Customer Service Program (CSP)

Service Market Analysis

Software Support

INPUT®

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DECEMBER 1987

SERVICE MARKET ANALYSIS SOFTWARE SUPPORT

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1280 Villa Street, Mountain View, California 94041-1194 (415) 961-3300

Published by
INPUT
1280 Villa Street
Mountain View, CA 94041-1194
U.S.A.

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Service Market Analysis,
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FMSW • 164 • 1987

Abstract

The U.S software product market is expected to grow from $19.9 billion in 1987 to $52.2 billion in 1992, representing an average annual growth of 20%. This growth will help fuel the software support market, which is expected to grow at an even faster rate (27%) over the same forecast period. This report—*Service Market Analysis, Software Support*—examines the growing market of software support, with emphasis on revenue opportunities and areas where improvements are needed.

A major contributor to this growth is the increased use of sophisticated software packages that require more software support. As hardware becomes both more reliable and serviceable, greater attention will be placed on the effectiveness of software support. Moreover, software support will need to emphasize a performance support role, rather than a remedial maintenance function.

Currently, users report greatest dissatisfaction with documentation and training services. Since these services are essential for optimizing product performance, user satisfaction with the software product itself is endangered. The report makes specific recommendations for improving usage and satisfaction with these services.

The report has 35 pages, including 17 Exhibits.

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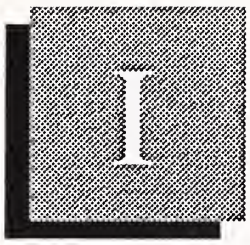
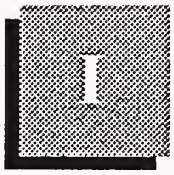
Exhibits



Introduction



Introduction

A Scope

The following report—*Service Market Analysis, Software Support*—provides an overview of revenue opportunities in the growing area of systems and applications software products. Since the hardware components of users' Information Systems activities are becoming more reliable, users are correctly identifying the importance of effective software support for achieving higher levels of system availability. As a result, the user requirement for software support is growing rapidly, and so is the opportunity for increased software support revenue.

This report will examine the current and future market for systems and applications software support. In addition, the report will break down the software support market to analyze faster growing support service areas, such as installation, consulting, performance optimization, and training services. The report will discuss how user requirements for these support services will help drive the growth in these service areas, as well as how other support issues will affect revenue growth.

The report begins with an Executive Overview, which provides a quick summary of the key research findings in both text and exhibit format. The Exhibits have been prepared in a manner that will facilitate slide preparation.

Next, the report provides an analysis of the software support market size and forecasted growth over the next five years. This analysis is broken down into systems software and applications software support markets.

In the next chapter, the report examines software support market changes that will affect revenue growth. The report breaks software support down into the four main support categories of software "maintenance," installation and tailoring, consulting, and education. The report also discusses

how changing user requirements for software support will create new revenue opportunities in these areas. This chapter will highlight key areas of user satisfaction, documentation, and training, and will provide specific recommendations for improving performance in these areas.

In the final chapter, the report presents a short summary and a list of recommendations to improve software support performance.

B

Methodology

The report is the culmination of user- and vendor-related research performed by INPUT during 1987. Such primary research is supplemented by information gathered from the popular press, annual reports, Form 10Ks, press releases, and other publicly available sources located in INPUT's Information Center. Where appropriate, information from other INPUT research programs has been included and properly referenced.

Exhibit I-1 provides an overview of the software product market structure; Exhibits I-2 and I-3 break out the systems and applications software segments of the software market.

EXHIBIT I-1

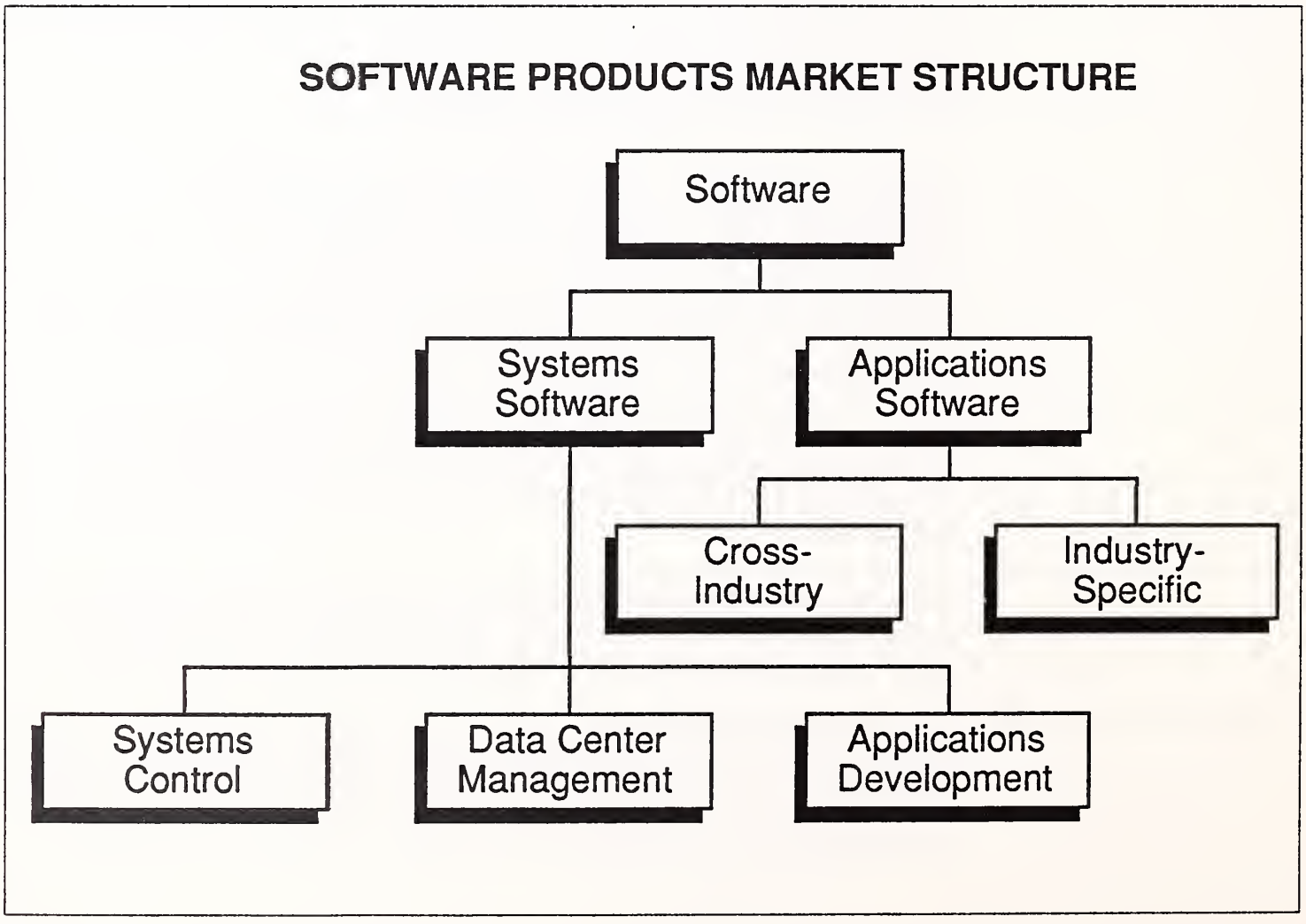


EXHIBIT I-2

SYSTEMS SOFTWARE PRODUCTS MARKET STRUCTURE

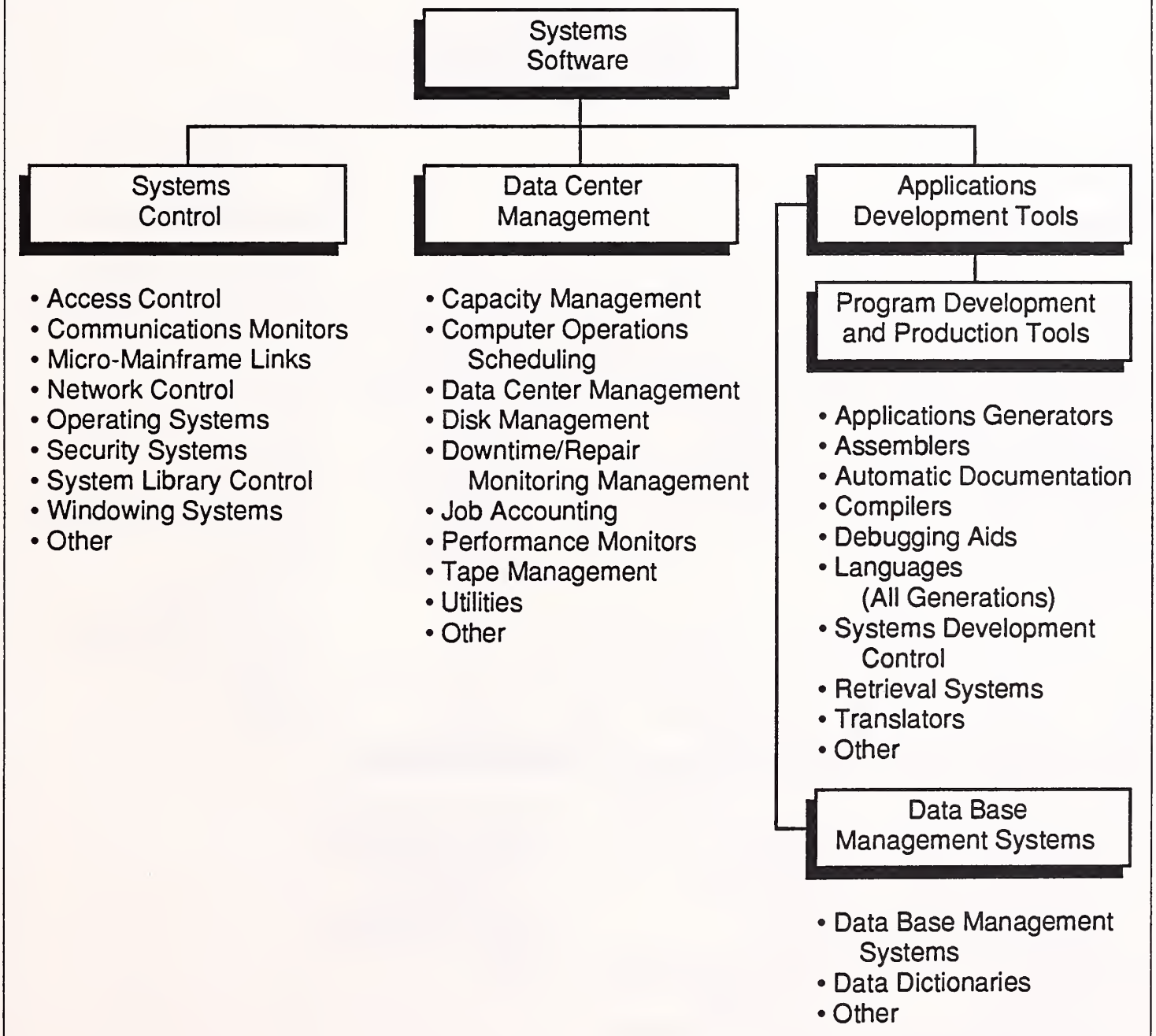
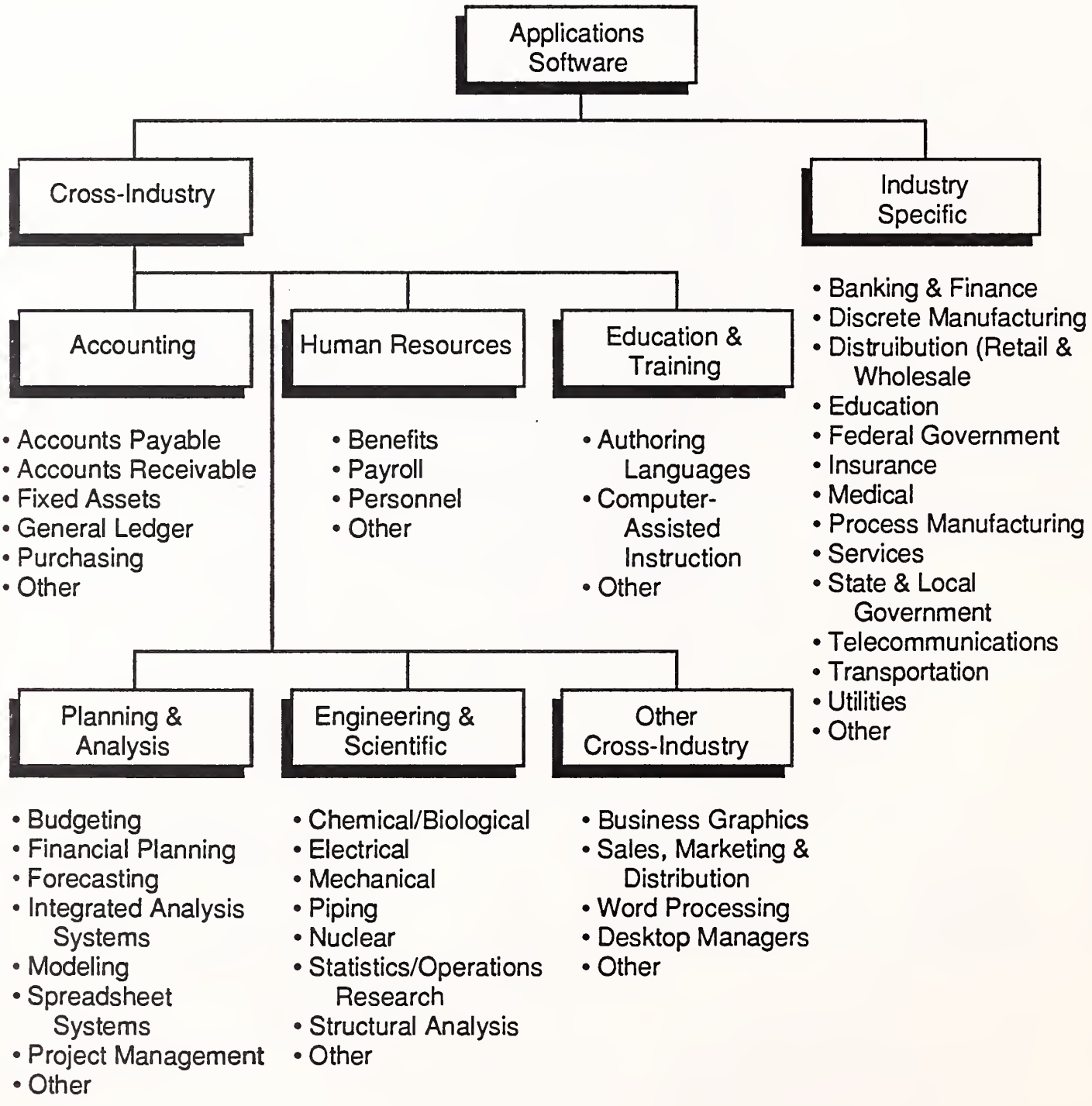
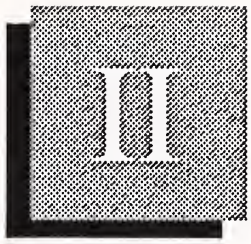


EXHIBIT I-3

APPLICATIONS SOFTWARE PRODUCTS MARKET STRUCTURE





Executive Overview

II

Executive Overview

This Executive Overview is provided as a convenient summary of the main points of this report. The Overview is presented in a format that facilitates its use as presentation material, with Exhibits that can be made into overhead slides and accompanying text that can be used as a script.

A number of factors have contributed to the growing pressure on software support. First, hardware is becoming increasingly reliable, which increases the percentage of system interruptions that are caused by software. At the same time, hardware is becoming "simplified" while software is becoming more "complex" (RISC systems are examples of this trend). The increase in the complexity of software created a need for better software support.

A

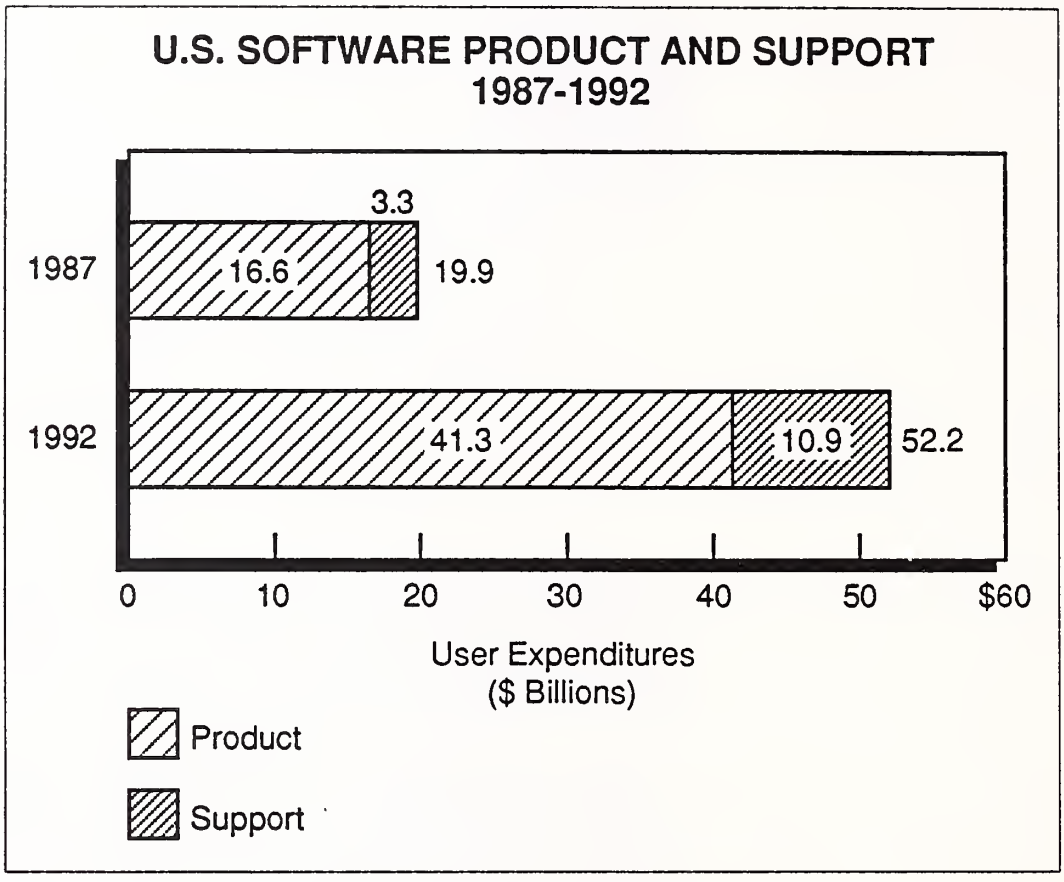
U.S. Software Product and Support

An increase in end-user applications helped drive growth in the U.S. software market in 1987, aided by increasingly accessible application development tools, as well as continued growth in the departmental systems (hardware) market. Exhibit II-1 indicates that software product sales growth is expected to continue at 20% per year through 1992. A number of other factors will aid this growth, such as:

- Increased use of integrated application platforms.
- Increased functionality of products in general.
- New applications, such as CASE and Desktop Publishing.
- Standardization of software.

Software support is expected to grow at an even faster rate, spurred not only by increased new-product sales and the resulting increase in net additions to the installed base, but also by increased user demand for software support services, particularly those that are performance oriented. Support is expected to increase at 27% per year over the next five years.

EXHIBIT II-1



Software support growth will be slightly faster in the systems software product market (at 28% AAGR) than in the applications software market (26%), as more large and small systems manufacturers and independent systems software vendors increase their involvement in support of such software products as DBMS packages and networking software.

B

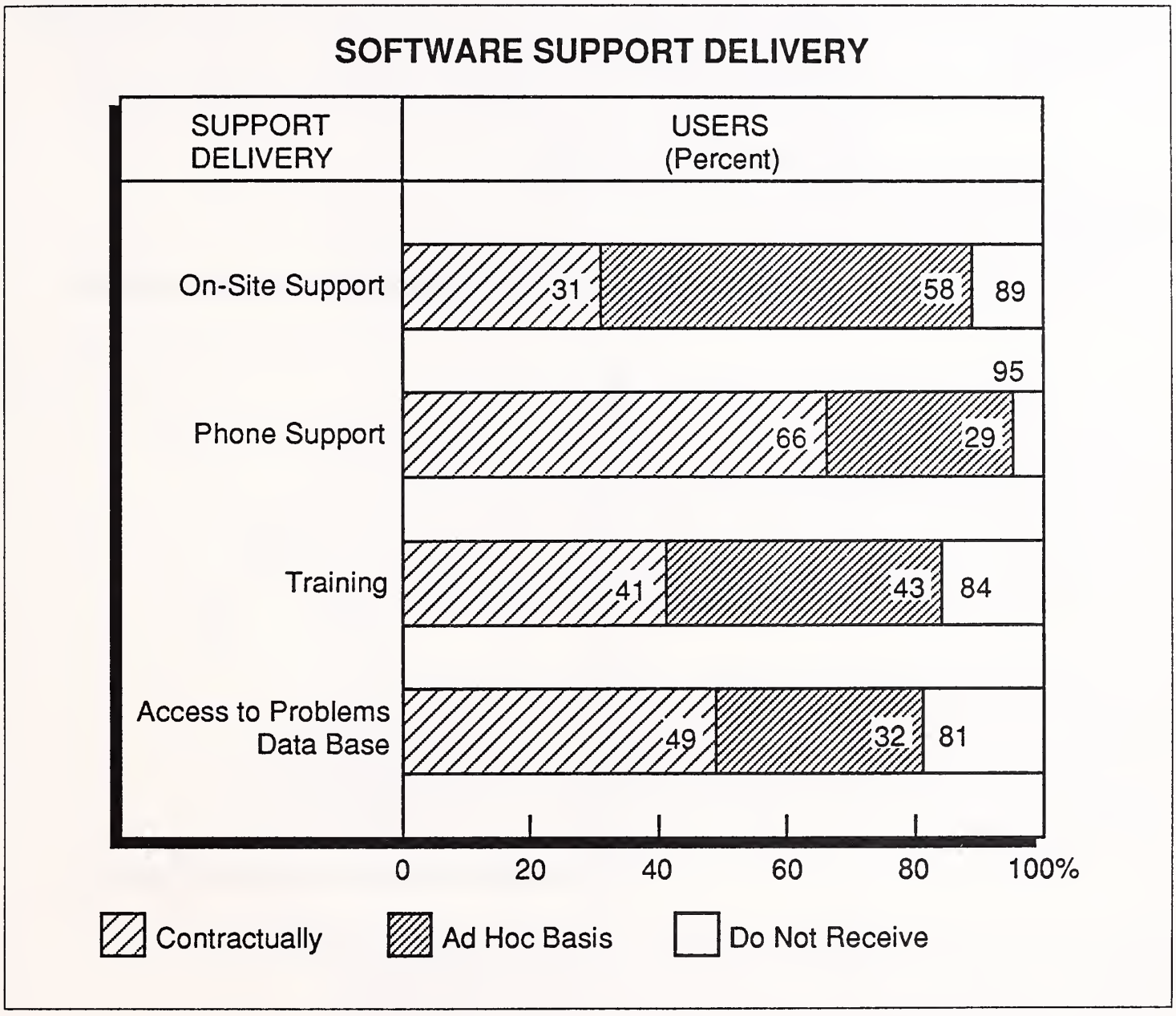
Software Support Delivery

As shown in Exhibit II-2, users most commonly receive their software support contractually via the telephone. Only 31% of users contract for on-site support, although most users have had some contact with on-site support in situations where the problem could not be resolved over the telephone.

Telephone support can be quite useful as a means of providing quick resolution to a user's software problem, since the phone support specialist can frequently recreate the environment that caused the problem, and then solve the "bug" at his own terminal. Telephone support effectiveness can be improved if either the support personnel or (even better) the user has access to a problems data base.

A growing percentage of software support is being delivered via remote support delivery, usually in the form of downline loading of fixes. The increased use of artificial-intelligence-(AI)-based diagnostic tools will supplement this remote support capability, greatly reducing system downtime.

EXHIBIT II-2



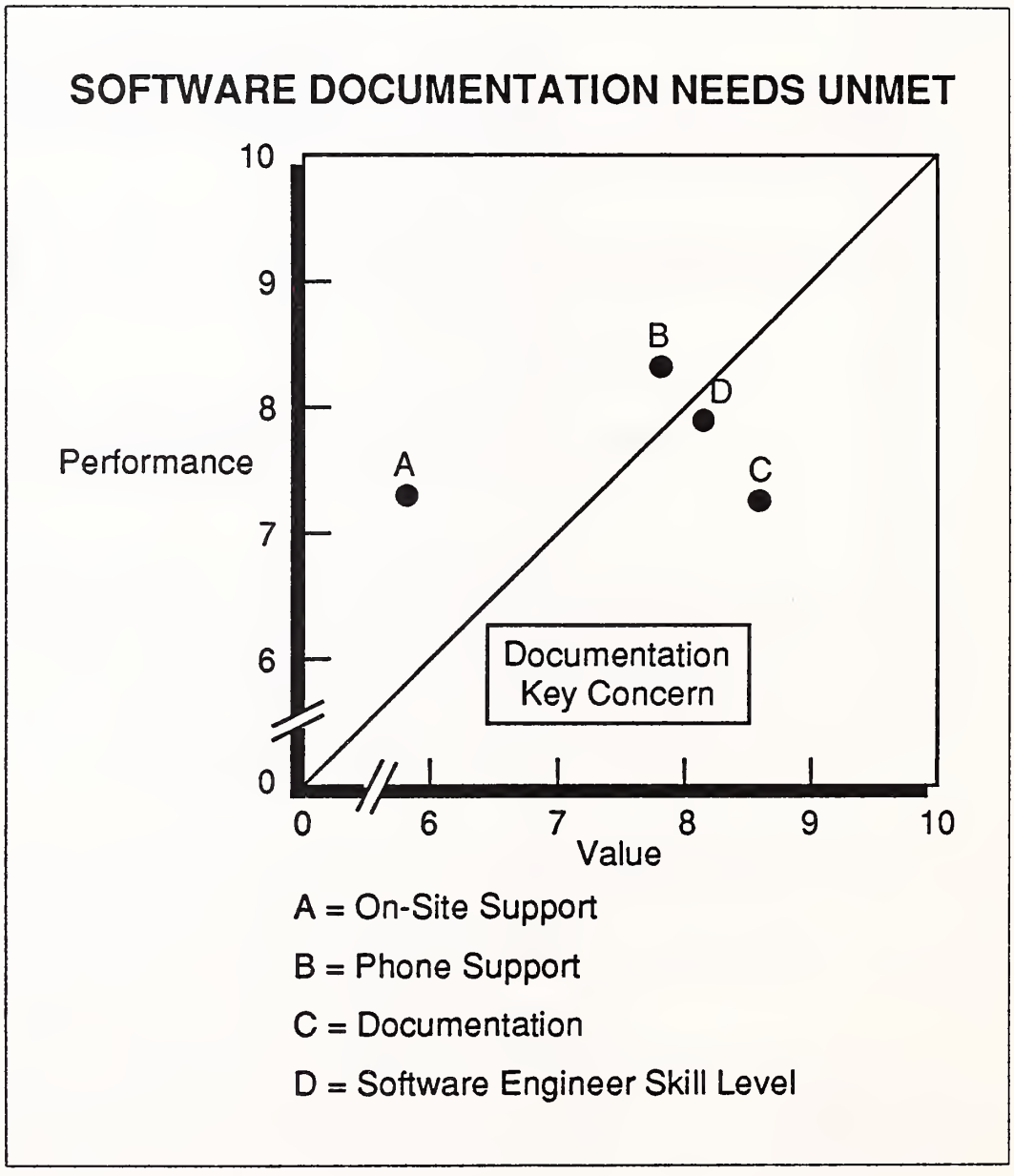
Few users report that they contract for ongoing training services, usually relying on whatever training they receive at the time of purchase. This reliance tends to reduce user satisfaction with the product performance as well as increase the number of system problems that are caused by user misuse or abuse. Users and vendors share the blame for this situation, as users don't perceive the value of training, in part due to the lack of marketing performed by the vendor. Software vendors will need to increase users' perceived value of ongoing training services by connecting training to improved system performance.

C

Software Documentation Needs Unmet

In 1987, INPUT interviewed 302 users of ten vendors' software products (detailed in User Service Requirements—Software Support). The users surveyed expressed overall satisfaction with the software support they received from their vendor in all but two key service areas: software engineer skill level and, most significantly, software documentation. Exhibit II-3 provides details.

EXHIBIT II-3



Software documentation has become such a pervasive support problem that a majority of users (57%) are currently dissatisfied with the documentation provided to them, up from 54% of the users in 1986. Users often complained about the clarity and completeness of their documentation. In general, most user dissatisfaction centered on the accessibility and useability of the documentation.

The problem of documentation spills over into other support areas, as evident from software support personnel whose first question is, "Have you checked the documentation?" This situation illustrates the importance of involving support personnel in the development and the testing of documentation before it gets to the end user.

The key to successfully meeting the needs of users is to recognize that documentation has to focus on user-driven task orientation. Both the text and the general approach of the documentation needs to be simplified. Useability can be further improved through increased use of examples and indices, as well as other "signposts" that assist the user in finding the solution.

D

Future Trends

Without question, software and software support have become and will continue to be critical to the continued growth of information processing. Systems manufacturers, most notably IBM, are already increasing their software development and support capabilities, while independent software vendors realize the growing revenue contribution of the support activities. Even third-party maintenance organizations such as Control Data Corporation have introduced (third-party) software support offerings.

Software support delivery will benefit from continued technological advances. Artificial intelligence (AI) and Expert Systems-based support programs will minimize system interruption by capturing minor fault occurrences and allowing predictive support. Even training services will be improved by increased use of computer-based training (CBT), which will reduce the cost of providing training programs that are customized to the needs of the user.

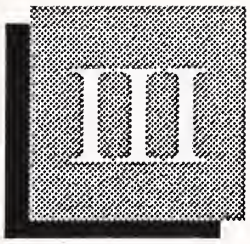
Still, software organizations will need to address user dissatisfaction with documentation. In the previous section, a series of specific recommendations was made that would make documentation more useable. To further increase user satisfaction with documentation, software vendors need to ensure that the final version fits the needs of their users. Since vendors alpha- and beta-test the software product, why not do the same for the documentation?

Lastly, software support vendors will need to redouble their efforts to work with the product user groups in order to improve the quality of support as well as to ensure that the support provided is what the majority of users need. By dealing with the user groups, software support vendors gain access to a large number of users with common experiences. These recommendations are outlined in Exhibit II-4.

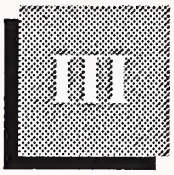
EXHIBIT II-4

RECOMMENDATIONS

- Increase Support Organizations' Involvement in Documentation
- Better Market Value of Training
- Continue to Emphasize Phone Support with Problems Data Base
- Increase Interaction with User Groups



Current Software Support Market Size and Forecast



Current Software Support Market Size and Forecast

A

U.S. Software Market and Forecast

The U.S. software product market is the fastest-growing computer service market, growing from $19.9 billion in 1987 to $52.2 billion in 1992, representing an average annual growth rate (AAGR) of 21%. The principle driving force for this growth is the continued demand for increasingly sophisticated end-user applications to run on more departmentally located Information Systems. This demand in turn helps drive increased demand for more (and better) systems software. Examples of these increasingly sophisticated software programs include computer-aided software engineering (CASE), artificial intelligence (AI), and desktop publishing to name just a few.

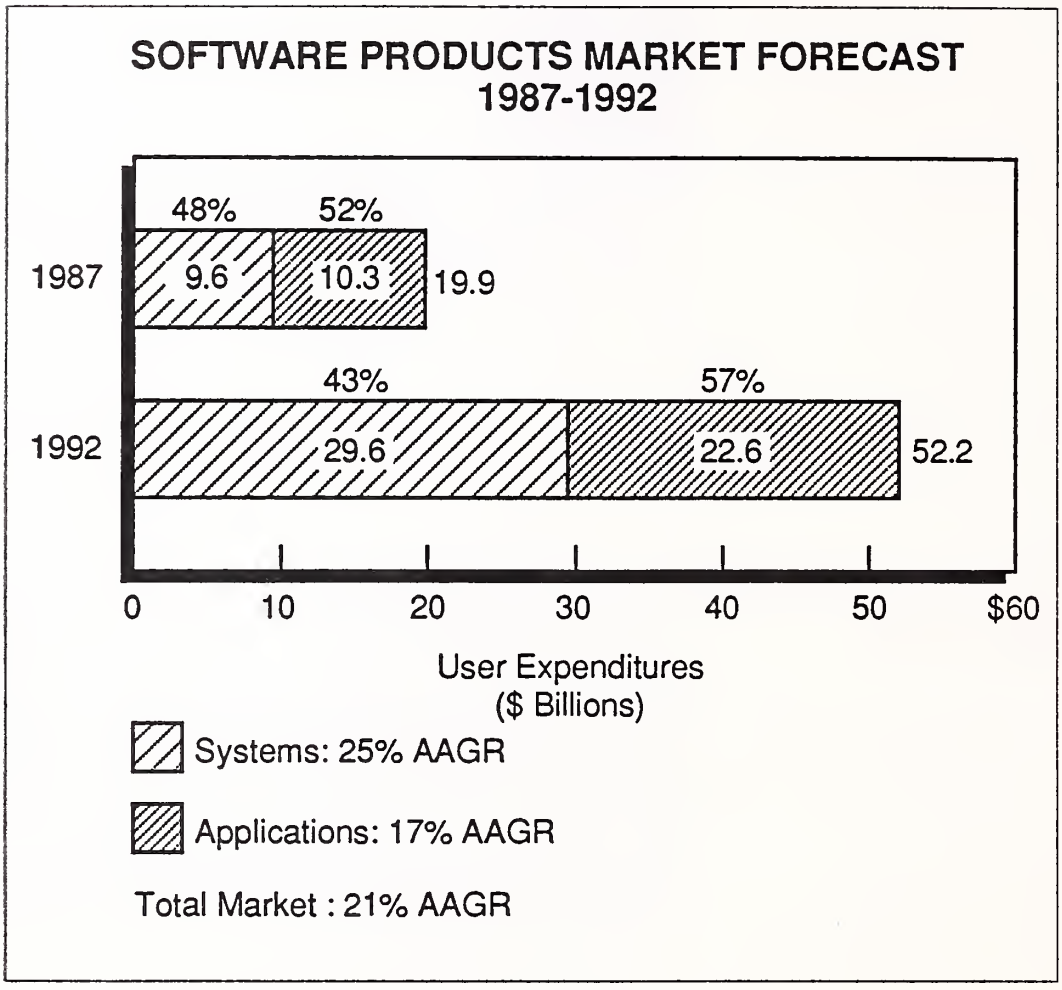
As computer systems become smaller and more powerful, the level of sophistication on these smaller systems has encouraged increased use of such small systems as desktop minicomputers, executive workstations, and more traditional microcomputers, which in turn has increased development of software to run on these systems.

Thus, traditional mainframe software development slows while smaller departmental systems software growth increases. In addition, minicomputer networking software is growing rapidly.

Exhibit III-1 shows the current systems software market and the current applications software market (both measured in terms of user expenditures), as well as a five-year forecast. Systems software is expected to grow at a faster rate than applications software, driven by the increased desire to manage and control Information Systems, particularly with the growth of networked and departmental systems.

In the systems software market, fastest growth is expected in the areas of CASE, data base management systems (DBMS), and data center management tools. The fastest-growing application software packages are in the banking, manufacturing, and medical industries.

EXHIBIT III-1



B

Systems Software Support

In 1987, users spent $2.1 billion on the support of systems software, constituting 28% of total user expenditures on systems software. Exhibit III-2 forecasts that systems software support will grow an average of 28% per year over the next five years, which is a higher growth rate than for new-product expenditures.

Contributing to this rapid growth will be the increased need for support services that are often referred to as professional services: performance optimization, planning, and most specifically network planning. These support services will increase in importance as end-user organizations perceive the added performance value that these support services offer.

Exhibit III-3 breaks down system software support by source of product (and support). In 1987, the majority of system software support was provided by hardware manufacturers, usually for the operating system. Leading manufacturers in the software market include IBM, DEC, H-P, UNISYS, Wang, and Data General. In the past, manufacturers had an advantage in the system software market since they were present at the time of the computer sale.

EXHIBIT III-2

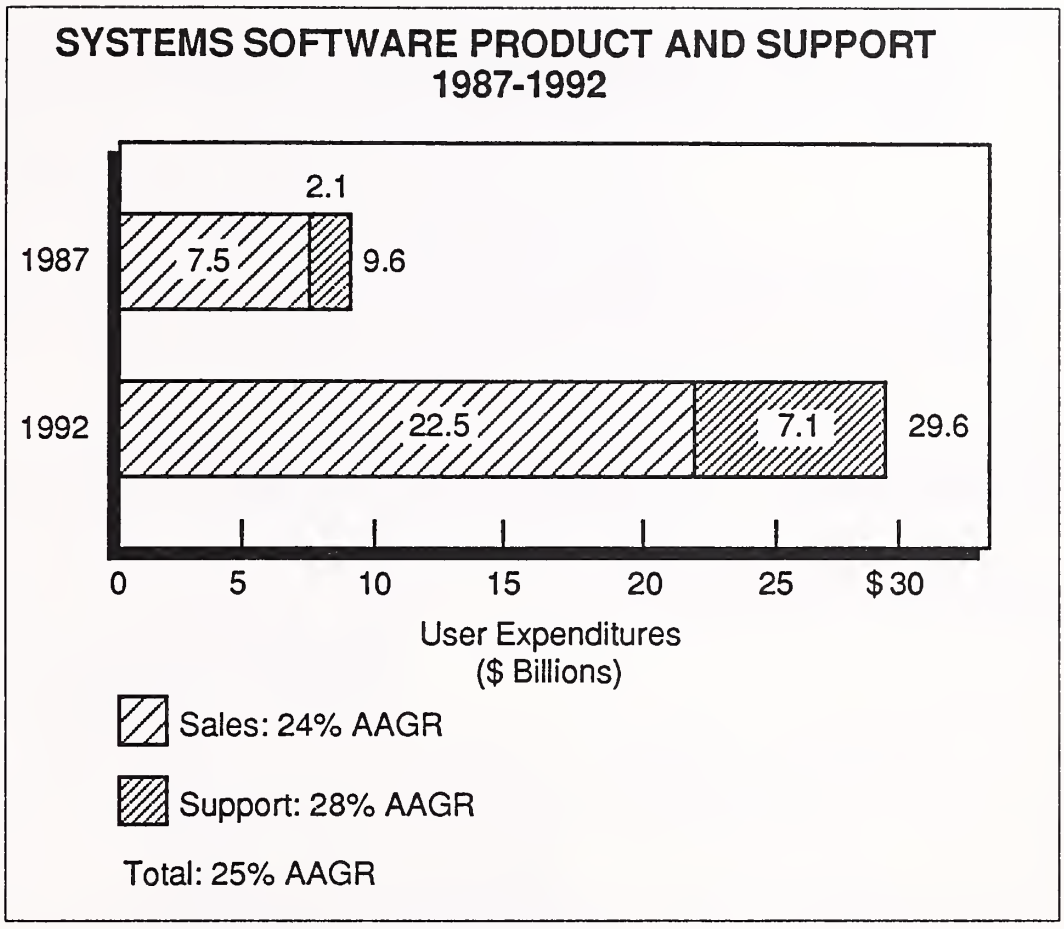
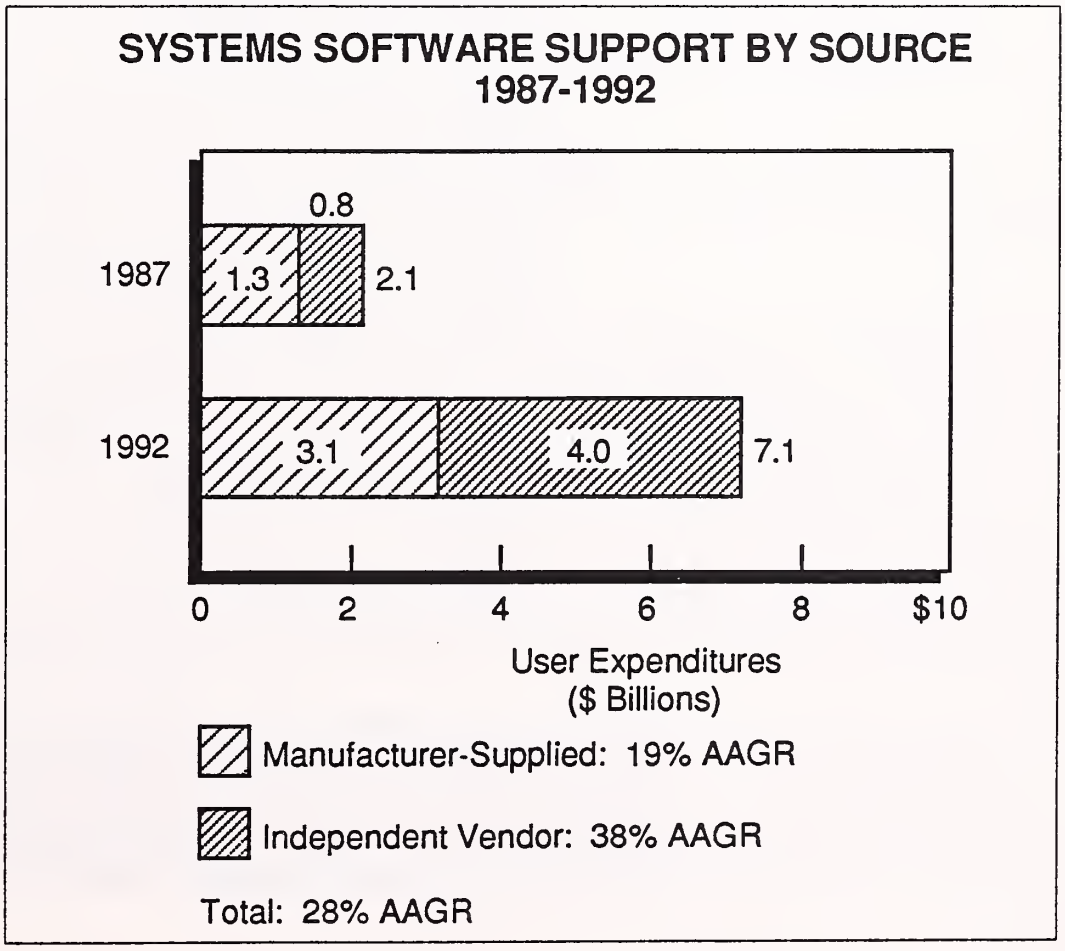


EXHIBIT III-3



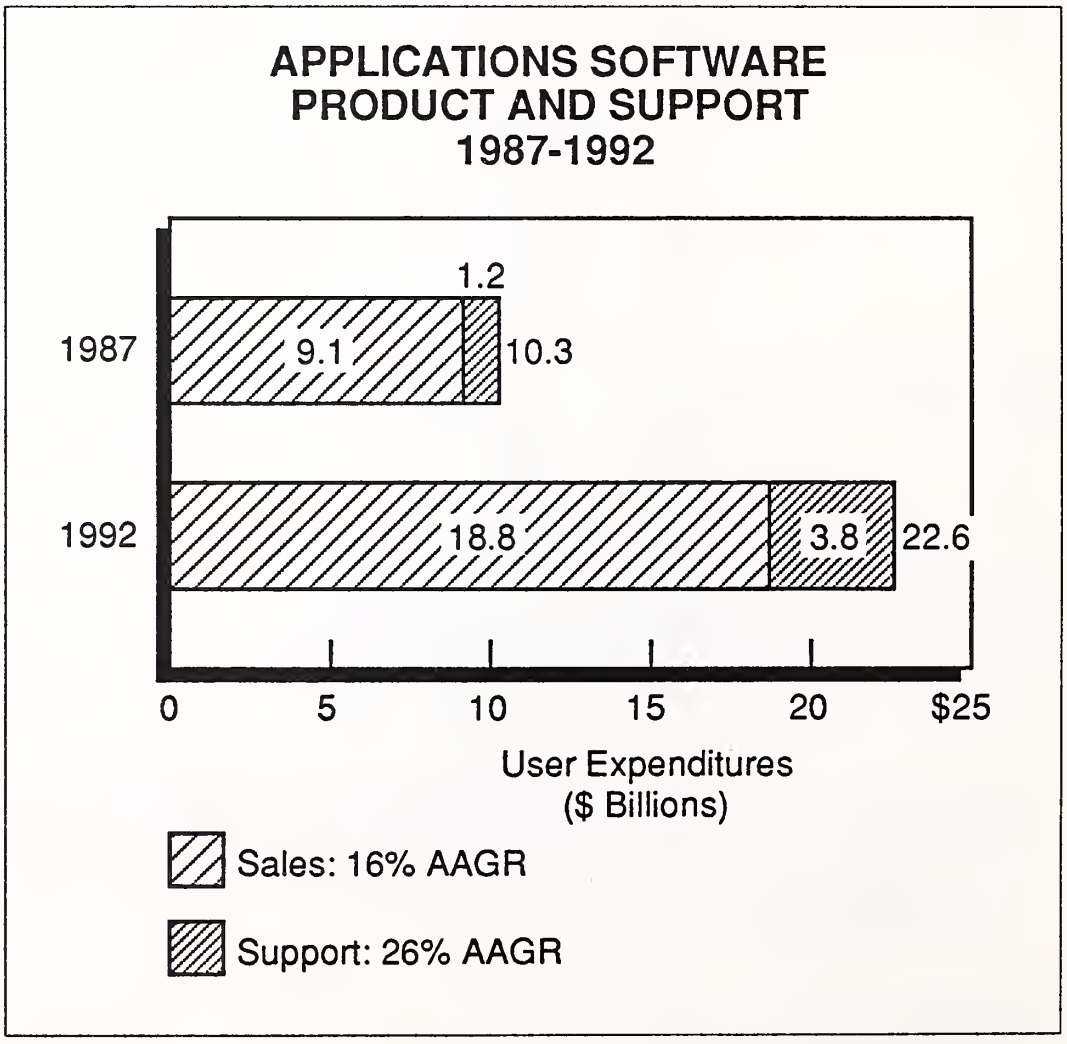
By 1992, independent software vendors are expected to make significant gains in system software product sales and support, particularly in the faster-growing segments of DBMS, CASE, and data center management system software. Leading independent software vendors include Computer Associates, Inc. (with the UCCEL entity), Ashton-Tate, Microsoft, and Cullinet. Note that two (Ashton-Tate and Microsoft) of these vendors are heavily involved in the microcomputer software market, which currently offers little in the way of software support but is expected to increase the support available, particularly in networked applications.

C

Applications Software Support

Users spent $1.2 billion on applications software support in 1987. Exhibit III-4 indicates that application software support will grow at a 26%-per-year clip, so that by 1992 users will spend $3.8 billion for support.

EXHIBIT III-4



In the past, applications software products were most often sold as packaged, "off-the-shelf" solutions to a specific information processing need. As such, there was less need to "fine-tune" the product once installed. Furthermore, the competitive environment encouraged software vendors to price support as low as possible in order to help sales of the product.

That environment has now changed. Applications software vendors are finding that to be more competitive, "off-the-shelf" software solutions now have to be tailored to fit the exact needs of their users. In addition, users are becoming increasingly attracted to other support services, including consulting and training.

Hardware manufacturers are also present in the application software market; however, not to the degree in the system software market. IBM is a market leader in the manufacturing software market (with COPICS and MAPICS); DEC and Data General are leaders in the office automation application area (with All-In-1 and CEO, respectively).

Still, independent software vendors have been more successful at addressing specific vertical-market needs with their software products. Independent software market leaders include such companies as Lotus, Management Science America (MSA), and Dun & Bradstreet to name just a few.

D

Software Support Market by Activity

Software support can be broken into four basic activities: software "maintenance," installation and tailoring, consulting services, and education and training (which includes documentation support).

The term "maintenance" is often a misnomer, since most software maintenance is provided to end users in the form of telephone support, the actual "maintenance" being performed by the users themselves. Thus, this activity should be referred to as "direct support," or more correctly, "problem resolution service."

The term "maintenance" can also be confusing since end users refer to their own involvement in "maintaining" existing programs (versus new-program development) as "maintenance."

Still, most software vendors refer to the basic activity of responding to user-reported system interruptions as software maintenance. Most often, this activity is delivered to users in the form of telephone support, although problems unresolved in this manner can be escalated to an on-site response (usually for a fee). When feasible (typically with regard to minor problems that can be circumvented with a "work-around" fix), minor problems are handled with mailed revisions that may be delivered months after the problem is discovered. In addition, an increasing amount of support is being delivered remotely via downline loading of software fixes.

Although some vendors may unbundle (price separately) any or all of these services, most vendors package these services as maintenance and charge for them in the form of an annual maintenance contract that is priced as a percentage of the software license fee (typically in the range

of 10-15%). For this annual fee, users usually receive telephone support and all product and documentation updates and revisions. Users can upgrade this support contract to include on-site delivery of support, usually for an additional 5-10% per year.

Noncontract customers can also receive software maintenance support; however, these customers typically have to pay for such support on a hourly basis.

Installation and tailoring of products are vital services provided to end users, often at the same time. Tailoring of the software is usually performed at time of installation to modify the package for the specific configuration at the end user site. In the past, these services were frequently thrown in during the sales process. Currently, common practice is to charge a fee equivalent to one month's license fee in recognition of the performance value of this support activity.

Consulting services are usually performed after product installation. Most frequently, any customization of the software after installation is categorized as consulting. Other consulting services include needs analysis (which may be performed prior to installation if billed on a hourly or flat-fee basis), feasibility studies, design and evaluation studies, and performance optimization services. Again, current practice is to bill these services on an hourly or flat-fee basis.

Educational services most often are provided in the form of classroom training (either at the user's site or at a vendor location) and educational materials. Educational services provided at the time of purchase are usually provided for free as part of the sales effort. Some vendors (most notably MSA) also offer a certain amount of ongoing educational support, usually in form of training credits, that varies by product. Most vendors charge users a flat fee per person per day for additional (ongoing) training.

Documentation services are an integral part of user education. Almost all initial documentation is provided to users as a part of the sales process, although some vendors make available duplicate sets of the documentation for an additional fee. Software maintenance contract customers receive all updates and revisions of the documentation for free as part of their software maintenance contract, yet most software vendors also make documentation changes available to nonmaintenance contract customers in the form of a materials update support option (at a charge).

Exhibit III-5 breaks down user expenditures for software support into these four main activities (software maintenance, installation and tailoring, consulting, and education and training) and provides a five-year forecast for each activity. Not surprisingly, most software support expen-

ditures are derived from software maintenance activities, and INPUT does not expect this to change in the foreseeable future.

EXHIBIT III-5

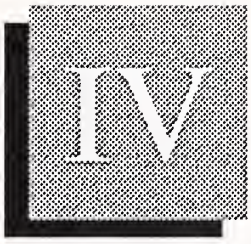
SOFTWARE SUPPORT MARKET BY COMPONENT

COMPONENT	$ MILLIONS 1987	$ MILLIONS 1992	AAGR (Percent)
Software "Maintenance"	1,815	5,670	26
Installation & Tailoring	330	1,410	34
Consulting	495	1,850	30
Education and Training	660	1,970	24
Total	3,300	10,900	27

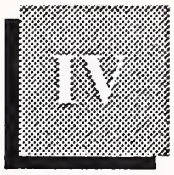
Rapid growth is expected in the area of installation and tailoring, as users place greater value on fine-tuning "packaged" solutions to their particular systems. This requirement will be increasingly important as users try to integrate existing software with complementary programs and modules, particularly in light of an industry trend toward "open architecture" and increased adherence to industry "standards."

Consulting services can also be expected to grow for the same reasons. Users will be increasingly attracted to vendors who can help integrate all the software. Furthermore, consulting services emphasize the improvement of system performance, rather than reactive problem resolution.

Educational and training growth will be limited by the lack of focused marketing of the performance value of ongoing training. INPUT found that only 41% of Fortune 1000 organizations contract for ongoing training services. At the same time, user satisfaction with the training they receive is dropping rapidly (only 55% of the 1987 users surveyed were satisfied with the training they received, versus 71% in 1986).



Software Support Service Issues



Software Support Service Issues

A

Software Support Pricing

Software support organizations, like many other product service organizations, are under pressure to satisfy user requirements for quality support at prices that do not repel customers. At the same time, software support organizations are judged by their contributions to overall company revenues and, increasingly, company profits.

In practice, most software support organizations utilize the sales value method for establishing support pricing. This method attempts to equate the cost of a support contract to the purchase price (or, in most software cases, license fee) of the product. By doing this, the value of the support contract can be measured against the purchase or replacement of the software itself. Thus, it becomes easier to communicate the cost of support ("the support contract costs ten percent more").

Still, there appears to be less industry standardization of software support pricing. Exhibit IV-1 provides a list of leading systems and applications software vendors' support pricing, as reported by vendors and users. Note that the effective range of vendor-reported support pricing levels goes from a low of 8% (for MSA) to a high of 20% (for DEC's premium software support level). Although it is true that some disparity of pricing can be accounted for by varying levels of support (the DEC price offers on-site support, for example), there is still a great deal of disparity among vendors who basically offer the same level of support (telephone support, with free software documentation, product revisions, and a limited amount of initial training).

Sales-value pricing methodology is frequently used by hardware service organizations with greater success, since software problems can be harder to define and isolate; thus it becomes more difficult to equate product replacement. Software support organizations should rethink their reliance on sales value pricing and instead attempt to equate support pricing to the real value of the processing performed by the software product.

EXHIBIT IV-1

SOFTWARE SUPPORT PRICING

SOFTWARE VENDOR	SUPPORT PRICE AS PERCENT OF PURCHASE	
	USER-REPORTED*	VENDOR-REPORTED
ADR	14.8	10-15
Cullinet	12.9	15
DEC	20.0	20
IBM	14.5	NA
McCormack & Dodge	12.7	NA
MSA	14.0	8-10
NCA	12.0	12
Pansophic	15.0	15
Sterling	12.7	12-15
UCCEL	14.4	12-18

*Average of 1987 Product Sample

Few users are expressing concerns about software support pricing levels (indeed, users who reported the highest support prices—Candle in 1986 and DEC in 1987—also reported extremely high satisfaction with the support that they received). Instead, users appear quite willing to pay more for software support if they perceive an improvement in support quality. If anything, the limiting factor to support revenue growth appears to be support quantity and quality.

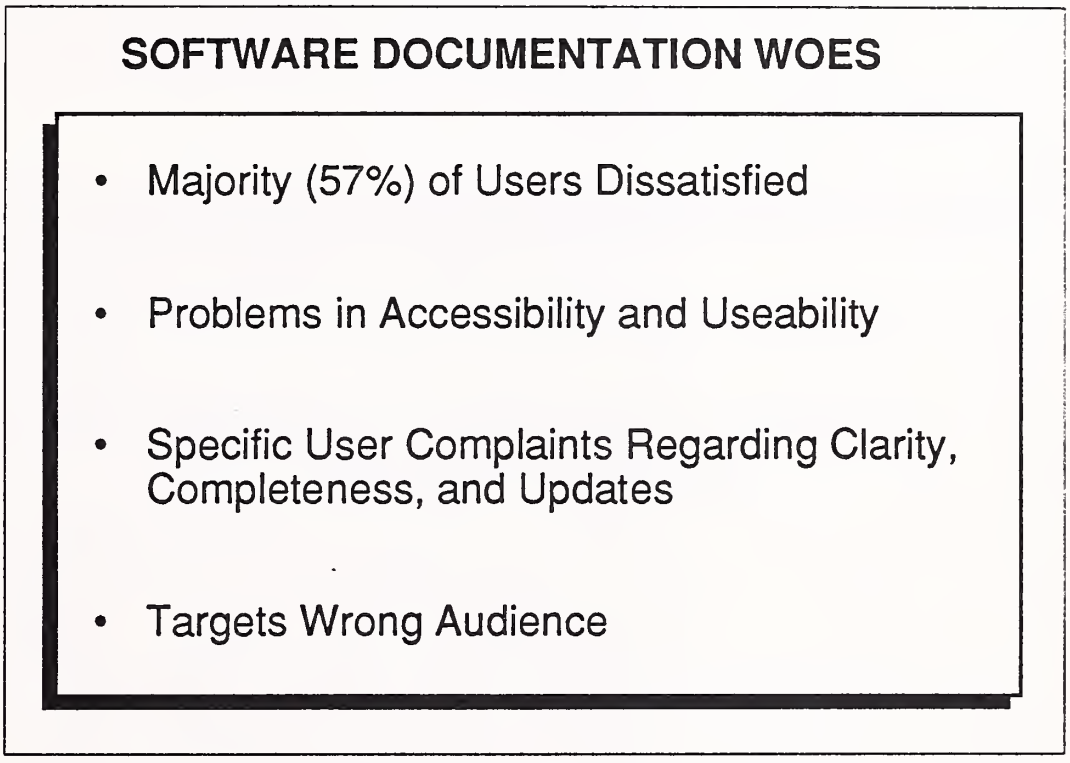
Thus, software support pricing can be adjusted to meet corporate support quality and revenue (and margin) contribution objectives. Of course, prices have to reflect some degree of competitive reality, or users will be discouraged from purchasing support (or worse, buying the product). Still, it is apparent that as long as support quality is continued, pricing levels can be set at levels that will not only defer support costs, but also provide profitability as support volume is increased.

B

Software Documentation Problems Continue

One software support area where quality is a major user concern is software documentation, as addressed by Exhibit IV-2. INPUT's earlier study on software support user requirements found that 57% of all software users were dissatisfied with their documentation. In 1986, INPUT found that 54% of software users were dissatisfied, suggesting that the problem is, if anything, increasing in severity. Software documentation has become so pervasive a problem that users most often list it as the number-one support concern.

EXHIBIT IV-2



In general, most user dissatisfaction with documentation centers on its accessibility and usability. Specific user complaints about software documentation invariably deal with its lack of completeness and lack of clarity. Furthermore, users often complain of the software update process, which is poorly tracked and maintained.

The key to user dissatisfaction with software documentation is that the documentation is often prepared with the wrong audience in mind. In most larger software companies, documentation is prepared by technical writers based upon notes prepared by the software development team. Smaller companies often require that the software developers themselves compose the documentation.

A problem arises when the documentation writers lose track of the experience level of the users. Frequently, documentation appears to assume that users have the level of understanding that the software development team has. As a result, users often complain that the documentation is unclear or too complicated.

It might be too simplistic to recommend simplifying the documentation to improve its usability (although most documentation does need to be simplified!). More precisely, documentation writers need to focus on how people use documentation. The key to documentation is user-driven task orientation.

As a reference tool, documentation has to be organized in such a manner as to facilitate finding the answer to a specific problem. Yet most documentation suffers from poor indexing, and few pieces of documentation provide useful "sign posts" to facilitate searches. Another common complaint is the lack of "real-world" examples of usage. Also, users are highly critical of the lack of completeness in the area of troubleshooting guides.

One way of assuring that documentation meets the needs of users is to increase the involvement of the software support team in the development, production, and testing of the documentation product. The support organization has a vested interest in doing this, since user problems with documentation result in misuse or even abuse of the software and the inevitable involvement of the support group to resolve the problem. Furthermore, the support organization's day-to-day contact with users will undoubtedly improve the usability of the final documentation.

Another way of assuring that documentation meets the needs of the user is to increase the amount of user-involved testing of the documentation before the final product is shipped. The software product is field tested (alpha and beta), so why not the documentation, too? Although some software vendors rely on self-addressed user response cards to gain user feedback, more-progressive software vendors are taking this more direct approach of measuring user satisfaction with the documentation at a stage when changes can still be made. Some software vendors also supplement this field-testing by using outside research houses to gain unbiased feedback from users.

Exhibit IV-3 summarizes these recommendations for improving documentation.

C

Training: Users and Vendors Share the Blame

A closely related problem is user training, as shown in Exhibit IV-4. In 1987, software vendors were successful at satisfying only 55% of their users' needs regarding operational training, down from 71% in 1986. Most disconcerting is the relatively small percentage of users (only 41%) who report that they contract for ongoing training.

Training problems, like those resulting from poor documentation, impact user satisfaction with support and the product itself. In addition, the lack of proper training can result in an increased need for support, increasing the cost of support for both the user and the vendor. User indifference to

EXHIBIT IV-3

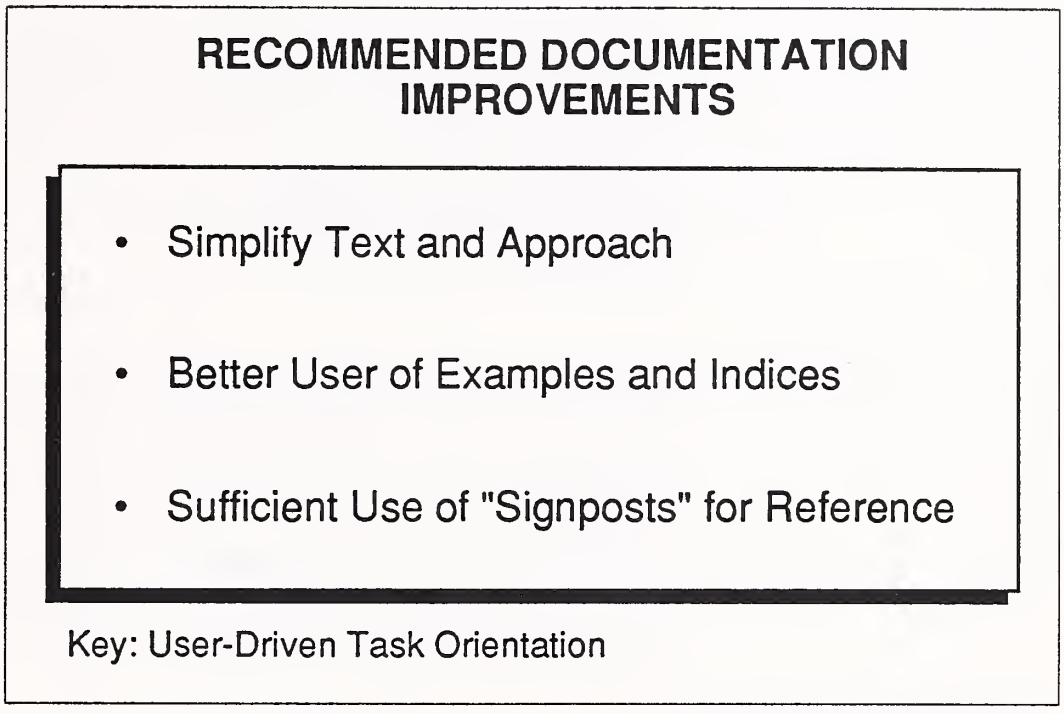
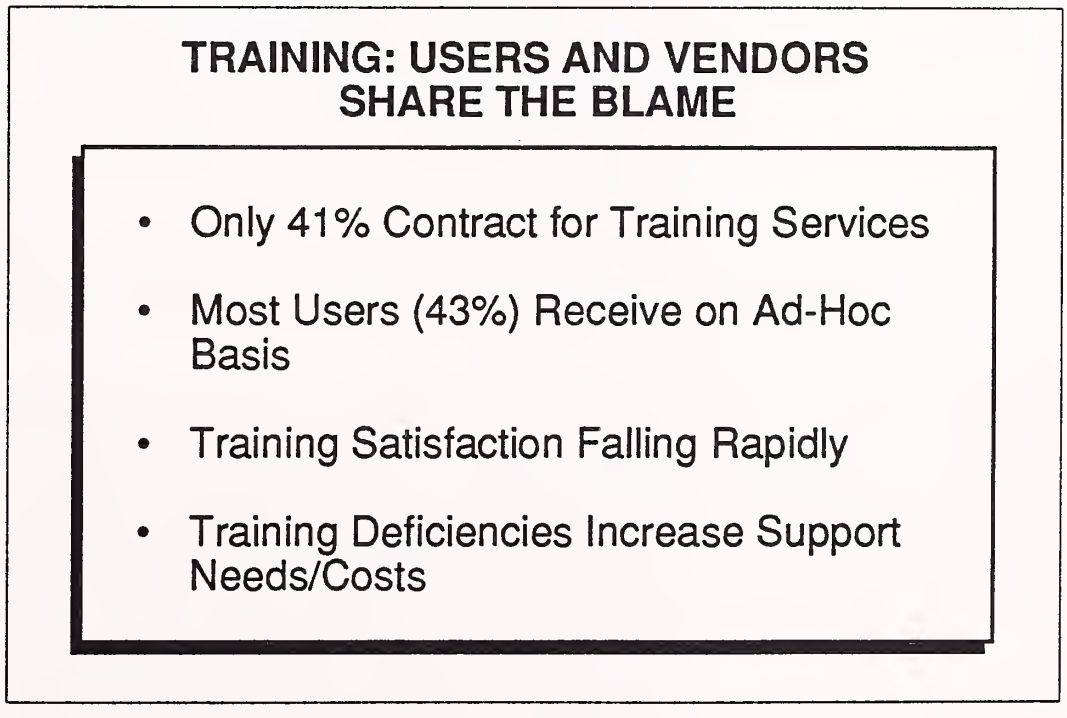


EXHIBIT IV-4



training also tends to aggravate the documentation problem, since without training, more users are forced to rely solely on the documentation.

Although users indicated that they place less importance on training services, software vendors must share the responsibility for this low perception of training value. Since most software vendors provide a certain amount of free training at the time of purchase, users tend to downplay the importance of the service. As a result, it becomes difficult to sell users additional training, particularly on an ongoing basis.

Unfortunately, most initial training emphasizes installation and rudimentary instruction on the program. Only rarely does free training go beyond this introductory level, thus limiting the usefulness of initial training with respect to the performance of the system. Furthermore, user staff turnover is sufficient to almost completely remove the benefit in the eyes of the user (this turnover was illustrated by responses from a significant number of users who could not comment on the training their company received, since it occurred prior to the responding users' arrival.)

Software vendors need to increase the value of ongoing operational training service by stressing the performance value of training. To stress the value of training, vendors will need to work closely with users (both individually and through user groups) in developing training curricula. Once training packages have been developed, software vendors will need to put more emphasis on marketing and selling these packages. One marketing strategy that has proved successful is publishing course catalogs that not only list course title, date, and prices, but also a descriptive outline of each course.

Training methodologies have varied with respect to costs and effectiveness. Most operational training is provided by traditional means, ie., classroom lecture (either at the user site or at a vendor location) supplemented by written materials. Training at the user site is preferred by users, since they get to learn in their own environment on their own equipment (as well as reap the obvious benefit of no travel costs). Labor costs are quite high—in travel costs and manpower costs, directly (the instructor) and indirectly (the impact on schedules). Frequently, the high costs involved discouraged many potential users from purchasing training to any great extent.

Eventually, technology was introduced to training, initially in the form of audio-tape-based, film-based, and eventually video-tape-based training presentations. Although these new methods reduced labor costs for ongoing training without increasing material costs significantly, each of these formats suffered from an inability to customize the material for a specific customer or application. For example, it was difficult to alter the pace of instruction using these formats. However, the lower costs made these training formats (particularly video-based) more accessible to users, since users could reuse instruction indefinitely.

Later, training itself entered the computer age, with the introduction of computer-based training (CBT). Although initially carrying high development costs, CBT offered many benefits over other training methodologies. First, CBT offered much greater flexibility over other media, since CBT could be easily adjusted to the needs of each user. The training could be received within the user's working environment using skills needed for the actual job. As a result, retention levels are improved.

CBT development costs have declined, making it an even more attractive form of training. Future advances in interactive videodisk and CD-ROM will further enhance the power of CBT by improving the visual impact of training images. These recommendations are outlined in Exhibit IV-5.

EXHIBIT IV-5

RECOMMENDED TRAINING IMPROVEMENTS

- Work with Users in Developing Training Packages
- Package Training Course Catalogs with Course Outlines
- Increase Development of CAI and CBT

Key: Increase Performance Value of Training

D

Remote Software Support

Remote support can be defined as the delivery of problems diagnosis and resolution from a location away from the user site. Software support vendors have used technology to improve the quality and reduce the cost of providing support to end users. The most significant of these technological tools has been the use of remote support technology in the diagnosis and resolution of software problems. Where remote support for hardware is predominantly diagnostic-only, remote support for software can include downline loading of actual fixes. NCA has already begun downline fix delivery to test locations, and other vendors (e.g., MSA, Cullinet, and Pansophic) are currently developing their own remote support implementation capabilities.

Remote diagnosis of software problems has been aided by integration of artificial-intelligence-(AI)-based programs that assist in problem determination and, to some degree, problem resolution. DEC, for example, has consolidated hardware and software support functions into centralized Customer Support Centers, such as the one opened in Colorado Springs (CO) in April, 1986. Integral to the telephone support provided to all DEC hardware and software users is an in-house-developed AI program called Standard Package for Error Accounting and Reporting (SPEAR), which accesses a data base of known problems and their indicators to

arrive with a list of three potential problems and their solutions. The benefit of such a program is the ability to provide fault identification prior to catastrophic failure and thus to allow scheduled replacement or revision of the problem software.

Problems data bases have been utilized to a much greater extent in software support. Seventy-one percent of the users surveyed reported some experience with problems data bases, either on a contract or ad-hoc basis. Originally, problems data bases were used only by the software support personnel in researching problem identifiers and recommended solutions. Now, most software support organizations are offering edited subsets of the problems data bases to customers as a way of allowing users to research their own symptoms. In this fashion, vendors hope to enable end users to decrease problem resolution time and control support costs, while benefiting the vendor by reducing the number of support responses required.

E

Identification of Problem Severity

The key to managing customer satisfaction with software support performance is developing a response and support schedule that is ordered by the severity of the software problem and modified by customer requirements. This schedule should be clearly spelled out to the user in order to assure realistic response expectations.

Software problems can be easily broken into two main groups, separated by severity level:

- Software problems where all processing is stopped and a "work-around" or temporary fix cannot be applied. The severity of this level is often aggravated by a loss of data integrity.

- Software problems that impact processing but can be bypassed with a temporary software patch. This level's priority can vary depending on the user's application. A problem that occurs in a main module or function would be more severe than one that occurred in a minor module or function.

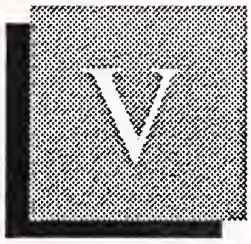
Next, a schedule of response time objectives and support implementation procedures should be established reflecting the severity of the problems as defined above. Of course, modification of such a schedule will be made depending on a number of factors, including client status, contract renewal status, duration of the problem, number of sites affected, and resource availability. In addition, any schedule must be developed after input from both product engineering and sales/marketing is incorporated to guarantee the "reasonableness" of the schedule.

In addition, an effective plan of problem escalation needs to be attached to this problem response schedule. The plan should outline timing and steps to resolve critical problems.

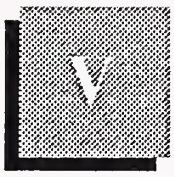
Most importantly, this schedule should be clearly communicated to the user, so that realistic support expectations can be made. By educating users upfront in this fashion, vendors will lessen the burden placed upon the software support specialist who initially fields the call. The specialist will then be able to concentrate on problem isolation and identification.

Software vendors must also chronicle the support procedures that have been implemented, particularly on lower priority fixes that have been handled in mailed revisions. Research suggests that in some situations users are unaware of a number of minor problems that were resolved in later revisions of the software as a result of poorly communicated or documented revisions.

Special mention should be made regarding ordering of requests for product enhancements. Frequently, enhancement requests are the result of user disappointment with the software, due to a lack of a desired function or feature. It would be unwise to treat such requests with less priority than an actual product failure because, in a sense, the product requiring enhancement has failed, at least in the eyes of the user. This "failure" could be attributed to unreasonable expectations made by the user, or it could be more directly the fault of the vendor, as the result of marketing, product specification, or documentation. In any case, it would be to the vendors' best interests to satisfy users' requests in as timely a fashion as possible.



Recommendations and Conclusions



Recommendations and Conclusions

Software support will become an increasingly important component of total system support as customer service organizations expand their focus from remedial maintenance to performance support. Improvements in hardware reliability and serviceability lessen the demand for hardware maintenance and increase demand for software support, particularly as the use of increasingly sophisticated software applications continues to rise.

Concurrently, competition in the software support market is expected to increase, as both hardware manufacturers and traditional third-party maintenance organizations recognize and exploit the opportunities inherent in software support, in terms of revenue growth and customer satisfaction. This increased competition will help fuel continued development of the software support market.

User research has indicated that users appear least satisfied with the services that software support vendors usually provide for free—software documentation and operational training. Most troubling is that these services have greatest impact on user operation of the software product. As a result, deficiencies in the provided documentation and training not only increase the need (and cost) for service, but also decrease user satisfaction with the support and the performance of product.

The shortfallings of documentation deal with the usability and accessibility of the information contained in the documentation. In short, users complained about the clarity and completeness of their documentation. This frustration is often exacerbated by a support person's usual first question: "Did you check the documentation?"

The problems regarding documentation are not helped by the fact that users do not contract for training on an ongoing basis. Vendors must share the blame, since few vendors place much emphasis on the marketing and sales of training services, and few users correctly perceive the

importance of continuing training services as a source of performance improvement. Instead, most users think the small amount of training they usually receive as part of the sale is sufficient, yet most of that training deals with installation and rudimentary operation, not with the more complex operations and applications. Furthermore, employee turnover is sufficient to lessen the value of initial training.

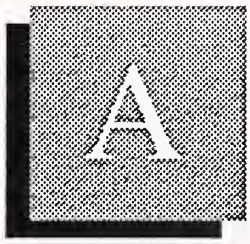
Instead, software support vendors need to increase user perceptions of the value of software training in order to encourage the further use of ongoing training services. One way to encourage the use of training is to publish course catalogs with detailed course outlines that indicate the depth and value of the training offered in each course.

Documentation itself must be simplified and organized in a manner that encourages its use and facilitates the ready access of needed information. The support organization has a vested interest in improved documentation, since support personnel are the first to hear about documentation problems (usually from an irate customer), and often their job is made more difficult by users who misuse or even abuse the software due to an inability to comprehend the documentation.

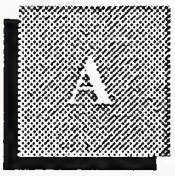
Since documentation leads to increased user dissatisfaction with the software product itself, it is inconceivable that software vendors do not test the documentation in the real world as they do the software itself. By alpha- and beta-testing the documentation prior to shipping the final product, the software vendor can improve the accuracy and the usability of the documentation.

Software support vendors will need to emphasize the performance aspects of their support offerings. Although users do not appear to exhibit the degree of support price sensitivity that they do regarding hardware maintenance pricing (most software users feel they get their "money's worth"), software support vendors will still have an easier time selling increased support to users if users better perceive the performance value of support.

One way of marketing the performance value of support is to establish a list or "menu" of premium support levels that emphasize training and consulting services. These services must be fine-tuned to the users' particular applications. Built into these premium support offerings should be some type of performance-monitoring service that assures that user operation is correct and prevents potential problems (either support- or operation-related). In addition, this performance monitoring service would also provide recommendations regarding future performance needs (e.g., additional product modules and customization) and would place the software vendor in a good position for future sales.



Appendix: Definitions



Appendix: Definitions

Applications Software—Software that performs processing to service user's functions.

Artificial Intelligence—The academic discipline involving the study of the processes by which humans perceive and assimilate data (and use reasoning to process this data) for the purpose of duplicating these processes within computer systems. Also, this term refers to the computer systems that accomplish these duplicated processes.

BOC—Bell Operating Company.

Consulting—Includes analysis of user requirements and the development of a specific action plan to meet user service and support needs.

Dispatching—The process of allocating service resources to solve a support-related problem.

Divestiture—The action, stemming from antitrust lawsuits by the Department of Justice, which led to the breakup of AT&T and its previously owned local operating companies.

Documentation—All manuals, newsletters, and texts designed to serve as reference material for the ongoing operation or repair of hardware or software.

End User—May buy a system from the hardware supplier(s) and do own programming, interfacing, and installation. Alternatively, may buy a turnkey system from a systems house or hardware integrator.

Expert Systems Applications—Applications for expert systems–a computer system based on a data base created by human authorities on a particular subject. The computer system supporting this data base contains software that permits inferences based on inquiries against the

information contained in the data base. "Expert systems" is often used synonymously with "knowledge-based systems," although this latter term is considered to be broader and to include expert systems within its scope.

Engineering Change Notice (ECN)—Product changes to improve the product after it has been released to production.

Engineering Change Order (ECO)—The followup to ECNs that include parts and a bill of material to effect the change in hardware.

Escalation—The process of increasing the level of support when and if the field engineer cannot correct a hardware or software problem within a prescribed amount of time, usually two to four hours for hardware.

Fiber Optics—A transmission medium which uses light waves.

Field Engineer (FE)—For the purpose of this study, field engineer, customer engineer, serviceperson, and maintenance person were used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

Field Service Management System (FSMS)—A specialized application program that automates some, if not all, of the following activities of a field service organization: call handling, dispatching, parts inventory and tracking, billing, efficiency reporting, and other functions. Ideally, the system accesses one data base from which each function can use and modify data.

Hardware Integrator—Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. May also develop control system software in addition to installing the entire system at the end-user site.

ISDN—Integrated Services Digital Network. A proposed standard for digital networks providing transport of voice, data, and image using a standard interface and twisted pair wiring.

LADT—Local Area Data Transport. Data communications provided by the BOCs within local access transport areas (LATA).

Large System—Refers to traditional mainframes including at the low end IBM 4300-like machines and at the high end IBM 308X-like machines. Large systems have a maximum word length of 32 bits and a standard configuration price of $350,000 and higher.

Major Software Problem—Problems ("bugs") that prevent further processing.

Mean Time Between Failures (MTBF)—The elapsed time between hardware failures on a device or a system.

Mean Time to Repair—The elapsed time from the arrival of the field engineer on the user's site until the device is repaired and returned to the user for utilization.

Mean Time to Respond—The elapsed time between the user placement of a service call and the arrival at the user's location of a field engineer.

Microcomputer—A microprocessor-based single- or multi-user computer system typically priced less than $15,000. A typical configuration includes an 8- or 16-bit CPU, monitor, keyboard, two floppy disk drives, and all required cards and cables.

Minicomputer—See Small System.

Minor Software Problem:—A software problem ("bug") that allows further processing with some level of degradation.

Operating System Software (System Software)—Software that enables the computer system to perform basic functions. Systems software, for the purposes of this report, does not include utilities or program development tools.

PBX—Private Branch Exchange. A customer premises telephone switch.

Peripherals —Includes all input, output, and storage devices, other than main memory, which are locally connected to the main processor and are not generally included in other categories, such as terminals.

Planning—Includes the development of procedures, distribution, organization, and configuration of support services. For example, capacity planning, "installation" planning.

Plug-Compatible Mainframe (PCM)—Mainframe computers that are compatible with and can execute programs on an equivalent IBM mainframe. The two major PCM vendors at this time are Amdahl and National Advanced Systems.

Professional Services—A category of services including system design, custom programming, consulting, education, and facilities management.

RBOC—Regional Bell Operation Company. One of seven holding companies coordinating the activities of the BOCs.

Remote Diagnostics—Gaining access to a computer from a point physically distant from the computer in order to perform problem determination activities.

Remote Support Implementation—An extension of remote diagnostics where some level of support delivery is performed from a point physically distant from the computer. Currently, this capability is more common to software support where problems can be solved or circumvented through downline loading of new code (fixes).

Reseller—A marketing organization that buys long-distance capacity for others at wholesale rates, selling services at retail but discounted prices and profiting on the difference.

Small Business Computer—For the purpose of this study, a system which is built around a Central Processing Unit (CPU), has the ability to utilize at least 20 M-bytes of disk capacity, provides multiple CRT workstations, and offers business-oriented systems software support.

Small System—Refers to traditional minicomputer and superminicomputer systems ranging from a small multi-user, 16-bit system at the low end to sophisticated 32-bit machine at the high end.

Software-Defined Network—A private network that uses public network facilities and which is configurable on an as-needed basis by the user (see Virtual Private Network).

Software Engineer (SE)—The individual who responds (either on-site or via remote support) to a user's service call to repair or patch operating systems and/or applications software.

Software Products—Systems and applications packages that are sold to computer users by equipment manufacturers, independent vendors, and others. Also included are fees for work performed by the vendor to implement a package at the user's site.

Superminicomputer—See Small System.

Systems Integration—The action of a single service vendor's design, development, and implementation of a system or subsystem including integration of hardware, software, and communications facilities for a customer.

System Interruption—Any system downtime requiring an Initial Program Load (IPL).

Systems House—Integrates hardware and software into a total turnkey system to satisfy the data processing requirements of the end user. May also develop systems software products for license to end users.

T-1—Refers to a standard 1.544 megabit per second digital channel used between telephone company central offices and now used for microwave, satellite, fiber optics, or other bypass applications.

Third-Party Maintenance (TPM)—Any service provider other than the original equipment vendor.

Training—All audio, visual, and computer-based documentation, materials, and live instruction designed to educate users and support personnel in the ongoing operation or repair of hardware and software.

Turnkey System—Composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.

VSAT—Very Small Aperture Terminal. A small satellite dish system, usually using Ku-band frequencies.

Virtual Private Network—A portion of public network dedicated to a single user.

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