrim, and Lotus. Competition in this market is increasing up as a number of major vendors (i.e., Lotus, Ashton-Tate, Software Publishing) have plans to release a multi-user data base management system in 1986.
 - However, because these new multi-user products should prove to be very popular, an opportunity exists to utilize these packages to develop multi-user vertical market applications that automate departmental routines.

EXHIBIT X-1

NEW OPPORTUNITIES IN MICRO SOFTWARE

- **Group Productivity Applications**
- **Multi-User Data Base Management Systems**
- **Artificial Intelligence Incorporated into Business Applications**
- **Generic Micro-Mainframe Links**
- **Text Indexing/Retrieval Systems**
- **Text Data Management Systems**
- **Downsized Versions of Mainframe Packages**
- **Tracking System to Evaluate Productivity of White Collar Workers**
- **Desktop Publishing**

- Text indexing/retrieval systems will allow the user to do a keyword search on all of the files that have been stored, retrieve the information, and index it.

- Turbo Lightning is another type of retrieval system that will stimulate the development of a number of memory-resident reference libraries that can look up text indexed to the word at the cursor.
 - . Turbo Lightning provides users with instant access to huge amounts of data. It uses special indexing and data-compression techniques so that searches are fast and huge amounts of data can be stored compactly. Turbo Lightning itself includes a dictionary and thesaurus; a variety of other reference materials in add-in modules are likely to appear soon, such as a fully indexed and on-line encyclopedia. Users in large corporations will also be able to store and access company information such as financial statements, employee records, and prices.

- Text data management systems are data bases that are capable of searching for and finding documents based on doing keyword searches. For example, a user will ask to find a document that was written within a certain time period that was sent to Sally in Personnel and dealt with the budget for 1985. The data base will be capable of searching the existing files and finding the document.
 - . AskSam, from Seaside Software, is a text-oriented data management program that permits freeform searches on a variety of textual information.

 - . As mass storage technology improves and text data bases grow in size, text data management systems software will likely grow into a major software category.

- Downsized versions of mainframe packages will become more popular as more powerful microcomputers are developed that are capable of running more robust versions of the mainframe package.
- A tracking system to evaluate the productivity of white collar workers is being developed by Pacesetter Software (Princeton, New Jersey). They have identified a need in large corporations to track the productivity of people in systems, research and development, human resources, and other knowledge- and worker-intensive areas.
- Desktop publishing has become a rapidly growing application in many corporations due to the proliferation of low-cost laser printers coupled with the development of sophisticated graphics software for microcomputers. This application is especially attractive to large corporations because of the great volume of information they publish.
- In addition to these products, other more specialized applications are likely to be developed for the Fortune 1000 market. Previously, vertical market applications for microcomputers were developed only for small- and medium-sized businesses. However, companies such as Software Publishing Corporation are developing specialized applications for the Fortune 1000.
 - Software Publishing, under the Harvard product family name, will be releasing several products in 1986 that will be targeted to the computer-competent mid-level manager in the Fortune 1000. These will be productivity tools for specific tasks, such as sales management, marketing management, job costing, and workflow control.
- When the 640K barrier is broken for program code (probably in the next year), developers will be able to write programs that consume large amounts of memory. These new products will incorporate AI, expert systems, and context-sensitive help screens and allow for easy-to-use software that adjusts to the skill level of the user.

- The real changes in the market will occur when IBM releases a high-end Intel 80386-based microcomputer which should be in 1987. This computer will offer both greatly increased memory and much greater processing speed to provide the necessary power to run these new applications.

- Recommendations are shown in Exhibit X-2. They include:
 - Offer easy-to-customize products. The Fortune 1000 has some unique product needs and the in-house computer professionals to write custom applications. Many corporations want to implement functions that are unique to the company.

 - Do not depend on retailers to push innovative software products. Retailers, already deluged by new products, are unlikely to invest the time needed to understand new programs and then pitch them to their customers.

EXHIBIT X-2

RECOMMENDATIONS

- **Constantly Track Leading Corporate Customers' Needs**
- **Ignore Industry Standards at Your Own Peril**
- **Offer Easy-to-Customize Products**
- **Do Not Depend on Retailers to Push New Products**

XI CONCLUSIONS

XI CONCLUSIONS

- There are a number of factors which inhibit success in this market, not the least of which is that it is intensely competitive. These factors, shown in Exhibit XI-1, are:
 - Standardization is retarding innovation. As IS managers assert more control over the purchase of applications software, de facto standards have emerged as companies try to limit the amount of training and support that is required by their users. This trend can be a problem for developers because it limits the potential for innovative products that do not conform to the standard. Moreover, customers are often not even considering products that do not work with or enhance the products that they have already standardized on.
 - It is very difficult to displace the market leader. Once a company has chosen microcomputer software packages, inertia sets in and the company is slow to switch to other programs.
 - Once a company has used a particular package for a period of time, a tremendous amount of training time has been invested. To justify retraining users on another package, the product has to have more than a few more nice features. It must give users the ability to work more quickly, which increases the company's productivity.

EXHIBIT XI-I

CONCLUSIONS: MARKET CONDITIONS

- **Standardization is Retarding Innovation**
- **Very Difficult to Displace Market Leader**
- **Present Distribution Channels Limit New Competition**
- **Performance and Features Still Most Important**
- **Network Versions and Micro-Mainframe Links Are Not Critical Yet**

- The price of the software program is not the only cost consideration when micro managers are evaluating whether to change over to a new product. Other costs they must consider are:
 - . Retraining users.
 - . Setting up a support program.
 - . Changing files over to the new system.

- Corporate customers now seem more interested in refinements to the leading packages, such as Lotus 1-2-3, than in replacing them with something better.

- Present distribution channels limit new competition. The distribution bottleneck for microcomputer software effectively prohibits all but the best-financed products from reaching wide distribution.

- Performance and features are still most important. Micro managers who were surveyed indicated that IBM compatibility, performance, and features were the most important selection criteria. Consequently, there will always be room in the market for a few new entrants with innovative, productivity-increasing products.

- Network versions and micro-mainframe links are not critical yet. Although currently not highly rated selection factors, these will increase in the future as more affordable and workable solutions become available.

- The factors that are important for the success of new products are listed in Exhibit XI-2. These include:

EXHIBIT XI-2

CONCLUSIONS: SUCCESS FACTORS

- **New Products Must Be Both Easier to Use and More Powerful Than the Standard Product**
- **New Products Must Provide Real, Immediate Productivity Benefits**
- **Successful Products Have a Smooth, Gradually Rising Learning Curve**
- **New Applications Will Need to Automate More Than "Pen and Pencil" Activities**
- **Advancing Hardware Technologies Will Create the Next Major Software Opportunities**

- New products must be both easier to use and more powerful than the standard product. Vendors are not going to unseat a product with one that is only marginally better.

- Future products must provide real, immediate productivity benefits. To be a success, a product must boost productivity right away because that is the only way to justify retraining someone on a new package. Benefits have to be tangible or companies are not going to bother with a new program.
 - . To maintain productivity levels, replacement products must be able to use data and programs developed under the existing software.

- Successful future products will need to have a smooth, gradually rising learning curve so that they are easy to use starting out, yet as the user becomes more experienced, he/she can uncover more power and features.

- New applications will need to automate more than "pen and pencil" activities. Developers need to develop products that resemble the automation of how users think. Through the application of artificial intelligence techniques, software products will become more intelligent, thus providing greater power and ease of use.

- Advancing technologies will create the next major opportunities. More powerful microprocessors combined with improvements in storage technology will create major new opportunities in software.

APPENDIX A: VENDOR QUESTIONNAIRE

APPENDIX A
VENDOR QUESTIONNAIRE

1. INTRODUCTION

A. Do you sell personal computer software to the Fortune 1000?

B. What percentage of your company's revenue goes to each market?

_____ Small (< \$10 Million)

_____ Medium (\$10 Million < X < \$300 Million)

_____ Fortune 1000 (> \$300 Million)

2. DISTRIBUTION

A. Which distribution channels do you currently use? And which do you plan on using in the next two years?

	<u>1984</u>	<u>1986-1987</u>
OEM	_____	_____
Direct	_____	_____
Retail	_____	_____
- Direct	_____	_____
- Distributor	_____	_____
Mail Order	_____	_____
Other	_____	_____

B. What channels would you like to exploit that you currently do not?

C. Which of these channels are most successful in reaching the Fortune 1000?
Why?

D. If you were to sell direct, how would you keep your dealers and distributors happy?

E. Do you target end users, departments, or IS department managers?
Why? Will this change?

3. MARKETING STRATEGIES

A. Which of the following factors are important for the Fortune 1000 purchasers? (Rate on a scale of 1-10, with 10 being the highest)

- _____ Price
- _____ Vendor reputation
- _____ Customer support (by vendor)
- _____ Customer support (by dealer/distributor)
- _____ Software performance
- _____ Software features
- _____ Ease of use
- _____ Micro-mainframe links
- _____ Multi-user versions
- _____ Ease of training
- _____ Interfaces to other software
- _____ Documentation
- _____ Security features
- _____ IBM compatibility
- _____ Source code availability
- _____ Vendor's financial stability
- _____ Lack of copy protection

B. What are the biggest impediments to selling to the Fortune 1000?

C. What steps is your company taking to increase sales to the Fortune 1000?

D. What will personal computer vendors have to do to be successful at selling software to the Fortune 1000?

E. What future needs do you think Fortune 1000 customers will have?

4. SUPPORT AND TRAINING

A. Do you currently offer special support and training to Fortune 1000 customers?

B. Do you plan to in the future?

C. Which post-sale support services do you offer to your Fortune 1000 customers?

- Centralized support
- Free training
- Purchased training
- Customization
- Software fixes
- Consulting
- Upgrades

5. PRICING

A. At what volume levels do you offer discounts to Fortune 1000 companies?

<u>Volume</u>	<u>Percent Discount</u>
_____	_____
_____	_____
_____	_____

B. Do you currently offer site licensing arrangements? Do you plan to?

C. If not, why not? If yes, how is it structured?

D. On a scale of 1-10, how important to your Fortune 1000 customers is the availability of site licensing?

6. PARTNERSHIPS AND JOINT VENTURES

A. Do you see companies entering into joint marketing agreements in order to penetrate Fortune 1000 accounts?

B. Is your company currently involved with any joint marketing arrangements for reaching the Fortune 1000?

C. Do you plan to?
(For example, mainframe software vendors, hardware companies, computer service companies)

With whom?

What are the details?

How successful have they been? Why?

Thank You!

APPENDIX B: USER QUESTIONNAIRE

APPENDIX B
USER QUESTIONNAIRE

DECISION-MAKING CRITERIA

1. On a scale of 1-10 (1 = least influence, 10 = most influence) how much influence in purchasing software do the following groups have in the purchase decision?

_____ MIS/DP
_____ User departments
_____ Top corporate management
_____ Administration
_____ Finance department
_____ Other (please specify) _____

2. How much involvement, on a scale of 1-10, does the MIS/DP department have in the following aspects of purchasing personal computer software in your organization?

_____ Advises user department of purchase
_____ Plans use and applications with user departments
_____ Buys personal computer software for user departments as needed
_____ Sets standards for purchases by user department
_____ Test and evaluation
_____ Establishes an approved vendor list
_____ Other (please specify) _____

3. Please rate each of the following factors in their importance to your company in choosing microcomputer software. (Scale of 1-10, with 10 being the highest)

- _____ Price
- _____ Vendor reputation
- _____ Customer support (by vendor)
- _____ Customer support (by dealer/distributor)
- _____ Software performance
- _____ Software features
- _____ Ease of use
- _____ Ease of training
- _____ Micro-mainframe links
- _____ Interfaces to other software
- _____ Documentation
- _____ Security features
- _____ IBM compatibility
- _____ Source code availability
- _____ Vendor's financial stability
- _____ Lack of copy protection

NEW PRODUCT NEEDS

4. What features missing in today's end-user software packages will be required in the future?

5. What improvements in microcomputer software would you like to see?

6. What types of products would you like to have that are currently not available?

List the top three:

1. _____
2. _____
3. _____

For example:

Shared file multi-user version of Lotus 1-2-3.

DISTRIBUTION CHANNELS USED

7. What percentage of your company's software purchases are made through the following channels:

<u>Now</u>		<u>Future</u>	<u>Preference</u>
_____	Retail	_____	_____
_____	Mail Order	_____	_____
_____	Direct	_____	_____
_____	VAR	_____	_____
_____	OEM	_____	_____
_____	Other	_____	_____

TRAINING AND SUPPORT

8. How would you rate the value of the following post-sales support services offered by vendors, on a scale of 1-10?

- _____ Centralized support
- _____ Free training
- _____ Purchased training
- _____ Customization
- _____ Software fixes
- _____ Consulting
- _____ Upgrades

9. What improvements in training and support from vendors would you like to see?

10. Do you see the need for training and support provided by vendors increasing or decreasing? Why?

PRICING REQUIREMENTS

11. What kind of volume discounts are you getting? Through which channels and what are the terms?

<u>Channel</u>	<u>Volume</u>	<u>Percent Discount</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

12. On a scale of 1-10, how important is the availability of site licensing when you select a package?

13. Which aspects of site licensing do you consider the most important, on a scale of 1-10?

_____ Price discount

_____ Lack of copy protection

_____ Other (please specify) _____

14. Are there any types of pricing approaches by vendors which you have not seen, but which you wish were available?

_____ Yes _____ No

15. If yes, what type of pricing approaches would like to see?

Thank You!

APPENDIX C: RELATED INPUT REPORTS

APPENDIX C: RELATED INPUT REPORTS

- Decision Support Systems and Beyond.
- Micro-Mainframe: Personal Computer Market Opportunities.
- Micro Software Support Systems.
- Selling Personal Computer Software to Corporate America.
- Software Support Requirements: Office Products.

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