CSP/E

Customer Service Software Support

INPUT

This report is part of INPUT's European Customer Services Program (CSP/E), one of two annual subscription research and planning programs INPUT provides to its European Clients.

CSP/E consists of a series of reports, briefs, conferences, and an inquiry service, all of which concentrate on providing detailed analyses of user needs, vendor services, major trends, and ongoing issues in the European customer services market.

INPUT also offers a similar program that concentrates on the market for information services called the Market Analysis and Planning Service for the Information Services Industry - Western Europe.

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CUSTOMER SERVICE SOFTWARE SUPPORT

APRIL 1984

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CONTENTS

EXHIBITS

I INTRODUCTION

A. SCOPE AND METHODOLOGY

- This brief is part of INPUT's Customer Service Program - Europe. The subject, software support, was selected by clients as a topic of interest.

- The report covers current characteristics and trends relating to software support, including:

  - Definitions of software support as seen by various respondents.

  - Organisational issues involving software support.

  - Strategic considerations.

  - Terms and conditions.

- Research for the report was derived from four different INPUT studies in the U.S. and Europe.

- This report focuses on the issue of packaged software maintenance in the commercial environment.

B. SOFTWARE PRODUCTS DEFINITIONS

- There are several subcategories of software products:

  - Application Products are software products that perform processing to serve user functions. They consist of:

    - Cross-Industry products, in multiple-user industry sectors. Examples are payroll, inventory control, and financial planning.

    - Industry-Specialised products, in a specific industry sector such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting and airline scheduling.

  - Systems Products are software products that enable the computer/communications system to perform basic functions. They consist of:

    - Systems operations products, which function during applications program execution to manage the computer systems resource. Examples include operating systems, DBMS, communication monitors, emulators, and spoolers.

    - System utilisation products, used by operations personnel to utilise the computer system more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.

II SOFTWARE SUPPORT CHARACTERISTICS AND TRENDS

A. WHAT IS SOFTWARE SUPPORT?

- Software support does not have a commonly accepted definition in either the user or vendor community.

  - Information systems departments have elastic definitions of support when maintaining their own in-house-developed software: support covers functions ranging from fixing minor bugs to system rewrites encompassing many man-years of effort.

  - This confusion carries over into vendor activites. It is at least partly influenced by the lack of clarity of IS departments' expectations.

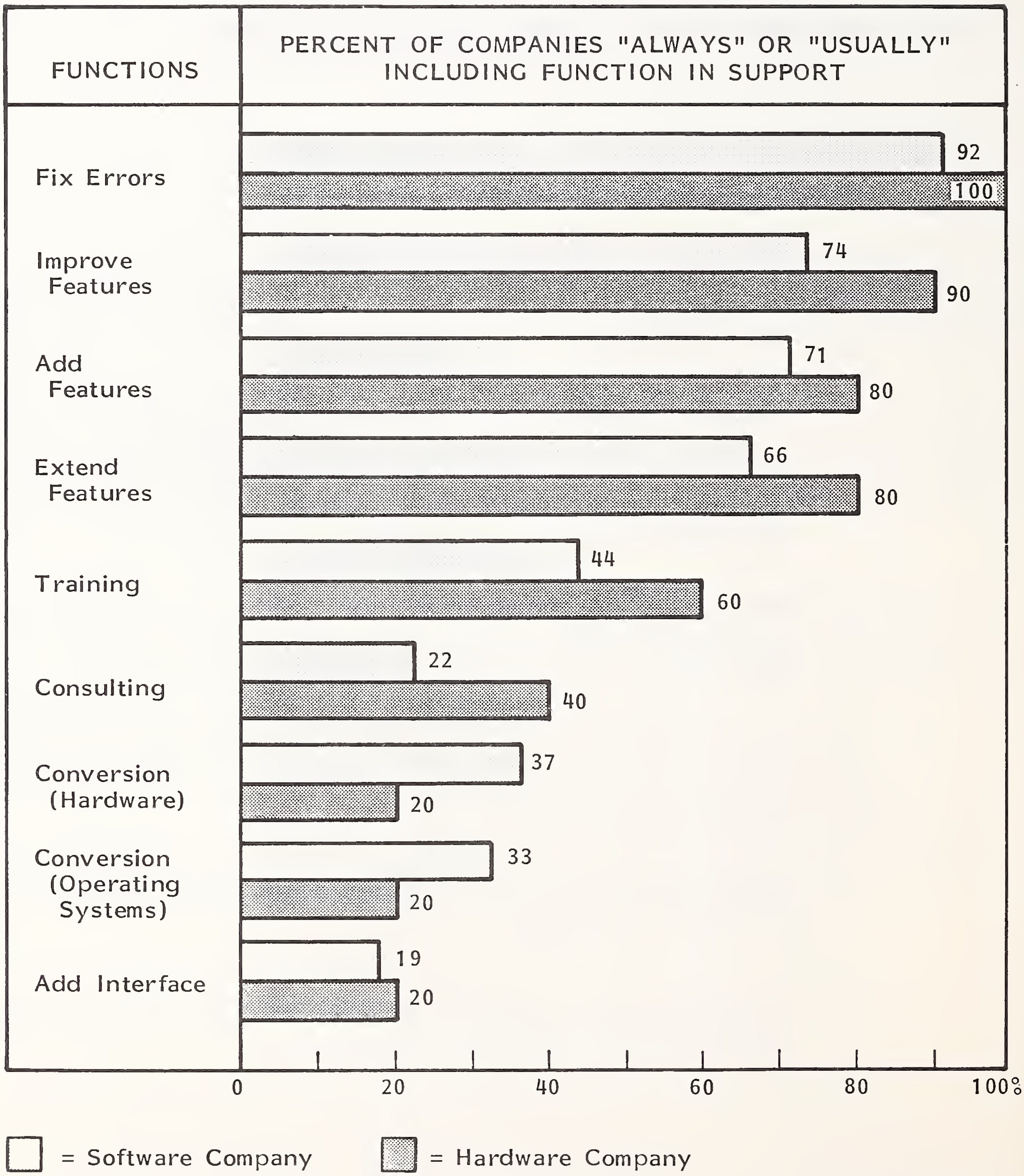
- Virtually all vendors agree that fixing software errors is included in software support, as shown in Exhibit II-1. It is interesting that a few software vendors do not see even this as part of their responsibilities.

  - Most vendors also see improving, adding, and extending features as part of software maintenance.

  - Software vendors are much less likely than hardware vendors to include training and consulting as part of support.

EXHIBIT II-1

FUNCTIONS INCLUDED IN VENDOR SOFTWARE SUPPORT



SOURCE: INPUT Survey (U.S. Data)

- Supplying conversion and interface assistance is seen by only a minority of vendors as being part of maintenance.

- Generally, software vendors include fewer activities in support than hardware vendors, except for conversions.

    . Hardware vendors take a more inclusive view of support because they are used to taking a more comprehensive view of customers' needs; in addition, a bundled services attitude in many cases has survived unbundling.

    . The exception for conversions points up the different roles of hardware and software companies. Hardware companies will only consider conversions within their own hardware line, while software companies will make any conversion that is economically attractive.

- Hardware vendors have not changed their definition of support in the past three years. However, 30% of the software vendors reported doing so to adapt to new markets and product areas.

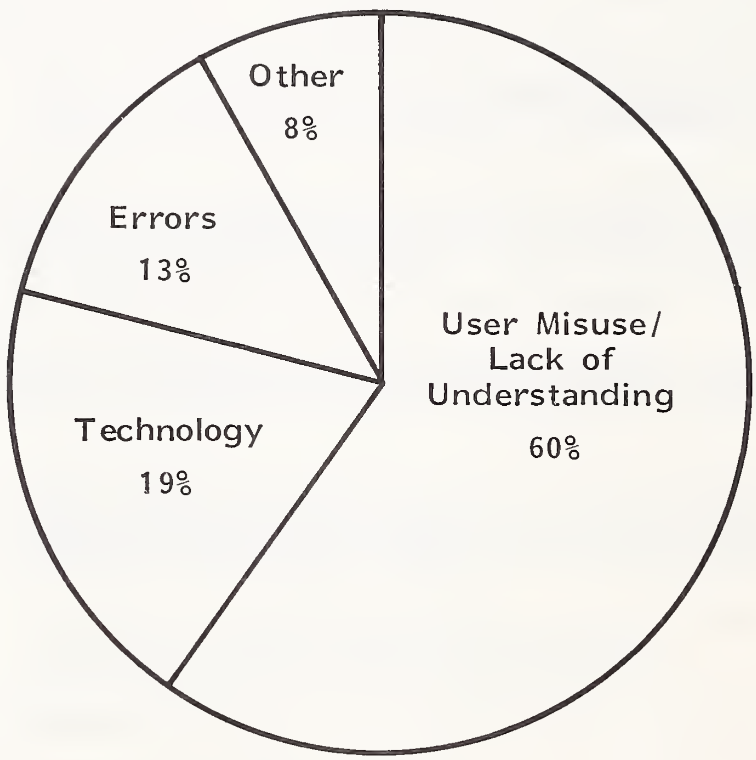
- Both hardware vendors (60%) and software vendors (44%) expect to be making changes in the activities included in software support. Both types of vendor will try to reduce the extent of services and activities included in support, as part of their efforts to reduce the resources and costs of software support.

- It is noteworthy that while fewer than half the vendors view training and consulting as activities normally part of software support, 60% of vendors see dealing with user misuse or lack of understanding as the key support activity, as shown in Exhibit II-2.

    - Error correction accounts for only 13% of activities. (Note: this is within the 10-20% range commonly reported for in-house support.)

EXHIBIT II-2

FREQUENCY OF SUPPORT ACTIVITIES



SOURCE: INPUT Survey (U.S. Data)

- Technology issues (e.g., conversions, upgrades, or improved efficiency) account for less than one-fifth of activities.

- There is consequently a built-in tension between what vendors see as software support and the actual demands on the software support area.

B. ORGANISATIONAL ISSUES

I. THE CUSTOMER SERVICE FUNCTION

- In virtually all companies the software support staff is ultimately attached to the marketing organisation.

  - The typical hardware company organises its software field support organisation as shown in Exhibit II-3. Some companies, such as Honeywell, have transferred software maintenance responsibilities (i.e., the hardware maintenance organisation) to field engineering.

  - A number of other hardware companies have been debating the value of a similar transfer.

    - INPUT's observation is that such transfers are neutral. There are advantages and disadvantages in having the software support in marketing (which in effect means that it is semi-independent) as well as in having it in field engineering. Exhibit II-4 shows some of the pros and cons.

    - The value of such a transfer will depend largely on the status of a company's marketing and field engineering organisations at a particular time, and the attitudes of key personnel.

EXHIBIT II-3

SOFTWARE FIELD SUPPORT ORGANIZATION
IN A TYPICAL HARDWARE COMPANY

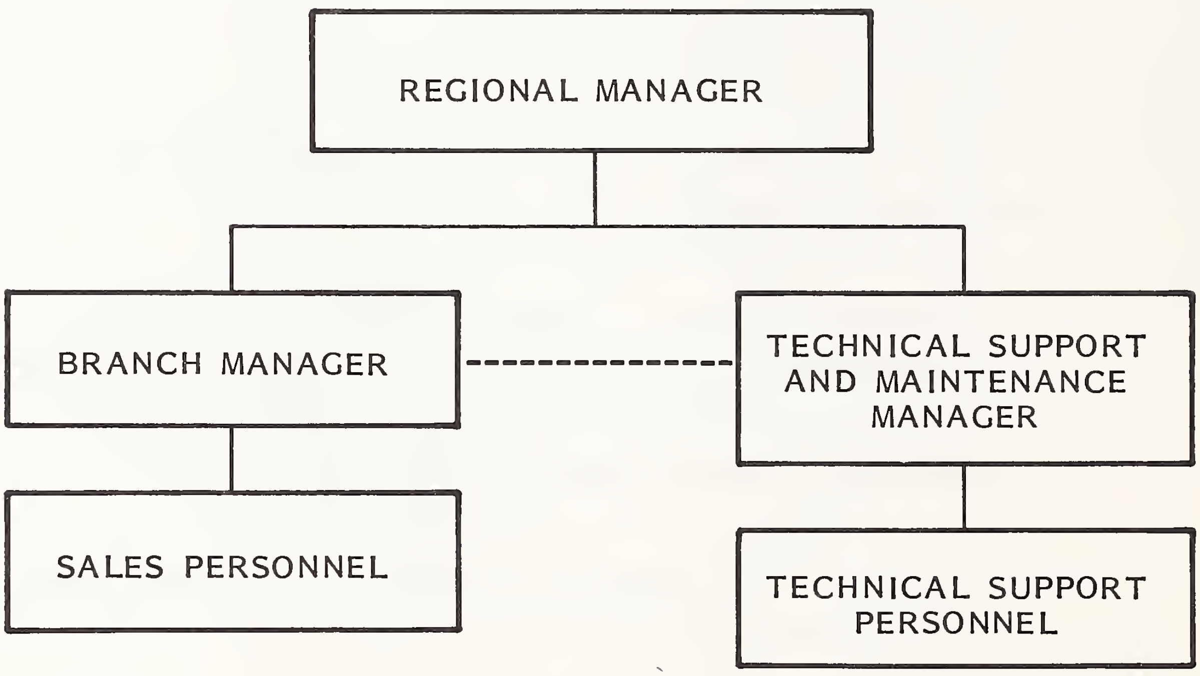


EXHIBIT II-4

ORGANIZATIONAL LOCATION OF SOFTWARE SUPPORT CUSTOMER SERVICE FUNCTIONS

	MARKETING	FIELD SERVICE
Advantages	Maintenance is integrated with pre- & post-sales support Maintenance activities can directly support sales efforts Marketing can understand customer product needs better	All maintenance activities are co-located Staff can be cross-trained Hardware maintenance staff can be retrained for software
Disadvantages	Marketing is not technically oriented Potential conflict between sales support and maintenance Marketing management may emphasise sales activities	Hardware and software technical issues is much different Interdepartmental cooperation needed to sales support Hardware retraining is difficult

- It is important to keep in mind that in certain critical respects software support does not fit well in either marketing or field engineering (at least as it is presently constituted).

    . Software in general is unlike hardware.

    . Software support will always have ties to the software development function.

    . People in software have different personal characteristics and attitudes from people in marketing and field engineering.

- Regardless of the organisational sponsorship, communication between the customer and the central maintenance group will follow the process shown in Exhibit II-5.

    - The customer support representatives are not necessarily technically trained in the internals of the product, but have an excellent hands-on knowledge of the product from the user's perspective.

        . If the vendor has a large enough customer base and resources, the representatives will specialise by product.

        . The staff can also provide sales and installation support.

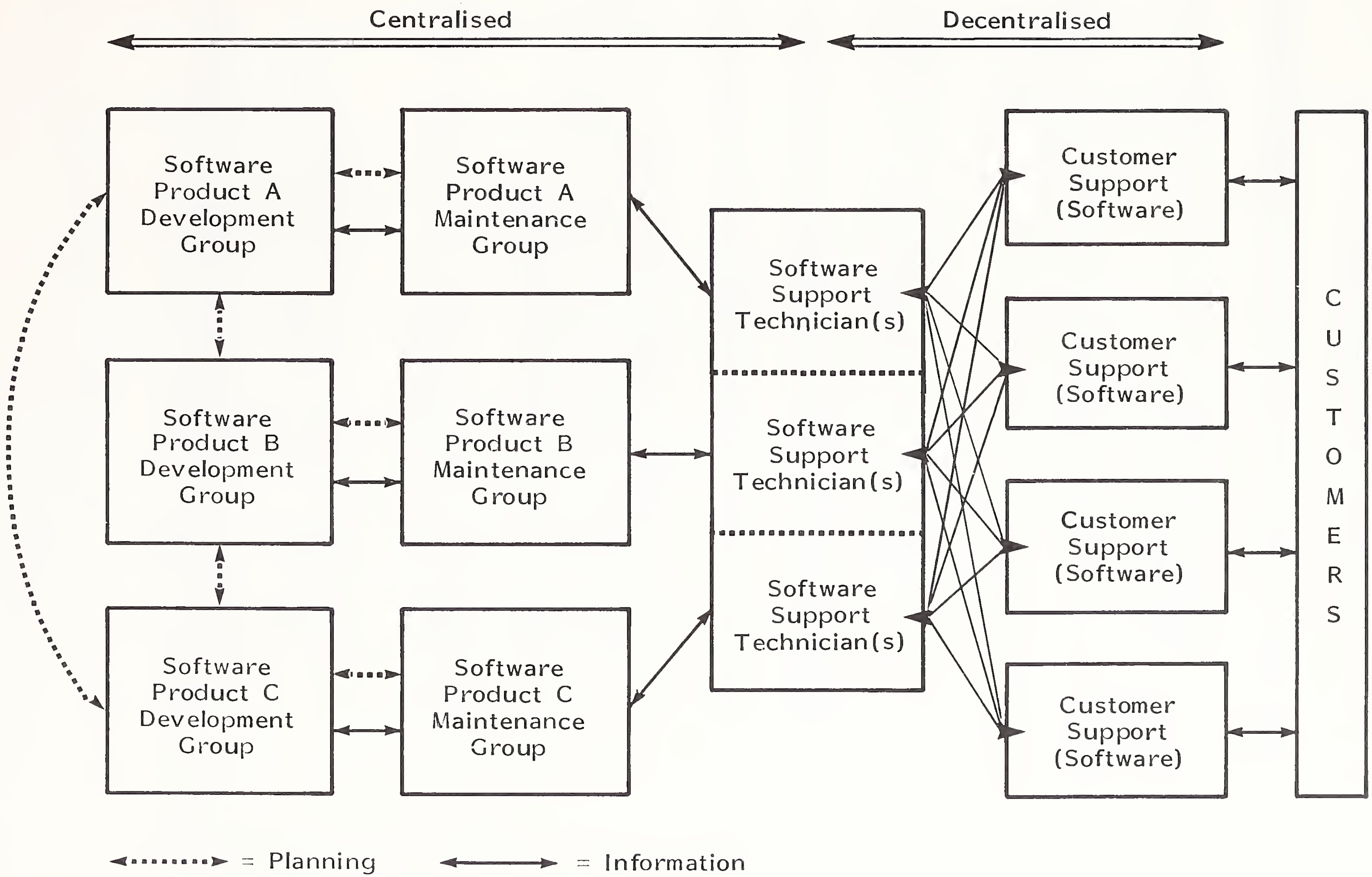
        . Personality is more important than intellectual skills.

    - The software support technicians are middlemen.

        . They back up the customer support representatives on narrow or technical issues.

EXHIBIT II-5

SOFTWARE SUPPORT COMMUNICATIONS



- They must specialise by product.

- They are filters to the central maintenance group.

- The maintenance group is made up of true software technicians (programmers and analysts).

  - They must keep up some contact with the field staff (and even customer) so that they do not become divorced from the real world.

  - They, in turn, must interact with the new product development group. This relationship is the subject of the next section.

2. THE RELATION OF THE DEVELOPMENT AND MAINTENANCE FUNCTIONS

- The role of the software support staff varies from company to company.

  - Generally speaking, the support staff is highly (usually, solely) involved with customer contact, as well as error determination and correction. There is less involvement in the design coding and documentation of software revisions, as shown in Exhibit II-6.

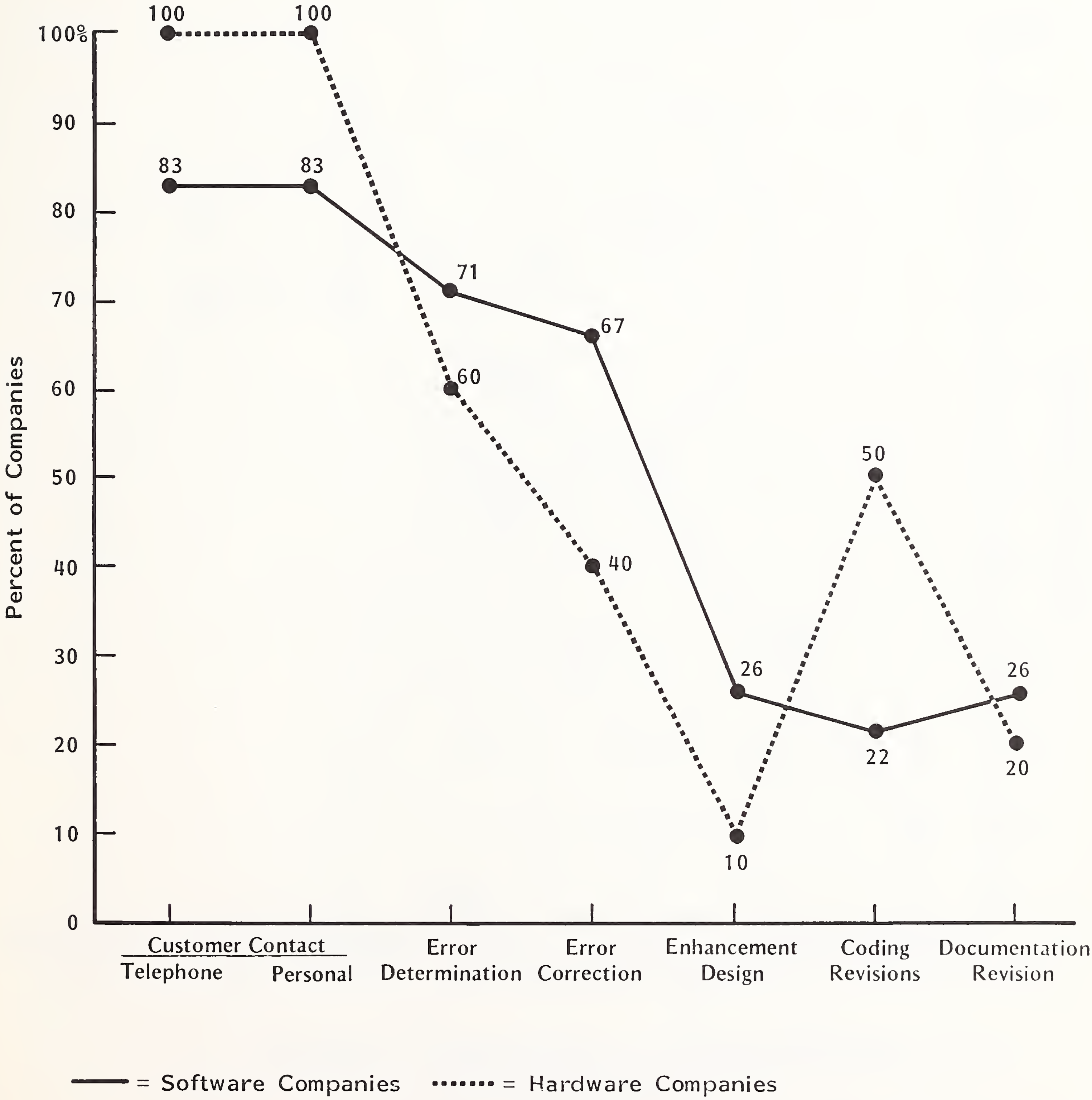
  - The software development group mirrors the support group's involvement, as shown in Exhibit II-7.

  - Development groups in hardware companies tend to be more involved than those in software companies, as shown in Exhibit II-8.

  - Respondents express satisfaction with present arrangements and plan few changes.

EXHIBIT II-6

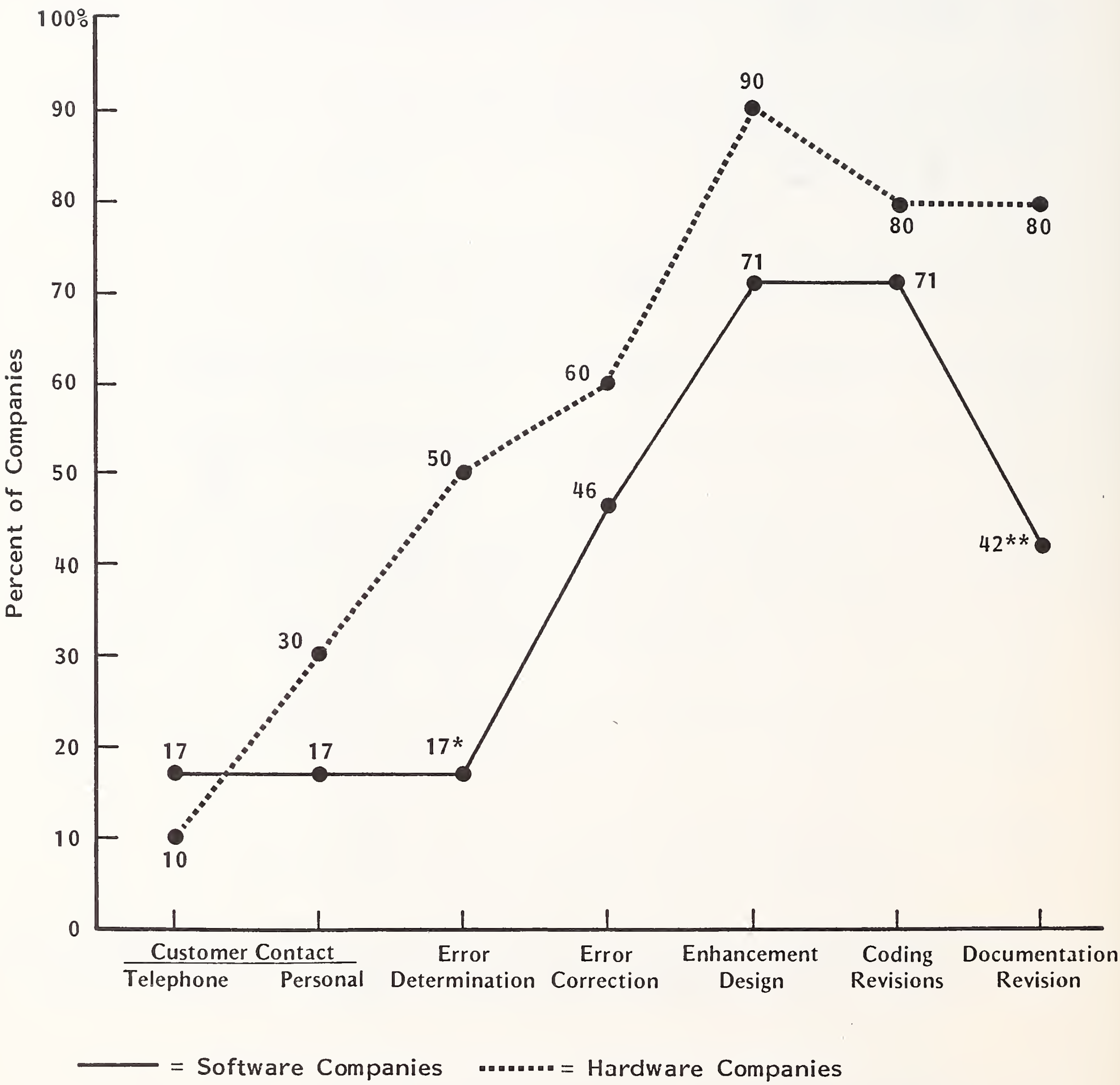
SOFTWARE SUPPORT STAFF FUNCTIONAL INVOLVEMENT



SOURCE: INPUT Survey (U.S. Data)

EXHIBIT II-7

SOFTWARE DEVELOPMENT GROUP FUNCTIONAL INVOLVEMENT



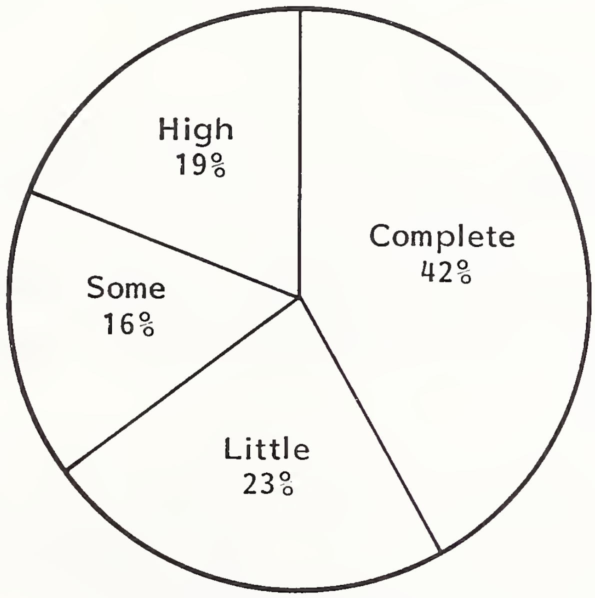
* Quality Control also involved in 17% of companies

** Documentation Group also involved in 21% of companies

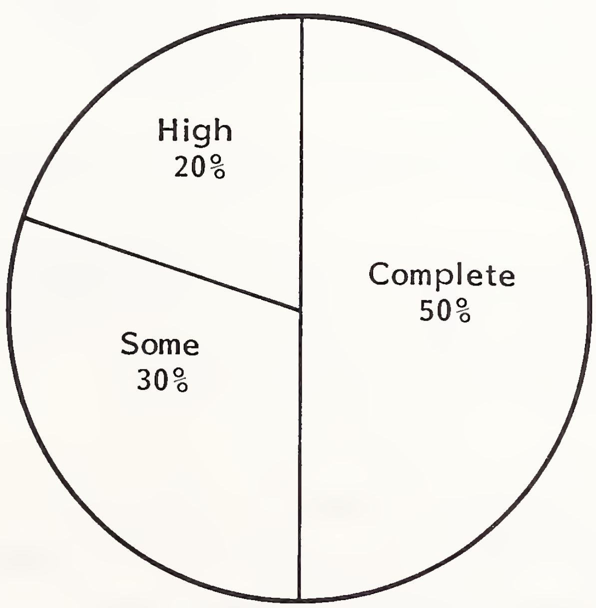
SOURCE: INPUT Survey (U.S. Data)

EXHIBIT II-8

EXTENT OF INVOLVEMENT OF
DEVELOPMENT GROUP IN SUPPORT



SOFTWARE VENDORS



HARDWARE VENDORS

SOURCE: INPUT Survey
(U.S. Data)

- There are three basic models for organising the central software maintenance function:

  - These approaches can be labeled as:

    . Coordinated.

    . Integrated.

    . Independent.

  - In the coordinated approach software support and development are separate entities, but they report to the same product software manager.

  - The integrated approach is similar, except that the developer and maintainer roles are not distinct. There is much trading of responsibilities. No one is stuck doing support.

  - The independent approach separates developers and supporters. Separate support career paths and specialisations can be developed. This is not practical if the entire staff for a software product (or product group) is small (i.e., under 25).

  - Exhibit II-9 shows the three approaches graphically.

- Each organisational option has different effects on the turnover, morale, skills, and feasible project size of the central software maintenance organisation. Exhibit II-10 summarises these effects.

  - The independent organisation is the most conducive to effective maintenance activities. However, skills are needed to coordinate the range of software activities for a given product. The development group will usually oppose this approach.

EXHIBIT II-9

ORGANIZATIONAL ALTERNATIVES FOR
CENTRAL SOFTWARE SUPPORT FUNCTION

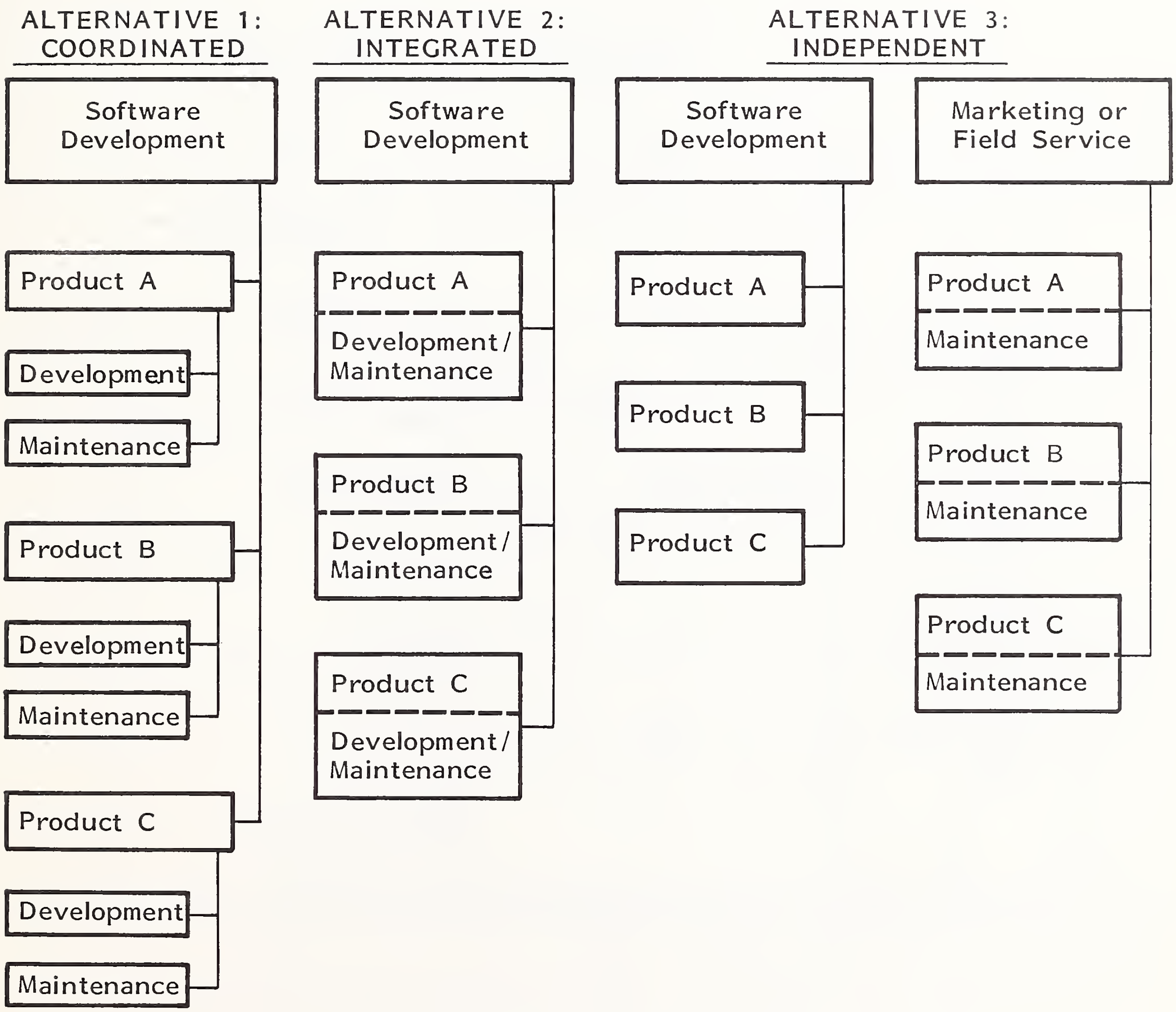


EXHIBIT II-10

EFFECTS OF SOFTWARE SUPPORT ORGANIZATION OPTIONS

		MAINTENANCE PHYSICALLY AND ORGANIZATIONALLY DISTINCT: Yes	MAINTENANCE PHYSICALLY AND ORGANIZATIONALLY DISTINCT: No
MAINTENANCE ORGANIZATION PERFORMS MAINTENANCE ONLY	Yes	(Independent) Low Turnover High Morale High Skills Developed Large Project Size Feasible	(Coordinated) High Turnover Low Morale Medium Skills Developed Large Project Size Feasible
MAINTENANCE ORGANIZATION PERFORMS MAINTENANCE ONLY	No	N/A	(Integrated) Medium Turnover Medium Morale Medium Skills Medium Project Size Feasible

- The integrated approach is well-suited to small software groups. The problem is that no one wants to do support, and the integrated approach often degenerates into the coordinated approach.

C. SOFTWARE SUPPORT STRATEGIES

I. STRENGTHS AND WEAKNESSES

- In developing a strategy for approaching software support, the first questions to ask are: "What kind of company am I?" then, "Will I be the same company in five years?"

  - The obvious place to start is with the differences between hardware and software companies. Some of the advantages and disadvantages of each are summarised in Exhibit II-11.

    - Many of the strengths and weaknesses of software companies are due to their relatively small size.

    - Hardware companies, especially the mainframe companies, are more ponderous and structured organisations. This is not always a disadvantage for a support function. Customers expect support to be uniform and by-the-numbers. There is little room for inspiration in a support environment.

  - Exhibit II-11 should not be taken as a prescription for every company. Each company is in a unique situation. Ideally, each company will make its own list of strengths and weaknesses and look for ways to build on strengths and minimise weaknesses.

EXHIBIT II-11

SOFTWARE SUPPORT STRENGTHS:

HARDWARE COMPANIES AND INDEPENDENT SOFTWARE COMPANIES

	INDEPENDENT SOFTWARE COMPANY	HARDWARE COMPANY
Advantages	High profile in area of specialization	Large resource base (dollars, people)
	Deep knowledge of products and market in area of specialization	Integrated, comprehensive software products
	Quick reactions to market	Good geographic support for marketing and support
	Relatively easy for new entrants to produce products	Sole source for some systems software
	Attractive to entrepreneurial/ risk-taking staff attempting breakthrough products	Much closer integration of hardware and software
Disadvantages	Limited resource base (dollars, people)	Resources possibly spread too thin
	Product line usually limited	Software products possibly obsolescent, inadequate, or nonexistent
	Difficult to obtain satisfactory marketing and support geographic coverage	Reaction time may be slow
	Relatively easy for new entrants to produce products	Risk taking may not be welcomed
	Must react to hardware changes	Software traditionally only offered for own hardware

2. SUPPORTING INDEPENDENTLY DEVELOPED SOFTWARE

- In the past, vendors tended to develop their own software. There was then little question, or option, of who would support the software.

- This situation is now changing as more companies are adding specific software products from outside suppliers to their own line of products.

    - One alternative, followed by many minicomputer and small system vendors, is not to actually acquire the software, but to keep at arm's length from the vendor.

        - At the most, the hardware vendors examines the software and recommends its use.

        - At the least, the hardware vendor merely maintains lists of software products but makes no recommendations of one over another.

        - Either way, the hardware vendor has little control over the product's evolution, its quality, or even its existence.

    - The alternative, followed by such diverse companies as IBM and Cullinane, is to buy up rights to a product. Where product presence is desirable, this gives a vendor a proprietary product and complete control over it.

- The question then becomes: will the buying or selling company support the software?

    - The main reason for going outside in the first place is to lower the investment in time and resources to develop a software product.

- Contracting with the seller to continue supplying central support functions would lower initial investment.

- It may be possible as part of the acquisition to take on part of the seller's technical and support staff. This is a desirable alternative, if feasible. However, many people will not want to leave their company or will not last long in a new, usually much larger company.

- Exhibit II-12 summarises the pros and cons of having the buyer or seller support third-party-developed software.

3. NEW VERSUS ENHANCED SOFTWARE PRODUCTS

- One of the barriers to making software support into a functioning P&L center is that some of the most attractive enhancements to existing software can just as easily be packaged as new products. If this is done, the benefits do not accrue to the software support organisation.

- Many software planners freely admit that their firms do not have hard and fast rules for deciding when a bundle of capabilities is a new product (as opposed to an enhancement), or what constitutes a major as opposed to a minor enhancement. Exhibit II-13 shows the relationship, and overlap, between new product development and support enhancements.

- Existing customers, of course, want all possible product additions to be considered enhancements and included as standard revisions covered by their maintenance contracts. Older customers (and some old-time vendor personnel) identify with the bundled software era when everything was free.

    - In reality, customers have little or no contracted protection from vendors announcing an improved software product, and charge current customers a significant proportion of list price, if not the full list price.

EXHIBIT II-12

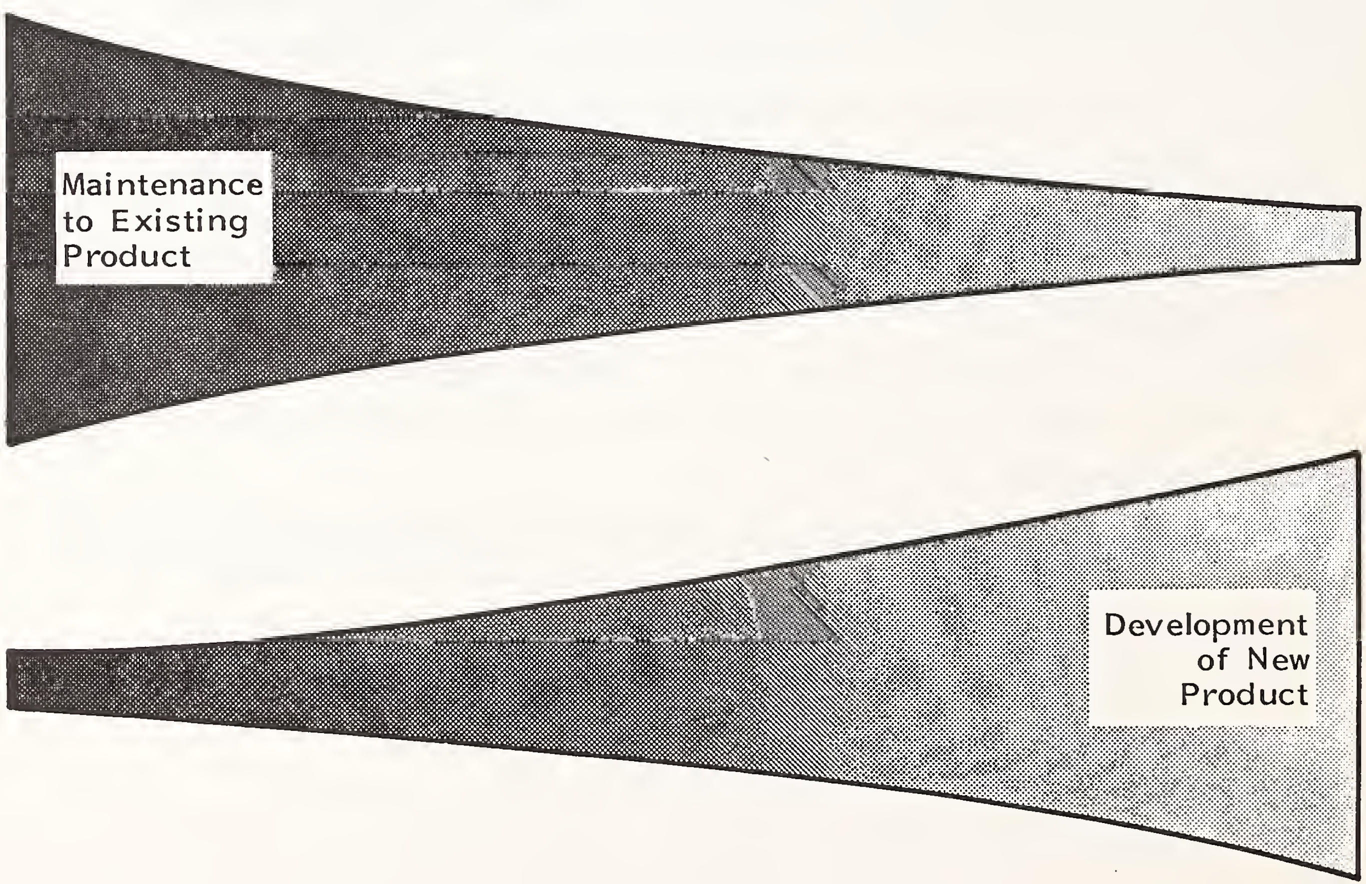
SUPPORTING INDEPENDENTLY DEVELOPED SOFTWARE: BUYER OR SELLER?

ADVANTAGES TO BUYER SUPPORTING	ADVANTAGES TO SELLER SUPPORTING
• More direct quality control	• Lower initial investment in resources and management time
• Easier maintenance of documentation and other standards	• Conserve scarce in-house staff
• Possible addition of key seller staff	• Greater expertise of seller's staff
• Difficulty in motivating staff for maintenance	• Reluctance of seller's staff to join/stay with buyer
• Easier field/central-staff coordination	

EXHIBIT II-13

DEGREE OF INVOLVEMENT OF NEW PRODUCT DEVELOPMENT AND SUPPORT

Fixing Errors	Improving Usability	Extending Current Features	Adding Interfaces	Adding Features and Functions



- The only barrier to this (but it is a strong one) is the long-term damage it will do to the vendor's standing in the marketplace. Some vendors have damaged their reputations in this way, usually because of serious financial pressures.

- Some vendors adopt a middle path, announcing a higher-priced, improved product, while including many of the new features as maintenance revisions to current products.

  - This approach must be well thought out from a marketing standpoint so that satisfying current customers does not undermine future sales.

  - There is a long-term technical burden in maintaining two or more similar, but not identical, products.

- For this reason many vendors "bite the bullet" and make it financially advantageous to upgrade to new products, especially when the old product, at a technical dead end, will not attract many new sales in any event.

  - Negative incentives can also be applied by announcing that support of the old product will be stopped soon (generally in less than a year).

  - This will get the new product off to a rousing start by giving it an instant track record.

4. OPPORTUNITIES IN SOFTWARE SUPPORT

- Not all software packages are created equal from a software support standpoint.

  - Few customers will want to go bare on operating system maintenance, even if they have the chance.

- On the other hand, many purchasers of large, industry-specialised packages buy the package, intending to modify it extensively. For them, support is just a tax on the purchase price.

- A buyer of small, stable packages that have been in existence for some time will rarely feel the need for extensive support.

- Support is perceived as highly valuable in large, complex packages that the customer has no intention of modifying. DBMS is a good example of this type of product.

- These relationships can be graphically illustrated, as shown in Exhibit II-14.

- This is not to say that vendors should ignore the low-need areas. These can in fact be the most profitable. Two approaches can be made:

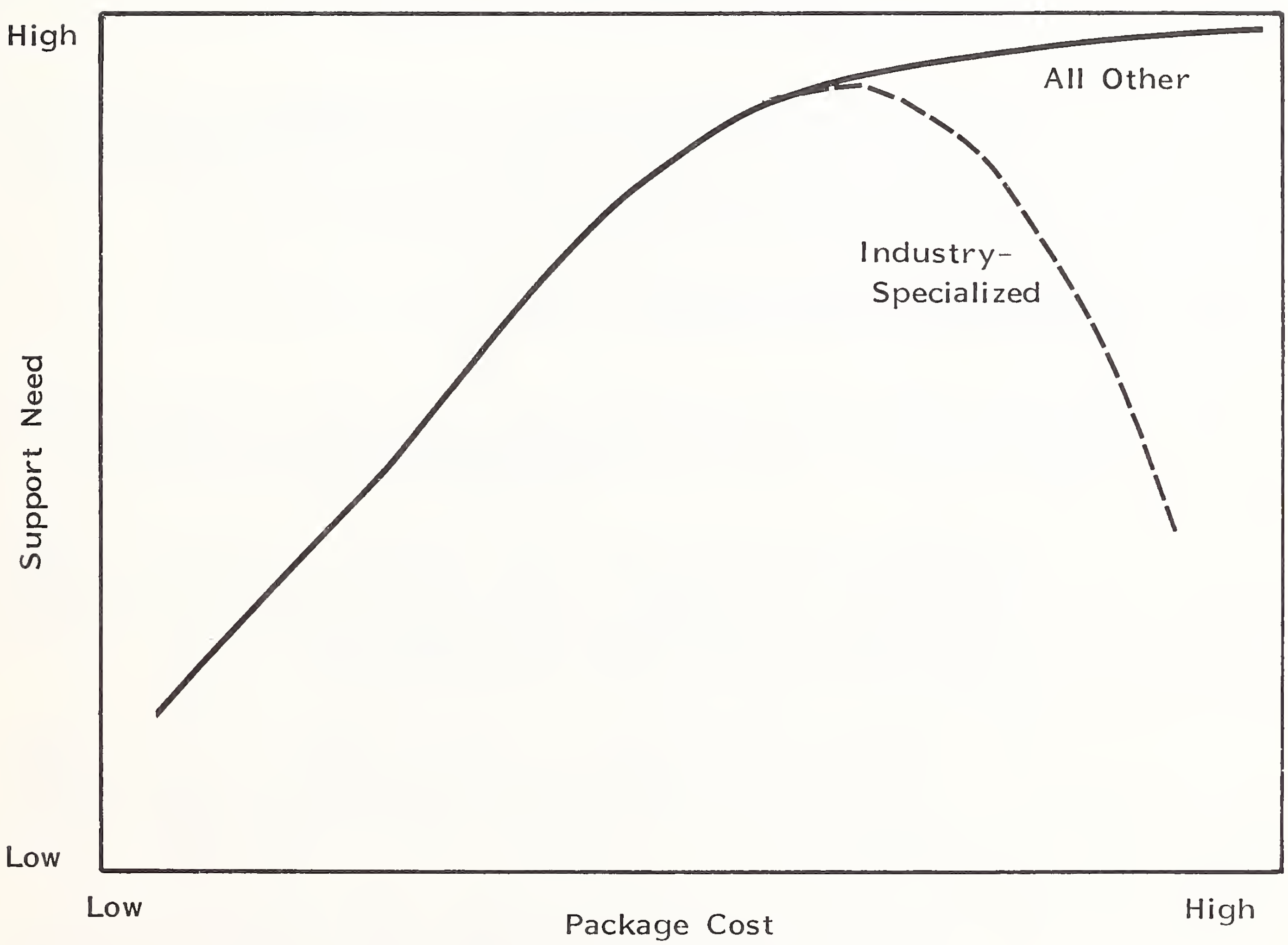
  - Tax: Given the relative price-insensitivity to software, if a customer sees a need for a package at \$X, then the customer will usually not balk at an additional \$.1X per year. If the vendor has an attractive product, then there should be a mandatory support requirement, at least for several years.

  - Insurance Policy: The other approach, useful for small, stable packages, is to have a nominal support price, covering error fixes only. At the right price, customers will buy the insurance for at least several years.

- Vendors should keep in mind that in general support has not been tracked or controlled very precisely in many data processing budgets.

EXHIBIT II-14

SOFTWARE SUPPORT NEEDS



- In some companies, operations software (and its support) is included in hardware budgets, a remnant of bundled hardware days.

- In other companies, hardware and software maintenance budgets are combined.

- In still others, specific application software and maintenance expenses are charged to a particular application system.

- In many companies, these different classifications are being used simultaneously.

- There have been some attempts to tighten up as a result of the current recession; however, software maintenance is too scattered and misunderstood for cost cutting to have much effect.

5. STRATEGIC CONSIDERATIONS

- Software support can be an important part of a company's business strategy. Software support is in some ways the last frontier for many companies.

    - Hardware's price/performance and reliability are improving rapidly. Unfortunately for established vendors, these same factors are turning many hardware products into a commodity market.

        - Hardware maintenance has been most resistant to these tendencies, but even here third-party maintainers have gotten a foothold.

        - Over the longer term, rapidly falling prices and increasing reliability will reduce hardware maintenance opportunities.

- Software in general is a messy area. It is expensive to produce and often only marginally meets customer needs. Software productivity has lagged far behind hardware performance. New software products, especially for smaller systems, are easy to produce in the well-known garage.

  . This places pressure on established vendors.

  . Outsiders cannot, however, feasibly offer add-ons or maintenance to existing software products. Consequently, it is the most protected area for established vendors.

- Exhibit II-15 summarises these relationships and trends.

• The conclusion is that software and especially software maintenance are tough areas for developing satisfactory products economically. Vendors who can make even marginal breakthroughs should be able to reap large rewards.

D. TRENDS AND DEVELOPMENT

• Many vendors, like IBM, are assigning software distribution and some maintenance to their field service divisions. This is done to provide a central source that the customer can go to for total service from one vendor.

• Typically, it is not the engineer in the field, but a centralised hotline service center that provides maintenance and distribution support. For example, Honeywell's Remote Support Update Facility provides maintenance service to users for applications and systems software.

• Users of small systems are undecided as to what the role of the FE should be in terms of software support. On one hand users rate communications with

EXHIBIT II-15

STRATEGIC FACTORS FOR
HARDWARE AND SOFTWARE PRODUCTS

	COST TO PROVIDE	CUSTOMER NEEDS SATISFACTION	RELIABILITY	RESISTANCE TO NEW COMPETITORS
Hardware Products	++	++	+	–
Hardware Enhancements	++	++	+	–
Hardware Support	+	0	+	+
Software Products	–	–	0	–
Software Enhancements	–	–	0	++
Software Support	– –	– –	–	++

Key: ++ = Very Favorable
+ = Favorable
0 = Neutral
– = Unfavorable
– – = Very Unfavorable

software engineers significantly lower than they do communications with hardware engineers. This suggests that the personal interaction between the hardware FE and the user could be used to improve software support. On the other hand, users definitely want to restrict the FE's function to only hardware support. For example, almost 60% of small-system users interviewed by INPUT opposed FEs that sell software.

- The need for centralised software support and personal interaction with the user has caused a majority of small-system vendors to begin integration of hardware and software support functions. Exhibit II-16 demonstrates the degree to which integration has been completed.

- Exhibit II-16 shows that a slightly higher percentage of vendors are integrating systems software into hardware functions, than they are applications software support into the hardware function. This is caused by two factors:

  - Applications software, even when licensed by the small-system vendor, is often written by a third party. The third party usually maintains its own software support group.

  - Conversely, systems software is usually the responsibility of the vendor and is instrumental in the overall functioning of the system.

- One factor that vendors report may limit the integration of hardware and software maintenance is the variability of software. While hardware is generally quite standard, customisation of software is common and limits the degree to which it can be maintained by standard maintenance procedures.

- Despite diversity in software, it is likely that vendors will move toward increased integration. Vendors reported that application software integration will lag behind system software integration, but that overall integration will grow substantially in the next three to five years.

EXHIBIT II-16

SMALL-SYSTEM INTEGRATION OF SOFTWARE SUPPORT INTO HARDWARE SUPPORT FUNCTION

INTEGRATION OF LARGE-SYSTEM SOFTWARE SUPPORT ACTIVITY	PERCENT OF VENDORS IMPLEMENTING	DEGREE OF INTEGRATION (percent)	
		1983	1985
Systems Software	60%	46%	68%
Applications Software	53	27	47

SOURCE: INPUT Survey (U.S. Data)

- While the 1980s will continue the trend toward reduced hardware costs or increased processing capacity for the same cost, this does not necessarily mean that full computer systems will be less expensive in the 1980s. Total software costs are increasing, resulting from increased sophistication as well as from rapidly escalating labor costs. However, the impact of increasing software costs, like other facets of computer technology, may be reduced by innovative ideas and advanced technology.

- One approach is to incorporate software into computer hardware. IBM is currently planning this approach through the introduction of an omnibox in the mid-1980s. This unit would be an entire system, including the central computer and peripherals, packaged in a box two cubic meters in size. This unit would have many software functions preprogrammed as firmware. While such systems may have limited versatility, the special-purpose software-oriented mainframe computer may also be a trend in the 1980s.

- Past practice has been to design a general or multipurpose central processor and then program the specific job application in order to achieve the desired system. Future mainframes may very well be either microprocessors with incorporated hardware to perform a prespecified task or a combination of several microprocessors designed to encompass all of a firm's application processing needs. This may become feasible because a tradeoff exists between decreasing hardware costs and increasing software costs, especially for scientifically oriented applications.

- Under any circumstances, the servicing and support of software in large mainframes will become an increasingly important function. In today's environment, the field engineer is primarily hardware oriented. Software support is provided by technical assistance centers. Increasingly, service engineers must be provided with direct access to this specialised software knowledge while at the job site. One approach is to use handheld/portable computers as a mechanism for software diagnostics and direct access to software specialists.

III THE STATE OF SOFTWARE SUPPORT IN EUROPE

A. USER RATINGS OF SOFTWARE SUPPORT BY VENDOR

- Exhibit III-1 indicates that users' perceptions of the software support they receive from vendors is good to excellent.

- Vendors receiving highest marks are:

  - Amdahl.

  - DEC.

  - Ericsson.

  - Honeywell (Benelux).

  - IBM.

  - Norsk.

- Vendors receiving lower marks are:

  - Honeywell (Germany).

  - ICL.

EXHIBIT III-1

USER RATINGS OF SOFTWARE SUPPORT

	UNITED KINGDOM	GERMANY	FRANCE	BENELUX	SCANDINAVIA	ITALY
Amdahl	Excellent	–	–	–	–	–
Burroughs	Good	–	Good	Good	Good	–
DEC	Excellent	–	Good	Very Good	–	Good
Ericsson	–	–	–	–	Excellent	–
Hewlett-Packard	Good	–	Very Good	–	–	Good
Honeywell	Good	Adequate	Good	Very Good	Excellent	Good
IBM	Good	Good	Good	Good	Excellent	Good
ICL	Good	–	Adequate	Good	–	Good
NCR	–	–	Very Good	Adequate	–	–
Norsk	–	–	–	–	Excellent	–
Prime	Good	–	–	–	–	–
Siemens	–	Good	–	–	Adequate	–
Sperry	Adequate	–	–	Adequate	Very Good	Good

– = No Data

SOURCE: INPUT Survey

- NCR.

- Siemens.

- Sperry.

B. QUALITY OF SOFTWARE SUPPORT

- Overall quality of software support is good to very good as shown in Exhibit III-2.

  - The U.K., German, and French users rate software support highly in all three categories including large, small, and all systems. "All" includes large and small as well as intelligent terminals, word processors, etc.

  - Representative ratings are also shown for Benelux, Scandinavia, and Italy.

C. TRENDS IN SOFTWARE SUPPORT IMPORTANCE AS SEEN BY USERS

- Software support is certainly important in the eyes of the user. INPUT has measured this for the past three years and the results are shown in Exhibit III-3.

  - In the U.K., software support has been and remains extremely important to users.

EXHIBIT III-2

SOFTWARE SUPPORT QUALITY RATED BY USERS

	LARGE SYSTEMS	SMALL SYSTEMS	ALL SYSTEMS
United Kingdom	Very Good	Very Good	Very Good
Germany	Very Good	Very Good	Very Good
France	Very Good	Very Good	Very Good
Benelux	Good	Good	Very Good
Scandinavia	Good	Good	Good
Italy	Good	Very Good	Good

SOURCE: INPUT Survey

EXHIBIT III-3

TRENDS IN SOFTWARE SUPPORT IMPORTANCE AS SEEN BY USERS

	1983	1982	1981
United Kingdom	Extremely Important	Extremely Important	Extremely Important
Germany	Extremely Important	Critical	Important
France	Critical	Extremely Important	Important
Benelux	Extremely Important	Extremely Important	Extremely Important
Scandinavia	Extremely Important	Important	Important
Italy	Extremely Important	Extremely Important	Important

SOURCE: INPUT Survey

- In Germany, software support became critical to users in 1982 but lately it reflects users' perceptions of the apparent lack of confidence in software support resources.

- The importance of software support in Benelux, Scandinavia, and Italy has risen currently, as users there become worried about resources.

D. SOFTWARE REPAIR TIME

- Exhibit III-4 indicates a wide variation in perceived software repair times in terms of what users think they now get, the ideal target, and the acceptable maximum.

- Software repair times, as perceived by users, exceed customers' limits in France, Scandinavia, and Italy - indicating that more software support skills are required.

- In the U.K., Germany, and Benelux, perceived repair times for software are less than the limits established by users. This indicates that resources are adequate.

E. BETTER SOFTWARE SERVICE REQUIRED FROM USERS

- While European users seem very satisfied with the quality of software support, improvements are required in Benelux, the U.K., and Italy, as depicted in Exhibit III-5.

EXHIBIT III-4

SOFTWARE REPAIR TIME (In Hours)

	CURRENTLY RECEIVE	IDEAL	LIMIT
United Kingdom	7.5	4.6	8.6
Germany	3.1	2.7	7.4
France	13.0	11.0	9.0
Benelux	6.8	2.3	7.7
Scandinavia	5.7	2.1	4.3
Italy	20.9	2.9	6.5

SOURCE: INPUT Survey

EXHIBIT III-5

BETTER SOFTWARE SERVICE REQUIRED FROM USERS

	DEGREE OF REQUIREMENT
United Kingdom	Strong
Germany	Moderate
France	Moderate
Benelux	Urgent
Scandinavia	Nil
Italy	Strong

SOURCE: INPUT Survey

F. SOFTWARE SUPPORT PRICING

- There is a general underpricing of software support in Europe, as shown in Exhibit III-6. The value of the underpricing was determined using figures from users representing their limits versus what they currently thought they were getting.

- In each country there is room to price software support at higher levels, with Scandinavia, Benelux, Germany, and Italy being prime targets.

G. USER INTEREST IN PROVIDING SOFTWARE ASSISTANCE

- On the whole, users are quite interested in providing assistance to software support vendors, in terms of helping with diagnosis and patching, as described in Exhibit III-7.

- With the exception of West Germany, this willingness on the part of users should be exploited by software support vendors.

H. SOFTWARE SERVICE PRODUCTS' MARKET POTENTIAL

- There are fair to excellent possibilities for new service products involving software support, as shown in Exhibit III-8.

- A provision for guaranteed turnaround on software fixes is in high demand, generally, as are software consulting services. Software enhancement services opportunities are better still.

EXHIBIT III-6

SOFTWARE SUPPORT PRICING AS SEEN BY USERS

	UNDERPRICING PERCENT
United Kingdom	3-6%
Germany	4-10
France	2-4
Benelux	5-11
Scandinavia	6-13
Italy	4-10

SOURCE: INPUT Survey and Estimates

EXHIBIT III-7

USER INTEREST IN PROVIDING SOFTWARE ASSISTANCE

	HELPING DIAGNOSE	HELPING PATCH
United Kingdom	Very Interested	Very Interested
Germany	Not Very Interested	Not Very Interested
France	Very Interested	Very Interested
Benelux	Very Interested	Very Interested
Scandinavia	Interested	Interested
Italy	Very Interested	Interested

SOURCE: INPUT Survey

EXHIBIT III-8

SOFTWARE SERVICE PRODUCTS' MARKET POTENTIAL

	SERVICE PRODUCTS' MARKET POTENTIAL		
	GUARANTEED TURNAROUND ON SOFTWARE	SOFTWARE CONSULTING SERVICE	SOFTWARE ENHANCEMENTS
United Kingdom	Good	Fair	Good
Germany	Fair	Fair	Fair
France	Good	Good	Good
Benelux	Fair	Fair	Good
Scandinavia	Excellent	Excellent	Excellent
Italy	Very Good	Very Good	Very Good

SOURCE: INPUT Survey

- The potential market is good to excellent in France, Scandinavia, and Italy.

I. GROWTH IN USER SOFTWARE BUDGETS

- As can be seen in Exhibit III-9, the growth in software support is expected to rise in 1985 to 32% of hardware maintenance budgets, according to users.

- In terms of projections based on INPUT's 1983 Field Service Annual Report this means that the value of software support approaches $2 billion for all of Europe.

EXHIBIT III-9

GROWTH IN SOFTWARE SUPPORT

	USER SOFTWARE SUPPORT BUDGETS AS A PERCENT OF HARDWARE MAINTENANCE
1983	25%
1984	28
1985	32

APPENDIX: SOFTWARE SUPPORT TERMS AND CONDITIONS

- Hardware companies are less likely to have separate support charges where the software is leased or where use pricing is used, as shown in Exhibit A-1. Otherwide, the profiles are similar.

- There is, however, considerable variation in the approaches used to set support charges, as shown in Exhibit A-2.

- An annual fee of 10% to 12% of purchase price is common for most software vendors (67%), as shown in Exhibit A-3. The fee varies for other companies.

- Support typically includes both fixes and enhancements for software companies (93%); this is less common for hardware companies (50%), as shown in Exhibit A-3.

  - The point at which an enhancement becomes a new product can depend on:

    - Size of product.

    - Changes in functionality.

- The minimum support term is usually 12 months for software companies, as shown in Exhibit A-3. This is only true for 50% of hardware companies.

EXHIBIT A-1

SEPARATE SUPPORT CHARGES
(Summary)

TYPE OF SOFTWARE LICENSE	HARDWARE COMPANIES (percent)	SOFTWARE COMPANIES (percent)
Lease	33%	90%
Continuous Payment	40	42
Use Pricing	50	80
Paid-Up	86	100
One-Time Charge	86	100

NOTE: (1) Percentages against companies that have that type of software license.
(2) If in fee, but optional, counted as separate.

SOURCE: INPUT Survey (U.S. Data)

EXHIBIT A-2

SOFTWARE SUPPORT CHARGE APPROACH BY METHOD OF LICENSE PAYMENT

VENDOR	LEASE	CONTINUOUS PAYMENT	USE PRICING	PAID-UP LICENSE	ONE-TIME CHARGE	COMMENTS
Mainframes:						
Honeywell	Sep.-Opt.	Sep.-Opt.	Sep.Opt.	Sep.-Opt.	Sep.-Opt.	-
Univac	Appl. - In Fee; Sys.-W/Hdw.	Same	Same	Same	Same	-
Amdahl	In Hdw. Fee	-	-	-	-	-
Burroughs	In Fee-(Req.)	In Fee-(Req.)	-	12 Mo.-(Req.)	12 Mo.-(Req.)	-
Minicomputers:						
Perkin-Elmer	In Hdw. Fee	-	-	-	-	-
System Engineering Labs	-	-	-	3 Mo.-Opt.	3 Mo.-Opt.	-
DEC	-	-	-	-	3 Mo.-Opt.	-
Hewlett-Packard	-	-	-	Sep. Crg.	Sep. Crg.	2 Options
Data General	12 Mo.-Opt.	In Fee-Opt.	-	12 Mo.-Opt.	12 Mo.-Opt.	3 Options
Prime	-	Sep.-Opt.	-	Sep.-Opt.	Sep.-Opt.	-

Key: "12 Month" means included in software fee for first 12 months.

SOURCE: INPUT Survey (U.S. Data)

EXHIBIT A-2 (Cont.)

SOFTWARE SUPPORT CHARGE APPROACH BY METHOD OF LICENSE PAYMENT

VENDOR	LEASE	CONTINUOUS PAYMENT	USE PRICING	PAID-UP LICENSE	ONE-TIME CHARGE	COMMENTS
Informatics	12 Mo.-Opt.	In Fee-Opt.	In Fee-Opt.	12 Mo.-Opt.	12 Mo.-Opt.	-
Computer Associates	In Fee-Opt.	-	-	12 Mo.-Opt.	12 Mo.-Opt.	-
SDC	12 Mo.-Opt.	In Fee-Opt.	12 Mo.-Opt.	12 Mo.-Opt.	12 Mo.-Opt.	-
Boole & Babbage	-	-	-	-	Opt.	-
Cincom	Sep.-Req. Soon	In Fee-Req.	In Fee-Req.	Sep.	-	-
Nixdorf	Oper.-In Fee Others- 6 Mo.	In Fee-Oper. Sys.	-	6 Mo.	6 Mo.	-
McCormack & Dodge	-	-	-	6 Mo.	6 Mo.	-
ADR	12 Mo.-Opt.	-	-	12 Mo.	12 Mo.	-
Mathematica	-	In Fee-Opt.	12 Mo.-Opt.	12 Mo.-Opt.	12 Mo.-Opt.	-
Software AG	12 Mo.-Opt.	In Fee	-	12 Mo.-Opt.	12 Mo.-Opt.	-
MRI Systems	Sep.-Opt.	-	Sep.-Opt.	Sep.-Opt.	Sep.-Opt.	-
Pansophic	In Fee-Opt.	-	-	12 Mo.-Opt.	12 Mo.-Opt.	-
University Computer	-	-	-	12 Mo.	12 Mo.-Opt.	-
MSA	-	-	-	-	12 Mo.-Opt.	-
Cullinane	12 Mo.-Req.	In Fee-Req.	-	12 Mo.-Req.	12 Mo.-Req.	-

Key: "12 Month" means included in software fee for first 12 months.

SOURCE: INPUT Survey (U.S. Data)

EXHIBIT A-3

SOFTWARE SUPPORT (1)

VENDOR	12-MONTH SOFTWARE SUPPORT FEE	SOFTWARE SUPPORT: FIXES	SOFTWARE SUPPORT: ENHANC.	SOFTWARE SUPPORT: OTHER	WHAT IS ENHANCEMENT VS. NEW PRODUCT	MINIMUM SOFTWARE SUPPORT TERM	HARDWARE MAINTENANCE PREREQUISITE
Mainframes:							
Honeywell	Varies By Product	X	-	-	Logical Extension	12 Mo.	N
Univac	None	-	-	-	Size-Offer 3 Levels/Year	N	N
Amdahl	Bundled-No Cost	X	X	-	Logical Extension & Hardware	N	N
Burroughs	10%	X	X	-	Functional Change	12 Mo.	N
Minicomputers:							
Perkin-Elmer	Varies By Product	X	-	-	N/A-No Enhancements	Hdw. Contr.	Y
System Engineering Labs	10%	X	X	-	Size	12 Mo.	Y
DEC	Varies	-	-	-	DK	12 Mo.	N
Hewlett-Packard	Mo. Fee	-	-	-	-	1 Mo.	Y
Data General	-	X	X	-	-	12 Mo.	N
Prime	1%/Mo.	X	X	-	Size	1 Mo.	N

SOURCE: INPUT Survey (U.S. Data)

EXHIBIT A-3 (Cont.)

SOFTWARE SUPPORT (1)

VENDOR	12-MONTH SOFTWARE SUPPORT FEE	SOFTWARE SUPPORT: FIXES	SOFTWARE SUPPORT: ENHANC.	SOFTWARE SUPPORT: OTHER	WHAT IS ENHANCEMENT VS. NEW PRODUCT	MINIMUM SOFTWARE SUPPORT TERM	HARDWARE MAINTENANCE PREREQUISITE
Informatics	10%+	X	X	-	Significant Shift in Tech.	12 Mo.	N (May Soon)
Computer Associates	12%	X	X	-	Functional Change	12 Mo.	N/A
SDC	10%	X	X	-	Difficult to Say	12 Mo.	N
Boole & Babbage	15-20%	X	X	-	System-Specific or Logical Extension	12 Mo.	N/A
Cincom	11%	X	X	-	Size or Function	12 Mo.	N/A
Nixdorf	$50/Hr.	X	-	-	No Enhancement Included	N/A T&M	N
McCormack & Dodge	15%	X	X	-	Separate Application	12 Mo.	N/A
ADR	12%	X	X	-	-	12 Mo.	-
Mathematica	Varies	X	X	-	New Application	12 Mo.	N
Software AG	10%	X	X	-	Logical Extension	12 Mo.	N/A
MRI Systems	Varies	X	X	-	Size	Y	N
Pansophic	12%	X	X	-	Size & Function	12 Mo.	N/A
University Computer	10-13%	X	X	-	Size	12 Mo.	N
MSA	11%	X	X	-	Functional Extension	12 Mo.	N
Cullinane	10%	X	X	-	Different Functionality	12 Mo.	N

INPUT Survey (U.S. Data)

- Hardware maintenance is sometimes a prerequisite for obtaining software support for hardware companies (30%), as shown in Exhibit A-3.

- Most vendors use most of the available methods of distributing software fixes to customers, as shown in Exhibits A-4 and A-6.

- Software firms are more likely than hardware companies to have the customer apply the fix, as shown in Exhibits A-5 and A-6.

- Support for back levels of a release varies from none to forever, as shown in Exhibit A-6.

- There are few response time promises for making software fixes, as shown in Exhibit A-6.

- Trouble report turnaround varies, as shown in Exhibit A-6. Immediate turnaround is the most common.

- Hardware companies are more likely to give a price discount for multilicense support (40%) than software companies (13%), as shown in Exhibit A-7. Central support arrangements are common among software companies (73%); they are less common among hardware companies (40%).

- On-site maintenance pricing ranges from about $200/day to $850/day, as shown in Exhibit A-7. The majority are in the $500 to $800 range.

EXHIBIT A-4

METHODS OF DISTRIBUTING
SOFTWARE FIXES TO CUSTOMER
(percent)

TYPE OF NOTIFICATION	HARDWARE COMPANIES	SOFTWARE COMPANIES
On-Site	70%	80%
Telephone	70	93
Letter	50	47
Newsletter	70	47
Maintenance Release	70	87
All Users	90	93

SOURCE: INPUT Survey (U.S. Data)

EXHIBIT A-5

APPLICATION OF SOFTWARE FIXES

(percent)

FIXES APPLIED BY	HARDWARE COMPANIES	SOFTWARE COMPANIES
Vendor	50%	33%
Customer	60	87

SOURCE: INPUT Survey (U.S. Data)

EXHIBIT A-6

SOFTWARE SUPPORT (2)

VENDOR	SUPPORT FOR OLD RELEASE	RESPONSE TIME	SUPPORT AVAILABILITY							
			ON-SITE	TELEPHONE	LETTER	NEWS LETTER	MAINTENANCE RELEASE	ALL USERS	FIX APPLIED BY	TROUBLE REPORT TURNAROUND
Mainframes:										
Honeywell	For 2 Releases	Varies	-	-	-	-	Y	Y	Custom.	DK
Univac	For 2 Releases	No Time	Y	Y*	Y	Y	Y	Y	Custom.	Immed.
Amdahl	Forever	No Cont.	Y	Y	Y	Y	Y	-	Custom.	DK
Burroughs	3 Months	Varies	Y	Y*	Y	Y	Y	Y	Both (Varies)	Varies
Minicomputers:										
Perkin-Elmer	12 Months	Varies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
System Engineering Labs	12 Months	No Cont.	-	Y	-	Y	Y	Y	Vendor	15 Days (1-3 Mo. Guaran.)
DEC	DK	Depends On Contract	Y	Y	-	-	-	Y	Vendor	DK
Hewlett-Packard	-	-	Y	Y	Y	Y	Y	Y	50/50 Cust./ Ven.	30 Days
Data General	3 Months-Varies	DK	Y	-	-	Y	-	Y	Custom.	DK-Varies
Prime	Forever Now, To Add Limit	No Cont.	Y	Y	Y	Y	Y	Y	Custom.	Immed.- 30 Days

* Usual, ** Last Resort

SOURCE: INPUT Survey (U.S. Data)

EXHIBIT A-6 (Cont.)

SOFTWARE SUPPORT (2)

VENDOR	SUPPORT FOR OLD RELEASE	RESPONSE TIME	SUPPORT AVAILABILITY: ON-SITE	TELEPHONE	LETTER	NEWS LETTER	MAINTENANCE RELEASE	ALL USERS	FIX APPLIED BY	TROUBLE REPORT TURNAROUND
Informatics	5 Months	No Contract	Y	Y	Y	Y	Y	Y	Cust.	Immed.
Computer Associates	18 Months	No Contract	Y	Y	Y	Y	Y	Y	Cust.	Varies
SDC	Forever	No Contract	Y	Y	Y	Y	Y	Y	Cust. 90%	DK
Boole & Babbage	Forever	No Time	Y	Y	-	-	Y	Y	Cust.	Immed.
Cincom	9 Months	No Contract	Y**	Y	-	-	Y	N	Cust. 80%	Immed.
Nixdorf	N/A (T&M)	No Time	Y*	-	-	-	-	Y	Vendor	DK
McCormack & Dodge	12 Months	30 Days	Y	Y	-	-	Y	Y	Cust.	80%- Immed. 20%- 14 Days
ADR	Not Covered	-	-	Y	-	-	Y	Y	Cust.	-
Mathematica	Forever	No Contract	-	Y	-	-	-	Y	Cust.	Immed.
Software AG	180 Days	No Time	Y	Y	-	-	Y	Y	Cust.	Immed.
MRI Systems	Contract Balance	No Contract	Y	Y	Y	Y	Y*	Y	Both	DK
Pansophic	12 Months	No Time	Y	Y	-	-	Y	Y	Vendor	DK
University Computer	Varies	No Contract	-	Y*	Y	Y	Y	Y	Cust.	DK
MSA	12 Months	No Contract	Y	Y*	Y	Y	Y	Y	Cust.	DK
Cullinane	DK	No Contract	Y	Y	Y	Y	Y	Y	Cust.	1 Day

* Usual, ** Last Resort

SOURCE: INPUT Survey (U.S. Data)

EXHIBIT A-7

SOFTWARE SUPPORT (3)

VENDOR	MULTI-LICENSE SUPPORT		OTHER	ON-SITE SUPPORT
	PRICE DISCOUNT	CENTRAL SUPPORT		
Mainframes:				
Honeywell	-	-	-	Varies by Systems & Customer
Univac	X	X	-	\$30-60/Hr. - 3 Service Levels
Amdahl	-	X	-	\$100/Hr.
Burroughs	-	X	-	\$500/Day
Minicomputers:				
Perkin-Elmer	N/A	N/A	-	Not Offered
System Engineering Labs	-	X	-	Not Offered
DEC	X	-	-	DK
Hewlett-Packard	X	-	-	Varies by Product
Data General	-	-	-	\$65/Hour & Volume Discount
Prime	X	-	-	\$50/Hour

SOURCE: INPUT Survey (U.S. Data)

EXHIBIT A-7 (Cont.)

SOFTWARE SUPPORT (3)

VENDOR	MULTI-LICENSE SUPPORT		OTHER	ON-SITE SUPPORT
	PRICE DISCOUNT	CENTRAL SUPPORT		
Informatics	X	X	-	$450/Day
Computer Associates	X	X	-	$500/Day
SDC	-	X	-	$500/Day
Boole & Babbage	-	X	-	Free-With Contract
Cincom	-	X	-	$850/Day
Nixdorf	T&M	-	-	$50/Hour
McCormack & Dodge	-	-	No Discount (separate)	$800/Day
ADR	-	-	-	DK Rare
Mathematica	X	X	-	Not Offered
Software AG	-	X	-	$600/Day
MRI Systems	-	X	-	$32/Hour
Pansophic	-	X	-	Free (Contract)
University Computer	-	X	-	$650/Day
MSA	-	-	No Discount (separate)	$700/Day
Cullinane	-	X	-	DK

SOURCE: INPUT Survey (U.S. Data)

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