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STRATEGIC MARKET PERSPECTIVE

Equipment Service Contracts in an Open Environment

Europe 1993

Customer Services Programme - Europe

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Equipment Service Contracts in An Open Environment

Europe, 1993

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**Equipment Service Contracts in an Open Environment
Europe, 1993**

Customer Services Programme—Europe

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Abstract

Rapid advances in technology have driven *open systems* development environment and been accompanied by strong vendor emphasis on delivering quality products supported by quality service. *Open systems* users consequently believe they are getting value for money from their equipment services contracts.

However, users are becoming increasingly reluctant to pay for service contracts on equipment that is perceived to be virtually fault-free. This presents an important challenge to the customer services organisation which needs to ensure that it can continue to supply quality *open services* that are competitive in the market and profitable to deliver.

This report reviews the current situation regarding equipment services contracts, primarily in the *open systems* market, within Europe. The report is based on a survey of European users and vendors conducted during the last quarter of 1993.

The user survey researched issues, attitudes and satisfaction concerned with equipment services in midrange and substantial networked-based PC installations, the sector of the market most dominated by the *open systems* phenomenon. Research was conducted in Germany, France and the United Kingdom.

Vendor research examined current practice in the delivery of equipment support services. The primary focus was placed on warranty terms, uptime guarantees and teleservices.

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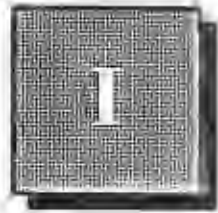
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Introduction

This report was produced as part of INPUT's 1993 Customer Services Programme in Europe.

A

Purpose

The purpose of this report is to provide customer service vendors with an analysis of current conditions relating to equipment support contracts in the open systems market in Europe.

Customer services organisations have placed much emphasis on new revenue-generating services in order to counteract the continual erosion of their equipment service revenue stream. However, equipment maintenance still generates over 50% of customer services revenues, amounting to \$14.9 billion in 1993, some 52% of the total customer services market and 14% of all European IT services.

Consequently this report was designed to focus on the key area of equipment services and to alert vendors to user issues and levels of satisfaction with equipment services. It was also designed to compare features of equipment service offered by leading vendors in the European market. These issues are becoming increasingly important in the *open systems* environment where customer services has become a key competitive differentiator. Essential service contract features now influence the choice of equipment as well as service vendor in an *open systems* environment.

B

Scope

INPUT defines the Equipment Service sector (which is the largest of the six sectors measured within the European Customer Services market) as:

- The repair or routine preventative maintenance of computer systems equipment or associated equipment components. Included are associated support activities such as telephone support, problem analysis and remote diagnostics. Contracts may be for one or more years; alternatively repairs may be effected on an *ad hoc* basis.

- The platforms defined as Equipment (Hardware) for the purposes of this definition include all data communications devices, but exclude PABX and other types of voice-only communications equipment.
- The measurement of the sector includes integrated contracts for support of both hardware and software.

The other five sectors of the customer services market measured by INPUT are:

- Environmental services
- Systems software support
- Education and training
- Professional services
- Business continuity services.

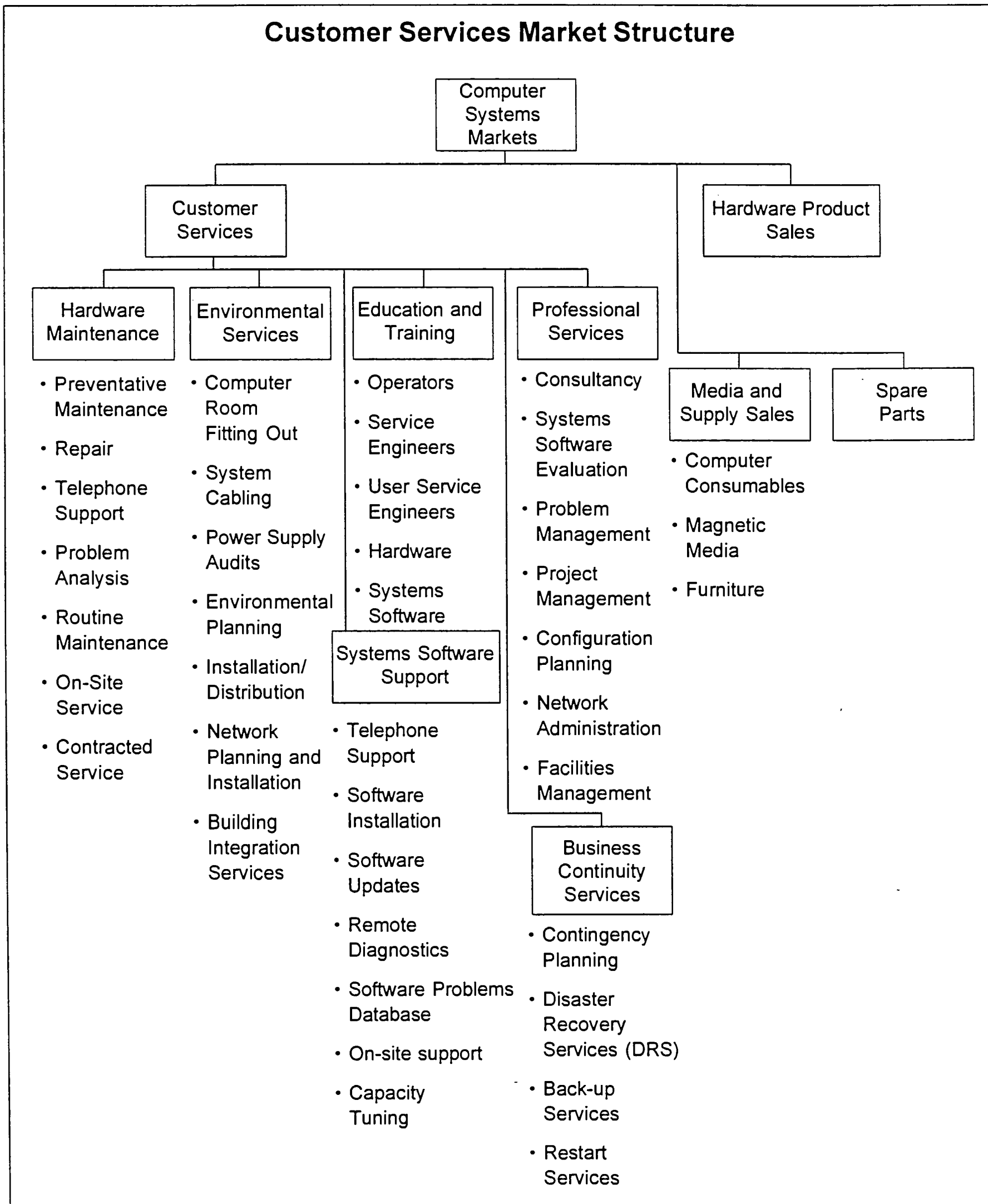
Excluded from INPUT's definition of the customer services market, as being essentially product markets, are:

- Sales of spare parts
- Media and supplies sales
- Equipment product sales.

Exhibit I-1 indicates the principal activities undertaken within each of the six service sectors of the customer services market. In each service sector, the definition of user expenditure includes only those services provided to users by an external organisation on a chargeable basis. Services provided by subsidiaries or internal resources are considered unavailable for open tender. They are therefore excluded from the open market but included in the captive market potential.

For a complete coverage of the entire customer services opportunity see the INPUT report *Customer Services Market Analysis and Forecast - Europe, 1993-1998 (October 1993)*.

EXHIBIT I-1



C

Methodology

The methodology used in the preparation of this report comprised both a user and a vendor survey supported by INPUT's continuous research of European customer services markets.

The user research was based on the preparation of a standard questionnaire (see Appendix C) designed to identify key user issues in respect of equipment service contracts and delivery. Sixty interviews were conducted by telephone during the last quarter of 1993. Respondents were selected to be a random sample of managers responsible for the equipment maintenance and support of midrange computers and substantial network-based PC installations, the sector most open to competitive conditions in equipment maintenance contracting.

The user survey was conducted in Germany, France and the United Kingdom. Exhibit I-2 shows the analysis of the user sample by country and equipment system category.

The vendor data was obtained from direct communication (both telephone and face-to-face interviews) with major European service vendors from within the IT industry. This information was supplemented by INPUT's continuous research of the customer services industry within Europe.

EXHIBIT I-2

| Analysis of User Sample | | | | |
|---|--|---------------|-------------|--------------|
| SYSTEM CATEGORY | Number of Respondents—Country Markets | | | |
| | Germany | France | U.K. | TOTAL |
| UNIX-based Systems | 4 | 2 | 8 | 14 |
| Network-based PC Systems | 10 | 10 | 4 | 24 |
| AS/400 | 6 | 4 | 4 | 14 |
| Other Midrange Proprietary Systems | - | 4 | 4 | 8 |
| TOTAL | 20 | 20 | 20 | 60 |

D

Report Structure

The remaining chapters of this report are organised as follows:

- Chapter II is an executive overview that summarises the major findings and recommendations of the report
- Chapter III provides an analysis of the user research, covering the topics of user maintenance arrangements, value-for-money issues, satisfaction with equipment maintenance services and the importance of various features of equipment maintenance contracts
- Chapter IV examines comparative vendor warranty and service offerings for the following vendors: Compaq, Digital, Hewlett-Packard, IBM, Motorola, Siemens-Nixdorf Informationssysteme, SUN Microsystems and Toshiba
- Chapter V discusses the emergence of uptime guarantees, signalling the shift from a response/restore model to a systems availability maintenance model
- Chapter VI focuses on the application of remote service delivery (teleservice) by vendors that offer more cost-effective and efficient customer services
- Appendix A contains a discussion of the Problems Management approach to customer services
- Appendix B contains previously published INPUT documents describing support centres referenced in Chapter VI
- Appendix C contains the questionnaire used for the user telephone survey
- Appendix D contains country data tabulations that support the European analysis shown as exhibits in Chapter III.

E

Related INPUT Reports

Other INPUT reports which address topics related to the subjects discussed here include the following:

- *Customer Services Market Analysis and Forecast - Europe, 1993-1998 (October 1993)*
- *U.S. Equipment Services Markets - 1993-1998 (December 1993)*
- *User Issues and Trends in European Customer Services (February 1993)*
- *User Satisfaction in Europe - Midrange Systems (March 1993)*
- *Open Systems Services Challenges and Strategies - Europe (March 1993)*



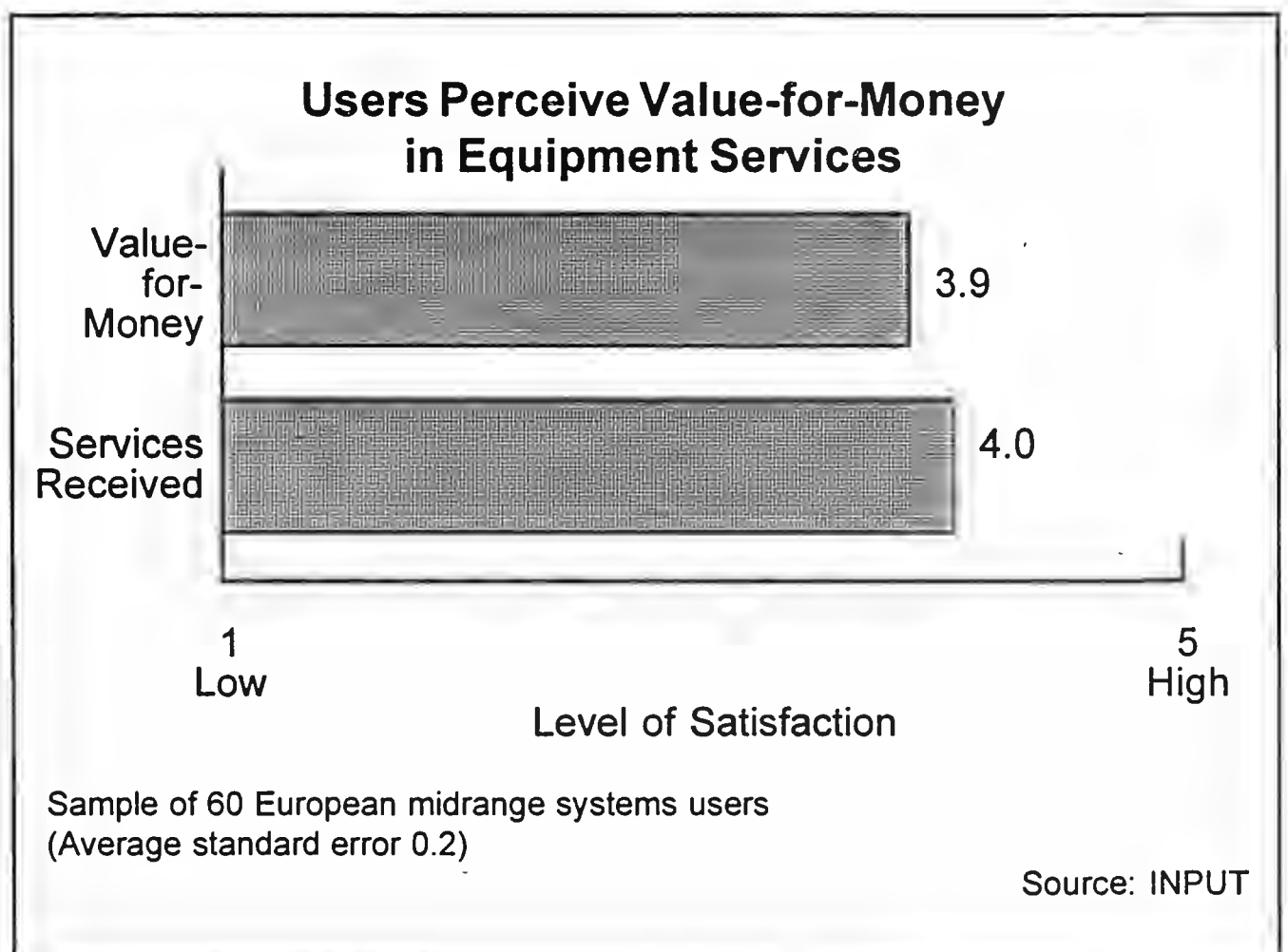
Executive Overview

A

Supporting Product Quality/Delivering Service Value

The technological developments of the computer industry and the strong emphasis placed on providing excellent customer service are being recognised by users. European users give relatively good satisfaction rating for value-for-money received from customer services equipment maintenance contracts and with equipment services received (see Exhibit II-1).

EXHIBIT II-1



However, as computer market competition continues to intensify, vendors will have to continue to improve their service delivery in order to retain or improve their market position. There are signs in the market of dissatisfaction with some aspects of hardware service. At the same time there are indications that some vendors have already begun to address the key issues raised by these problems.

The principal message that emerges from this study is that customer services vendors will have to intensify their efforts to provide *systems support* rather than just *equipment services* and communicate this support message more strongly and more effectively. Vendors need to increase their *marketing* efforts, and change their service contract forms and delivery mechanisms, to demonstrate to open system users that they are supporting *product quality* and delivering *service value*.

Vendors will have to do this because they need to escape from the maintenance model that served the needs of the past and create a new model of maintenance support relevant to the *open services* environment of today. The research conducted for this report indicates the need for vendors to address three key aspects of equipment service contracts:

- Where the user focus remains primarily on individual items of equipment, vendors will need to demonstrate their willingness to offer increasingly attractive extended warranty terms. Already many vendors are signalling their realisation of a shift in user attitudes and needs and are beginning to use warranty as a competitive weapon.
- Where the user emphasis is at the system level, vendors will need to escape from the old *response/restore* model of the industry and embrace the *systems availability* model for service delivery. This has important price and cost implications because this will be an essential aspect in delivering value-for-money in the future.
- Vendors will need to introduce more *flexibility* and *comprehensiveness* into maintenance contracts in order to retain competitiveness. Research undertaken for this report revealed significant user requirement for more flexibility and comprehensiveness in equipment maintenance contracts. Vendors will have to carefully evaluate the additional services that they can profitably offer or risk customer defection to more responsive competitors.

B

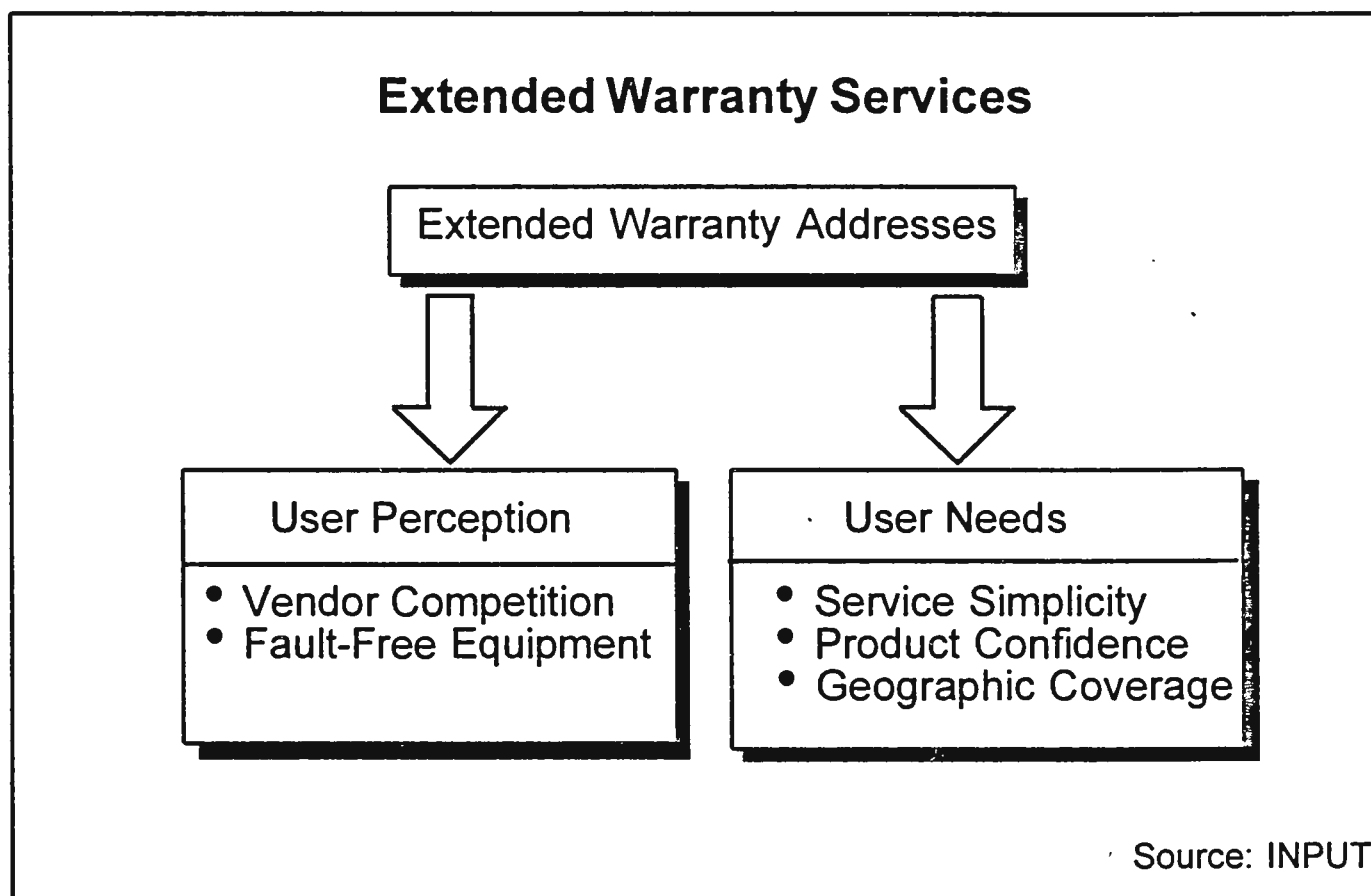
Using Warranty as a Competitive Weapon

The open systems movement has increased the competitiveness of the equipment services business supporting the development of what has been called the *open services* environment. At the same time technological development has created the user perception that traditional equipment maintenance contract arrangements are no longer applicable to an environment in which many system components are virtually maintenance-free.

Extended warranty terms are a response to these trends. Extended warranty terms can be presented as an attractive competitive offering to a traditional equipment maintenance contract. They are becoming widely available in the mass PC market and for workstation equipment and servers. These categories of equipment are ultra-reliable in practice and their users are becoming increasingly sceptical of the need to be supported by traditional equipment service contracts.

Exhibit II-2 also indicates other user factors that are driving the need for extended warranty services.

EXHIBIT II-2



Users in mass markets for servers, workstations and PCs want simplicity in service delivery and vendors want to make it simple for users to purchase service agreements. Extended warranty supports these objectives.

The extension of warranty, albeit for an additional fee, is an important psychological demonstration of the vendor's confidence in the product being sold, in its reliability and basic quality. Users want to see that confidence underwritten, and warranty and extended warranty terms help provide that confidence.

In the PC area increasing numbers of mobile users have introduced the demand for homogeneous geographic coverage. *Nomadic devices*, for example portable PCs, and widely distributed client/server systems, highlight the need for common forms of service across national boundaries.

The increasing attractiveness of warranty service offerings, from those offered on traditional forms of computer systems to those offered on new forms of computing, is illustrated in Exhibit II-3. The conditions become increasingly more comprehensive in the shift from mainframe to servers and from servers to PCs. In addition, extended warranty terms can be expected to become more and more comprehensive and to be applied to more and more categories of equipment.

EXHIBIT II-3

Warranty Terms

| Warranty Feature | Equipment Category | | |
|------------------|--------------------|-----------------------|--|
| | Mainframe | Server | PC |
| Response Time | No guarantee | 3 days | 1 day |
| Period | 1 year | 1 year | 1 year basic 2 years return to maker |
| Extension | None | Up to 2 or 3 years | Up to 4 years |

Source: INPUT

C

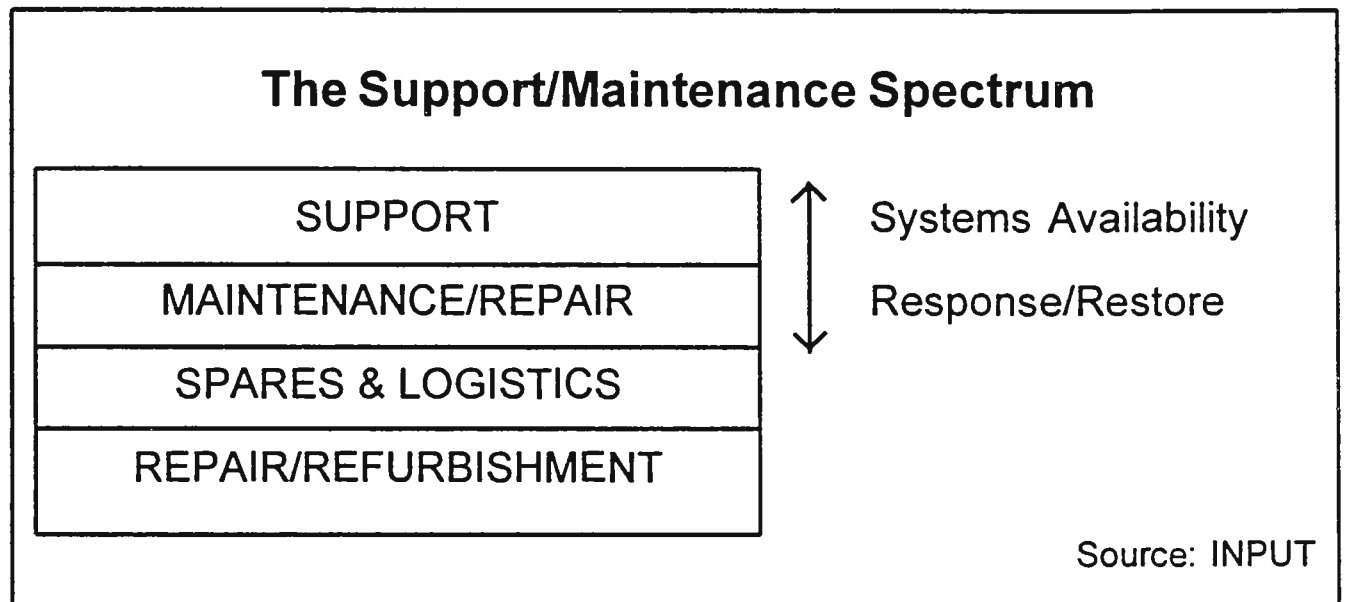
Adopting the Systems Availability Model

As IT equipment has become increasingly fault-free, users have become more reluctant to pay for basic equipment repair contracts. This challenges the continued existence of the traditional *repair/restore* model of the customer services business.

The rapid adoption of complex network-based systems, driven by the availability of open systems and client/server architecture, are creating the need for higher-level problem management approaches to customer service. However, equipment services vendors must not neglect the continuing provision of quality response/restore services—the platform upon which new higher value-added services are built.

Exhibit II-4 illustrates the spectrum of service needs that are required to support IT systems. This exhibit shows the basic value chain for the IT systems support market. Within it different types of vendors operate at different levels of service, from full support service through to fourth-party maintenance.

EXHIBIT II-4

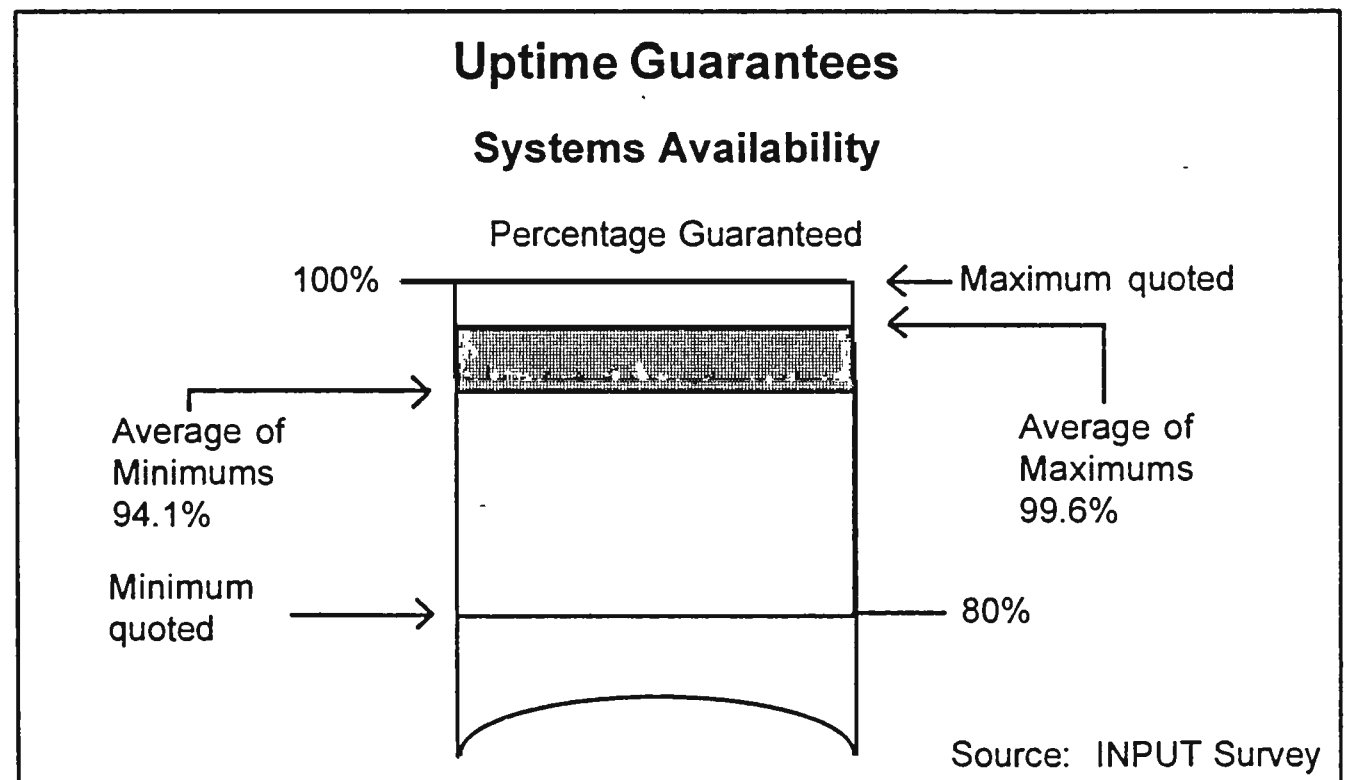


The provision of higher value-added services implies the need to operate on a different business model, one in which excellent quality products and associated equipment services are taken for granted by the user. The measurement parameters will be different. The most obvious one that has emerged from research amongst users is *systems availability*.

From the vendor perspective this is manifesting itself in the demand for uptime guarantees. Most vendors admit to some experience of this type of contractual requirement. The demand for this type of guarantee or assurance of system viability is likely to intensify in the future. Vendors need to prepare for this different environment and can gain competitive advantage by building in the infrastructure now that will support a rapid response to the likely user demands of the future.

Exhibit II-5 provides an indication of the range of uptime guarantees being offered by vendors. Assessment periods for uptime guarantees ranged from monthly to annually with the monthly period being that most frequently quoted.

EXHIBIT II-5



Other issues related to the provision of uptime guarantees include the provision of penalties and the premiums or special conditions that vendors will apply before giving any guarantee. Few penalty conditions were identified but this practice can be expected to increase. Where they were in place they covered a wide range of values, from as little as 10% of the monthly maintenance fee to as much as 100%.

Clearly it is in the interest of the vendor to ensure the capabilities of the systems being guaranteed. Consequently, applying special conditions, i.e., conducting studies of the system and requiring the customer to upgrade vulnerable parts of the system, is an important insurance strategy. Requiring premiums provides an additional level of risk compensation.

D

Marketing Services Flexibility and Comprehensiveness

Although users of open services are relatively satisfied with the levels of equipment service being received, there are areas of discontent that relate largely to issues of contract flexibility and comprehensiveness.

Customer services vendors must monitor and respond to these market signals in order to maintain and enhance their competitive positions.

In order for vendors to address new service improvements profitably they will need to convince users of the fair price to be paid for them. Unfortunately, the legacy of product price-related service contracts, still very evident in the market today, is making this process difficult to implement in some sectors. Vendors will have to make significant investments in marketing communications to change these user perceptions and these will need to be supported by realistic cost models for service pricing.

1. Open Services Users Get Value-for-Money

Users perceive that the value-for-money received from equipment services contracts is generally good. User opinion was consistent across the three countries surveyed (see Exhibit II-6).

A significant minority exists (about 15% of the total sample) that still thinks that service rates are too high. Many of these users were from installations where proprietary equipment was installed. In these areas of the market vendors need to balance the risk of short-term financial gain against the long-term alienation of established customers.

Users also indicated the need for their contracts to be more comprehensive in their coverage, for example:

- Warranty extension, although this practice is now becoming widespread
- Provision of hot-site options
- The exclusion of variable expenses (e.g., for out-of-hours coverage) to aid budgeting
- Cover for a wide variety of products, e.g., all PCs irrespective of brand, particularly data communications-related equipment
- Easy access to help-desk facilities
- Increased levels of problem responsibility.

Although this survey indicated that the majority of users were happy with the price being paid for equipment service, a significant minority (15% of the respondents) were not. They either felt that they were paying far too much for the service or that there were important deficiencies in the service being provided.

The problem for vendors in meeting exacting client requirements is the additional costs incurred in offering more flexible and more comprehensive contracts. Vendors will only be able to succeed in doing this when they can relate service pricing to service costs in the perception of the users. Customer services vendors will need to invest in marketing this perception to their clients.



User Analysis

Appendix D provides data tabulations by country sample (for Germany, France and the United Kingdom) that support the European summary analyses included in this chapter.

A

Changing Priorities for Customer Services

INPUT conducted a user survey in order to identify significant issues for users in respect of their equipment maintenance arrangements. The survey also addressed the contractual terms under which services are provided and customer satisfaction with equipment maintenance services.

This user survey was targeted at users of midrange equipment, i.e., UNIX servers, AS/400 and similar systems as well as significant network-based PC installations. The survey thus specifically excluded traditional mainframe-type environments and small-scale desktop installations. The targeted user base thus represented the open systems market in which competitive conditions are the most challenging for customer services vendors.

This survey indicates that users are generally happy with the maintenance services that they receive. They consider that they are getting good value-for-money and they are highly satisfied with the principal traditional measures of equipment service, i.e., response time and repair time. A significant proportion of this perception can be attributed to the virtual fault-free nature of most equipment today, but it also results from the strong efforts made by customer services vendors over the last decade to offer quality services.

The traditional measures of service reflect the *response/restore* model of customer service. However, there are signs that users may shift their requirements towards a *systems availability* customer services model. This subject is discussed in more detail in Chapter V in respect of vendor initiatives to offer up-time guarantees as part of their contractual arrangements.

Shifting user priorities relating to customer services are signalled from the survey data, which identifies issues that will require increased vendor focus. These can be classified into two broad categories:

- Issues relating to pricing and the costs of equipment and maintenance services
- Those relating to the comprehensiveness and flexibility of the maintenance contract over the life-time of the installed equipment.

These and other results from the user survey are analysed in the remainder of this chapter. The user survey analysis is set out in the following way:

- Section B looks at how customer services are contracted and with what type of vendor
- Section C discusses the value-for-money issue for customer services
- Section D analyses the customer satisfaction data
- Section E identifies those features of maintenance contracts considered of particular future importance.

B

User Maintenance Arrangements

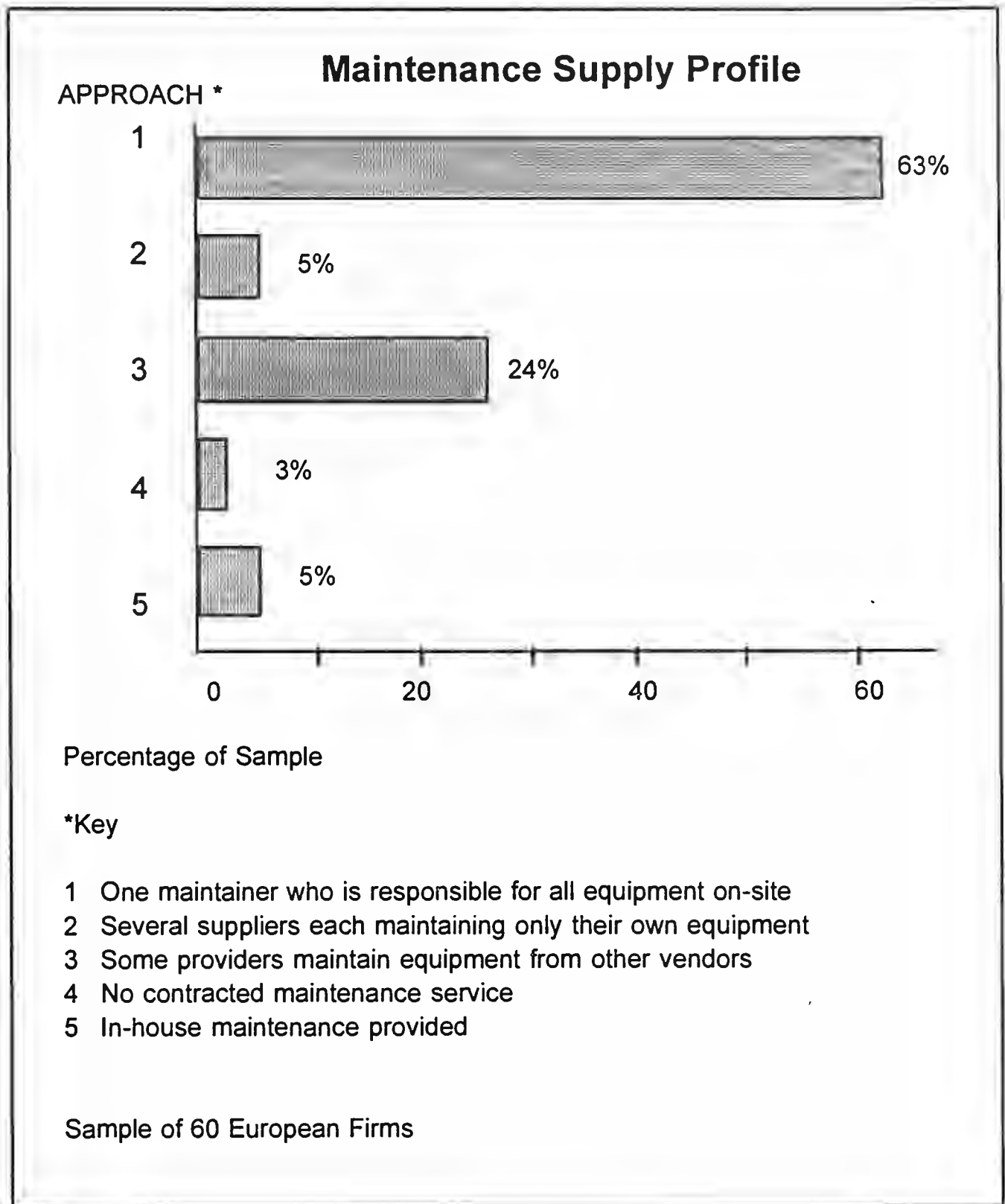
An analysis of the distribution of maintenance supply arrangements for the research sample is shown in Exhibit III-1.

Only a minority of users had no contracted maintenance arrangements. In these cases they relied on back-up from time and materials services or had maintenance provided in-house where that expertise existed in some other part of their organisation. There was also only a limited incidence of situations in which there was more than one vendor present on the site but where the vendors maintained only their own equipment.

The majority of users were split across two categories of use:

- The largest of these was where one maintenance organisation was responsible for all of the equipment on the site. About 60% of this group was accounted for by single-vendor equipment installations.
- The second-largest category contained those situations where more than one vendor was supplying maintenance services to the site. Nearly all of these vendors (80%) were supporting equipment not supplied by themselves.

EXHIBIT III-1



In the total sample around 50% reported more than one vendor's equipment present at the site for which they were responsible. About half of these (i.e., some 25% of the total group) were situations in which one vendor held a maintenance contract for all of the equipment in the system.

The provision of Multivendor Services (MVS) on an exclusive basis at one site is frequently portrayed by vendors as the strategic objective with the long-term aim of continuing account control. This situation existed in only about a quarter of the sites surveyed.

A similar percentage (about 30% of the sample) reported a specific need for multivendor services but a number of users pointed out that they were very much in favour of keeping a *multiple* service vendor situation in order to maintain competitive bidding conditions.

MVS represents a useful way of handling the needs of increasingly complex multivendor equipped sites, but the majority of users prefer to be able to maintain multiple suppliers for reasons of both cost containment and the security that comes from multiple suppliers.

Only about one quarter of the respondents expressed the need to have just one vendor handling all equipment on-site. For those that did, opinion was polarised around two considerations:

- Lack of confidence in the technical and service quality of small independent maintainers. One respondent commented that they "were disgusted at the service they were getting" and that "it is all too easy to be attracted by very low rates" but that poor quality service ensued. In these situations a maintenance organisation with a significant market position is an attractive option; higher rates are worth paying for higher levels of service.
- Having the benefit of simplicity of operations. One user in this group reported that they felt that they could still get "the best financial deal" through relatively frequent contract review (every two years).

These research insights help to place the prospective demand for customer services *one stop shopping* into perspective. Vendors would do well to examine very carefully their ambitions in this regard. Only a minority of big vendors with access to significant resources will be able to offer these services really effectively and only a part (about one quarter) of the user community appears to want them.

Exhibit III-2 shows the distribution of vendor categories providing the different service approaches discussed above. The channel suppliers in this sample were exclusively supporting PC network installations.

EXHIBIT III-2

Distribution of Maintenance Providers

| Approach* | Percentages | | | | Total |
|--------------|--------------|------------------------|------------------|----------|-------|
| | Eqpt. Vendor | Independent Maintainer | Channel Supplier | In-House | |
| 1 | 38 | 18 | 7 | | 63 |
| 2 | 3 | 2 | - | | 5 |
| 3 | 3 | 9 | 12 | | 24 |
| 4 | - | - | 3 | | 3 |
| 5 | | | | 5 | 5 |
| Total Sample | 44 | 29 | 22 | 5 | 100 |

*Key

- 1 One maintainer who is responsible for all equipment on-site
- 2 Several suppliers each maintaining only their own equipment
- 3 Some providers maintain equipment from other vendors
- 4 No contracted maintenance service
- 5 In-house maintenance provided

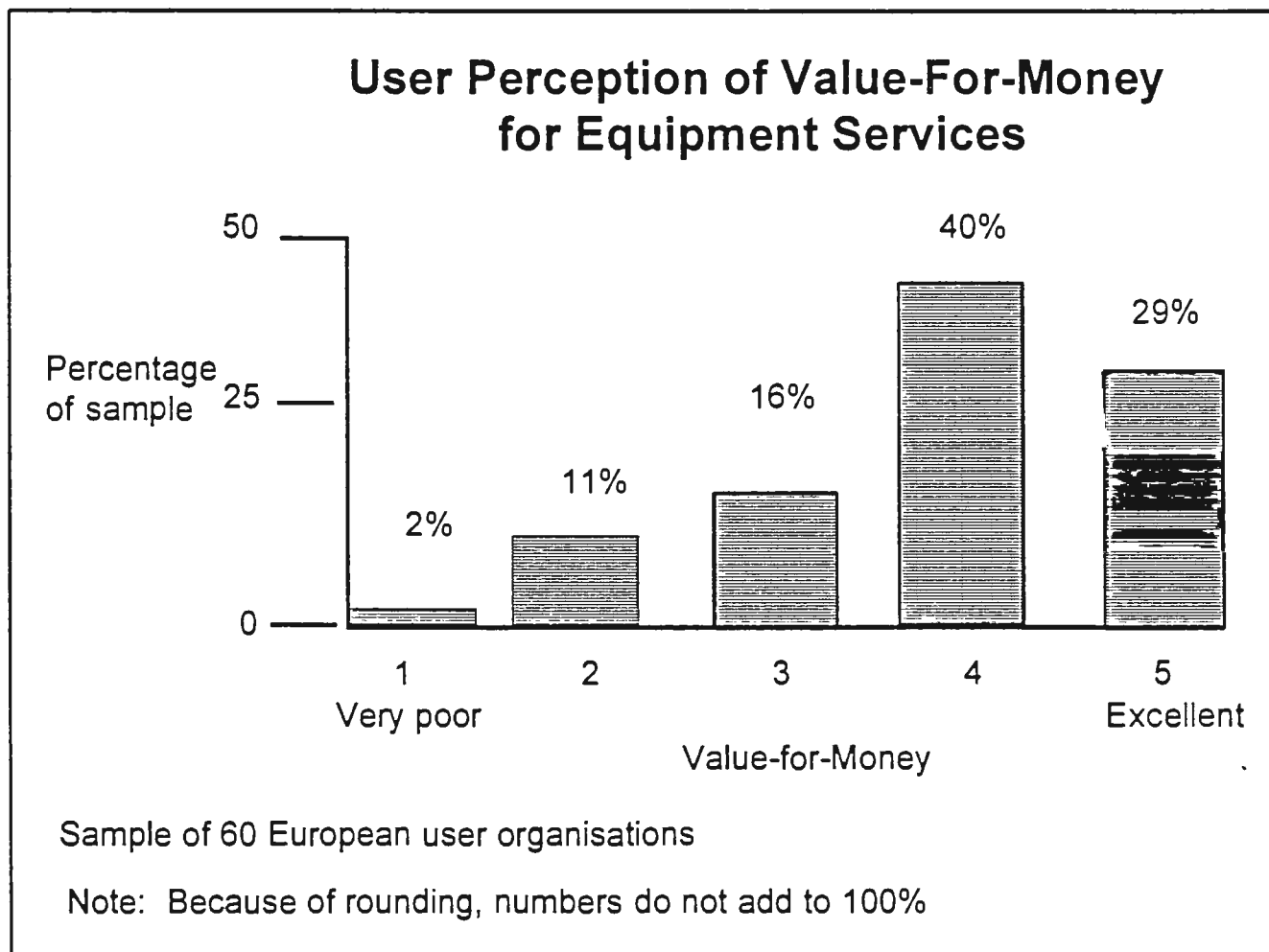
Sample of 60 European Firms

C

Value-for-Money Issues

User perception of the value-for-money received from equipment maintenance contracts is good, as can be seen from Exhibit III-3. The overall rating for value-for-money received was 4.0 on a scale of 1 (low or poor value) to 5 (high value).

EXHIBIT III-3



Clearly there exists a minority of users who do not believe that they are getting value-for-money. Their experience and the incidence of critical comments from more satisfied users contain some important indicators for improving satisfaction amongst the user base.

Despite the overall level of satisfaction with value-for-money shown in this survey (see Exhibit III-3), a significant proportion of the sample (about one third) considered that equipment maintenance charges were still too high. Amongst these comments were specific references to the exorbitant rates charged in some areas for *time and materials* services.

The main source of dissatisfaction with equipment maintenance pricing polarised around the related issues of high rates for old equipment and the high reliability of new equipment. The following user comments provide an insight into users' attitudes on these issues:

- "Astronomical costs for old equipment"
- "Lower costs, considering that IT equipment costs are continually falling but maintenance costs are not"
- "The maintenance charges do not reflect the almost 100% availability of the system"
- "Maintenance charges on installed UNIX systems must reduce more. If they (the vendors) can give one or two years free warranty on new equipment surely they can reduce existing charges"

- “On the basis that the equipment rarely failed, we decided to terminate the maintenance contract. It has proven to be a sound decision that saves us about 15,000 DM (\$9,000) per annum.”

These comments throw sharply into relief the basic pricing dilemma being faced by most equipment vendors. To shore up rapidly falling equipment maintenance revenue streams, existing contract rates, particularly on old equipment, are maintained at the highest level possible. In contrast, as new equipment is released onto the market severe competitive pressure demands that maintenance contracts are priced at the low rates commensurate with their inherent reliability. Vendors are thus in danger of alienating their existing customer base and thus destroying any inherent customer loyalty that might act in their favour at the next procurement round.

A sense of perspective needs to be taken on this issue as instanced by the following respondent comment made in relation to value-for-money received:

- “IBM have reacted very positively to current market conditions”
- “Maintenance charges have fallen in the last 2 years, so we are happy”

However, equipment services vendors are caught in an historical trap, the relationship of equipment services prices directly to equipment pricing. Although most vendors are aware that the model for equipment services pricing should now be based on the cost of delivering a service rather than the price of the hardware, clearly little progress has been made in getting this perception across to the customer base.

This signals a very real marketing challenge for customer services vendors. Increased efforts must be made to impress on users the relationship of service pricing to service value, to indicate that service prices are related to the real cost of providing the service and not established on some artificial basis that reflects the old virtual monopoly market conditions. This is something that the independent maintenance organisations realised some time ago in relation to stationing engineers on-site. The customer can have an engineer permanently on-site, but naturally there is an appropriate charge for this service.

Amongst other issues raised by respondents in respect of the improvement of value-for-money perception were:

- Having separate contracts for the principal system, i.e., the server or processor system, and for the more vulnerable peripheral equipment which could be covered by a time and materials contract
- Having extended warranty periods.

The majority of user opinion concerning value-for-money related to the price of the service rather than to the service delivery itself, which generally was rated highly in this survey.

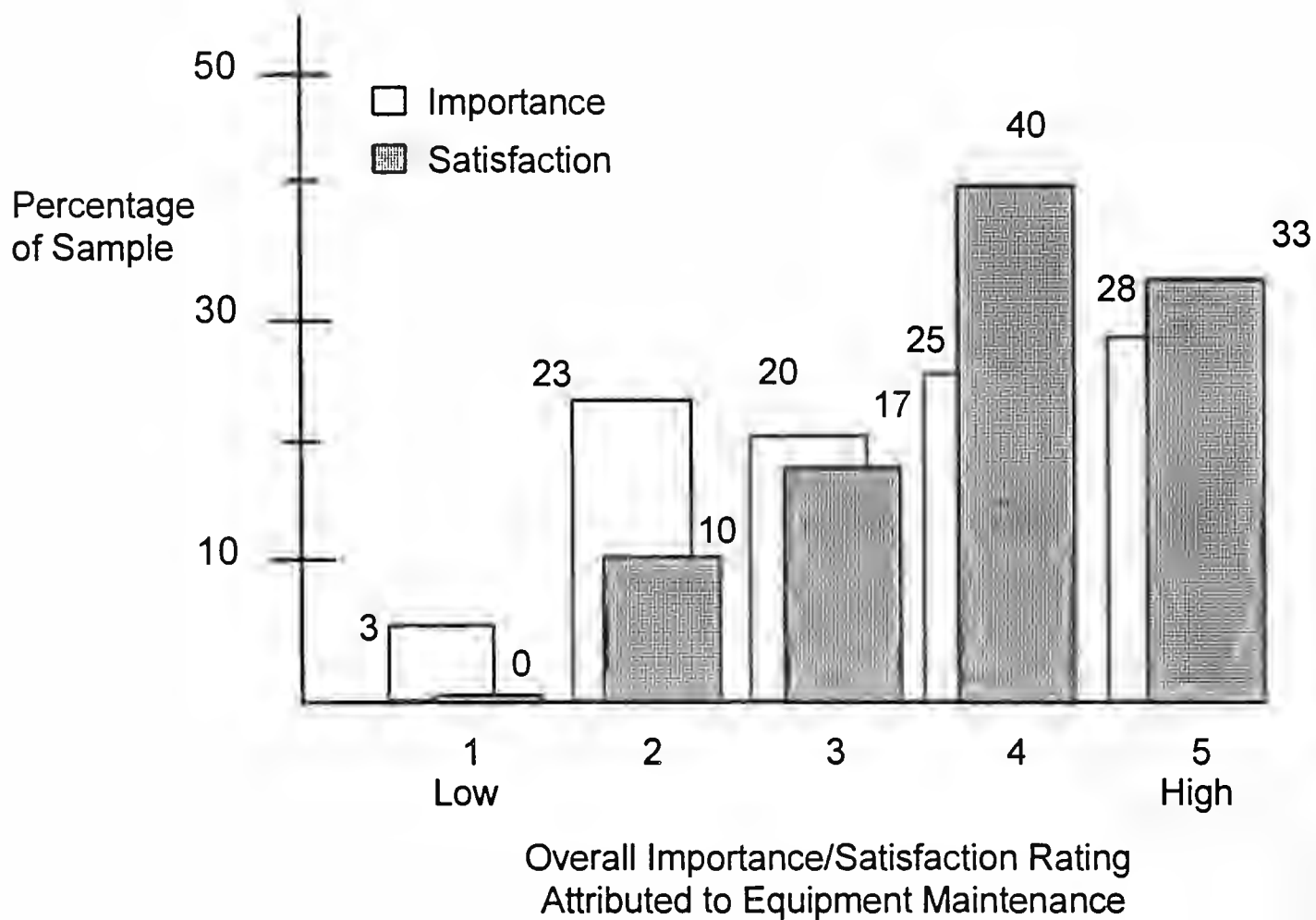
D

Overall Satisfaction with Equipment Maintenance Services

Respondents in the user survey were asked to rate the level of importance and satisfaction that they attributed to the key features of equipment maintenance service. The sample distribution for the overall ratings is shown in Exhibit III-4. This histogram indicates a very high level of overall satisfaction with equipment services, nearly 70% of the sample rating it at 4 or above.

EXHIBIT III-4

Sample Distribution of Overall Importance/Satisfaction Rating for Equipment Maintenance/Services



Sample of 60 European users

Note: Because of rounding, numbers do not add to 100%

The ratings for individual elements of service are shown in Exhibit III-5 together with the DeltaSI for each item. (The DeltaSI represents the difference between the satisfaction and importance level attributed to any particular item and thus provides a measure of the extent to which a user's requirements are being over-fulfilled or under-satisfied.)

EXHIBIT III-5

User Satisfaction with Equipment Maintenance Services

| SERVICE FEATURE | User Rating (1 Low to 5 High) | | |
|----------------------|-------------------------------|---------------------|----------|
| | Importance Rating | Satisfaction Rating | DeltaSI* |
| Systems Availability | 4.5 | 4.3 | -0.2 |
| Engineer Skills | 4.7 | 4.6 | -0.1 |
| Spares Availability | 4.5 | 4.5 | - |
| Problem Escalation | 3.2 | 3.7 | +0.5 |
| Documentation | 2.6 | 3.3 | +0.7 |
| Remote Diagnostics | 3.0 | 3.4 | +0.4 |

* Satisfaction - Importance Index

Sample of 60 European users (average standard error 0.2)

The three key areas for hardware service clearly stand out as engineer skills, systems availability and spares availability. Satisfaction ratings are also strong and the resulting DeltaSI in each case lies within the standard error for the sample. This high level of satisfaction pays tribute not only to the increased reliability of equipment, but to the significant efforts made by equipment services vendors to offer high-quality services in a competitive open market environment.

An important message can be drawn from this analysis, and that is the importance of sticking to the fundamentals. Users want to see good basic services delivered to them at their site and are much less interested in remote diagnostics and sophisticated problem escalation procedures than vendor sales literature might lead one to believe.

Thus although equipment maintenance can at times be considered to be the least promising activity in which to invest, it remains the bedrock upon which all other customer services are built. As was pointed out earlier, low satisfaction, or a perception that equipment maintenance services are poor value-for-money, can help to destroy customer loyalty built up over a long period of time. Few vendors can afford this loss of installed base user confidence.

E

Important Features of Equipment Maintenance Contracts

Respondents to the user survey were requested to state the level of importance they attributed to specific aspects, potential or otherwise, of an equipment maintenance contract. The summary of the results is shown in Exhibit III-6.

Four features were rated of particular importance; on-site service and guaranteed restore time were particularly highly rated.

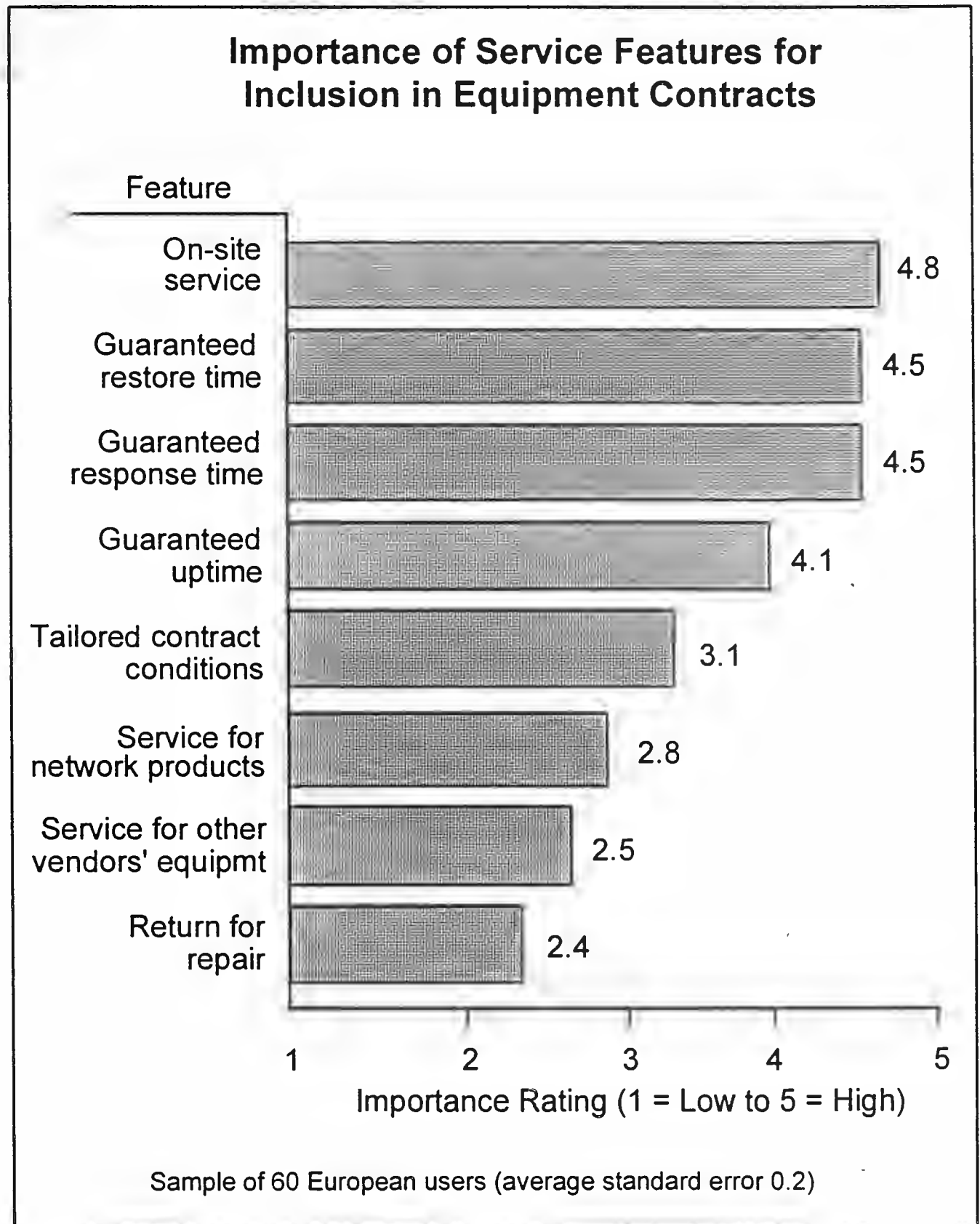
Respondents were also asked to comment on other preferences that they might have in relation to equipment maintenance contracts. These could be classified into three groups:

- Features that were liked
- Features that were not liked
- Required features not yet offered by their current maintenance supplier.

Features that were liked included the following:

- An annual hardware health check
- Availability of electronic support
- Warranty extensions
- Hardware automatically (i.e., continuously) maintained to the latest revision level
- The capability to be able to select the particular service elements required.
- Swap-out options
- Exclusion of high reliability components from the contract. (The idea being a desire to not have to pay any maintenance charges for system elements considered extremely unlikely to ever breakdown.)

EXHIBIT III-6



The service elements that were singled out as not being liked included the following:

- No rebate payment for low call-out activity
- The high cost of replacement devices
- Long-term contract lock-in
- Pricing related to the original capital cost of the equipment.

- Inexperienced engineers working on older equipment

Two required features were identified:

- The ability of the maintenance vendor to cover data communications equipment
- The provision of substitute machines in situations where the equipment had to be returned to depot for repair.

The overall synthesis of user comment about equipment contracts reflected a need for more comprehensiveness and more flexibility. This also reflected on the attitudes of system vendors towards independent maintenance companies, some respondents identifying this as a particular problem.

Users are looking for more co-operation between vendors as most expect to maintain multiple service vendors on their sites. There is a recognition that most vendors cannot provide the expertise in all of the equipment types used; and this is particularly critical for communications devices. Engineer skills was the most highly rated importance factor in this survey.



Warranty Offerings

A

Warranty Issues

As equipment reliability and quality continues to improve, users are becoming more reluctant to pay for what they perceive to be inessential service features. This increasingly implies a reluctance to sign a service contract for equipment maintenance. One response to this threat to the maintenance revenue stream is to offer attractive extended warranty conditions at an additional cost.

Warranty extensions are being widely sold as a standard service product, and increasingly through the hardware and software catalogues supported by the vendors' direct marketing/telesales force. The range of equipment covered in this way includes low-end and mid-sized workstations and servers, normally running some version of UNIX, although extended warranty for some proprietary products is also available.

The area in which extended warranty appears to most attractive to users is for peripheral equipment where the greatest likelihood for malfunction exists. This is reinforced by the likelihood of some kind of misuse in unprotected environments, increasingly the case for many items of computer equipment.

A disk repair vendor interviewed by INPUT pointed out that the MTBFs (Mean Time between Failures) being quoted for the most advanced drives now amount to something like a period of 50 years. In theory, therefore, repairers should never see these drives before they are consigned for scrap. User mistreatment, however, ensures that they do.

This type of problem is being addressed by the longer warranty periods now on offer as standard (up to three years) as well as by support contracts for the networks to which the desktop units are increasingly linked.

In the future the mishandling of office-based devices is likely to be a frequent occurrence as offices reconfigure and information workers become more mobile. The advent of wireless LANs is likely to further encourage this trend.

The trend to more mobile use of equipment introduces another important trend in respect of warranty. For portable and mobile computing environments the issue is raised of the geographic applicability of the conditions associated with the warranty. Users wish to be able to have *on-site* or *walk-in* warranty service wherever they happen to be operating, both within Europe and on a world-wide basis.

Vendors are likely to come under increasing pressure to offer the same warranty level of service in all regions where *on-the-move* users are operating with their portable units. They will need to re-assure their users that warranty means the same thing in whatever country they happen to be located at the time, even though legally this cannot be the case. The implication is that warranty is becoming just another way of marketing equipment services.

Vendors without a significant field support operation across Europe are increasingly likely to use an independent maintenance or multivendor maintenance organisation to undertake the warranty and repair activities on their behalf. For example, Sorbus handles this work for Dell, Granada Computer Services for Sequent and Thomainfor for Compaq in Germany.

IBM claims to be following a European Union (EU) guide-line in having a policy which states that *warranty is transferable across borders within Europe*. This implies that warranty on equipment sold in any EU country will be honoured in any other. This policy is believed to be in force with IBM on a world-wide basis.

B

Warranty Offerings Compared

Exhibit IV-1 provides a comparison of important warranty service elements for two key vendors in the client/server and desktop/PC sectors and includes a comparison with the warranty offered on an IBM mainframe system.

IBM follows a traditional approach to the provision of warranty on mainframe processor systems and connected peripherals. This is still one year in duration and is offered as an equivalent to on-site service. There is no guaranteed or committed response/repair time for any units serviced under warranty. SNI would provide another example where a standard warranty is 12 months for both mainframe hardware and software modules.

EXHIBIT IV-1

Warranty Offerings by Equipment Type

| FEATURE | Equipment Category/Vendor Example | | |
|----------------|-----------------------------------|---|------------------|
| | Servers Hewlett-Packard | Desktop/PC Compaq | Mainframe IBM |
| Period | 1 year | 1 year basic (2 more years return to maker) | 1 year |
| Standard Level | on-site | Return to maker | on-site |
| Extension | up to 2 or 3 years | up to 4 years | none |
| Response Time | 3 days basic | 1 working day | no guarantee |

As is indicated in Exhibit IV-1, there is a significant improvement in warranty terms as the system size decreases, i.e., in progression from mainframe systems to server systems and from servers to PCs. This is further supported by the data provided in Exhibit IV-2. This exhibit provides a warranty comparison for a number of different systems including the proprietary IBM AS/400 system. However, it is imperative that vendors of proprietary operating system-based computers offer attractive maintenance terms if they are to retain any current credibility in the market.

Comparative Warranty Offerings - Midrange Systems

| Vendors (Systems) | Products | Warranty Period | Type (on-site/ carry in) | Response time (e.g. next day) | Items Included | | | Limitations | |
|----------------------|-----------------|-----------------|-----------------------------|-------------------------------------|-----------------------------|----------------------|--------------------|-------------------------|--------------------------|
| | | | | | Materials/parts (yes/no) | Manpower (yes/no) | Travel (yes/no) | Territorial (yes/no) | Other |
| Systempro | COMPAQ | 3 year | carry in/ on-site | na/next day | yes | yes | na/yes | no | registered users |
| Proliant | COMPAQ | 3 year | on-site | next business day | yes | yes | yes | no | pre-failure |
| HP 9000 | HP | 1 year | on-site | next day | yes | yes | yes | no | same counting improve |
| RS 6000 * | IBM | 1 year | on-site | next working day/no guarantee | yes | yes | yes | no | no guarantee on-times |
| AS/400 * | IBM | 1 year | on-site | next day | yes | yes | yes | no | no guarantee on-times |
| AXP | DEC | 1 year | on-site | 4 hour | yes | yes | yes | no | extendable |
| DRS 6000 | ICL | 1 year | on-site | 8 hour | yes | yes | yes | no | - |
| NCR 3000 | NCR | na | | | | | | | |
| RM 400 | Siemens Nixdorf | 1 year | carry in + | na | yes | yes | na | Germany standard | - |

* IBM give no guarantees on response/repair times for units under warranty

+ User often granted on-site, especially outside Germany

C

Vendor Warranty Offerings

1. Compaq

Compaq startled the personal computer market in the autumn of 1992 when it announced its policy of offering a standard three-year warranty period on its new products launched at that time. It claimed that this was a deliberate move to gain a significant competitive advantage against other *clone* manufacturers.

Dell also has a high-value warranty package with the standard first 12 months on-site offering being available for extension at user's choice and with next day call-out guaranteed.

ProLiant servers are being marketed with a comprehensive three-year warranty including three years on-site service (this is guaranteed to be within the next business day). Compaq also markets the Insight Manager service which provides an uptime pre-failure warranty under which components are replaced free of charge before they fully fail.

SystemPro/XL Advanced servers are offered with a three-year on-site repair service warranty available to registered users; to other users it is a three-year return-to-base warranty.

Compaq's ProLiant servers are being marketed with extensive monitoring routines and fault tolerance features. Compaq Full-Spectrum Fault Management is built into every ProLiant server to provide a combination of fault prevention, fault tolerance and rapid recovery services. ProLiant servers are claimed to be able to predict and warn of impending component failure in order to allow time to schedule preventive maintenance. An example of this type of operation is in the unlikely situation of a hard disk failure, where hot-pluggable drives allow the user to replace a disk without interrupting server operation. In the event of a processor failure an off-line backup processor would take over automatically.

The built-in Compaq Rapid Recovery Engine starts up immediately to diagnose the problem and intelligently return the server to normal operation. In many cases, this doesn't require administrator intervention, but the user is kept informed by telephone pager.

For the SystemPro range Compaq offers the optional Server Manager/R service to make possible remote monitoring and control, whilst the standard Insight Rapid recovery service ensures that the user is able to diagnose and solve system problems. In the event of a failure Automatic Server Recovery can restart the server while generating a pager alert and remote diagnostics session. Server health logs provide a complete record of information critical to maintaining system uptime.

Exhibit IV-3 summarises some key features of Compaq's warranty terms.

EXHIBIT IV-3

Compaq Warranty Terms

| Feature | Servers | PCs |
|---|---|---|
| <i>Standard Warranty:</i> Warranty Period Older servers | 1 year on-site 2 more years return-to-maker | 1 year 2 more years return-to-maker |
| Latest models | 3 years on-site | |
| Standard Level | Return-to-maker | Return-to-maker |
| Cover Period | Working hours | Working hours |
| Response Time | Next day | Next day |
| <i>Extensions</i> Period | Up to a 4th year | Up to a 4th year |
| Level | Up to on-site | Up to on-site |
| Cover Period | Up to 24 x 7 | As per standard warranty |
| Response Time | Up to 2 hours | As per standard warranty |
| <i>Other</i> Cost Centre | Factory for worldwide warranty Commercial channel for country upgrades | Factory for worldwide warranty Commercial channel for country upgrades |
| <i>Conditions</i> Older servers | On-site repair during first year available free to registered users | On-site repair during first year available free to registered users |
| Latest servers | Uptime Pre-Failure Warranty | |

2. Digital

Digital was the first of the major vendors to pursue a deliberate policy of offering extended warranties. This was done in two ways:

- Standard warranty was set at one year for all devices
- Extended warranty for periods of two or more years was introduced as an option

This policy was introduced in the mid-1980s. Digital now offers a standard warranty on all items sold direct, whether by the sales force or through telephone sales from the DEC catalogue (which is applicable to low-end products). This warranty is for one year in duration and is normally equivalent to DECsystem support; it therefore offers on-site service on hardware and software products. However, it does not apply to third-party software products.

On high-volume products such as PCs and printers, Digital offers an extended warranty scheme known under the brand name of Warranty Plus in the United Kingdom and in the United States. Warranty Plus is a scheme whereby the user is able to buy *peace of mind* by extending the standard one-year warranty on all products (including Digital software products) to 2, 3, 4 or even 5 years. Warranty Plus users are allocated a *part number* at the time of purchase at an additional fee related to the purchase price of the configuration. In Germany and France this scheme is currently restricted to PCs, printers and other high-volume products like data communications devices.

Digital has in place a worldwide carry-in programme covering the issue of standard provision of service across different national borders. A PC or other device may be brought in to a Digital service centre and will be repaired within 24 hours irrespective of where it was purchased. Units under warranty will be serviced free of charge.

3. Hewlett-Packard

Hewlett-Packard rationalised its warranty terms and conditions in the autumn of 1992 in order to standardise them across the whole corporation, worldwide.

Warranty on products is currently offered at three levels:

- For Systems and Workstations, one-year on-site warranty is provided with a three-working day response time as the base. This warranty can be upgraded at time of purchase to any level of cover or response time as provided in the normal maintenance contract, e.g., with a 4-hour response, with extension to 2-shift or even to 24 hour by 7 day cover.

- For PC products, warranty gives one-year on-site cover with next working day response. There are no cover or response time options
- For PC peripherals, such as Laserjet and Inkjet printers and plotter product families, there is warranty of a period dependent upon the particular device. The period can vary, typically from one year to three years, and the service level is normally *return-to-HP*, but this can, according to a schedule of charges, be upgraded to give what is known as a *Diamond Edge* service, i.e., up to three-year on-site service. For return-to-depot warranty, there is no guaranteed turn-around time, although five days is usually quoted.

The HP warranties and their upgrades can be sold through indirect sales channels. These are empowered to take the orders while HP itself will be responsible for delivering the service. The trend in place at HP is for the extension of warranty period upgrades to the larger system units.

Workstation support is provided either directly by HP or by approved associates called Value-added remarketers. There is also another class of associates called value-added resellers but they are only allowed to sell service contracts for HP to fulfill.

HP has historically tied the level of warranty support to the ensuing hardware service contract, which comes into force at the end of the traditional one-year warranty period. This has the advantage of giving sales people the opportunity to sell support at the same time as the system, thus increasing the potential for raising the percentage penetration of maintenance contracts.

Exhibit IV-4 provides a summary of Hewlett-Packard's warranty terms.

EXHIBIT IV-4

Hewlett-Packard Warranty Terms

| Feature | Servers | PCs |
|--|---|---|
| <i>Standard Warranty:</i> Warranty Period | 1 year | 1 year |
| Standard Level | On-site | On-site |
| Cover Period | 8.00 - 17.00 hrs. | 8.00 - 17.00 hrs. |
| Response Time | 3 days basic | Next day |
| <i>Extensions</i> Period | Up to 2 or 3 yrs. | Up to 2 or 3 yrs. |
| Level | On-site | On-site |
| Cover Period | Up to 24 x 7 | As per standard warranty |
| Response Time | Up to 2 hours | As per standard warranty |
| <i>Other</i> Cost Centre | Factory for worldwide warranty Commercial channel for country upgrades | Factory for worldwide warranty Commercial channel for country upgrades |

4. IBM

IBM follows a traditional approach to warranty on processor systems and connected peripherals. This is still one year in duration and is offered as an equivalent to on-site service. IBM aims to fulfill over 80% of calls from the telephone response/call dispatch centres without sending CEs on site. There is no guaranteed or committed response/repair time for any units serviced under warranty.

IBM offers product warranty on desktop devices such as PCs, printers, general-purpose and application-specific terminals, for example point-of-sale and financial terminals. The warranty offered for this type of device is normally from one month up to six months. For legal reasons this has to be extended in certain markets; for example, German law demands a minimum six-month warranty.

Support services on workstations are provided by IBM but there is considerable emphasis on the provision of service through indirect marketing channels. There are four types of associates:

- Business associates
- Sales associates who act through business associates as a second tier
- Service associates who are third-party maintenance organisations approved for delivering maintenance and software support
- Software associates who are software product companies with whom IBM has sales agreements and who would normally support their own products.

In general there is a trend for increasing warranty periods which are pushed by increasing device reliability and pulled by competitive market conditions. For example, IBM offers standard one-year on-site service on PCs and 3270 terminals and is also allowing this warranty to be extended to three years. This warranty extension is only available at the time of purchase. It was introduced for 3270 terminals in 1991 and was first applied to PCs in the autumn of 1992 for the new models introduced at that time.

This warranty extension has its own structure of options:

- Users may choose to have a parts-and-labour or parts-only upgrade
- The service level offered after the first 12 months is dependent on the unit size. Larger PCs have full on-site service; smaller models only have *return-to-depot* service.

IBM honours its warranty conditions across country borders. There exists a European Union directive that manufacturers should do this, but IBM in fact operates this policy on a worldwide basis.

5. Motorola

The Motorola warranty is different from the other examples in that it is primarily aimed not at users but at firms that integrate Motorola processors into complete systems. It is effectively a next-day parts replacement service free of charge, with Motorola reclaiming the defective part(s). It is marketed as a life-time warranty, but developers would be responsible for their own warranty arrangements with their users, using their own spare parts stock to provide shorter than next-day replacement. The service would be available to users who wanted to do their own integration.

Exhibit IV-5 provides summary data concerning Motorolas's warranty terms.

EXHIBIT IV-5

Motorola Warranty Terms

| Feature | Servers |
|---|--------------------------------------|
| <i>Standard Warranty</i> Warranty Period | 5 years |
| Standard Level | On-site delivery of replacement swap |
| Cover Period | Working hours |
| Response Time | Next day |
| <i>Extensions</i> Period | Not Applicable |
| <i>Other</i> Cost Centre | Commercial channel |
| Conditions | Standard misuse |

6. SNI

Standard warranty on SNI equipment is 12 months on both hardware and software components. SNI extends the warranty to three years on displays and PCs, in line with IBM's practice. On units which are subject to wear and tear from the general public, such as retail terminals, banking terminals and cash dispensers, the warranty is limited to six months (the minimum under German law).

The level of service offered by SNI is essentially *return-to-depot*, but in the case of systems (i.e., excluding displays and PCs) it is more likely that the user will expect on-site service and that this is what will be provided. The advantage to the user in these situations is that if the system is delivered and installed free of charge to a user site a German court would be likely, in the event of a dispute to rule that the warranty should be provided in the same way.

Warranty is usually invoked with a *pro forma* written order. As with other vendors the trend is for SNI warranty cover periods to lengthen.

7. SUN Microsystems

SUN offers three different categories of warranty for three different types of products: desktop devices, servers and software products.

Desktop devices carry a warranty of twelve months. The level of service is *return to Sun*. The user must return the unit for repair to a Sun Repair Centre, paying the freight/carriage cost. There is no guaranteed repair time.

Servers carry a warranty of twelve months as well. The level of service is On-site Repair, including parts and labour, but again there is no guaranteed response time. Servers are normally distinguished from desktop units by being too heavy for a single person to carry in.

Software products bearing the Sun label also carry a twelve-month warranty. This implies that defective media and bugs will be corrected free of charge but without an on-site visit. All software products will be brought up to their full functionality as specified in the manuals. Solutions, patches and fixes of a temporary nature will be provided through a Sun Service Centre hotline. Any user has the right to demand a *minor release* to work around the problem, since there is no guarantee of *fix time*. Users are also eligible for a patch to be down-loaded from the Sun electronic database of faults/patches and are free to look into the known bug-list on-line. There are other options available to Sun to speed up the process of delivering a new clean system or to deliver a patch, but these are only used at Sun's discretion.

Sun sees an advantage in allowing its users to invoke warranty through the telephone and not require hard-copy verification.

In Germany a 12-month warranty is offered as standard in contrast to the 3-month minimum offered in some other European countries, i.e., the U.K., which effectively offers the Sun standard worldwide minimum.

SunExpress, which is Sun's *standalone telephone sales subsidiary*, also offers a 12-month warranty on all units including software, but this is a return-to-depot service. The same terms are offered across the whole of Europe, and can be invoked via a free-phone telephone number.

Another German specific warranty element is that for educational (universities, schools, etc.) and for other not-for-profit organisations. These can demand that warranty be extended to either three or five years with no consequent increase in the purchase price.

8. Toshiba

The type of standard worldwide warranty being offered by Toshiba is common to many suppliers of portables who see the necessity to offer nomadic users equal levels of warranty service irrespective of their temporary location and original point of purchase.

Exhibit IV-6 summarises some of the main characteristics of Toshiba's warranty terms.

EXHIBIT IV-6

Toshiba Warranty Terms

| Feature | Servers | PCs |
|---|----------------|-------------------------------------|
| <i>Standard Warranty</i> Warranty Period | Not Applicable | 3 years |
| Standard Level | NA | Return-to-maker |
| Cover Period | NA | Working hours |
| Response Time | NA | None guaranteed |
| <i>Extensions</i> Period | Not Applicable | 3 years |
| Level Cover Period | | Upgrade to on-site Working hours |
| Response Time | | Up to 4 hours |
| Cost | | Not known |
| <i>Other:</i> | | |
| Costing Percent | NA | Not known |
| Cost Centre | NA | Commercial channel |
| Conditions | | Standard misuse |

(Blank)



Uptime Guarantees

This chapter discusses some of the principal considerations concerning uptime guarantees including contract parameters, measurement methods, penalty calculations and premiums and extra conditions.

A

The Systems Availability Maintenance Model

As IT equipment becomes increasingly fault-free the *response/restore* model of equipment maintenance may become more and more irrelevant to many users. However, the widespread adoption of complex client/server architecture-based systems is likely to drive the demand for a new *systems availability*-based maintenance model.

A *systems-availability* based maintenance model focuses attention on the performance of the whole system and its capability to meet the overall processing requirements of the customer. In contrast the traditional *repair/restore* model tends to focus on individual component performance and the capabilities of the services vendor in responding to problems on those components and restoring them to working order.

The *repair/restore* model tends to encourage too narrow a view of system performance in widely distributed client/server type environments. It is a sterile approach for systems where most components are unlikely to fail individually, and where the most likely source of problems will be system component incompatibilities and environmental hazards or misuse.

A discussion of these issues was provided in an earlier INPUT publication, *Problems Management Valued More than Maintenance Services*, which is included in this report for completeness, as Appendix A.

As information systems are more and more used to support every type of business process so users come to depend more and more on them. In this environment users have to place significant emphasis on the availability of their systems and it is likely that there will be an increasing demand for systems availability to be guaranteed. The adoption of a *systems availability*-based maintenance system implies the need to focus on *uptime*, and this chapter is devoted to a discussion of *uptime* guarantees.

Nearly all vendors researched reported having at least one contract where penalties were in force for excessive down-time. In one case the penalty was imposed not because of a failure in meeting an uptime figure, but because actual response times exceeded their agreed targets.

However, most vendors reported only minimal incidence of this type of contractual commitment. Exhibit V-1 classifies some vendor comments concerning uptime guarantees.

 EXHIBIT V-1

Guaranteed Uptime Levels in Service Agreements Vendor Comments

LIMITED APPLICATION

STRONG APPLICATION

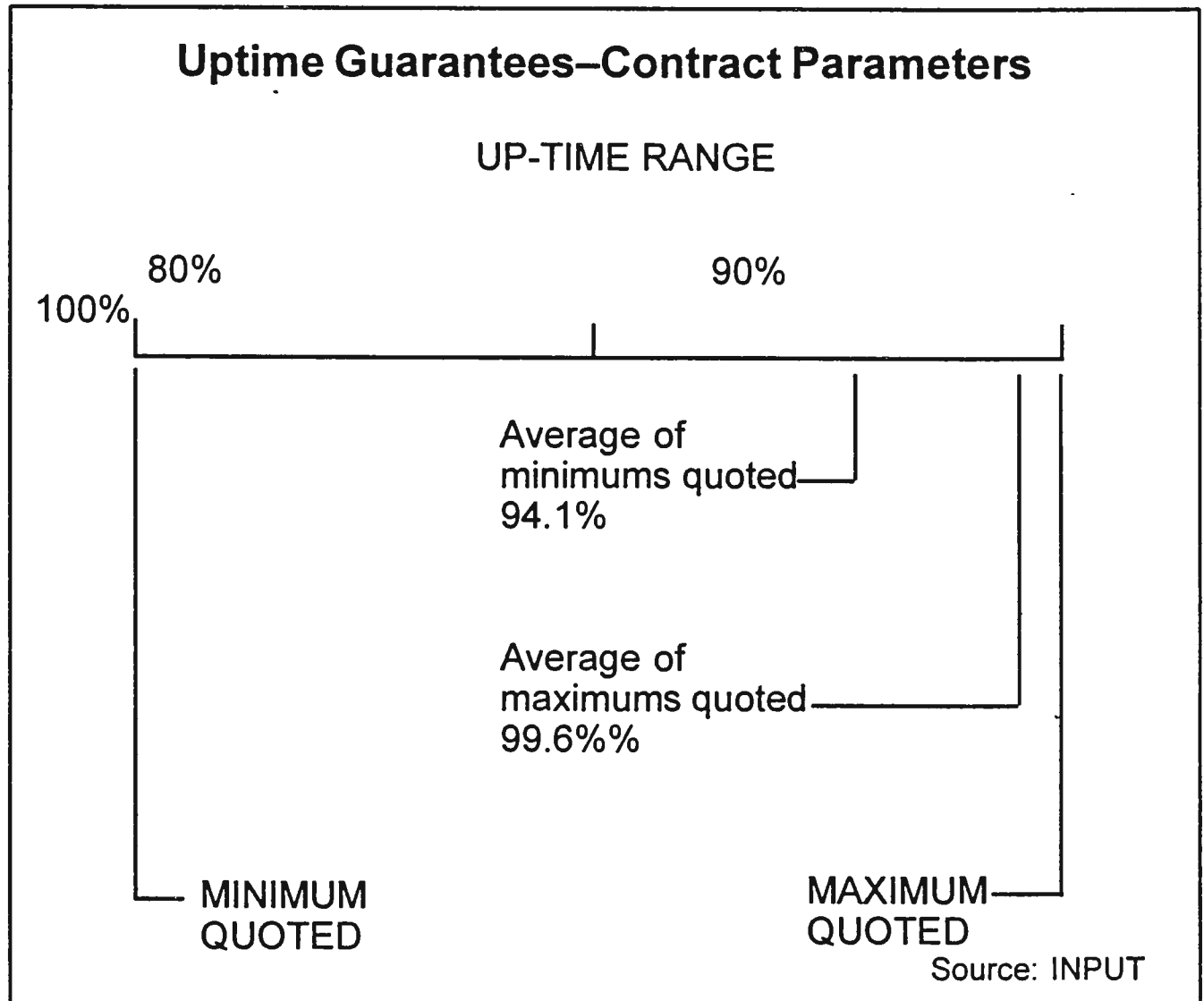
- | | |
|--|--|
| <ul style="list-style-type: none"> • Not standard - only used for Government sites • We will not accept any penalties • Important to certain industries, e.g., telecomms • Only grant guarantees in special cases e.g., for an airline reservation system. | <ul style="list-style-type: none"> • Been in use for 10 years - minimum uptime level is now built into all contracts. |
|--|--|

B

Contract Parameters

Exhibit V-2 indicates the ranges of the basic parameters being built into contracts. Only one vendor had standardised on the range of values being used. Other vendors had no standardised models in place and simply developed contractual commitments on a case-by-case basis.

EXHIBIT V-2



The assessment period is another key parameter. Monthly assessment was the most frequently used, being used in 40% of the cases quoted. However, as one vendor pointed out, this was the option that most users would prefer. From the vendor perspective the longer the period of assessment the better. The maximum period quoted was one year, which accounted for 30% of the cases. The remainder were evenly split between quarterly and half-yearly assessment periods.

C

Measurement Methods

The most common measurement method currently being used is to agree on a target figure based upon the *downtime* allowable within the period of cover. This is measured as the sum of the periods from the time the fault call was received at the vendor's support centre and the time the engineer started work on repairing the fault. This figure, when subtracted from an agreed uptime target figure gives a measure of the actual uptime achieved.

In most cases the measurement/calculation of downtime is a "manual" one, but in some cases respondents instanced techniques for automating it.

- One vendor's service management system has the capability of interrogating the failed system to confirm the time and date given by the user, when calling in.
- In another example times of incoming calls received at the support centre are collected by the service management system for the purpose of managing the escalation procedures.

In practice, none of the methods described could be rated as more than *semi-automated* or *computer-assisted*. The main emphasis in the management of the contract is placed upon the mutual trust in the vendor/user relationship.

D

Penalty Calculations

At least 70% of vendors researched reported only minimal use of penalty clauses. The majority of vendors did not have a standard formula for calculating the penalty to be applied when the guaranteed uptime was not achieved. Instead the vendor and user would negotiate a penalty for use on a contract-by-contract basis.

The system characteristics that were used as a basis for this negotiation included the following:

- Measurement of downtime
- Response times exceeding targets
- Applications criticality
- Configuration parameters.

In the cases where a formula was being used the principal parameter was an allowable number of downtime hours. In one case it was based on no allowable hours of downtime.

None of the companies contacted were prepared to admit that they had actually had to pay any penalties resulting from such contracts. The range of potential penalty payments quoted was from about 10% to 100% of the monthly maintenance fee.

E

Premiums and Special Conditions

In order to limit their risk, vendors engage in charging premiums or imposing special conditions before agreeing to contracted uptime guarantees. One vendor, for example, quoted a 20-25% uplift to standard maintenance rates.

Another vendor had compiled a special tariff rate in order to simplify the process for the sales staff to sell *maximum availability* contracts without turning each request into a special case. The special tariff was based on:

- Configuration and machine model characteristics
- The type of application to be supported
- The level of uptime guaranteed.

One of the most interesting approaches was covering the risk adequately by insisting that the user commission a chargeable consulting assignment. The vendor would conduct the study to determine:

- The most *at-risk* components in the system
- The times and conditions when system failure would cause most damage to the operations being supported.

The incidence of applying extra conditions was more common than charging premiums, typical examples being:

- Acceptance tests for each device
- Payment for extra equipment to make configurations more resilient
- Allowing the vendor to undertake a study of the applications
- Ensuring clear terms and conditions are agreed between user and vendor.

(Blank)



Remote Service Delivery

Customer services vendors must continue to make their services as cost effective and efficient as possible. An important contributor to this objective is the provision of remote service options (teleservices) that optimise the availability of stored information about possible problems for the benefit of the user.

User opinion is, however, equivocal on this issue as was seen from the data presented in Chapter III, particularly Exhibit III-6, which shows the importance rating attributed to on-site service. Users appreciate the added efficiency implied in this approach but are dissatisfied if they do not get the personal service they think need at their sites.

This chapter reviews different types of services being provided remotely and gives examples of the type of service provided by IBM, Digital and Hewlett-Packard. A previously published INPUT Research Bulletin that discusses remote services issues, *Customer Services Support Centre Trends*, is included in Appendix B.

A

Characteristics of Teleservice

There are three principal aspects to Teleservice:

- Remote diagnosis
- Remote fix
- Delivery of semi-remedial or non-remedial services through a network.

Remote diagnosis has two manifestations:

- Access to *central* diagnostic services from a *remote site*, using special hardware diagnostic engines with communication facilities resident for this purpose in the *remote* processor. This facility can be made available either to a user or to a visiting field engineer. It may involve handing over the *remote machine* to the control of *central engineers* in order to simulate or replicate faults.

- *Central* monitoring of a *remote site* system. This is often thought of as predictive maintenance, where fault or impending fault histories can be analysed by an expert system with *learning* ability, in order to notify the user or the customer service department that a fault is likely to occur. This type of monitoring is increasingly being applied to the environmental conditions within the computer complex. This latter type of service is also now being offered as an adjunct to Disaster Recovery Services (DRS) by specialist DRS vendors.

Remote fix is normally used in the case of software faults, where *central engineers* have access to a user's failing *remote machine* in order to replicate/rerun faults and implement/test patches.

Delivery of semi- or non-remedial services through a network has a number of manifestations:

- In one of its forms it is an extension of a key function available to engineers using remote diagnostics. This is where the user has access to vendor databases of remedial or non-remedial information including fault histories. Non-remedial information can include information on new products or company news.
- Another form of service delivery through the network is the down-loading and/or installation of new releases of software.

B

IBM

ServiceLink allows customer help-desks to network with the IBM Call Management Centre. AIX-Connect provides a similar facility for RS/6000 users. This service is designed to not only provide a fast call placement service, but to allow help-desk personnel to view the status of all current calls.

Dial IBM allows users access to IBM remedial and non-remedial information via a dial-up connection.

Assist/400 hardware service includes facilities for electronic access to AS/400 engineers and to a database of remedial information. SiteView and SiteView/400 provide environmental monitoring for MVS and OS/400 users respectively.

CEDACS (CE Direct Access) delivers remote diagnostics, remote fix and maintenance information through connection of a system to IBM CE (Customer Engineering) specialists in a central location. This is a service for MVS customers and is now included within the OSA (the IBM Operational Support Agreement). The service is delivered via the IBM Managed Network Service (MNS), which is a pre-requisite to CEDACS installation.

C

Digital

DECTEL is a service which has, as its central component, software equivalent to IBM's long-standing RETAIN database of engineering diagnostic and fix information. DECTEL is a free-standing service.

VAXsimPLUS gives customers the ability to monitor systems around the globe from one central location. It is delivered as a software product for installation at a chosen user site. The product includes an expert system.

Advanced Electronic Support (AES) is the highest level of predictive maintenance and automated monitoring available to Digital customers working through a network connecting to a Customer Support Centre.

Some further, previously published, information concerning Digital's remote service centre operations is included in Appendix B.

D

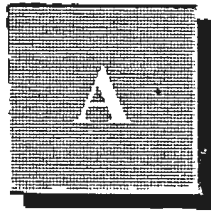
Hewlett-Packard

Hewlett-Packard offers:

- Electronic access to a worldwide database of support information as part of its Software Support service at the BasicLine level
- HP SupportLine which includes electronic fault call submission at its next level of software support, called HP ResponseLine
- Predictive support, supplied as a software tool to monitor the error logs on its HP 3000 central systems. Coupled to an electronic link, this allows notification of a fault or impending problem to be made automatically to a Response Centre.

Some further, previously published, information concerning Hewlett-Packard's remote service centre operations is included in Appendix B.

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Problems Management Valued More than Maintenance Services

The following text was originally published as an INPUT Research Bulletin (Vol. IV, No. 13 in the Customer Services Programme—Europe in July 1993).

Users have become more reluctant to pay for basic equipment repair services as IT equipment has become increasingly reliable. However, complex network based systems are driving the need for higher-level problems management services. Customer services vendors are in danger of missing this opportunity if they remain too focussed on equipment repair and software product support rather than developing the skills necessary to support higher value-added *problems management* services. To profit from increased customer perception of *value* vendors need to:

- Understand the reasons for users' higher-level service requirements
- Develop increased knowledge sets that enable the firm to deliver genuine *value* to the client
- Adjust pricing and contract models to reflect a total system approach rather than an equipment repair orientation.

Systems Complexity Drives Problems Management Services

Over the last five years the dominance of proprietary systems vendors has been overturned by the industrial democracy of the open systems movement. The old type of competition, centred on the advantages of one proprietary technology over another, has been replaced by one in which a vendor has to win business by demonstrating the ability to deliver *value*. This trend has been followed by the shift to *open support* in customer services. Whilst users have generally become increasingly satisfied with hardware service (although not with the price paid for it) there are indications from INPUT's research that satisfaction with total systems support is decreasing.

User satisfaction with total systems support is decreasing because complete systems (computers and networks) are becoming more complex and involving users in additional support functions. One of the fundamental reasons for using any service function is to be protected from complexity. Few customer services vendors have risen to the challenge of extending the scope of the services provided to cover the latent demand for more comprehensive problems management of entire systems.

One aspect of the need for higher-level problems management services in complex systems is the decrease in total availability incurred as the number of units increases. This is illustrated by the simplified model shown in Exhibit A-1. This exhibit tabulates the availability of a network against the numbers of devices connected to it. The availability is measured in terms of the average unit availability (A_{av}) across all connected devices. In this simplified model the error rate of the network links is assumed to be zero. As this is an unrealistic assumption the model represents a best case scenario for each network size.

EXHIBIT A-1

| Simplified Network Availability Model | | | |
|--|--------------------------------|---------------------|----------------------|
| Number of Devices | Network Availability (Percent) | | |
| | A_{av} =99.9% | A_{av} =99.99% | A_{av} =99.999% |
| 10 | 99.0 | 99.9 | 99.99 |
| 100 | 90.5 | 99.0 | 99.9 |
| 1000 | 36.8 | 90.5 | 99.0 |

Source: INPUT

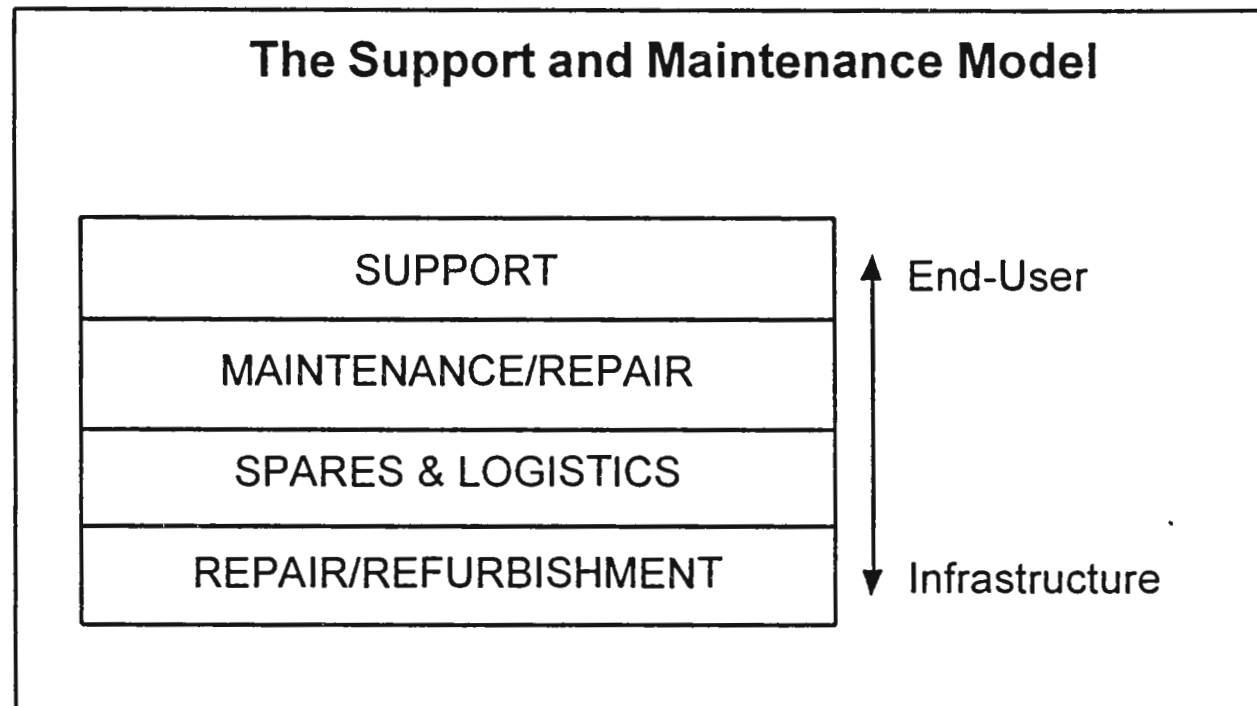
Given the known high individual reliability of system components (e.g., a PC or workstation), user concern for service value has shifted to the overall availability of the system and the potential conflict situations incurred in organising remedial support amongst multiple vendors. This is the *problems management* opportunity for customer services.

Increased Systems Knowledge Delivers Value

IT only has *value* in its application to real human or business problems. Customer services vendors must respond to this challenge if they are to increase the real and perceived value of their services. The more clearly that the service provider understands the overall business process, the more likely it has the capability to provide high-*value* services to the customer.

Customer services organisations can succeed in achieving this by correctly identifying the operational interface required by each individual client. This interface will be a function of the level of systems complexity from which the user wishes to be shielded. This interface can be defined at various levels; some are shown in Exhibit A-2.

EXHIBIT A-2



This exhibit illustrates a basic value chain for the IT support and maintenance market. Different types of vendors operate at different levels of the model. Currently few customer services organisations have entered the support layer in its fullest sense. This is a cause of potential dissatisfaction amongst users needing more comprehensive problems management service.

Some users have demanded services at even higher business levels. In a number of outsourcing contracts the vendor has taken responsibility for a complete business process of which the computer system is but a part. For example, EDS has a contract with Memorex in Europe for the management of its complete logistics operation.

In order to effectively meet these new opportunities customer services vendors must not only be able to demonstrate a thorough understanding of the system level which they are supporting but also have significant understanding of the adjacent levels. A failure to do this is likely to lead to contracts reverting to in-house management as the perception of *value* on the part of the customer erodes. Granada Computer Services' loss of the FordNet contract illustrates the vulnerability of services vendors to this threat.

The customer services organisation is thus facing profound challenges in increasing the scope of its knowledge base in order to be able to deliver real *value* to the client as a problems manager.

Redefined Contracts Communicate Value

Customer services vendors' sales presentations and marketing materials often emphasise high-level support and responsibility for user system problems. In contrast, service contracts still emphasise equipment-based services. This is a classic example of over-promising and under-delivering, the exact opposite of the service advice given by Tom Peters, the management guru, *under-promise and over-deliver*.

Customer services vendors can effectively meet the problems management challenge by adapting their contract and pricing mechanisms to communicate their higher-level service commitment. There has to be a complete shift away from an equipment repair orientation towards problems management. This will be essential to achieve the objective of increasing the user's real and perceived *value* from customer services.

Customer services vendors should be guided by the user who recently commented to INPUT that "they would be very happy to have a contract to support their 250 end-users, but they were very unhappy about signing a contract to just support 250 PCs".



Remote Service Support

This appendix contains three sections each one previously published by INPUT within the Customer Services Programme–Europe.

Section 1 contains a bulletin on Customer Services Support Centre Trends previously published by INPUT [Research Bulletin Vol. IV, No. 10] in June 1993.

Section 2 contains an article on Hewlett-Packard's Response Centre previously published in July 1992.

Section 3 contains an article on a Digital Customer Support Centre previously published in January 1992.

A

Customer Services Support Centre Trends

Customer Service Support Centres are in use among the majority of IT vendors as the key focal point of the supplier's customer services operation.

Among the full-range equipment suppliers, the Support Centre is now facing a number of challenges brought on by the commoditisation of hardware products and the consequent margin pressures:

- Inhibiting factors impacting the 'unbundling' process for new services
- Identification of (pre-sales) professional services opportunities
- Maintenance of service quality as cost-cutting exercises take effect.

The Support Centre has a tendency to symbolise the earlier assumption of the inclusive nature of *service*, i.e., service is included as part of the purchaser's deal with the vendor. This inhibits the required 'unbundling' of services, which is part of the trend embodied in the support of systems on open platforms.

Many Support Centres act purely as post-sales entities, bringing their value-added to the operation and maintenance phases of the system life-cycle. Many of the new service opportunities arise at other phases in this cycle and are not remedial in nature.

Scarce resources needed to exploit these professional services growth areas might by default be husbanded within the Support Centre organisation, thereby causing the vendor to miss out on worthwhile service contracts and bids.

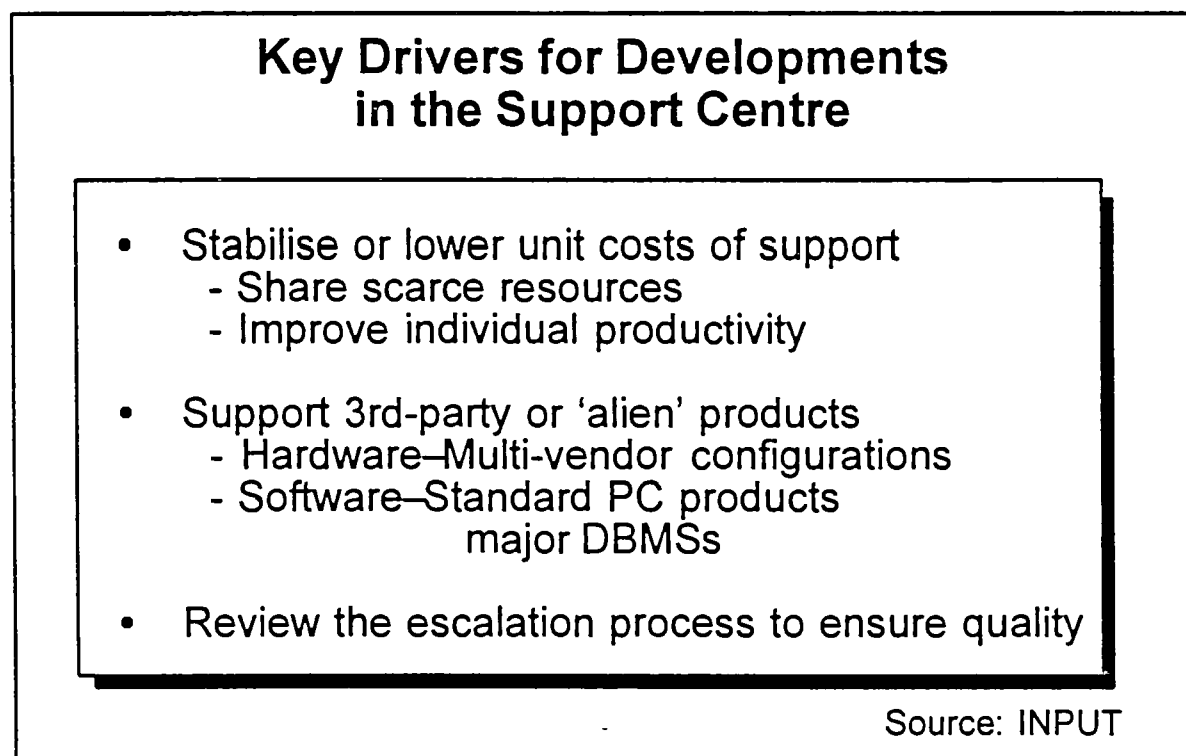
In the current climate the majority of equipment vendors (there are, of course, some notable exceptions) have accepted that growth and profit both go hand-in-hand with an increasing emphasis being placed on *services*. We might have expected to see a corresponding decline in the position of the Support Centre. However, the evidence is that many vendors have concluded that more support of all types—for hardware, software or networks—can only be offered with profit by the increasing use of remote support facilities, which are most easily offered through central or regional support centres.

The PC vendor Dell has led the way in meeting these challenges by making the Support Centre concept into the focal point of its service differentiation, which mirrors its almost total reliance on telephone sales. All activities needed to progress a customer through the system life-cycle are available from a telephone centre:

- Sales and Marketing
- Order and Delivery Progressing
- Post-sales Support
- General Enquiries.

Exhibit B-1 summarises the three key factors impacting the Support Centre organisation in 1993.

EXHIBIT B-1



Lowering Unit Support Costs

There are basically two ways of lowering unit support costs:

- Cut the headcount with a static workload, thus forcing each member of support staff to feel the need to become more productive
- Increase the chargeable workload on a rising curve of support contracts, thus offering the possibility to retain existing headcount levels or even expand them through recruitment.

INPUT's 1993 research finds that in practice a combination of these techniques is being implemented in a number of vendor organisations:

- Vendors such as Stratus and IBM have re-allocated certain of their support functions to have a regional European remit in order to assist in spreading cost across a wider customer base than would be the case if the functions were replicated at the national level.
- INPUT expects Compaq to re-engineer its support functions along similar lines, reallocating functions between national and pan-European units
- Digital in the U.K. reports that 1992 saw a large increase in its call-handling volumes, as a result of twin factors:
 - Installed base growth is taking place naturally under the impact of the spread of distributed open systems
 - The company is now supporting more standard PC products from the industry's leading software vendors.

The situation with IBM is highly fluid as the company struggles to get its costs under control with an altogether slimmer organisation. In its German subsidiary, which appears to be the most advanced in its reorganisation of all the subsidiaries in Europe, support centres, which used to specialise by geographical region or by hardware and software, are being replaced by new national centres that specialise by type of unit, i.e., there is one centre for printers, others for PCs, AIX or MVS systems, etc. These new centres will be responsible for all types of problem whether of a hardware, a software or a services nature.

Sun Microsystems (Sun) has recently been putting most effort into improvement of the front end of its despatching system, since speed of call answering and precision of problem definition had previously left room for improvement. In contrast to Digital, Sun reports that call volumes have now plateaued in the U.K., due principally to the increased reliability of software. Their new SunSpectrum family of service programmes is set to reverse this trend.

Supporting Third-Party Products

A key issue affecting the future of the Support Centre is the issue of third-party software products and their increasing use in an open networked environment. The impact on vendors comes in three ways:

- To what extent do these products interact with a given vendor's own products, making problem identification that much more complex
- To what extent will the user expect support to be included in the maintenance contract/warranty provided by the 'primary' vendor, but nominally only to cover its own products
- How credible is it for any vendor to offer support on all products which may be accessible via an open network?

Sun has tackled the first of these areas by putting the emphasis on diagnostic tools. Currently Sun does not offer specific multivendor services as such. Instead its standard contracts aim to support the network, which is the system, as far as they are concerned. The main strategy for handling problems which arise through the connection to the network of any 'alien' products, hard or soft, is to make use of sophisticated software tools, developed within the company itself, for problem isolation and identification. The objective is to be able to pinpoint the device or module responsible for any service degradation on the network. Sun could be said to be more in the business of assisting the user in 'finger-pointing' at the relevant 'offending' vendor, this being achieved by licensing the tools as products to users.

INPUT expects to see Sun become more formal in the way it handles support for third-party products, in an effort to gain more straight services revenue. Sun's new set of services (see Research Bulletin Vol. IV, No. 8) are aimed at supporting all Sun's approved standard system software products, all as part of the normal support contract. Alien software products can be formally supported but on a chargeable RFQ (Request for quotation) basis.

Digital has pursued the route of making the leading software products available as standard DEC-supported products. The third-party products are then able to attract the whole range of Digital's support and maintenance services. In many cases these products and the support contracts can now be ordered through the company's mail order facility.

Managing the Escalation Process

Escalation procedures are going through a period of review in which a trade-off is being established within each major vendor's environment between the formality of escalation procedures which have their origins in engineering-oriented hardware maintenance departments and the more flexible approach needed to tackle unusual software-oriented problems.

The main trends in Support Centres which impact escalation procedures are:

- Specialisation by type of hardware unit/type of software module. This is needed to cope with the increasing number of combinations of problem, which can be encountered in an Open Systems environment
- Desire to keep to a minimum the number of technical people with whom an individual user will interface during the course of an online fault correction session.

In its Customer Support Centre at Basingstoke, U.K., Digital no longer uses a set of hierarchic escalation procedures. Instead, there is a special section called the Exception Management Team, whose job it is to process difficult situations, i.e., ones which have not been resolved within a typical or adequate repair time. These situations come to their attention through the AI-based call logging and management system, which is available to all the support centre staff from the moment they pick up the incoming call, whether it be from a customer or from a Digital engineer in the field.

The standard criterion is the need to have assessed a fault within 1/2 to 1 hour of an incoming support request, before it gets referred. This team of exception managers operates under the overall guidance of the managerial section, the section where the managers of each problem-solving team or group sit and work together, themselves acting also as a team. Escalation is much less formal on the software side than on the hardware, since no guarantees on response and repair times are included in the contract. It is more a question of:

- Maintaining standards and
- Managing the users' expectations.

Exhibit B-2 summarises the changes which are under way within the major vendors' organisations in Europe.

EXHIBIT B-2

Changes Being Implemented in Support Centres Across Europe

- | |
|--|
| <ul style="list-style-type: none"> • Lower unit costs <ul style="list-style-type: none"> - Re-allocate specialist resources - Differentiate centres by device type • Support third-party software <ul style="list-style-type: none"> - Use diagnostic tools to 'externalise' labour costs - Bring 3rd-party products into the catalogue • Revamp the Escalation process <ul style="list-style-type: none"> - Use flatter organisation structures - Experiment with and foster teamwork |
|--|

B

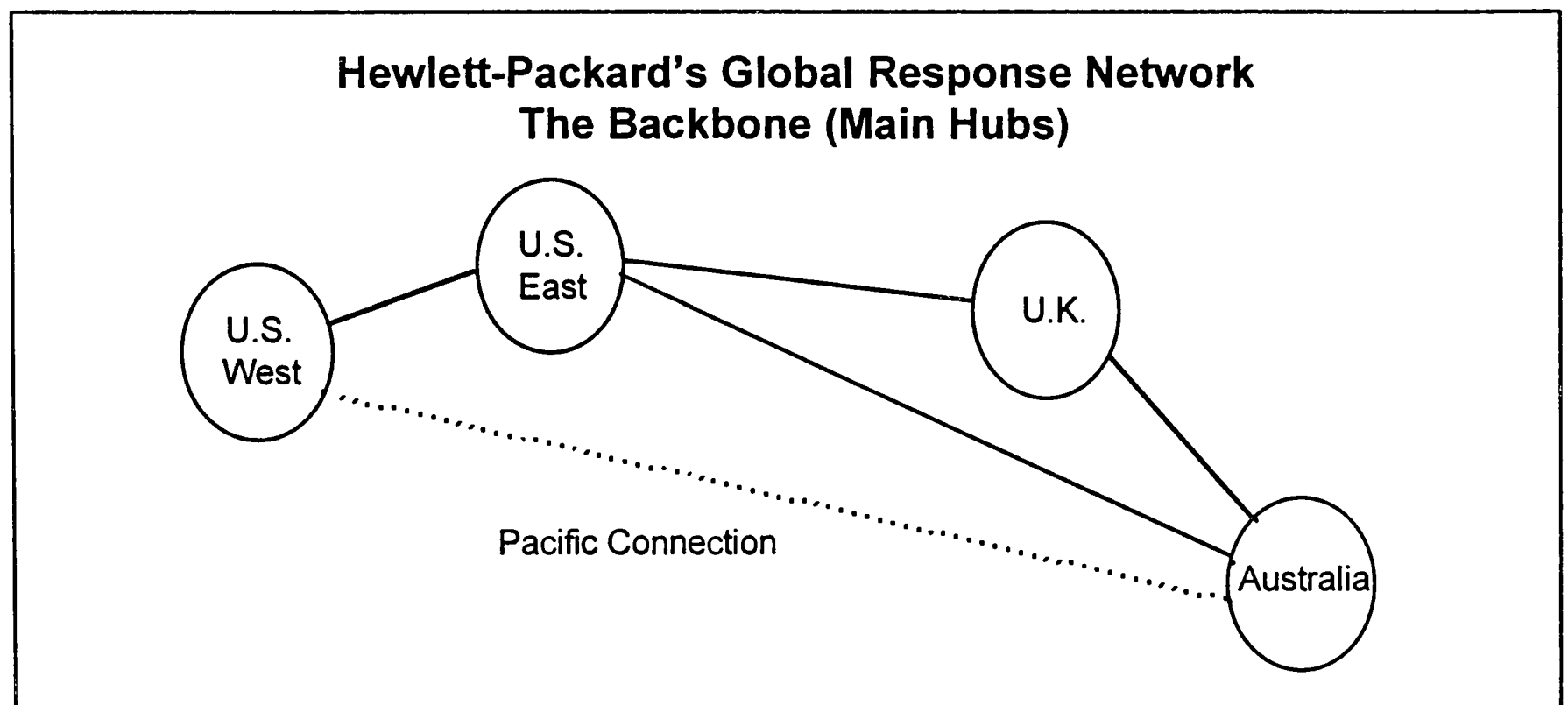
The Hewlett-Packard Response Centre

A Global Service

Hewlett-Packard (HP) is continuing to receive the top awards in customer satisfaction studies run by independent organisations. In many aspects of service, if HP does not come first, it is certainly unusual for any satisfaction parameter to be poorly rated by its users. What more natural than that *Service Update* should want to make a visit to an HP Response Centre a high-priority item in its 1992 calendar of such visits?

The first and most basic concept to which the visitor is introduced is that of the global network. INPUT's port of call was HP's U.K. Customer Response Centre in Winnersh outside Reading, Berkshire. This has been the centre for all U.K. support for almost ten years, but it is scheduled to be relocated in the nearby U.K. head office outside Wokingham later in 1992. It was soon impressed upon us that although principally accessed from the U.K., this Customer Response Centre (CRC) was one of the four major hubs of the worldwide HP response network. Exhibit B-3 shows the backbone structure, with two main hubs in the U.S. and two outside it.

EXHIBIT B-3



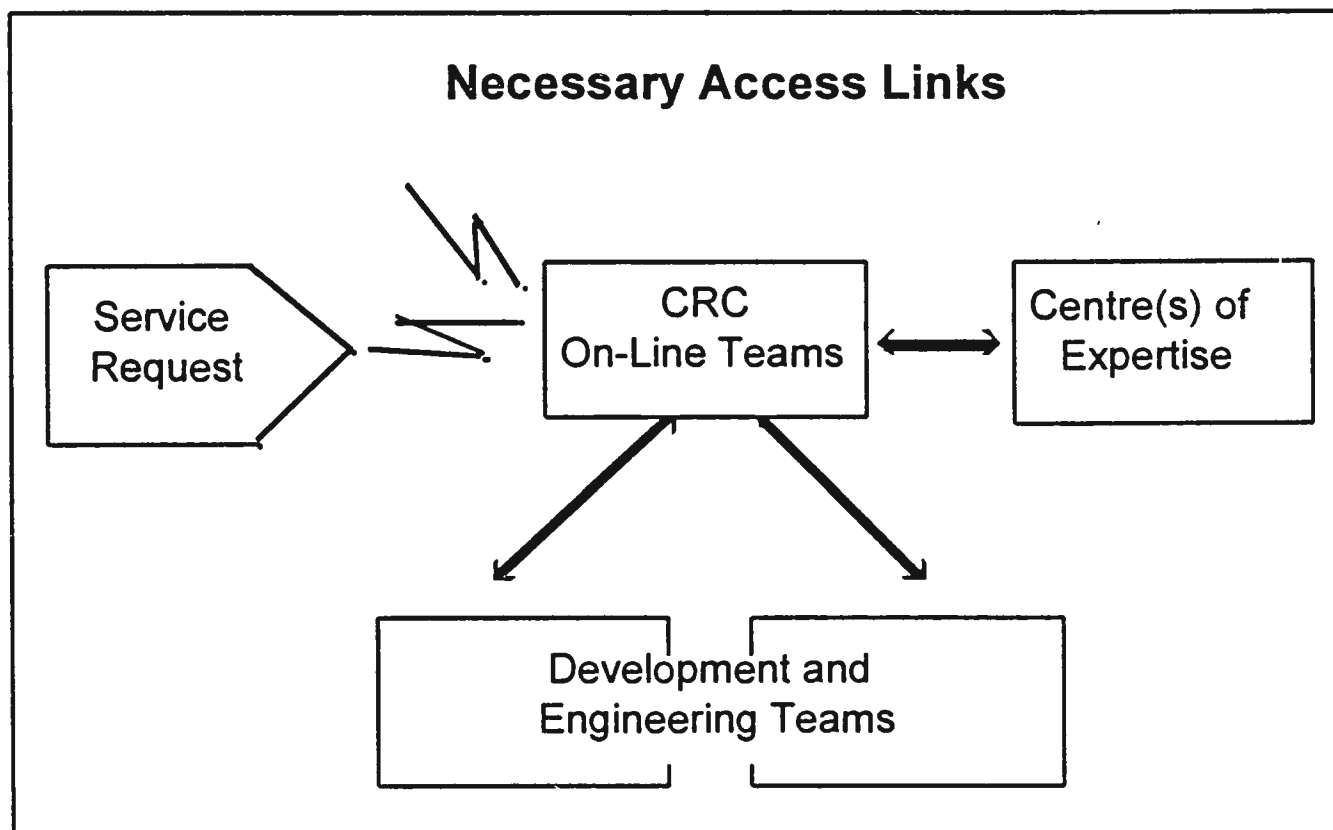
These hubs connect to all subsidiary response centres and field engineering offices around the world. All centres have access to the same Problem Knowledge database, so that any customer can, with one telephone call, be in touch with the whole HP support resource. The worldwide database of fault and service information is being accessed continuously round the clock, and

engineers in one location are thus able to continue to give support to a customer even though the customer's local or national centre may be closed for business during the hours of darkness or during a holiday. This ability to hand on a service call from one engineer to another can happen without any inconvenience to the customer, to whom it can be totally transparent. In this global network environment, every midnight all local components of the company's service database are updated to the new day's status in a synchronised manner.

The Organisation

The U.K. Response Centre is linked to response centres throughout Europe, e.g., to the equivalent centres in Germany and France. Normally, customers will access their nearest national response centre, but, depending on the type of problem encountered, resources will be obtained from the most appropriate centre of expertise. Centres of expertise are found spread across the U.S. and Europe. For example, the Winnersh site is the European centre for Novell networking know-how and services users in other large and smaller countries. Another way in which expertise can be called up is by referral to the engineering teams responsible for each product or project. Exhibit B-4 illustrates the access links needed to implement the delivery of service expertise.

EXHIBIT B-4



Within the U.K. organisation there are nine separate departments with customer service responsibility. Some of these operate reactively as a function of incoming requests for service. Others act in a more proactive way, and some of HP's newer services have been given to this second group to deliver.

The normal task of servicing a request filters a user's call in one of three directions depending on whether it is for:

- Hardware
- Software
- Networking

Customer Support Operations is the department that receives incoming service calls. It has responsibility for qualifying calls, arranging for response to them by a person qualified to diagnose the problem, and finally, if an on-site call is required, for organising the engineer despatch calls. In 50% of cases an on-site visit is not needed.

Engineering Services is the department providing the logistical support to the entire customer service operation. It uses the statistics gathered in the worldwide database for planning the spares holding, controlling inventory and generally doing the housekeeping for Customer Support.

Escalation procedures are built into the standard user contract. These are triggered when a 'hot' site criterion is exceeded, i.e., "you are taking too much time to repair a particular fault". The standard delay is four hours before a site is declared a "problem site"; after a further four hours it becomes a "hot site". A problem site manager is appointed to produce an action plan with the affected user. Hot sites appear on a new database that is available to the Response Centre Manager. The appointed problem site manager is usually the local district manager for support. The key challenge at this juncture is to communicate both internally and to the customer what needs to be done to resolve the problem.

Processes

The procedures described above are those typically needed to service a hardware fault call. These service procedures have been developed to handle the standard layered hardware maintenance services that are summarised in Exhibit B-5. There are, however, other procedural routes through which customers may be shepherded depending on the nature of the call.

In the software area, the Response Centre reacts in a similar way to the hardware fault procedure. On receipt of a call, the Response Centre engineer logs it into the database and it follows a similar path to find the appropriate knowledge resource. Software teams are organised roughly into three areas:

- Proprietary systems—MPE
- Open system—UNIX/HP-UX
- Networking

EXHIBIT B-5

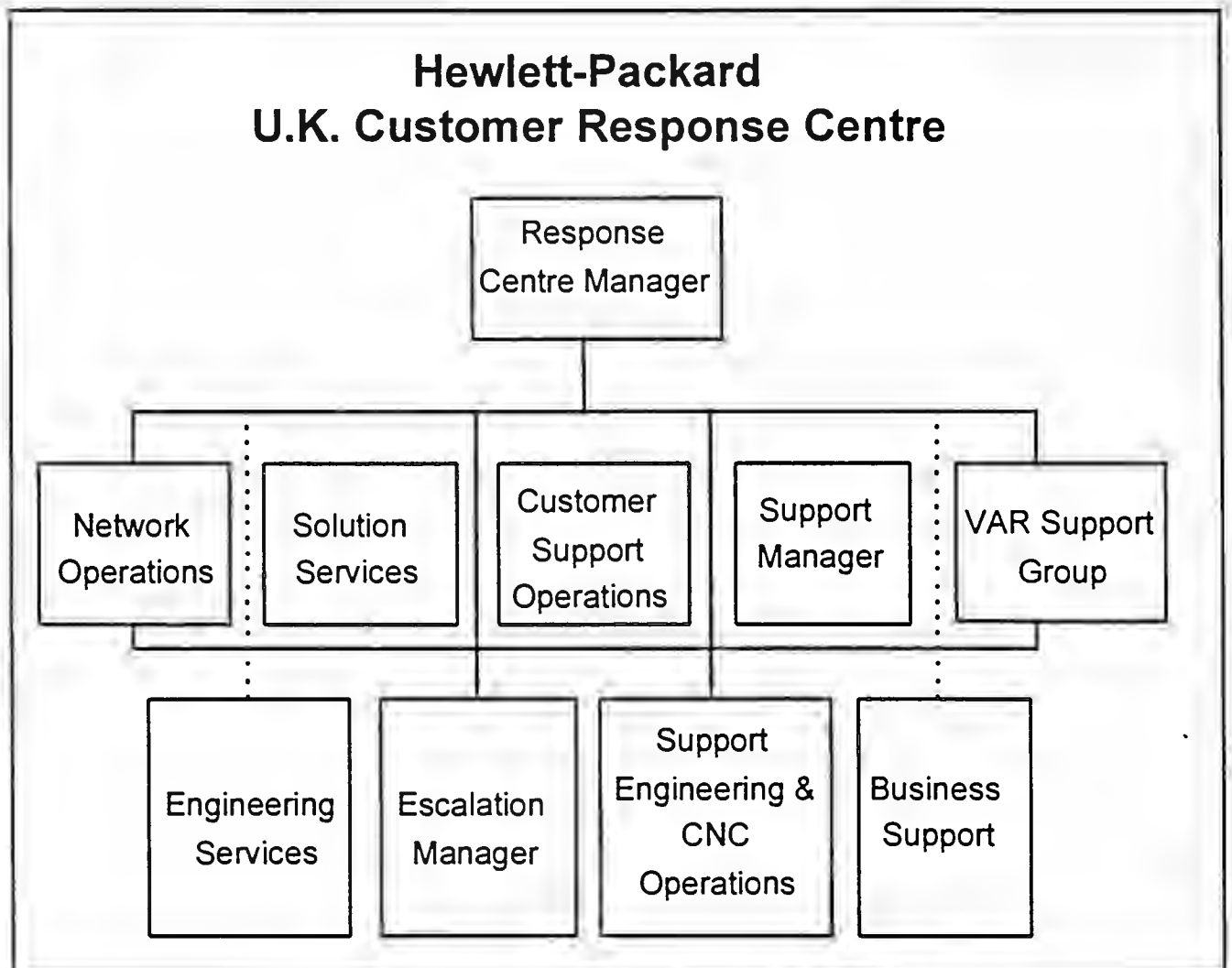
| Hewlett-Packard Hardware Maintenance Service | | |
|---|----------------------------------|--|
| | Coverage | Response |
| Priority Plus Support: For critical applications, multi-shift operations. | 7 days a week, 24 hours a day | Best response is not more than 4 hours |
| Priority Support: Maximum availability during standard business hours and evenings | 5 days a week, 9 a.m to 9 p.m | Best response is not more than 4 hours |
| Next Day Support: Where your application allows for delivery of service the next day | 5 days a week, 9 a.m to 9 p.m | Next day response |
| Scheduled Support: Economical solution if a user has multiple PCs or workstations and the end users are running less critical applications | 5 days a week, 9 a.m to 9 p.m | Weekly visit, Monday to Friday |

Mixed teams allow for cross-fertilisation of ideas to cope with the often totally open networking and multi-vendor user situations. Software tools, keyword searching and on-line documentation on CD ROM are all used to help speed problem resolution.

In the networking area, a new focus has been set up over the last 12 months in the Network Operations section (see Exhibit B-6). This consists of a large mixed team that is able to support whole networks as well as look after the daily "nuts and bolts" problems at the local level. This section operates with a customer focus across both open and proprietary networks of HP, Novell or other manufacturer's origin.

The section is able to undertake complete FM deals for user networks. It can support users from the Remote Network Support Centre at Bristol, U.K., which offers 24-hour network management and full administrative facilities, including regular reports.

EXHIBIT B-6

**Other Sections**

Another new area of proactive support has been established within the last year. This is the Solution Services section, which gives support to users with solutions based on important third-party products from the independent software sector. Products such as INGRES and ORACLE are key products for many of HP's customers and HP feels it cannot stand aside and not support its customers in an integrated manner at the application level.

This venture is of strategic significance and has been underway for over six months. It involves cross-training between HP and the independent vendors whose products are selected. For example, HP staff are trained on ORACLE products and ORACLE staff are trained on HP software and hardware products. It is proving to be a key growth activity.

HP is, of course, also a leading vendor of peripherals, such as plotters and ink jet and laser printers. These products, like HP PCs and terminals, are normally sold through the dealer distribution channel. Support to dealers is the responsibility of the VAR Support section, which has both reactive and proactive components. In interactive mode, the section handles day-to-day queries of the dealer community, which have arisen from dealers' users. In proactive mode, the section is on the lookout for quality support issues and for training requirements that may arise among the dealers themselves. The section also supports certain of HP's major users on a second-line basis, where these have opted for self-service in the desktop services area.

People and Technology

Response Centre engineers have account responsibilities as well as product line expertise. HP is building towards increasingly proactive "relationship support" in which evaluation of user comments, understanding how a user's network supports that user's business processes, and in-depth industry knowledge all play a part in retaining that account for repeat business.

Most engineers have had a good technical training and background before joining HP. Many have extensive experience with HP user companies; a smaller number have joined HP directly after finishing their education. Key skills sought are:

- Good technical knowledge
- Good approach to problem resolution.

The culture of the Response Centre is designed to reward the team effort. To this end, management is constantly monitoring processes and effectiveness, seeking through both internal and external contacts to foster "best practice". One technique is to employ staff on exchange periods, i.e., engineers swap places with colleagues from other countries. This is found to stimulate new and improved practices.

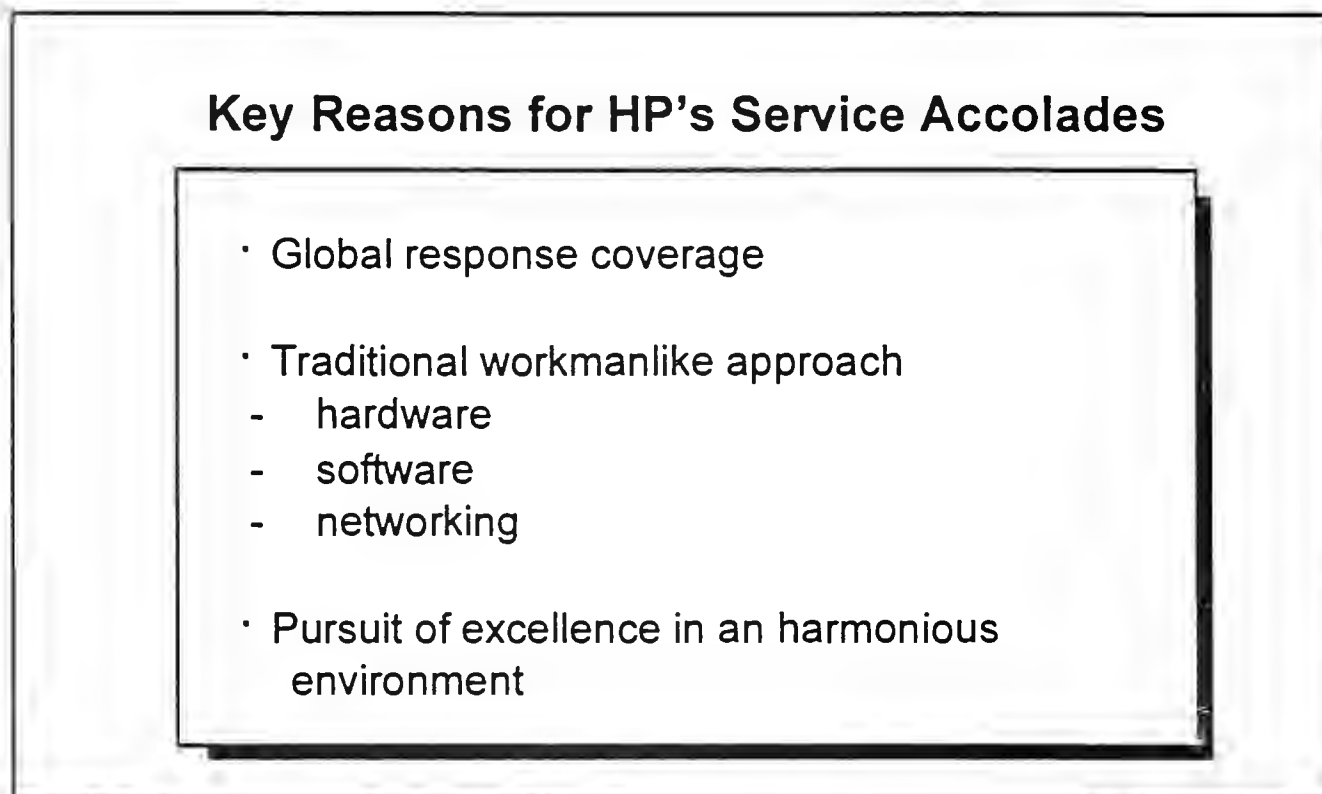
Future Trends

HP is going to be using more workstation technology of its own manufacture to make the organisation more efficient. For example, the increasing use of CD ROM readers attached to engineers' workstations has two obvious advantages:

- Compared with storing documentation on disk or tape, the physical storage space used by archiving on CD ROM is an order of magnitude less.
- The need to update by throwing away the previous CD ROM version (since the physical disk cannot be written on again) means that there is much less likelihood of getting muddled between succeeding generations of software.

BSI accreditation, which HP has already obtained, is seen as essential for a 1990s service operation. The pace of change is felt to be increasing, and the challenge is to evolve to meet user needs in the most cost-effective way. Exhibit B-7 summarises INPUT's assessment of the major characteristics of the HP service operation that are leading it to perform so consistently well in the eyes of its user base.

EXHIBIT B-7



C

A Digital European Customer Support Centre

Digital's Customer Support Centre (CSC) at Basingstoke in Hampshire, U.K. was purpose-built for its job and opened in 1982. It is one of four centres in Europe connected together with four centres in the U.S. into the worldwide Digital network, which is currently claimed to be supporting over 60,000 nodes. Other CSCs in Europe are at Valbonne in the south of France, outside München in Germany, and a newly opened centre at Warrington in the north of England.

The Basingstoke Centre is housed in a modern low-rise building in a business park and makes flexible use of the space provided. The Centre connects externally to the BT network by satellite link with backup connection to Mercury Communications. Thus, external networking is available through twin sources of supply.

In 1988, Digital decided to make visits to the U.K. CSC available to its customer base and other industry visitors on a regular on-demand or by-invitation basis. In the three years that the scheme has been operating, over 500 visits have been made—equivalent to about 10% of the U.K. customer base having seen the facility. These visits are normally scheduled to last between 1/2 and 1 day.

Visits are tailored for customer needs as a function of the status of each user's acquaintance with Digital systems—new users, old users, senior executives or technical specialists. Topics covered during visits can be selected from a range

of 40 modules and include demonstrations as well as tours, discussions and presentations. Some 60 senior members of the 300 staff on the site are available to assist during parts of a visit by giving presentations on detailed support questions.

Support and Maintenance Policy

Digital pursues a support policy with two objectives:

- 100% availability for any system being supported
- Fix once—meaning never correct a recognised problem more than once; however many times and in however many places a bug occurs, it should be corrected by the multiple application of a single correction.

To reach its 100% availability target, Digital has constructed a range of AI (artificial intelligence)-based software tools, which are available to engineers, software specialists, and increasingly to users and systems themselves (as embedded or networked modules).

- DECTEL is a service that allows users to access Digital's base of worldwide information on system and software problems. It uses the same AI-based software as is available to the CSC support specialists when they are diagnosing a problem.
- VAXsim PLUS is the latest in a family of products that provides remote diagnostic and monitoring capability. Again AI-based, VAXsim PLUS is installed on a user's system and can monitor an entire network of VAX system from any one central location. It aims to provide three modes of initiating corrective action:
 - The system automatically takes the suggested action—e.g., switching onto backup disk drives.
 - The user is notified to take simple corrective action.
 - The user is notified to call the support centre about a specified problem.
- AES (advanced electronic support) moves the state of the art forward by further reducing the amount of human intervention required. AES operates in a predictive mode to anticipate faults by comparing the continuously monitored system performance data with the profiles of known faults and their precursory symptoms. This process is based on AI software techniques that can correlate parameters logged and store profiles of newly occurring fault symptoms, thus 'learning' as it goes. AES is able to initiate service calls to a CSC automatically, but also permits the user to initiate these or communicate verbally or by electronic mail with a support centre.

VAXsim PLUS and VAXsim (its earlier version) have been available worldwide since the initial launch in 1984. AES has been running commercially for 18 months, is present in around 100 sites in the U.K. and is now being routinely installed in VAX sites.

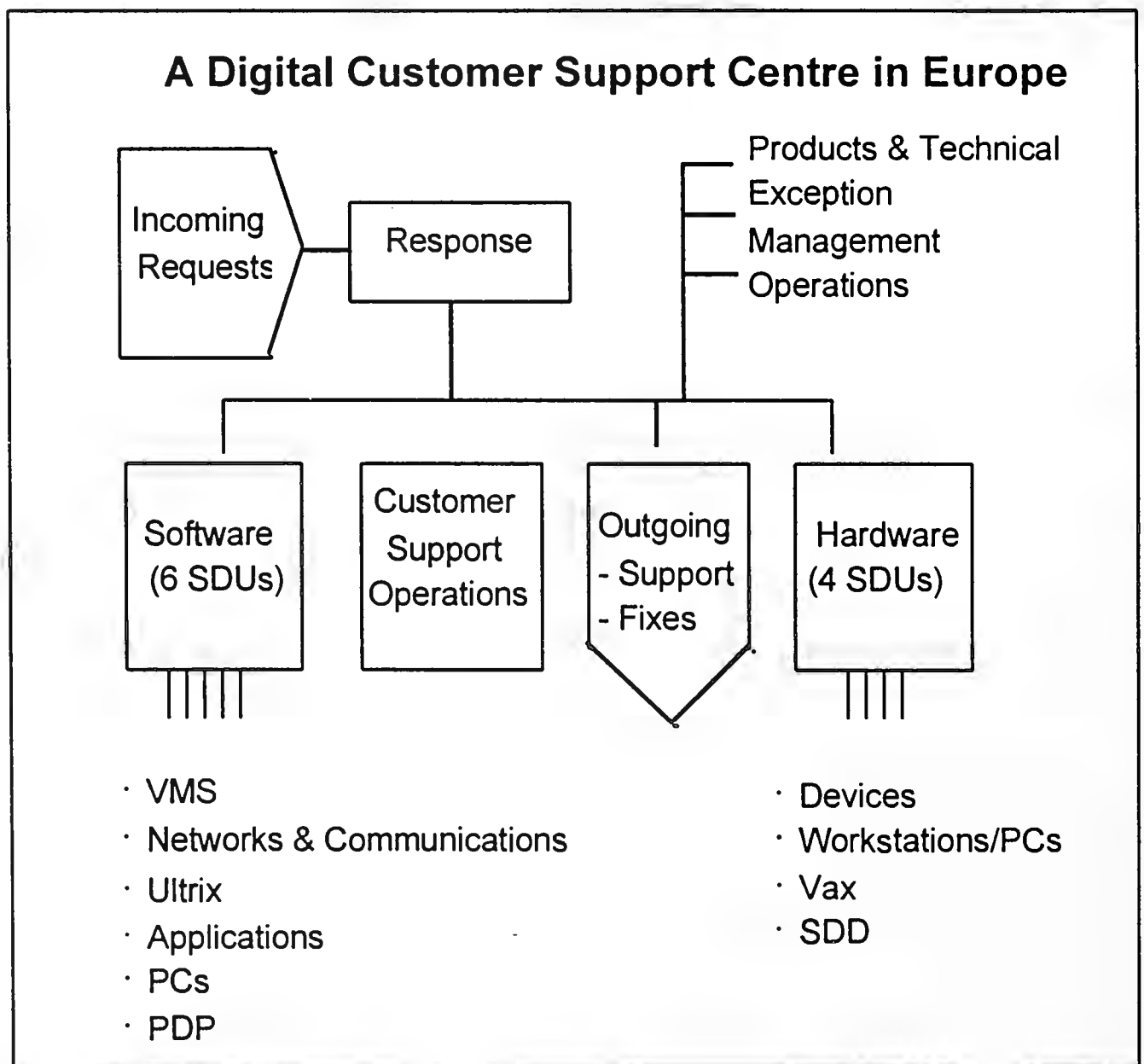
Support Centre Organisation

The organisation of the CSC is built around two types of units:

- Response Centre, which is the single, central section responsible for handling all incoming support requests
- Service Delivery Units (SDUs), of which there are several and whose actual number may expand or contract depending on the hardware and software support needs of the current market at any time.

Both types of support units are connected via an automated European Call Control System, which forms the computer intelligence built into the building. Exhibit B-8 outlines the system organisation.

EXHIBIT B-8



The Response Centre has the initial task of picking up the telephone and answering the call. The building is designed to give easy visual access to screens suspended from the ceiling that show the status of unanswered incoming calls. The aim is to answer 95% of calls within 30 seconds. Around 90% of calls are answered in under 10 seconds. After identifying the caller and logging the call in a system record, Response inputs the caller's trouble statement to the system where the STARS AI-based software subjects it to 'noise stripping' to determine the correct specialist skill to handle that call.

SDUs function in a standard fashion, although there are some differences between software and hardware:

- Software groups have access to the worldwide database of faults and bugs, and the trouble statement automatically pulls down a selection of relevant "articles" that the STARS system suggests might prove helpful. This software is equivalent to the DECTEL service available to users on-line. Approximately 60% of software repairs are cleared in less than 20 minutes; over 75% in less than a day; and 98% in less than a month.
- Hardware groups use the STARS database and have the additional resource of field engineers to schedule and assist. Some 30% of hardware calls are serviced without the need for an engineer to visit the site. For calls that need an engineer's assistance, the SDUs' task is to add value to the call-out request that they make to the local office by:
 - Assessing the problem's impact on the user's business
 - Producing an accurate description of the cause of the problem and adding it to the system record
 - Selecting parts required by the engineer and ordering them
 - Detailing the skill set characteristic of the engineer needed to service the call.

Digital currently claims an 87% success rate in problem identification at this stage.

Hardware SDUs are also responsible for assisting self-diagnostic and help-desk units within user organisations, such as central government, where self-maintenance service contracts are in force.

Since 1987, the mix of hardware and software support calls has changed dramatically—from being roughly 70:30 in favour of hardware in 1987 to being predicted at roughly the same proportion in favour of software for 1992. During that period, calls have levelled off significantly to around 750,000 calls per annum. There is growth in the number of calls, but Digital does not expect to see the fast growth rates that were experienced in the early 1980s after the centre was opened.

About 30% of hardware support calls are from Digital's own engineers calling from site or using remote diagnostic tools on-line to support the centre.

The support centre has three special sections that undertake supporting activities:

- Products and Technical acts as a pool of very highly experienced engineers who can interface with corporate development groups responsible for designing the individual hardware or software products.
- Exception Management is a small section responsible for making progress on difficult situations—i.e., situations that have not been resolved in a typical or adequate repair time. Digital does not operate with a hierarchical escalation procedure or the traditional split between response time and repair time. The aim is to always assess a fault within 1/2 to 1 hour of the incoming support request.

When this target is missed or in other unusual circumstances, the Exception Management team goes into action under overall management's guidance. This procedure reinforces another of Digital's targets—a caller should not have to deal with more than two of Digital's technical staff before the problem is resolved.

- Operations is responsible for keeping the CSC Call Control system up and running and connected to the internal and external networks. Besides the equipment supporting the call control system, Operations has a number of reconfigurable configurations that can be assigned to engineers locally or remotely for the reduction of bugs and the testing of fixes. For certain of Digital's older products, such as the DECsystem 10 mainframes, the Basingstoke centre handles calls for the whole of Europe. To backup these products with real-life situations, Operations has a separate room full of old mainframe equipment, including disks and tapes.

Management, Staff and Culture

The last section in the organisation is the group of managers, who are situated together rather than with their individual sections. This arrangement emphasises their group role and de-emphasises the hierarchy and the status overtones that go with it—all in tune with the management style of the 1990s where group work in a client/server environment is the order of the day.

Teamwork is encouraged at Basingstoke—by choice of staff, in their training and throughout the office culture. Digital claims that its staff obtains eight times the national average for the U.K. in terms of training. This training covers not only the IT skills needed to do the tasks required, but also general items such as stress management, interpersonal communications and safe driving. Support staff are young, active and obviously intelligent. Many are graduates. Some have experience from industry. Many have had a varied career in IT projects before moving into support.

Interpersonal skills are ranked as important, above even technical skills. Many problems cannot be solved by one or even two persons—the ability to involve colleagues in a temporary and informal way to resolve a situation gets the customer satisfied most quickly. The person fronting the situation at the customer level also has to act as the entrepreneurial hub in the ‘sub-team’. These sub-teams are forming, disbanding and reforming in the centre all day long.

The final close of customer calls is only instigated when customers signify that their problem has been ‘permanently fixed’. This close occurs when, in answer to a specific call to put this to the customer, a ‘yes’ answer is received. Exhibit B-9 summarises the key characteristics of Digital’s customer support cycle.

EXHIBIT B-9

The Customer Support Cycle

- 100% availability target—one-only fix
- Increasing use of AI-based software support tools in call control, system monitoring and logistics
- System history log and software assist in matching the correct specialist to the caller’s problem
- Fix time replaces traditional response and repair times
- Teamwork minimises fix time and prevents caller from needing to access more than 2 engineers

(Blank)



User Questionnaire

- Q1 What are the main types of equipment for which you have day-to-day operational responsibility? Please complete the matrix below with the principal elements in each case.

| | DATA CENTRE/SERVER | NETWORK | CLIENTW/S,PC |
|------------------|--------------------|---------|--------------|
| VENDOR/MODEL | | | |
| OPERATING SYSTEM | | | |
| DBMS | | | |

HARDWARE SYSTEMS MAINTENANCE

- Q2 Could I first of all ask what are your maintenance arrangements and who are your principal suppliers? Which of the following statements best fits your situation?

| OPTION | DESCRIPTION | PRINCIPAL VENDOR |
|--------|--|------------------|
| 1 | One maintainer who maintains everything on-site. | |
| 2 | Several suppliers each maintaining only its own equipment. | |
| 3 | Some providers maintain equipment from other vendors; some maintain only their own. | |
| 4 | No contracted maintenance service. It is provided on a T&M (time and materials) basis. | |
| 5 | Other arrangements. (Please describe) | |

FOLLOWING QUESTIONS SHOULD BE RATED ON A 1-5 SCALE WHERE 1 IS LOW AND 5 IS HIGH. IN EACH CASE PLEASE RATE THE LEVEL OF IMPORTANCE YOU ATTACH TO A PARTICULAR ELEMENT OF SERVICE AND THE LEVEL OF SATISFACTION YOU RECEIVE.

PLEASE ANSWER THE FOLLOWING QUESTIONS IN RELATION TO YOUR PRINCIPAL COMPUTER SYSTEM

I would now like to ask you some questions concerning the **HARDWARE MAINTENANCE** of your computer systems.

Q3 a) What is your rating for the importance of hardware maintenance overall to your business and how satisfied are you with your main service vendor's performance?

IMPORTANCE (1-5)

SATISFACTION (1-5)

b) What is your rating for
SYSTEMS AVAILABILITY

Q4 Some further aspects of hardware maintenance.

IMPORTANCE (1-5)

SATISFACTION (1-5)

Spares availability

Engineer skills

Problem escalation

Documentation

Remote diagnostics

Q5 I would now like to ask you some questions regarding your hardware maintenance contract. Please rate again on a 1-5 scale the importance of the following features of a hardware maintenance contract to you?

IMPORTANCE RATING (1-5)

Guaranteed response time

Guaranteed restore time

Guaranteed uptime

Service for other vendor's equipment

Service for network products

Tailored contract conditions

On-site service

Return for repair

Other (please state)

Q6a What aspects of your hardware maintenance contract are significant issues for you? i.e., are there conditions/clauses which should be included/excluded (e.g., comprehensiveness of the contract—too restrictive, not modularly priced, etc.)?

i) _____

ii) _____

iii) _____

Comments _____

Q6b On a 1(low) to 5(high) scale, to what extent are you getting value-for-money from your hardware maintenance contract? _____

Q6c What changes would markedly affect your perception of the value-for-money that you receive?

SYSTEMS SOFTWARE SUPPORT

I would now like to ask you some questions relating to the support you receive for your systems software (operating systems , DBMS and utilities).

Q7 What are your support arrangements and who are your principal suppliers? Which of the following statements best fits your situation?

| OPTION | DESCRIPTION | PRINCIPAL VENDOR |
|--------|--|------------------|
| 1 | One vendor who supports everything on-site. | |
| 2 | Several suppliers each supporting only their own products. | |
| 3 | Some providers support products from other vendors; some support only their own. | |
| 4 | No contracted support service. It is provided on a T&M (time and materials) basis. | |
| 5 | Other arrangements. (Please describe) | |

a) What is the overall importance of your business' software product support and how satisfied are you with your main service vendor's performance?

IMPORTANCE (1-5)_____ SATISFACTION (1-5)_____

Q8 How do you rate the following aspects of the systems software product support you receive?

| | IMPORTANCE (1-5) | SATISFACTION (1-5) |
|-------------------------------|------------------|--------------------|
| Software product installation | _____ | _____ |
| Engineer skills | _____ | _____ |
| Problem escalation | _____ | _____ |
| Documentation | _____ | _____ |
| Remote diagnostics | _____ | _____ |
| Provision of updates | _____ | _____ |
| Help-desk support | _____ | _____ |
| Other (please state) | _____ | _____ |

I would now like to ask you some questions regarding your systems software support contract.

Q9 Please rate again on a 1-5 scale the importance of the following features of a support contract to you.

IMPORTANCE RATING (1-5)

| | |
|-------------------------------------|-------|
| Support included in the licence fee | _____ |
| Three-year contract or longer | _____ |
| Access to experts | _____ |
| Service for other vendor's products | _____ |
| Service for network products | _____ |
| Tailored contract conditions | _____ |
| On-site service | _____ |
| Other (please state) | _____ |

Q10 What aspects of your system software support contract are significant issues for you? i.e., are there conditions/clauses which should be included/excluded?

i) _____

ii) _____

iii) _____

e.g., comprehensiveness of the contract—too restrictive, not modularly priced, etc.

Comments _____

Q11 Are there any changes to your contracted conditions that would make it more relevant to your business environment?

Q12 On a 1 (low) to 5 (high) scale—to what extent do you consider that you are getting value-for-money from your systems software support contract? _____

Q13 What changes would markedly affect your perception of the value-for-money that you receive?

Thank You

(Blank)



User Survey Data Tabulations

This appendix provides data tabulations from the European user survey to show the country market data for the exhibits included in Chapter III.

EXHIBIT D-1

Maintenance Supply Profile—Country Analysis

| APPROACH* | Numbers of Respondents by Country | | | TOTAL |
|-----------|-----------------------------------|--------|------|-------|
| | Germany | France | U.K. | |
| 1 | 12 | 14 | 12 | 38 |
| 2 | 1 | 0 | 2 | 3 |
| 3 | 4 | 4 | 6 | 14 |
| 4 | 2 | 0 | 0 | 2 |
| 5 | 1 | 2 | 0 | 3 |
| TOTAL | 20 | 20 | 20 | 60 |

*Key

- 1 One maintainer who is responsible for all equipment on-site
- 2 Several suppliers each maintaining only their own equipment
- 3 Some providers maintain equipment from other vendors
- 4 No contracted maintenance service
- 5 In-house maintenance provided

Sample of 60 European Firms

EXHIBIT D-2

Distribution of Maintenance Providers—Germany

| APPROACH* | Vendor Category (No. of Respondents) | | | | TOTAL |
|-----------|--------------------------------------|------------------------|------------------|----------|-------|
| | Equipment Vendor | Independent Maintainer | Channel Supplier | In-House | |
| 1 | 9 | 1 | 2 | | 12 |
| 2 | 1 | - | - | | 1 |
| 3 | - | 1 | 3 | | 4 |
| 4 | - | - | 2 | | 2 |
| 5 | | | | 1 | 1 |
| TOTAL | 10 | 2 | 7 | 1 | 20 |

*Key

- 1 One maintainer who is responsible for all equipment on-site
- 2 Several suppliers each maintaining only their own equipment
- 3 Some providers maintain equipment from other vendors
- 4 No contracted maintenance service
- 5 In-house maintenance provided

EXHIBIT D-3

Distribution of Maintenance Providers—France

| APPROACH* | Vendor Category (No. of Respondents) | | | | TOTAL |
|-----------|--------------------------------------|------------------------|------------------|----------|-------|
| | Equipment Vendor | Independent Maintainer | Channel Supplier | In-House | |
| 1 | 4 | 8 | 2 | | 14 |
| 2 | - | - | - | | - |
| 3 | - | - | 4 | | 4 |
| 4 | - | - | - | | - |
| 5 | | | | 2 | 2 |
| TOTAL | 4 | 8 | 6 | 2 | 20 |

***Key**

- 1 One maintainer who is responsible for all equipment on-site
- 2 Several suppliers each maintaining only their own equipment
- 3 Some providers maintain equipment from other vendors
- 4 No contracted maintenance service
- 5 In-house maintenance provided

EXHIBIT D-4

Distribution of Maintenance Providers—U.K.

| APPROACH* | Vendor Category (No. of Respondents) | | | | TOTAL |
|--------------|--------------------------------------|------------------------|------------------|----------|-----------|
| | Equipment Vendor | Independent Maintainer | Channel Supplier | In-House | |
| 1 | 10 | 2 | | | 12 |
| 2 | 1 | 1 | - | | 2 |
| 3 | 2 | 4 | - | | 6 |
| 4 | - | - | - | | - |
| 5 | | | | - | - |
| TOTAL | 13 | 7 | - | - | 20 |

*Key

- 1 One maintainer who is responsible for all equipment on-site
- 2 Several suppliers each maintaining only their own equipment
- 3 Some providers maintain equipment from other vendors
- 4 No contracted maintenance service
- 5 In-house maintenance provided

EXHIBIT D-5

User Perception of Value for Money for Equipment Services—Country Analysis

| COUNTRY | User Rating (1 Very Poor to 5 Excellent) | | | | | | Average Rating |
|---------|--|---|---|---|----|----|----------------|
| | 0 (no resp) | 1 | 2 | 3 | 4 | 5 | |
| Germany | 3 | - | - | 4 | 7 | 6 | 4.1 |
| France | 1 | 1 | 3 | 3 | 6 | 6 | 3.7 |
| U.K. | 1 | - | 3 | 2 | 10 | 4 | 3.8 |
| TOTAL | 5 | 1 | 6 | 9 | 23 | 16 | 3.9 |

EXHIBIT D-6

Sample Distribution of Overall Importance/Satisfaction Ratings for Equipment Maintenance Services

| COUNTRY | Importance/User Rating (1 Low to 5 High) | | | | | TOTAL |
|---------|--|----|----|----|----|-------|
| | 1 | 2 | 3 | 4 | 5 | |
| Germany | - | 7 | 4 | 4 | 5 | 20 |
| France | 2 | 3 | 5 | 6 | 4 | 20 |
| U.K. | - | 4 | 3 | 5 | 8 | 20 |
| TOTAL | 2 | 14 | 12 | 15 | 17 | 60 |

| | Satisfaction/User Rating (1 Low to 5 High) | | | | | TOTAL |
|---------|--|---|----|----|----|-------|
| Germany | - | - | 4 | 10 | 6 | 20 |
| France | - | 4 | 2 | 6 | 8 | 20 |
| U.K. | - | 2 | 4 | 8 | 6 | 20 |
| TOTAL | - | 6 | 10 | 24 | 20 | 60 |

EXHIBIT D-7

User Satisfaction with Equipment Maintenance Services—Germany

| SERVICE FEATURE | User Rating (1 Low to 5 High) | | |
|----------------------|-------------------------------|---------------------|-------|
| | Importance Rating | Satisfaction Rating | Delta |
| Systems Availability | 4.3 | 4.5 | +0.2 |
| Spares Availability | 4.6 | 4.8 | +0.2 |
| Engineer Skills | 4.6 | 4.6 | - |
| Problem Escalation | 3.1 | 3.8 | +0.7 |
| Documentation | 2.4 | 3.5 | +1.1 |
| Remote Diagnostics | 2.9 | 3.8 | +0.9 |

Sample size 20 (average standard error 0.2)

EXHIBIT D-8

User Satisfaction with Equipment Maintenance Services—France

| SERVICE FEATURE | User Rating (1 Low to 5 High) | | |
|----------------------|-------------------------------|---------------------|-------|
| | Importance Rating | Satisfaction Rating | Delta |
| Systems Availability | 4.5 | 4.0 | -0.5 |
| Spares Availability | 4.5 | 4.2 | -0.3 |
| Engineer Skills | 4.6 | 4.4 | -0.2 |
| Problem Escalation | 3.0 | 3.5 | +0.5 |
| Documentation | 2.7 | 3.5 | +0.8 |
| Remote Diagnostics | 2.8 | 2.8 | - |

Sample size 20 (average standard error 0.2)

EXHIBIT D-9

User Satisfaction with Equipment Maintenance Services–U.K.

| SERVICE FEATURE | User Rating (1 Low to 5 High) | | |
|----------------------|-------------------------------|---------------------|-------|
| | Importance Rating | Satisfaction Rating | Delta |
| Systems Availability | 4.8 | 4.5 | -0.3 |
| Spares Availability | 4.5 | 4.4 | -0.1 |
| Engineer Skills | 4.8 | 4.7 | -0.1 |
| Problem Escalation | 3.6 | 3.7 | +0.1 |
| Documentation | 2.7 | 3.0 | +0.3 |
| Remote Diagnostics | 3.3 | 3.7 | +0.4 |

Sample size 20 (average standard error 0.2)

EXHIBIT D-10

Importance of Service Features for Inclusion in Equipment Contracts

| Feature | Average Importance Rating (1 Low to 5 High) | | | Total Sample |
|--------------------------------------|--|--------|----------------|--------------|
| | Germany | France | United Kingdom | |
| Guaranteed Response Time | 4.7 | 4.3 | 4.4 | 4.5 |
| Guaranteed Restore Time | 4.3 | 4.5 | 4.5 | 4.4 |
| Guaranteed Uptime | 4.1 | 3.8 | 4.3 | 4.1 |
| Service for other Vendor's Equipment | 2.6 | 2.7 | 2.3 | 2.5 |
| Service for Network Products | 2.9 | 3.1 | 2.5 | 2.8 |
| Tailored Contract Conditions | 2.8 | 3.0 | 3.6 | 3.1 |
| On-Site Service | 4.9 | 4.6 | 4.9 | 4.8 |
| Return for Repairs | 2.2 | 3.0 | 2.0 | 2.4 |

Sample of 60 users, 20 in each country (average standard error 0.2)

