MAINTAINING LOW-COST

EQUIPMENT PROFITABLY

INPUT

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INPUT Planning Services for Management

MAINTAINING LOW-COST EQUIPMENT PROFITABLY

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1 INTRODUCTION

I INTRODUCTION

A. SCOPE

- This report is produced by INPUT as part of the 1982 Field Service Planning Information Programme in Europe.

- This major issue report under the subscription service deals with the current status of vendor planning for the services to be offered to maintain low-cost equipment. It also reports on their likely future activities in this field and on the way in which this part of their offerings can be integrated into the total catalogue of field service products.

- The subject was selected because of high client interest, the speed with which low-cost systems are being installed (and hence the rapid growth in their installed base), and a growing awareness that these systems are not susceptible to the same type of maintenance treatment if the task is to be performed profitably.

B. METHODOLOGY

- Research carried out for this report included interviews with 11 major vendors of data processing and office automation equipment:

- The interviews were conducted with field service executives, some with international, most with national managerial responsibility.

- Five of the interviews have been written up and included in the report as case studies illustrating the varied approaches to the problems encountered at the detail level.

- Because of the nature of the information imparted, INPUT is not able to reveal the names of the companies involved; however, the companies featuring in these case studies are classified as operating in one or another, or all, sectors of the information processing industry.

- In an initial attempt to define low-cost equipment, INPUT arbitrarily selected a threshold purchase price of $20,000 (above which, units of equipment were excluded from consideration). As can be seen from the analysis contained in the report, this definition was reduced to $13,000 by the responding vendors.

- Fifteen user interviews were also undertaken with the objective of assessing the attitudes of the user community to the maintenance of equipment below the threshold.

- Three types of user were approached:

  - Large corporations.

  - Professional users within organisations of different sizes:

    . Teachers.

    . Architects and civil servants in local government.

    . Research workers.

  - Small businesses.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

A. THE SPLIT BETWEEN LOW-COST AND OTHER EQUIPMENT

- Field service has been traditionally an event-driven sector of the EDP industry, responding to customer equipment maintenance needs, principally as and when they arise. The majority of vendor managements still see this as the case, and the consequences for productivity which emerge from this situation were fully dealt with in INPUT's earlier report Productivity and Motivation in Field Service issued in December 1981.

- A new force has, however, arisen to drive the sector in another direction - the need to service low-cost equipment profitably. Field service managers are having to face this new driving force and to incorporate into their total service philosophy methods of handling what is in effect a new subsector:

  - To ensure that maintenance of the newly installed low-cost units does not depress overall profitability to unacceptable levels.

  - To establish a balance between maintenance of low-cost units and the more traditional work on larger systems.

- This study deals with the issue principally by addressing current vendor practice in three major European markets.

- From an analysis of the in-depth interviews held in February and March 1982, it is clear that a division is now occurring between the traditional treatment of mainframe equipment sites and the services offered to users of low-cost units. This breakpoint (initially taken by INPUT at a purchase price of $20,000) was subsequently adjusted downwards to $13,000 at current European equipment price levels.

- It was difficult to find a vendor who defined low-cost equipment by any criterion other than purchase price. INPUT discovered only one - a TPM vendor - who defines low-cost equipment as products producing less than $1,000 of maintenance revenue per annum.

- INPUT's general conclusion is that if pieces of equipment falling below a 1982 price of $13,000, or equivalent, are being maintained, the responsible maintenance company should have a set of policies to handle that type of maintenance which is separate from the way in which larger systems are serviced. What the policies are, and how different they will be from the traditional approach, depends upon:

  - The relative sizes of the installed bases above and below the threshold.

  - The growth characteristics in these two subdivisions of installed base, as envisaged in the short and longer terms.

B. USERS' VIEW

- Users believe that the problems associated with maintaining low-cost equipment lie firmly on the side of the vendor.

- On the whole, users are pleased with the reliability of their low-cost systems and expect the reliability to increase still further with future generations of equipment.

- Exhibit II-1 illustrates the ratings given to four different types of equipment in the low-cost category.

- The user has not yet experienced a step-function change in the way servicing is performed; nor does he expect to.

- This conservative approach is evidenced by the analysis of user maintenance policies, as shown in Exhibit II-2. Fifty-three percent (53%) of users chose normal on-site service as the first plank in their company's maintenance policy. Only 13% saw a lower level of service (in the form of a contract to return faulty units to the supplier for repair) as adequate enough to act as their first option.

- Two other aspects also function to put the onus for coping with the problems squarely on the shoulders of the vendors:

  - Small systems are being sold in multiples and this increases the amount of redundancy built into a fixed value of equipment over earlier, more expensive generations of hardware.

  - Small systems can be application-dedicated and the type of maintenance chosen can be tailored to the criticality required by each application.

C. HOW THE VENDORS ARE RESPONDING

- The majority of vendors agreed that to ignore the problem posed by the falling cost of unit equipment is to court financial failure. Merely to continue to provide a single type of on-site contract is uneconomic and in many ways unnecessary.

EXHIBIT II-1

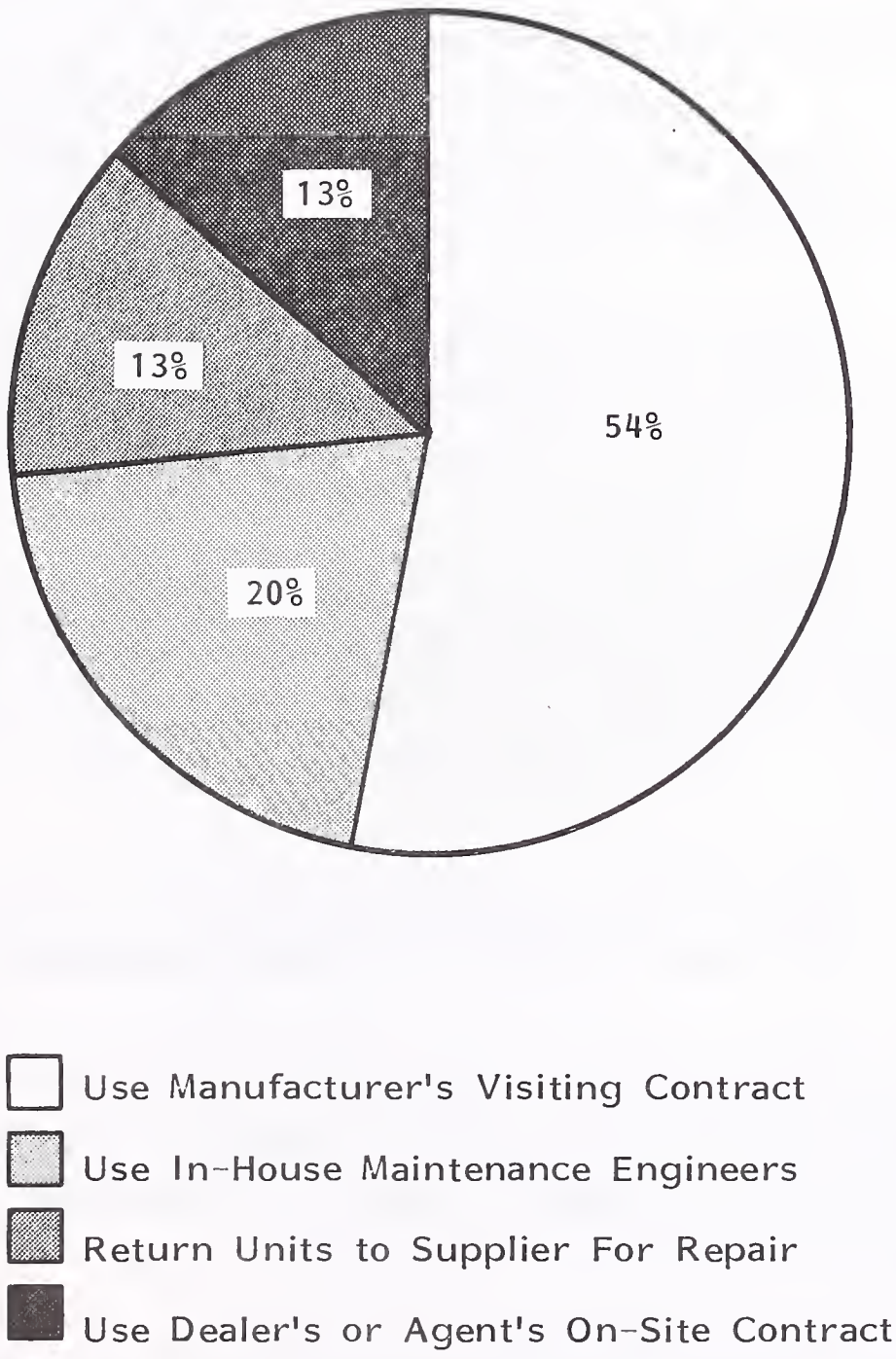
RESPONDENT RATINGS OF THEIR EXPERIENCE WITH LOW-COST EQUIPMENT

TYPE OF EQUIPMENT	AVERAGE RATINGS*			
	RELIABILITY	MAINTENANCE SERVICE	SOFTWARE	GENERAL SUPPORT
Personal Computers	7.5†	4.6	5.3	3.7
Word Processors	8.0†‡	6.8	8.0†‡	6.2
Terminals	7.2	7.4†	6.4	7.0‡
Other (including Minis and Data Communications Equipment)	7.0	7.8†‡	6.0	6.6

* RATING: 0 = NO EXPERIENCE, 1 = POOR, 10 = SUPERB
† BEST IN THE ROW
‡ BEST IN THE COLUMN

EXHIBIT II-2

USER MAINTENANCE POLICIES - ANALYSIS OF FIRST MENTIONS



- The principal solution to the problem has been to offer at least two levels of service:
  - The mainstay of service remains the On-Site Visiting contract.
  - The new offering is the second and lower level - the Return for Repair contract.
- There are a number of variations on this theme:
  - On-site service is now being offered with a greater variety of contract options.
  - Similarly, Return for Repair can be packaged as:
    - Repair, or swap a faulty unit, if repair is not effected in a certain time.
    - Exchange a unit and retain the faulty one for repair.
    - Repair the unit, however long it takes.
  - The objective is to optimise between the cost of providing a properly working unit and the time it takes to respond with this service.
- Only a minority of the 11 vendors interviewed are today providing this second level of service; indeed, only one respondent makes the Return for Repair contract the main method of support. This vendor is able to do so because his sales are through a distribution network.
- Factors tending to retard the growth of Return for Repair services are:
  - The momentum of the traditional approach.

- The need for more definite business planning before implementing a tiered offering.

- The high average site value.

- The value of equipment at a site is important to the maintenance vendor as well as the unit cost of its component installations. Three factors need to be evaluated:

  - The unit cost of the average installation,

  - The total site value (a high-value site may be composed of n low-cost units).

  - The total account value (a high-value account may be composed of m low-value sites).

- As Local Area Networks (LANs) get installed in greater numbers, the unit cost of equipment will become only one of a number of factors which need to be taken into account in justifying-or-not the installation mix of a maintenance supplier.

D. UNBUNDLING - A LONG-TERM TREND

- The field service managers in Europe are starting to address the problem of the lower unit cost of hardware in a number of ways. Important efforts noted are:

  - The need to educate or reeducate the user in the realities of maintenance economies.

- The effort to make organisations more efficient, more productive in terms of labour and more effective generally.

- However, INPUT's analysis of current vendor strategies shows that overwhelmingly (91%) they are putting commercial considerations first, whether it be:

  - To plan for a high level of Return for Repair contracts.

  - To sell and market a professional approach.

  - To turn service into a true product catalogue.

  - To see hardware and software servicing as two complementary products.

  - To aim in 100% of cases for a first-time repair.

- At last the management of field service is starting to rise above the day-to-day pressure and decision-making. INPUT predicts that this trend will continue and strengthen, and will result in a much broader market for maintenance services of all kinds and levels.

- It is perhaps no coincidence that the single exception to this general move towards becoming outward-looking is one of the two companies in the sample which have retained their field service function as a cost, and not a profit, centre.

- The advent of low-unit cost equipment has triggered this response to a challenge. INPUT views it as the beginning of the era of unbundled offerings - unbundled in the sense that the parts of the service product are now being considered as separate entities which may be sold singly or in combination:

  - Installation.

- Fault prevention.
- Fault diagnosis.
- Component, subsystem, or full system repair off-site.
- Similar repairs on-site.
- Recommissioning and upgrading.
- Installation of software changes and upgrades.
- Management of the maintenance function.
- Guarantee of a certain uptime.
- Sundry other pre- and post-installation services.

E. FEARS FOR THE FUTURE

- Two major areas of concern surfaced during the research for this study:
  - First, that vendors would be forced to downgrade the quality of service which could be provided; not only to the low-end users but increasingly also in the midrange, small business system area.
  - Second, that a cut-throat price war was just around the corner, or at best could only be postponed into the late eighties.
- The two fears are not unconnected, and together they present a formidable challenge for immediate and later management decision-making.

- The immediate challenge is:

  - To maintain the quality of the service provided in order to maintain and increase market share, in the face of increasing competition and a market which is progressively more of a buyer's one.

- INPUT believes that this is a genuine cause for concern, which is, however, more general than the low-cost equipment problem, and to which some of the answers are starting to appear, in the form of:

  - Better productivity tools and methods.

  - Unbundling of the maintenance product catalogue.

  - Gradual realisation on the part of the user community that maintenance service must be purchased on the basis of its own market value, and not priced with reference to an arbitrary percentage pegged to hardware.

- The second fear is analysed as the fear of the sudden bold initiative of a competitor forcing everyone to follow suit; e.g., the throwaway card, the perpetual warranty period, or similar weapon.

- As long as Europe remains a large importer of information technology (IT), it is going to be at risk from a competitor from an outside bloc moving in to take a major slice. Since the main preoccupation of the largest IT companies is still to sell equipment, the use of the service area as a weapon in the price war cannot be discounted. It cannot, however, be an objective of this report to develop such a longer term scenario further, since it is not judged to be directly related to the current topic.

F. RECOMMENDATIONS

- INPUT concludes that the nature of the problems presented by the increasing quantity of low-cost equipment to maintain, is strategic. These problems must, therefore, be met on the strategic planning level.

- INPUT recommends that vendors undertake a strategic evaluation programme with respect to their stance on servicing low-cost units.

- Elements to feature in this programme are:

  - Assessment of the present installed base mix above and below the $13,000 threshold.

  - Extrapolation of this mix to the three-year and five-year future positions, making allowance for estimated movements of the threshold (up or down).

  - Estimates of the profitability levels attainable with their present and likely future organisations with the present (actual) and future (predicted) mixes obtained in the above stages.

  - Injection into the calculation of the importance of the multiplier factor arising on individual sites and within individual accounts, as shown in Exhibit II-3 and below.

  - Assessment of the weights to be given to the geographical density factors of their present and future site distribution.

  - And finally, an evaluation of whether they need to adopt a positive or a defensive stance towards low-cost equipment servicing.

EXHIBIT II-3

PREFERRED TYPES OF SERVICE CONTRACT

FACTOR 1 / FACTOR 2	LOW-COST UNITS	LOW-VALUE SITES	LOW-VALUE ACCOUNTS	LOW-DENSITY SITES (Accessibility)	FACTORS FOR MAINTAINABILITY	
					GOOD	BAD
High-Cost Units			OSV	O/R	OSV	O/R
High-Value Sites	O/R			O/R	OSV	O/R
High-Value Accounts	OSV	O/R		OSV	OSV	OSV
High-Density Sites (Accessibility)	O/R	O/R	OSV		OSV	O/R
Factors for Maintainability - Good	RFR	RFR	O/R	O/R		
- Bad	RFR	RFR	RFR	O/R		

Key:
OSV = On-Site (Visiting) Contract
RFR = Return For Repair
O/R = On-Site or RFR
X = An Invalid Combination

- A defensive stance assumes that the low-cost portion of the installed base is inherently less profitable, and amounts to a containment policy to prevent it draining resources (and, therefore, profit) in physical, financial, and managerial terms.

- A positive approach is likely to start from the premise that the installed base can be made at least as profitable as the rest and to set about finding ways, including the use of synergies, to achieve this objective.

- The outcome of this evaluation should be to render assistance to the establishment of the future maintenance product catalogue.

- Exhibit II-3 is offered as a guide to the likely profitability of two different offerings (standard service and Return for Repair) as a function of a number of important factor-combinations of:

  - Unit equipment cost - high or low.
  - Individual site equipment value.
  - Individual customer account value.
  - Site density (the accessibility factor).
  - Maintainability factors for type of equipment.

III DEFINITION OF LOW-COST EQUIPMENT

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A. MICROS, SMALL BUSINESS MACHINES, AND NETWORKS

- In considering the problem of maintaining low-cost equipment profitably, it was first necessary to define those types of equipment which might be involved. INPUT drew up a list of likely contenders and extended this to cover certain higher cost items, which are also being serviced by the same EDP maintenance companies. This was done in order to encompass all the surrounding areas on which the impact of low-cost equipment might have an effect.

- For the purposes of designing questionnaires, the list of processing equipment included:

  - Desk-top calculators, such as those with a printing capability but larger than hand-held calculators.

  - Microprocessors and single-board microcomputers.

  - Single-user configured microcomputer-based systems.

  - Personal computers.

  - Desktop computers, such as the HP 9800 or the IBM 5100 series.

- Industrial minicomputers.

- Small business and office computers, including multi-user microcomputer-based configurations.

- Business mini systems.

- The first two categories did not, in fact, feature prominently in the research for the following reasons:

  - The type of electromechanical desk calculators which used to require periodic servicing are a very minor consideration to all the respondents interviewed; a calculator on the whole is an office stationery item which is replaced when its useful life is over.

  - Microcomponents and single board computers become part of other systems either at the hands of a manufacturer or of an OEM. Two vendors with a high or significant proportion of their business in the component field reported that the majority of their servicing was for 'on demand' replacement.

- Users were asked how they defined small computers. Exhibit III-1 shows the breakdown of their responses:

  - Price (average price range was given, from $200 to $12,000).

  - Size or power of configuration.

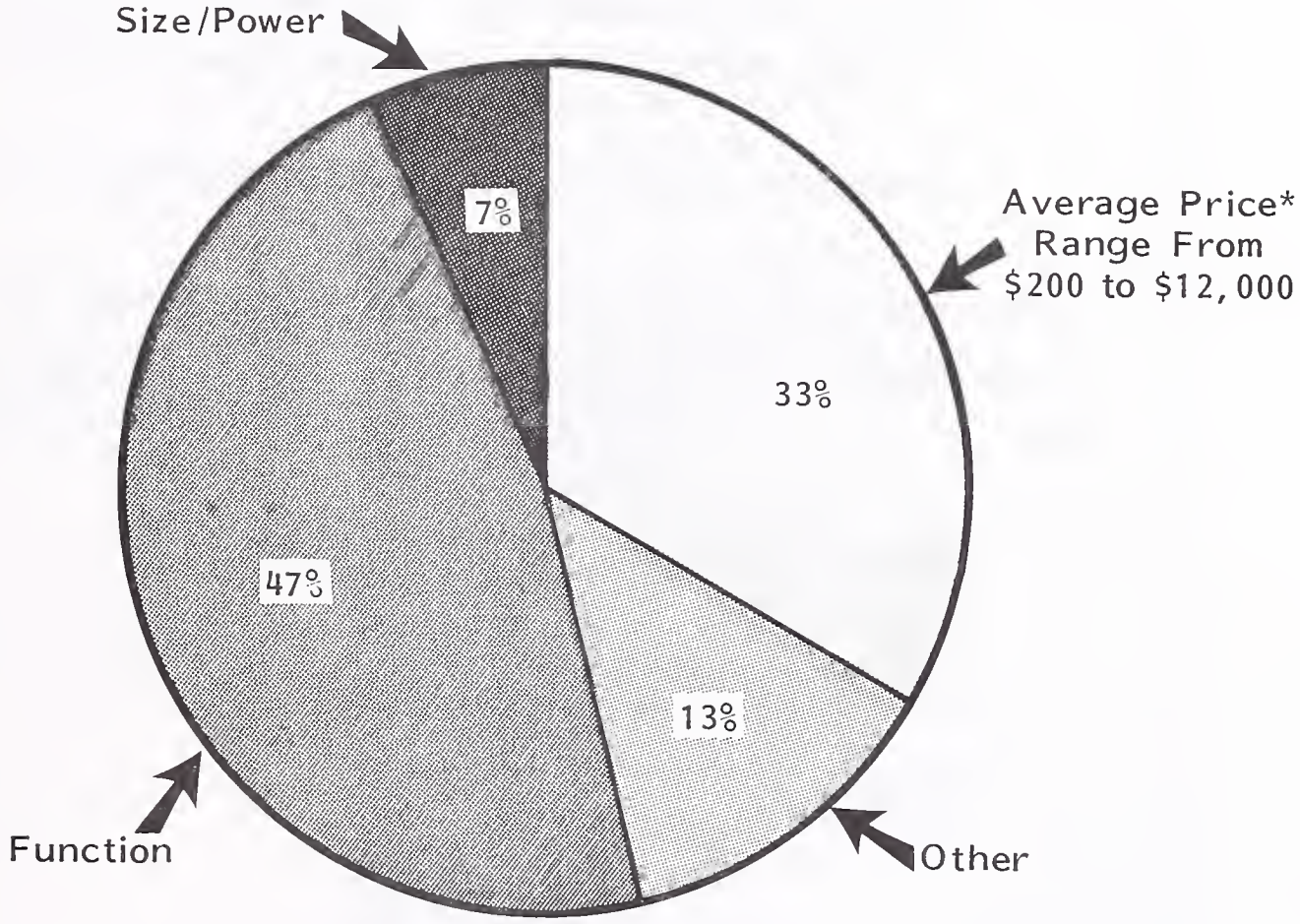
  - Functional use of equipment.

  - Other methods (e.g., by manufacturer label).

- Definition by function was used by seven respondents including the largest who had over 500 small computers installed in one European country alone.

EXHIBIT III-1

USER METHODS OF DEFINING SMALL COMPUTERS



* PRICE EXCLUDED SOFTWARE, INSTALLATION, OR MAINTENANCE

Definition by price was the next most popular method, chosen by five users or one-third of the sample. Size or power was the method used in the headquarters of one very large organisation.

- Other methods comprised:

  - Definition by site location; i.e., a machine is a small computer when it is housed outside a centre with a mainframe installation.

  - By manufacturer (Hewlett-Packard in this case).

- Exhibit III-2 shows how the functional uses of small computers were included in the definitions. Desktop calculators were ignored. The three major categories are:

  - Personal computers.

  - Word processors.

  - Terminals.

B. TERMINALS, OFFICE EQUIPMENT, AND OTHER

- All the types of equipment which vendors are currently servicing which lie below the price threshold of $20,000 were analysed. Exhibit III-3 shows that microcomputers and personal computers are the largest subsector; with terminals and other data communications equipment (modems, etc.), they account for 49% of mentions.

- Office equipment, including word processors, electronic typewriters, and copiers, formed a relatively low percentage at 8% each. Many word processing configurations quoted were slightly above the $20,000 threshold.

EXHIBIT III-2

USER DEFINITIONS OF FUNCTIONAL USES OF SMALL COMPUTERS

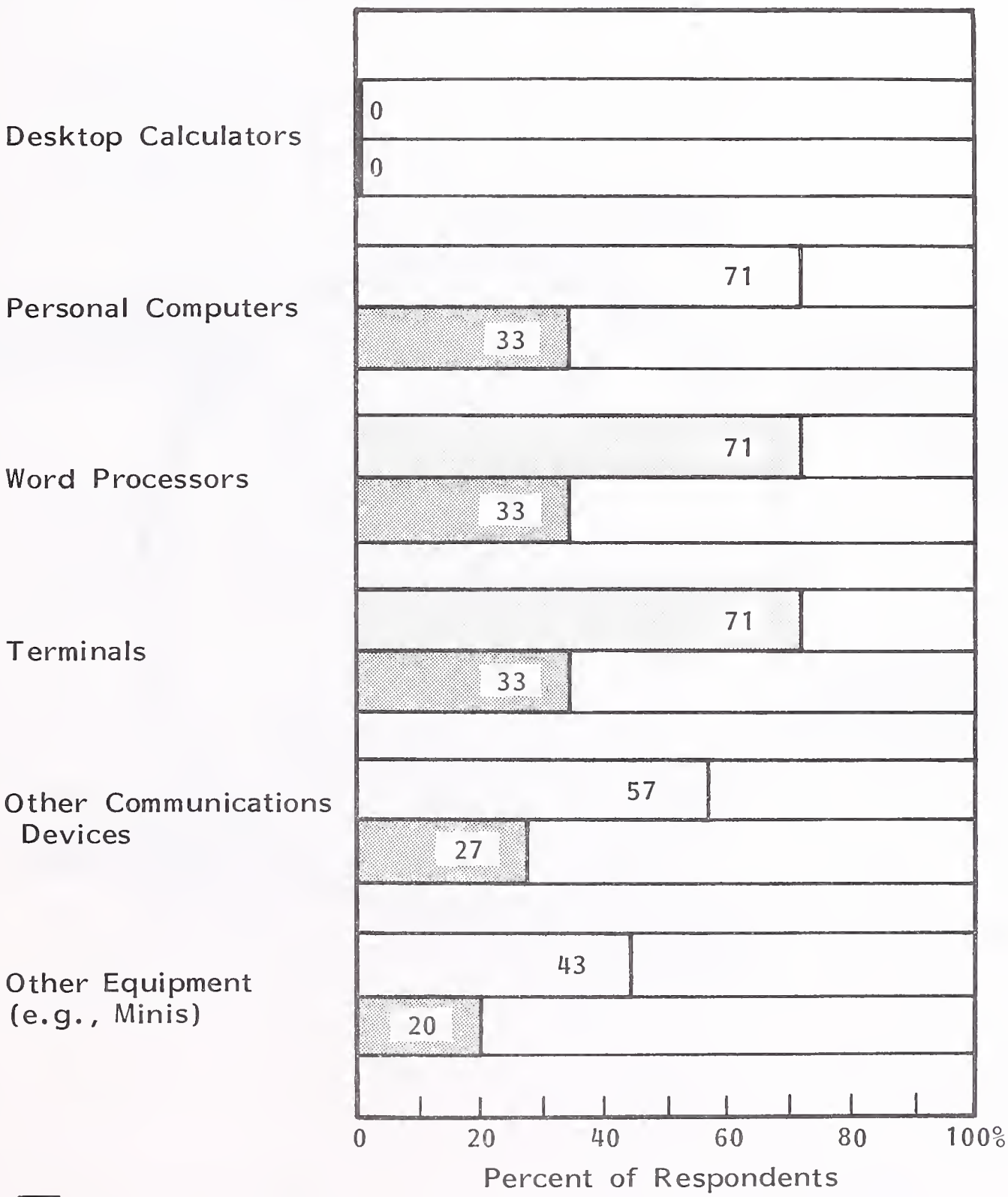
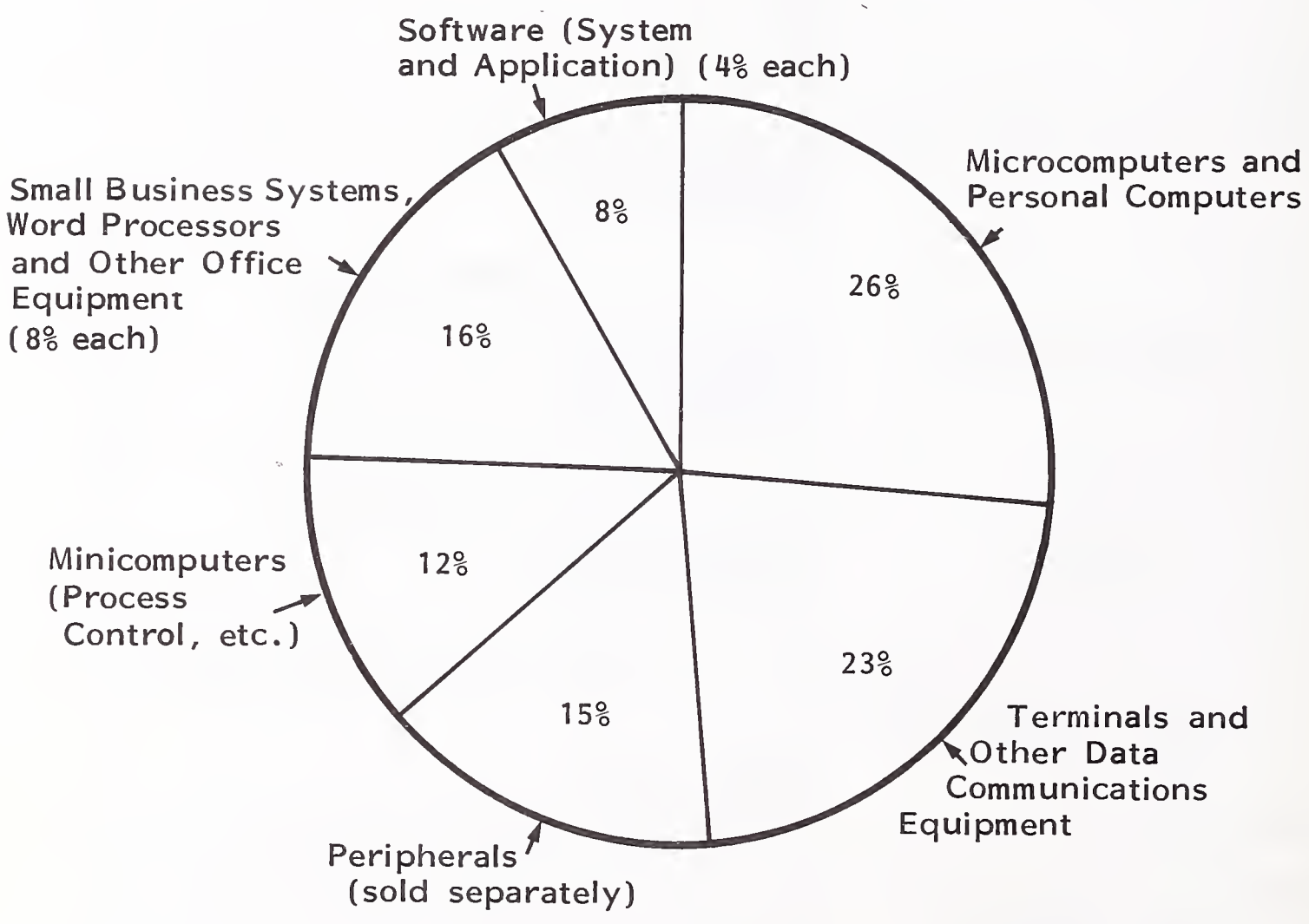


EXHIBIT III-3

LOW-COST EQUIPMENT SERVICED BY VENDORS
(PERCENT OF MENTIONS)



- Exhibit III-4 illustrates the comparison between vendors' first and second estimates for the correct price definition of low-cost equipment. On the revised response the average fell to $13,000 from the earlier $15,000.

C. RELATIONSHIP TO THE MAIN MARKET FOR FIELD SERVICE

- INPUT estimates that the West European installed base of low-cost units will increase from 800,000 units in 1981 to over 2.5 million in 1986. These units are defined as:

  - Costing less than $20,000 (in 1982 constant dollar terms) purchase, or equivalent rental, price.

  - Not forming part of a configuration going over this unit price.

- During this period the potential maintenance market for this installed base will grow from $400 million in 1981 to over $3 billion in 1986, at an AAGR of 50%.

- Exhibit III-5 shows how this growth rate affects the proportion of the total maintenance market which is available to vendors servicing low-cost equipment. These growth rates translated into percentage rises from 11% in 1981 to 38% in 1986.

- This installed base will have to be serviced not only by the manufacturers and TPMs, but also by the in-house maintenance group.

- No vendor can afford to ignore so large and fast growing a segment.

EXHIBIT III-4

VENDORS' ESTIMATES OF THE
POSITION OF THE LOW-COST THRESHOLD

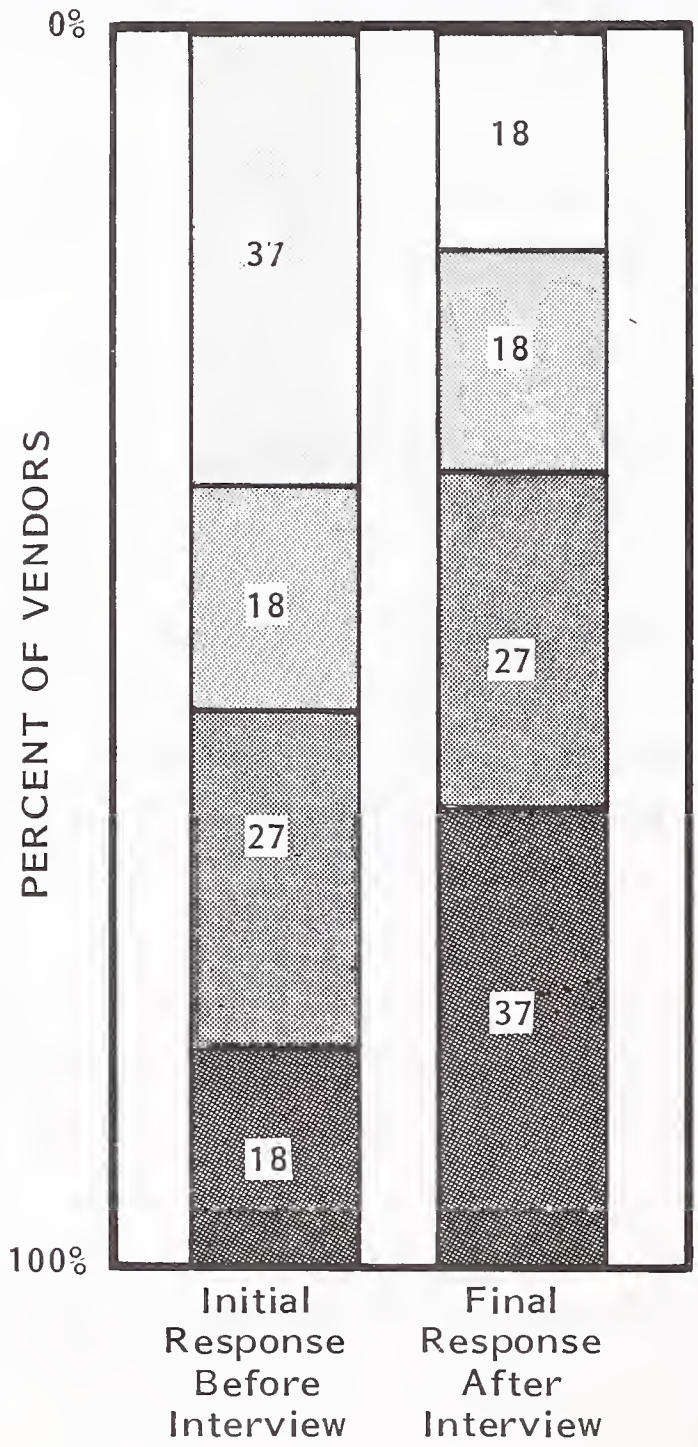
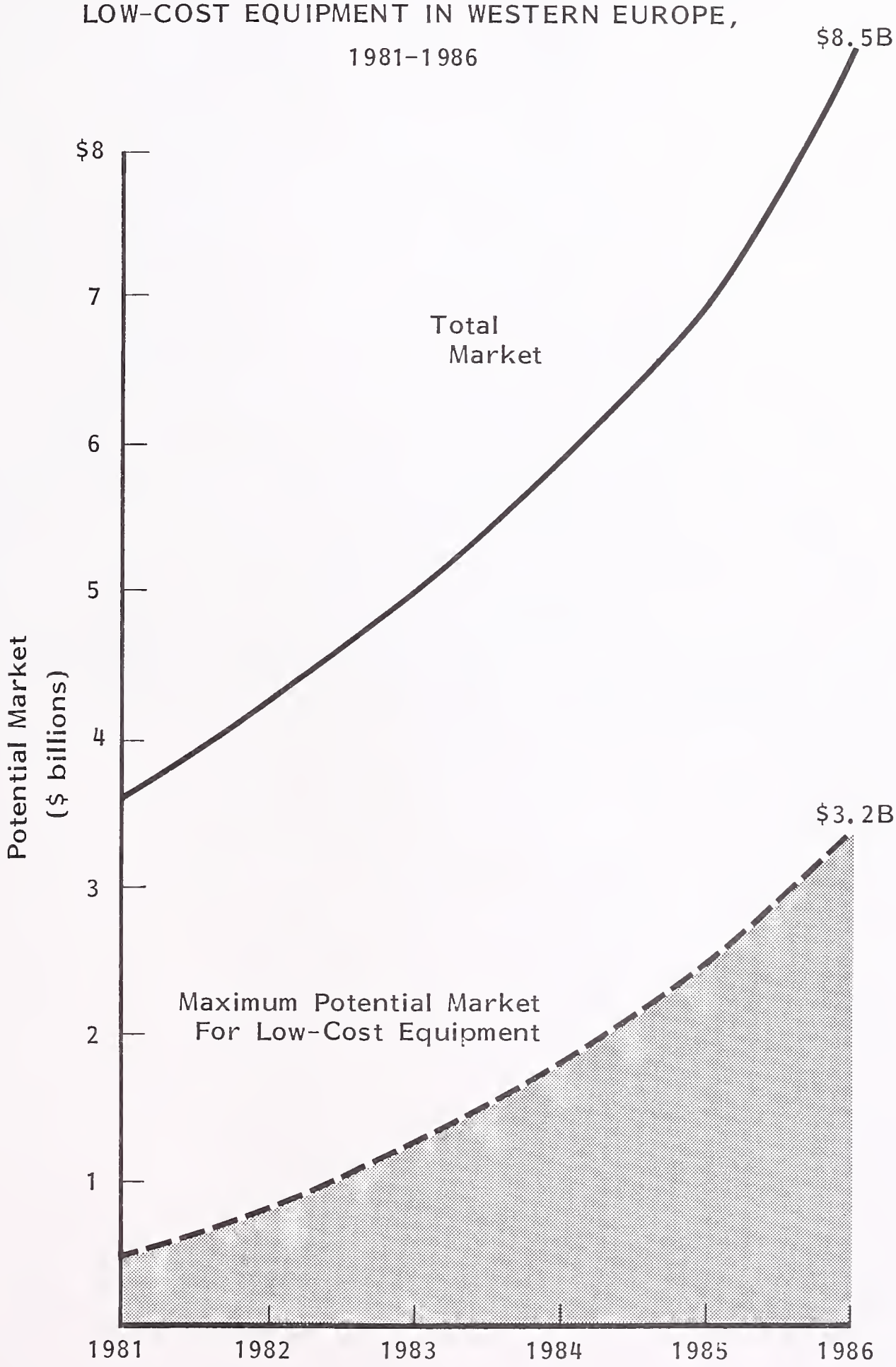


EXHIBIT III-5

FORECAST OF POTENTIAL MARKET FOR MAINTENANCE SERVICES FOR LOW-COST EQUIPMENT IN WESTERN EUROPE, 1981-1986



IV ISSUES AFFECTING PROFITABILITY AND VENDOR ATTITUDES TOWARD THEM

IV ISSUES AFFECTING PROFITABILITY AND VENDOR ATTITUDES TOWARD THEM

A. FALLING COSTS OF EQUIPMENT

- Equipment costs for hardware of equivalent power have been falling dramatically in recent years. Traditional estimates say that a reduction of 50% takes place every two and one-half years.

- During the same period, the costs of personnel, software, and maintenance have all escalated steadily. Whereas in 1970 hardware maintenance formed 4% to 5% of EDP budgets, INPUT's estimates for 1980 and 1981 put it at nearer to 8% of overall expenditure, including personnel and staff costs.

- The simple relationship which has hitherto existed and which said that hardware maintenance cost approximately 10% of purchase price per annum is starting to erode now that figures of 13%, 15%, and even 22%, are being quoted as necessary to support the standard on-site call-out contract on micro-based small computer systems sold for single unit installations.

- It is clear that the problem is not as simple as to be an inverse function of purchase price. In single unit installations, however, an inverse relationship is visible, with minicomputer systems falling around the norm of 10%, while large mainframe sites are maintained for around 4% of purchase price and micro-based units can reach one of the rates quoted above.

- Factors which complicate the equation are:

  - The number of similar units on a site.

  - The geographic density of sites.

  - Age of the equipment.

- Vendors of maintenance are well aware of the pressure on maintenance prices, but are unable to escape the trend of increasing costs which are driving service prices up.

  - Ten out of eleven vendors interviewed are already servicing equipment sold in units of less than $20,000 in cost, and the eleventh will be doing so in not more than two years.

  - Even TPMs who might be thought able to select the most profitable market areas are as susceptible to the same pressure as the manufacturers themselves.

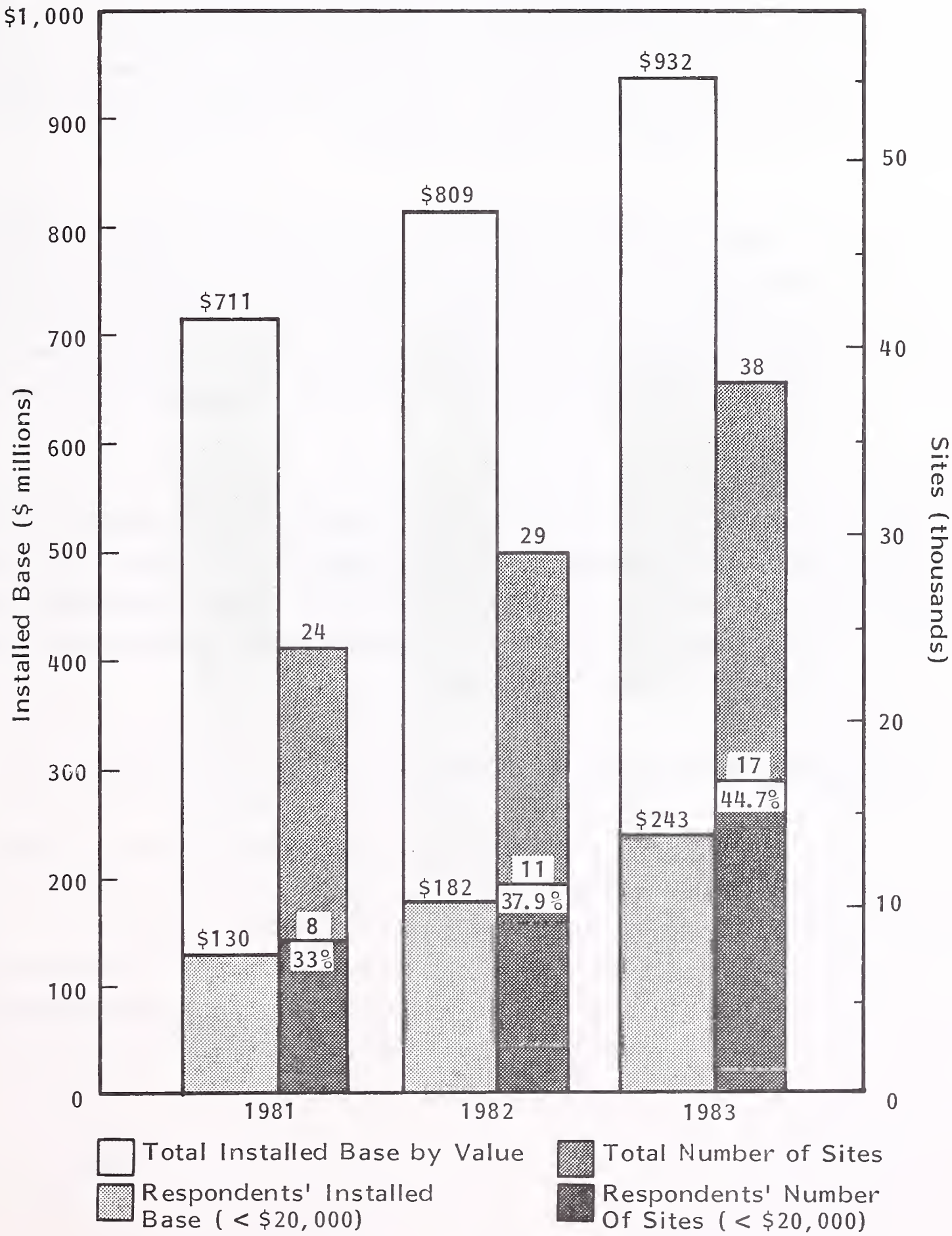
- Exhibit IV-1 illustrates this trend by comparing the way in which the installed base is being penetrated by equipment installed in sites of less than $20,000 purchase price. The progress in low-cost units is shown to be faster in terms of numbers of sites than it is in dollar value terms; but it is evident on both scores.

B. RISING COSTS OF SALES AND THE USE OF DISTRIBUTION NETWORKS

- It has been estimated that in the semiconductor and microcomputer equipment sectors approximately 30% of the West European market's demands are handled through distributors and dealers.

EXHIBIT IV-1

SHORT TERM GROWTH OF RESPONDENTS' INSTALLED BASES
BY VALUE AND NUMBER OF SITES



- The use of a distribution network for semiconductor products has been an established mode of selling since the early 1970s. The expansion of the semiconductor-equipment distributors into the fields of microcomputer supply and maintenance was a natural diversification into products in which the added value could be enhanced. This movement has been visible for some years also. To some extent it has come at the expense of other companies in the computer industry, notably the computer bureaux and software companies. These latter are now entering the micro-system based sector, principally in the role of dealers where their end-user expertise allows them to offer added value in hardware, software and service offerings.

- Distributors fulfill an important role and have a number of advantages for both manufacturer and user. By functioning mainly as stockists and marketing outlets they are able to satisfy orders at short notice for the products of different manufacturers. They aim to handle a large number of orders efficiently and thus come in contact with the needs of a wide range of customers.

- A subsidiary function of the distribution network is to provide manufacturers with important market demand information to assist them in the planning of their production. This type of feedback data has been noticeably lacking in the semiconductor industry up to now and this has resulted in wide fluctuations in the availability of these devices.

- These oscillations are a function of:

  - The speed with which new developments are being brought to the market place.

  - The absence of a distribution infrastructure in the early years of the industry when the majority of the customers were large and could justify a high proportion of direct selling by the manufacturers.

- The presence of the distribution network in place acts as a damping function to lessen the swings in the supply and demand cycle. From its earliest days, it was clear that the microcomputer equipment sector would be a volume market.

- Nevertheless the main companies entering this sector have mostly come to it with existing sales forces and existing sales and marketing policies. There is, therefore, a certain inertia in the system which prevents the subsector taking full advantage at once of the benefits of using an established distribution infrastructure.

- Exhibit IV-2 shows the sources of field service for low-cost equipment users. The outstanding feature is the small number (6% of mentions) where only one company maintains the equipment. Though this might appear good for the user in terms of his being able to shop around for the best buy, it is disadvantageous for the supply of adequately trained engineers.

- The vendor sample included a majority who maintained equipment throughout Europe and the tendency was for the low-cost items to be serviced more widely than the larger units. By contrast, over 50% would not make any special provision to get maintenance done by third parties in countries in which they were not represented.

C. IMPROVEMENTS TO FIELD FORCES IMPLEMENTED AND PLANNED

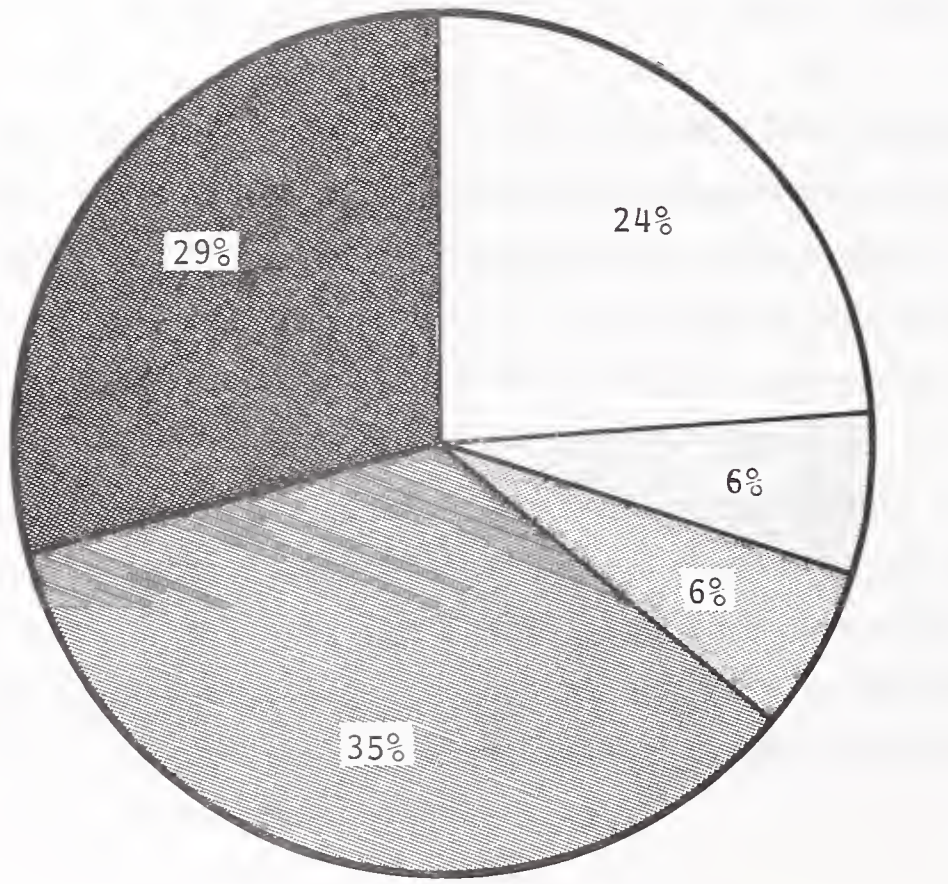
- Faced with the need to provide profitable field service to low cost products, vendors have implemented a variety of improvements over the last two years.

- The four main areas mentioned were:

  - Improvement of manpower productivity.

EXHIBIT IV-2

SOURCE OF MAINTENANCE FOR
LOW-COST EQUIPMENT



- In-House Maintenance Groups or Manufacturers
- Single Source of Maintenance
- Other Divisions of Own Company
- Distributors and Dealers
- TPMs

- Changes in management and organisation including:
  - . Appointments of executive staff.
  - . Improved siting of service centres.
  - . Redefining the service function's role.
- Logistical and technical support.
- Recruitment and training.

- By contrast, there has been relatively little emphasis put on sales and marketing functions; nor has equipment reliability/design featured as a major improvement.

- This is now changing; ten out of eleven vendors have a strong marketing approach built into their present overall service strategy.

- Exhibit IV-3 details the ratings given in the different areas of recent improvement, while Exhibit IV-4 lists the more prominent comments especially those relating to the topic of productivity.

- Productivity is now losing emphasis and the new priorities are the commercial aspects of the business.
  - Providing the correct product lines, (responding to users' requirements).
  - Mounting a professional marketing thrust.
  - Supporting and utilising the new distribution networks.

EXHIBIT IV-3

AREAS OF RECENT IMPROVEMENT TO VENDOR FIELD SERVICE ORGANISATIONS

AREA OF IMPROVEMENT	NUMBER OF MENTIONS, BY PRIORITY				OVERALL RATING
	1ST	2ND	3RD	4TH OR LOWER	
Labour Productivity	3	3	2	2	27
Management / Organisational	4	3	1	1	25
Logistics / Technical Support	–	3	3	–	15
Recruitment / Training	3	1	–	–	15
Sales / Marketing	–	–	3	–	6
Equipment Reliability	1	–	–	–	4

EXHIBIT IV-4

VENDOR COMMENTS ON RECENT IMPROVEMENTS

- 'User self-maintenance is positively encouraged for low-cost equipment'.
- 'We have improved the siting of our service centres. By bringing them closer to the centres of gravity of our main customer locations'.
- 'We have looked very closely at our training and recruitment; we are now able to take on people in the under-20s age group with no previous experience'.
- 'Since becoming a profit centre we have moved even further towards making service into a product'.
- 'The awareness of our strengths and weaknesses has improved. We are now working on the definition of the field engineer's role'.
- 'Improved the calibre of our people. We use the CDC training school'.
- 'Training has much more audio-visual content now'.
- 'Productivity was increased by 50% last year'.
- 'Staff are now more specialised'.
- 'Information is captured and accessed more in real-time'.
- 'We are better at matching the job profile to the person profile'.

- Exhibit IV-5 demonstrates the priorities which vendors are setting in their present strategic thinking. Incorporated in the new emphasis on sales and marketing is their interest in providing:

  - What the marketplace needs.

  - A response to competitive products.

  - What the marketplace can afford.

- Vendors who are servicing mainframes as well as small systems perceive a fairly clear demarcation between the traditional approach to the visiting site contract and the cost problems of transplanting this approach into the lower end. Vendors whose products do not go as far up the range as this are more likely to perceive their market in different terms:

  - By size of account.

  - Standalone versus networked configurations.

  - Customer sophistication, in terms of exposure to EDP.

- Turning to the future, vendors have immediate plans for improving their operations in the following areas:

  - Increasing the numbers and sitings of their depot repair centres.

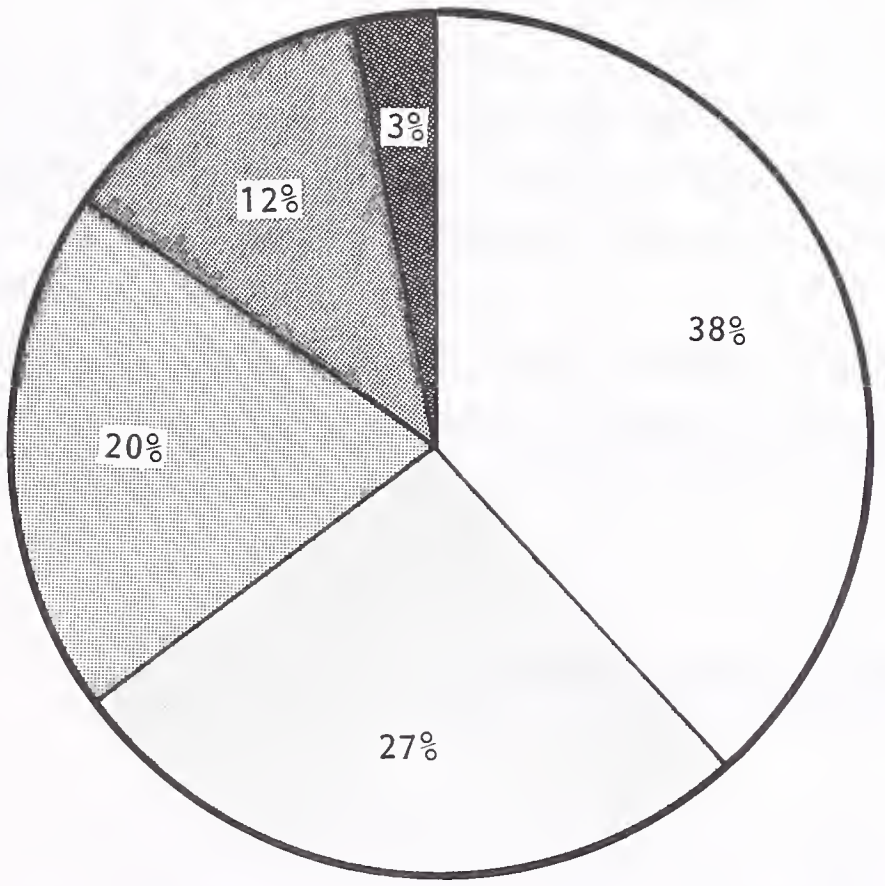
  - Automating the day-to-day operation and adding more sophisticated management information.

  - Incorporating more and better diagnostic tools for user site and remote centre use.

  - Plugging gaps in the response time service in key geographic regions.

EXHIBIT IV-5

MAIN ELEMENTS OF PRESENT STRATEGIES



- Commercial Considerations
- Quality of Logistics
- Quality of Service
- Quality of Personnel
- Reliability of Equipment

- Widening the choice of contract open to the user.

- Improving their spares holdings, where these are critical to the maintenance of adequate service levels for return for repair contracts.

- Revamping training schemes to fit into a more highly differentiated catalogue of services.

- Addressing the problem of the low status of sales and marketing within the service function.

- Exhibit IV-6 tabulates those improvement areas which can be isolated as significant common themes, and ranks them according to the priorities which vendors are currently imposing on them.

- Exhibit IV-7 highlights some of the important comments which vendors used to emphasise and justify their chosen set of priorities. The common thread is the emergence of a strong marketing orientation, which was long overdue.

D. MOTIVATION OF ENGINEERS

- The problem of motivating FEs to ensure optimum productivity was emphasized in INPUT's recent productivity study, in which it was reported that vendors, though aware of the problem and claiming to be addressing the topic, had, in fact, few concrete results to show for their efforts to date.

- Emerging from the current study is evidence that:

  - The need for low-cost unit maintenance is not perceived by vendors as relevant to the motivation issue.

EXHIBIT IV-6

PLANNED IMPROVEMENTS TO VENDOR
FIELD SERVICE ORGANISATIONS

AREA OF IMPROVEMENT	NUMBER OF MENTIONS, BY PRIORITY				OVERALL RATING
	1ST	2ND	3RD	4TH OR LOWER	
Repair Centres	1	2	3	–	16
Use of Automation	2	1	–	1	12
Diagnostics (Both on-line and remote)	–	3	1	1	12
Response Times	2	–	–	–	8
Choice of Contract (Unbundling)	–	2	–	–	6
Spares Holdings	1	–	–	1	5
Training	–	–	1	2	4
Sales and Marketing	–	–	1	1	3
Others	5	–	3	5	34

Source: vendor interviews

EXHIBIT IV-7

OTHER PLANNED IMPROVEMENTS

- 'We shall continue to install control desks in service centres'.
- 'Spares availability is not yet a problem area'.
- 'We shall carry on with our progression towards offering total customer base support'.
- 'This will mean a broader product catalogue. At the same time it is hoped to retain our present penetration'.
- 'We want to make more use of publicity aids, press releases, etc., and also to improve on customer liaison'.
- 'Overseas development is targetted'.
- 'Improvements will depend on the growth patterns of the respective product groups, and this is very difficult to predict. at this time'.

Source: vendor interviews

- Engineers of lower quality and lesser experience are being recruited without adverse effects to on-going services, but with benefit to a more flexible approach to taking on new types of work.

- In the longer term, the differentiation of types of service and the use of different contracts will affect field engineering career structures and career paths in the industry. Today, however, there is still a requirement for staff of quality in all grades. The problem is to match the job profile to that of the individual and his aspirations. Conversely, engineers must be encouraged to develop a flexibility sufficient to plot a positive course through the changes in job requirements brought on by technology.

- Exhibit IV-8 illustrates the contract relationships which can exist and will develop further in future between:

  - Manufacturer and dealer.

  - Manufacturer and TPM.

  - One service vendor to another.

  - Any one of the above and the end user.

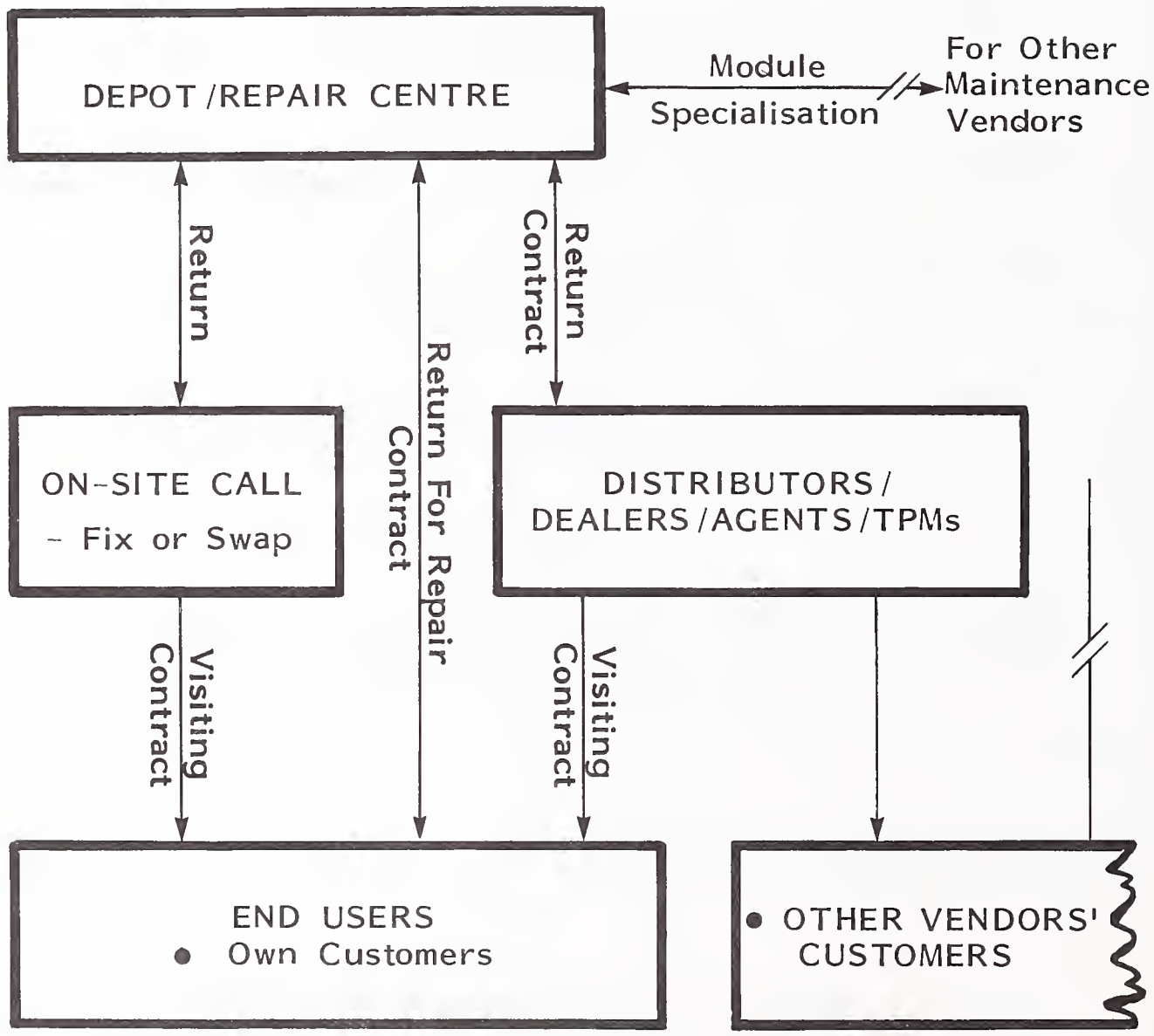
E. SOFTWARE MAINTENANCE

- Software maintenance refers principally to system software since the majority of application packages are supported by end users or software houses.

- The current status is that a majority of vendors have integrated hardware with system software maintenance. Application software, when supported by the hardware vendor, is serviced by a separate department.

EXHIBIT IV-8

CONTRACT RELATIONSHIPS FOR
FUTURE FIELD SERVICE OFFERINGS

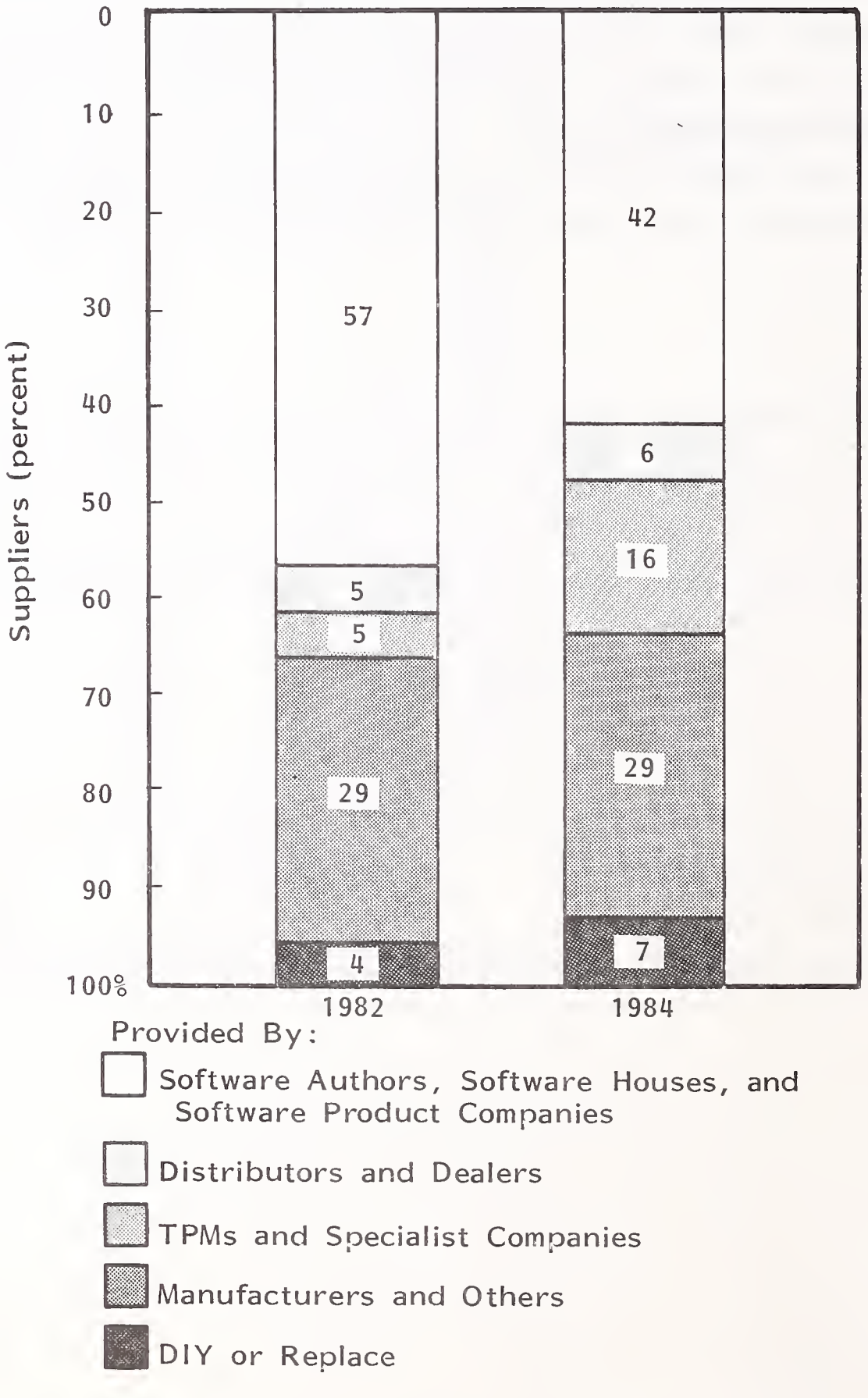


- Vendor views on how the handling of software maintenance will change over the next two years (1982 to 1984) are summarised in the chart in Exhibit IV-9.

- INPUT's view of this subsector is that low-cost equipment system software maintenance will remain tightly coupled with hardware maintenance service. The advent of Local Area Networks (LANs) and increasing use of a smaller number of standard operating systems will increase the market share of hardware manufacturers except in newly created markets such as personal computers. The manufacturers' share of the microcomputer system software market will gradually increase as the market matures, while the software houses' relative share will fall. In revenue terms, however, because of the very fast increase in sales of business micro-systems, all types of software maintainers will experience rapid expansion in the next two years.

EXHIBIT IV-9

THE DIFFERENT SUPPLIERS OF SOFTWARE MAINTENANCE FOR LOW-COST EQUIPMENT, 1982-1984



V ANALYSIS OF USER INTERVIEWS

V ANALYSIS OF USER INTERVIEWS

A. DEPARTMENTAL USE AND CHOICE OF SUPPLIER

- A total of 15 user organisations was interviewed, ranging from some of the largest European multinationals to small and medium-sized local or national organisations. The sample was balanced by choosing five from each of the following three categories:

  - Large companies of at least $100 million 1981 revenues.

  - Professional users, in education, research, and local government.

  - Small and medium-sized organisations, with 1981 revenues generally much less than $50 million.

- The relationships of the respondents to their organisations varied.

  - In seven cases he or she was an end-user EDP department or computer manager.

  - In four cases, a central manager or director of the Information Services function was interviewed.

- In another four, a specialist internal consultant gave the interview, and in two of these cases it was with a person with special maintenance responsibilities.

- In cases where large numbers of small systems were installed it was impossible to determine a breakdown between the usage in different departments, particularly in educational and government establishments whose structures are very particular. In most cases the response was:

  - 'All departments use small computers or some form of intelligent equipment'.

- The sample is currently responsible for an installed base of over 5,000 low-cost devices (of less than $20,000 equivalent purchase price) in Western Europe.

- The largest percentage (53%) of users purchased low-cost computers and office automation equipment on departmental budgets, but in all these cases either technical or economic approval needed to be obtained from a central advisory unit in the Information Services function at national or European headquarters.

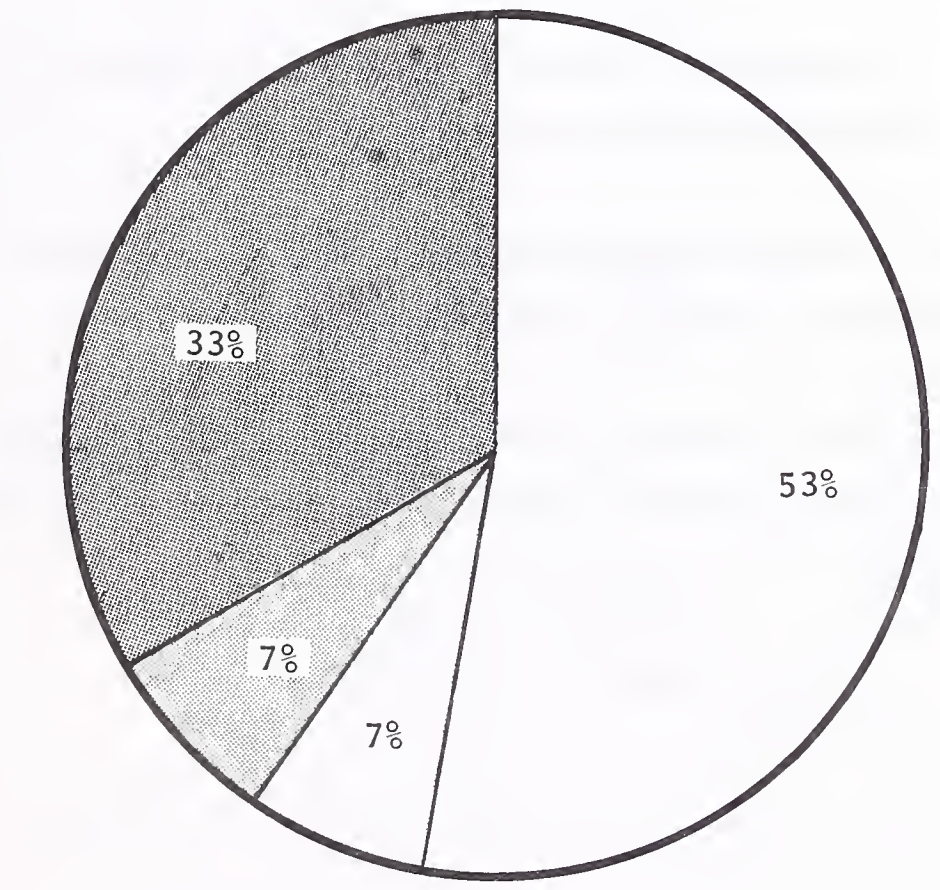
- The evaluation and approval in 60% of the above cases amounted to the setting and policing of a set of standards on such items as operating systems; e.g., 'CP/M is obligatory', or even stipulated actual suppliers for specific applications or functions.

- Exhibit V-1 shows the breakdown between this 'standards' approach and three other possibilities.

- There was no suggestion that purchasing at departmental level was out of control. However, because of the relatively large numbers of units being installed, accurate on-order quantities and future forecasts were not available. In general, large organisations were expanding their low-cost equipment numbers between 20% and 30% per annum in 1982 and 1983, while smaller

EXHIBIT V-1

DISTRIBUTION OF USERS' PROCUREMENT AND APPROVAL LEVELS FOR LOW-COST EQUIPMENT



- Departmental Budgets with Central Evaluation and Approval
- Divisional Budgets with Central Approval
- Mixed Central and Departmental Budgets
- Central Budgets

companies who had only just started looking at the low end expected to install several units during the next 18 months.

- The only exceptions to this general pattern came in the areas of:

  - Word processing (initially part of an administration budget), where the older function-dedicated units are giving way to cheaper, general-purpose machines usually based on microprocessors (calling for evaluations by the EDP department).

  - Terminals in which users had specific numbers of units in mind to make their networks up to planned strength.

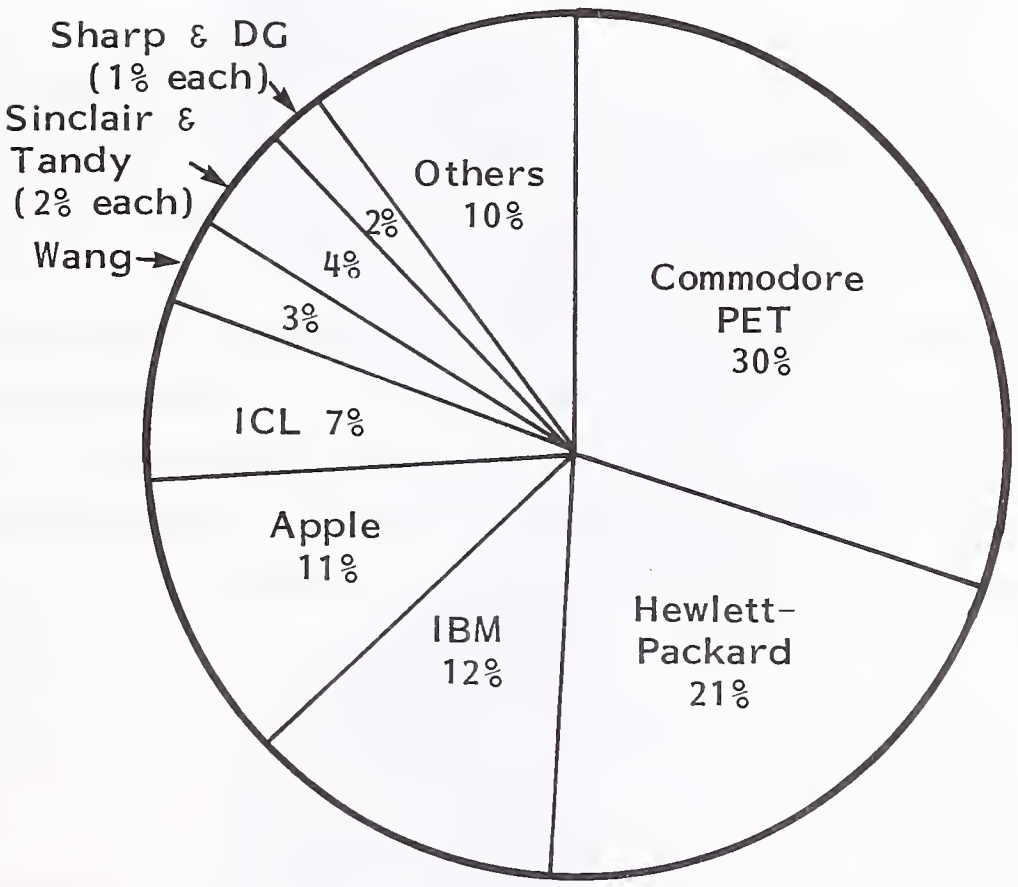
- User forecasts to 1985, though extremely qualitative and vague, all expected current rates of expansion of the base to continue.

- Exhibit V-2 illustrates the breakdown of the respondents' installed base by supplier. Manufacturers' popularity can be gauged by the following numbers of mentions:

-	Commodore/PET:	7
-	H-P, Apple:	4 each
-	IBM, ICL:	3 each
-	Tandy, Sharp, Superbrain, and Wordplex	2 each
-	Others	21
	Total	37

EXHIBIT V-2

DISTRIBUTION OF USER SAMPLE BY
SUPPLIERS OF LOW-COST SYSTEMS



B. MAINTENANCE POLICIES

- When questioned on the maintenance procurement standards which were implemented, users made no unsolicited differentiation between maintenance for low-cost and for other larger units. There is, in fact, no driving force impelling them to do so. However, a trend can be detected by separately analysing their first choice method of maintenance procurement and a weighted average of all their policy priorities, and then comparing the two.

- Exhibit V-3 illustrates how the 'Return for Repair' contract moves slightly up in the overall analysis as compared to present first choices. At the same time, use of a TPM assumes its approximate market rating.

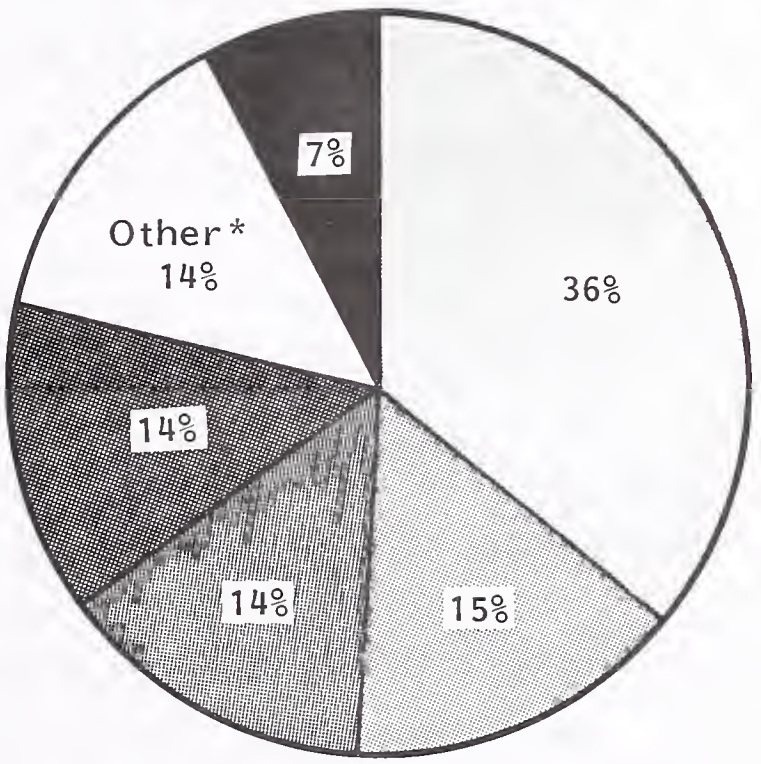
- INPUT sees a conservative approach to hardware maintenance among professional and corporate users, while at the same time the small business user is so wrapped up in the problem of getting the right software for his system that he hasn't got the time to focus enough effort onto the area of the servicing of his equipment. It is after all a down-stream problem.

  - The true cost of ownership does not impact the first-time micro-based business user.

- Vendors have therefore an opportunity window in which to establish a product catalogue which serves both types of user. The window will start to close in late 1983 when the early micro-based systems come up for replacement, and more rigorous equipment justifications begin to be made.

EXHIBIT V-3

USER MAINTENANCE POLICIES

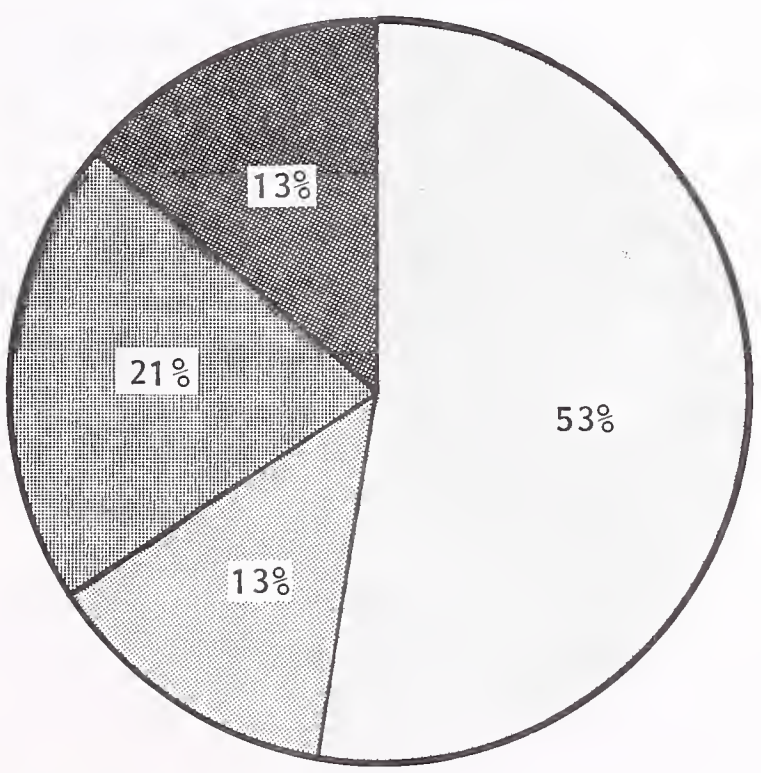


Weighted By

1st Priority	3
2nd Priority	2
3rd Priority	1

WEIGHTED ANALYSIS OF ALL PRIORITIES

* SET STANDARDS FOR DEPARTMENTAL PROCUREMENT, TREAT LOW-COST DIFFERENTLY, ETC.



ANALYSIS OF FIRST PRIORITIES

- Use Manufacturer's Contract for On-Site Visits
- Return Units to Supplier for Repair
- Use In-House Maintenance Engineers
- Use Dealer's or Agent's On-Site Contract
- Use a TPM's Visiting Contract

C. EXPERIENCE WITH MAINTENANCE CONTRACTS

- Exhibit V-4 shows the ratings which users give to their experiences with low-cost equipment. It would be hard to find clearer evidence of the difference between:

  - Personal computers.

  - The other three types of data processing equipment.

- Were it not for its reasonable rating on reliability, the personal computer would be totally unacceptable in the marketplace for professional equipment for business use. Current pricing of the units (aimed initially for a consumer market which has to be 'created') just will not support the sort of services and software which the EDP community has come to expect. Hence the need to restrict these units to the support of noncritical applications.

- Users perceive a higher reliability for personal computers than for all other types of kit, excepting word processors.

- Discounting personal computers, the maintenance service is an inverse function of the type of equipment's reliability. This indicates that, for these equipment types at least, an equilibrium has been established between supply of and demand for a given uptime. This 'steady state' has not yet been reached for personal computers.

- Large users who are currently implementing company networks with minicomputers, expect their standalone micro-based and personal systems to become integrated into local networks in due course, though this is not an immediate priority. Cabling is, and will largely remain, an in-house responsibility.

EXHIBIT V-4

RESPONDENT RATINGS OF THEIR EXPERIENCE
WITH LOW-COST EQUIPMENT

TYPE OF EQUIPMENT	AVERAGE RATINGS*			
	RELIABILITY	MAINTENANCE SERVICE	SOFTWARE	GENERAL SUPPORT
Personal Computers	7.5	4.6	5.3	3.7
Word Processors	8.0	6.8	8.0	6.2
Terminals	7.2	7.4	6.4	7.0
Other (including minis and data communications equipment)	7.0	7.8	6.0	6.6

*On a Scale of:

0 = No Experience
1 = Poor
10 = Superb

- Because in some larger organisations units are being installed in monthly quantities of at least ten, some users operate a policy of moving to a 'Return for Repair' contract when more than a pre-set threshold number have been put in. In one case a theshold of 20 similar devices was quoted.

- Some comparisons were made by users between maintenance and software provided by the hardware manufacturer, and what is provided to his dealer or agent, and always to the detriment of the latter. Ranges of rating numbers went from six to four or from seven to two for manufacturer and dealer, respectively. A typical comment in this context:

  - 'We only use the dealers or distributors for service in the simple cases'.

- Many users do not expect to get general support when they buy a micro-based system from a dealer or agent.

- Exhibit V-5 lists some of the general comments made by users in describing their experience with low-end equipment.

- Exhibit V-6 gives the breakdown by types of service contract for each type of equipment under the headings of:

  - Personal computers.

  - Word processors.

  - Terminals.

  - Other equipment.

- Exhibit V-7 compares the average contract cost levels (in terms of percentages of original purchase price per annum) for the two principal kinds of contract quoted:

EXHIBIT V-5

COMMENTS ON USER EXPERIENCE WITH LOW-COST EQUIPMENT

- 'We are fairly happy; but we would only use a maintenance vendor other than Hewlett-Packard or IBM when we are dealing with simple cases'.
- 'Our head office treats personal computers rather like calculators for maintenance - return them to office equipment stores for repair'.
- 'We are upgrading certain of our dumb terminals to turn them into local CP/M-based processing units and intelligent terminals. We hope to continue to service these units in-house after their conversion'.
- 'Though I'm in charge of the group management services company, we don't have experience of the servicing of this type of low-cost equipment'.
- 'Reasonably satisfied when a supplier maintains his own equipment, but it is very variable across the world'.
- 'We are not looking for any support on our micros'.
- 'DEC word processors are well maintained by them'.
- 'We had a very bad experience commissioning one of our micro-development systems'.
- 'We did have some teething problems with an HP1000'.
- 'Keyboard wear and tear is our commonest problem; the machine isn't "small boy proof"'.
- 'We've had a lot of problems with our terminals'.

EXHIBIT V-6

ANALYSIS OF SERVICE CONTRACTS BY TYPE OF EQUIPMENT

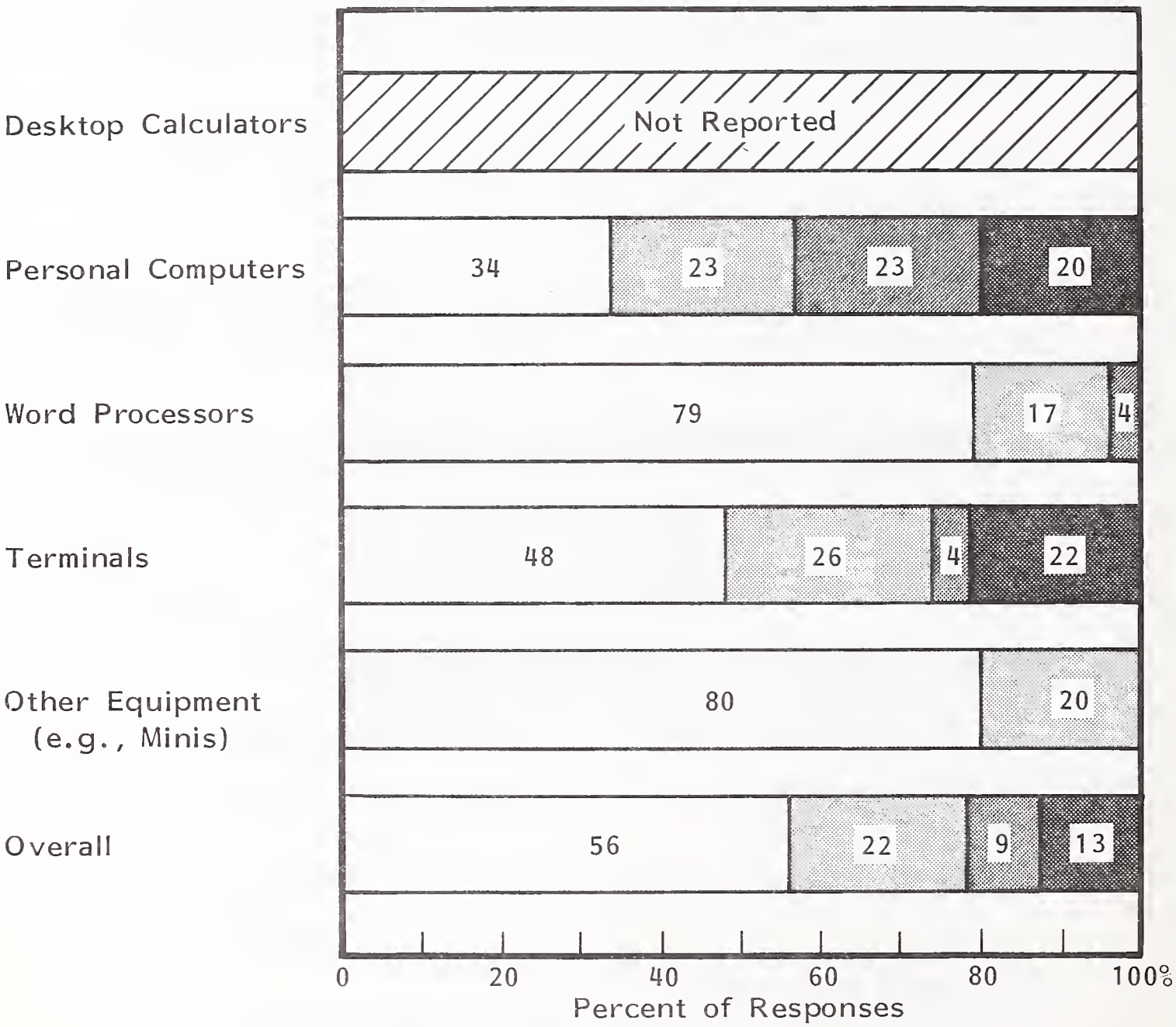
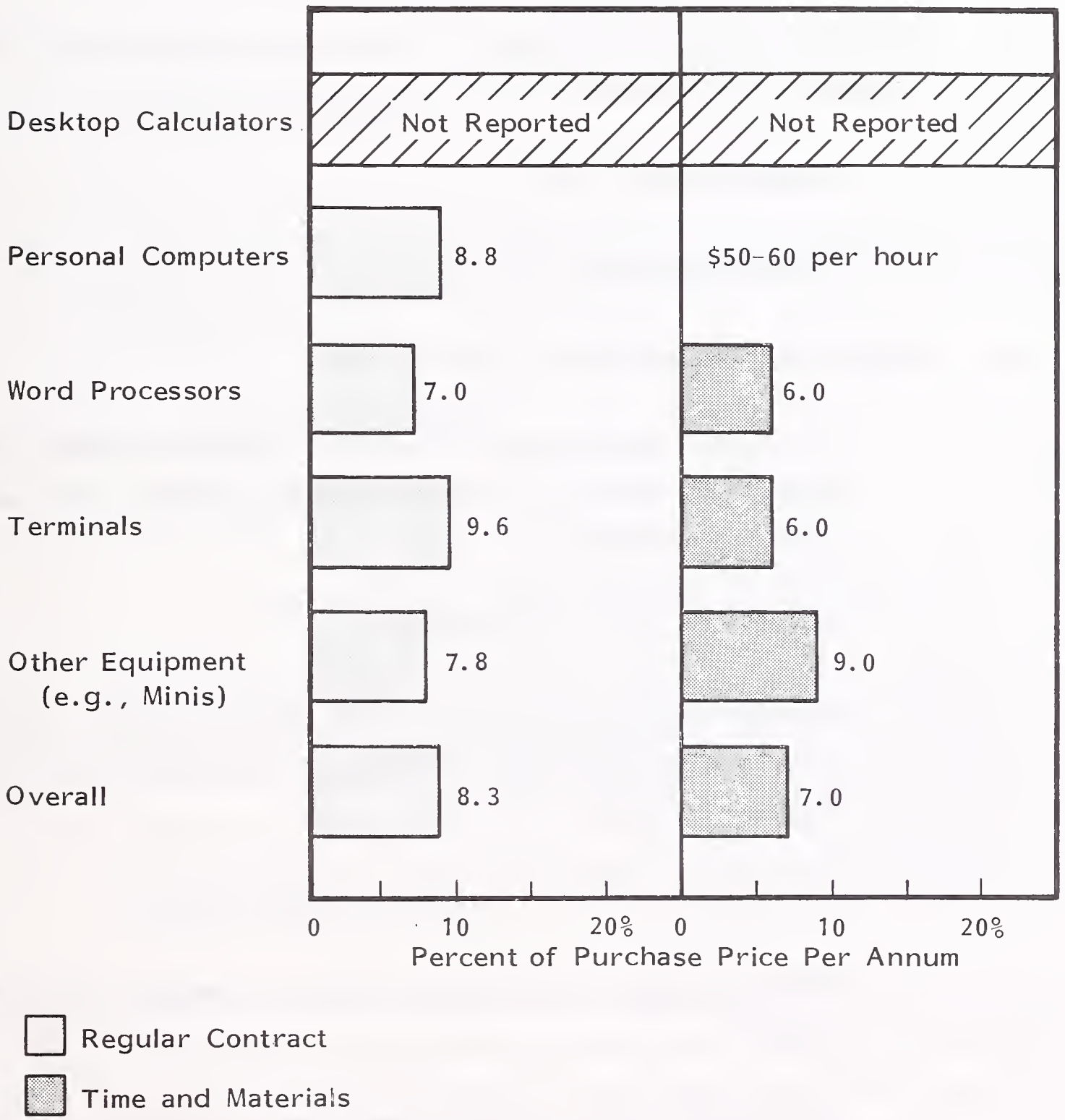


EXHIBIT V-7

AVERAGE CONTRACT COST LEVELS BY TYPE OF EQUIPMENT



- Regular fee (annual or monthly).

- Time and materials.

- The greatest savings made by moving to a time and materials contract occur with terminals - a relative cost improvement of 38% - compared with an overall saving across all equipment of 16%.

- Software is generally maintained in a much more informal way. Users with contractual arrangements came to:

  - Regular contract - 27%.

  - Time and materials - 7%.

- Requirements are handled in a variety of ways.

  - 'Our small machines have one contract covering everything. Departments make their own arrangements for purchase and support of application packages'.

  - 'No separate software maintenance'.

  - 'Personal computer software is referred to our agents. Local small processors use proprietary system house software and the software house maintains it'.

  - 'Departments make a contract with a software house'.

  - 'Software is only maintained rarely and for specific national requirements'.

  - 'Personal computer software doesn't need maintenance, we get WP upgrades free'.

- 'DEC maintains our WP software'.

- 'The service is good but the documentation has some shortcomings which means we have to phone them up too often'.

- 'System software is looked after by the manufacturer who provides free installation of upgrades and fixes for known bugs'.

D. LEVELS OF RESPONSE

- Except for the uptime parameter, in which personal computers score the best performance, terminals have the best rating for the three major measures of maintenance service:

  - Mean time to respond.

  - Mean time to repair.

  - Failure rate (MTBF - Mean Time Between Failures).

- Exhibit V-8 tabulates the average responses to the questions on actual performance and the minimum acceptable to users. For this analysis, the units used in the first three columns have been changed from the phrasing of the questions to bring them into line with the units most commonly occurring in the responses; i.e., 'hours' was changed to 'working (8-hour) days' or to 'faults per year' (instead of MTBF).

- Except for personal computers, the average reported time from initiation of a call for service to repair being effected is not more than one working day. In the case of personal computers, leaving aside a very large value for time to repair of 15 days (three elapsed weeks), the mean downtime is 1.14 working days for full visiting service contracts.

EXHIBIT V-8

MAJOR SERVICE LEVEL PARAMETERS BY TYPE OF EQUIPMENT

TYPE OF EQUIPMENT		MEAN TIME TO RESPOND (Working Days)	MEAN TIME TO REPAIR (Working Days)	FAILURE RATE (Faults/Year)	UPTIME (percent)
Personal Computers	Actual Figure	0.98	0.16*	3.2	97.8%†
	Minimum Acceptable	1.1	0.36	7.1	93.8
Word Processors	Actual Figure	0.56	0.24	8.6	96.0
	Minimum Acceptable	0.66	0.48	11.3	94.4
Terminals	Actual Figure	0.55†	0.16†	2.9†	97.1
	Minimum Acceptable	0.59	0.35	5.6	94.1
Other (e.g., data communications equipment and minis)	Actual Figure	0.61	0.39	11.2	94.2
	Minimum Acceptable	0.83	0.64	11.5	94.4
Average Overall	Actual Figure	0.67	0.23	6.0	96.4%
	Minimum Acceptable	0.82	0.45	8.5	94.1%

* = 2.3 IF ONLY THE RETURN FOR REPAIR CONTRACT IS INCLUDED.

† = BEST IN COLUMN

- The inclusion of some minicomputers in the sample has increased the number of faults reported under 'other equipment' to give also a low value for reported uptime.

- Terminals and word processors maintain a high actual uptime by dint of the good service levels provided. This is in spite of, in the case of word processors, having a considerably higher failure rate than either personal computers or terminals, a rate which is attributed by respondents to their heavy usage as text input devices.

- There is a much greater gap between minimum acceptable and actual parameters for repair time than for response time, confirming opinions, often voiced, which claim that response time is the most important figure by which a field service vendor is judged.

E. FUTURE TRENDS

- Exhibit V-9 summarises some typical user viewpoints on the overall working of their service contracts. Their attitudes to specific future trends reflect a generally satisfied view of the risks involved in moving to low-cost equipment in the next few years.

1. PURCHASING LOW-COST EQUIPMENT

- Procurement procedures for equipment are generally expected to remain stable with perhaps even more simplification and decentralisation. One very large user anticipates procedures would change if 'instead of buying dozens per month, we were installing hundreds'.

- Compatibility of operating systems and printers is likely to be an important aspect of the guidelines to intending departmental buyers.

EXHIBIT V-9

COMMENTS ON THE WORKING OF USERS' CONTRACTS

- 'Price is a function of the number of units in use in any of our operating companies. It is also a function of the complexity of the configuration'.
- 'We are moving towards a time and materials arrangement since we are satisfied on reliability, it will be cheaper than having a number of separate maintenance agreements, as at present'.
- 'Our end users can be paying from 25%-30% of cost for maintenance on terminals for a 90 minute response time. In most cases it is negotiable in this range'.
- 'I have not been worried so far, that we have no PM on our micros'.
- 'We're still evaluating maintenance for word processors'.
- 'We haven't ever looked at the pricing too closely; we view maintenance as an "insurance for uptime"'.
- 'I need a standard repair service based in our town. At the moment we have a once-a-week collection service to the distributor in the capital, but a local resident engineer helps out sometimes'.
- 'Classic maintenance problems of multi-sourced equipment'.
- 'We short-circuit the service desk; sometimes it saves half a day in getting an engineer'.
- 'The chairman's letter is only used occasionally'.

2. PURCHASING MAINTENANCE

- A much less stable set of situations was encountered in this area. Users are looking at ways of rationalising because of the great number of different types of kit being installed:

  - Moving towards user self-maintenance to improve the bargaining position.

  - Considering setting up the in-house group for this.

  - Using or switching to time and materials once experience is gained on a particular piece of equipment of which many multiples are installed.

3. RELIABILITY

- Fifty percent of users expect reliability to improve still further. Poor areas quoted were:

  - Floppy disks.

  - Winchesters.

  - Printers.

  - Keyboards.

  - Air-conditioning.

- Vendors whose equipment featured reliability problems were:

  - Wang.

  - Hewlett-Packard.

- Wordplex.

4. CRITICALITY OF APPLICATIONS

- Except for two users, respondents foresaw an increase in criticality of the applications mounted on small and personal computers. Areas cited were:

  - Administrative systems.

  - Process control.

  - Volumes being processed entailing more file interactions.

- The two dissenters were tackling the most critical applications first.

5. USER SELF-MAINTENANCE

- Users are split roughly two to one against an increase in self-maintenance over present levels. Those who foresaw an increase had usually not previously considered it.

6. REGULAR PRICE INCREASES

- An average inflation-countering rise of 10% per annum is anticipated. Comments include:

  - 'Factors will balance out; people costs versus self-maintenance and local diagnosis savings'.

  - 'In fact, our word processor maintenance went down last year'.

  - 'This is the force which is pushing us towards more in-house and also more TPM (typically it's been 8%)'.

- 'A minor factor on Return for Repair contracts'.

- 'Spares will continue to drift up in price'.

- 'It is anyway not much of a factor in influencing us'.

- 'Yes; currently it varies from 5%-15% for this type of equipment'.

- 'It goes on moving up'.

- 'I haven't seen a maintenance price increase for two years now, but I must expect one soon - maybe a big one saved up'!

- 'We must expect to go on having them'.

7. USE OF LOCAL AREA NETWORKS

- The use of LANs is being considered by large corporate and professional end users, but none of the small and medium-sized businesses interviewed could see any immediate need to connect small machines to each other or to the company's minicomputer even when it is on the same site.

- Those large organisations that are looking at it are nevertheless holding back from purchasing.

  - 'Certainly a trend but it needs a standard first'.

  - 'We are studying Ethernet, ARC and Ophis. We can start at once on electronic mail, even ahead of a standard'.

  - 'The idea is to have a local processor (LP) on each floor; connect them up and you have an LAN for each building; then you can link each LAN to your mainframe. We are attracted by the Xyonics concept; also looking at Ethernet'.

- 'We use the Canadian Gandalph Packs for the communications switch and DECnet for our files; not really a modern LAN concept'.

- 'The word processor network will come first. We are looking at Datapoint's ARC'.

- 'Just starting to couple our micros - to give more power at the elbow'.

- 'In the classroom we can load off a disk now - we hope to have a machine for every pupil in senior maths courses and then we will want to control things by loading programs off the disk'.

- LANs have an enormous future in Europe over the next three to five years. their installation in numbers will greatly strengthen the arguments for the TPM - whether an independent TPM or just a TPM service provided by a manufacturer.

8. SOFTWARE MAINTENANCE

- No clear trend emerged on the question of software maintenance, though the majority of users felt they would be getting more involved with the problems in the future. Here again, the large organisations and professional users are more concerned than the small businessman.

- Some typical comments:

  - 'It is bound to be more expensive'.

  - 'Problems follow from doing one's own mods'.

  - 'I expect better telecommunications capability as an early upgrade'.

  - 'Our programs need to be maintained by ourselves'.

- 'We are now out of the wood with ICL's TME'.

- 'Must review the whole subject soon'.

9. USE OF REDUNDANT SYSTEMS

- The increased use of redundant equipment, particularly storage and input/output peripherals, is either being practised or is envisaged by most large or professional users. However this is different from the use of dualled processors and complete non-stop systems of the type made famous by the Tandem Corporation.

- Even the largest users are a long way from the concept of small system networks being maintained under the same sort of replacement procedures that one would use for servicing electric lighting or electric power-points.

- User comments of note included:

  - 'For critical applications we do install multiple micros'.

  - 'Not relevant in our group at the micro-level'.

  - 'We might keep some redundant units'.

  - 'Only in our glass-house automation project'.

  - 'It's already built-in due to the numbers of machines'.

10. RELATIONSHIP WITH THE FIELD SERVICE SUPPLIER

- This question was intended to discover the strength of the force pushing vendors towards providing a more generalist type of field engineer with capability in:

- Selling spares and accessories.

- Advising on necessary or beneficial upgrades.

- Systems consultancy for office automation.

- The question tended to provoke an almost opposite reaction and responses to underline the increasing complexity of systems by highlighting a call for more and better specialists.

- One very large user, however, thought that a bad specialising trend was already under way.

  - 'The quality is bound to get worse as engineers get more specialised, when more sophisticated diagnostics come in on low-cost equipment'.

- Forty percent of users either had not experienced any basic change in the type of engineer provided or were pretty happy with the kind of man and service that they were getting.

- Another 25% thought that transformation of the engineer might take place, but it would not be very relevant to their type of work.

- The positive side of the responses given indicates a requirement for engineers who specialise in diagnosis, but who to do so have to be trained as good systems engineers. This requirement is independent of the grade of engineer, whether technician grade or fully chartered.

- In line with INPUT's conclusion on the trend towards 'unbundling' of the maintenance product catalogue, the service unit of the future will require good specialists and good generalists, and a proper balance between the two tailored not only to the profitable conduct of the operation but also to the career structure of the engineer, with everything that implies in the area of his motivation.

VI ANALYSIS OF VENDOR STRATEGIES

VI ANALYSIS OF VENDOR STRATEGIES

A. CASE STUDY OF A MAINFRAME MANUFACTURER

1. BACKGROUND TO THE COMPANY

- The company has been operating in the mainframe business with a series of equipment generations which date from the end of the 1950s and has since that time extended its operations worldwide. In recent years it has moved steadily down into small business systems as the markets for minis and micros have matured.

- Since the middle of 1981 it has started to accelerate the formation and implementation of a whole series of policies designed to cater specifically for the low-cost end of the market place. Without necessarily preempting a choice between the mainframe, mini-, and microcomputer segments, the company is manoeuvring itself into a position where the policies designed to cover the different sub-markets are optimised between:

  - The requirement to tailor tactics and procedures to the individual subsectors.

  - The requirement to confront the marketplace with an integrated and coherent strategy.

- The important feature of recent policy developments has been the decision to grasp the opportunities for the new distribution channels in a positive way. Third-party sales outlets have become acceptable and the company has moved into this mode of selling for low-end distributed and personal computer processing, adding to this a viable local area network capability to put alongside its traditional data communications facilities for remote processing.

- While accepting INPUT's preliminary threshold for the implications of low-cost maintenance at $20,000, it proved impossible to segregate the shipment and installed base values above and below that mark:

  - Because the figures for historical reasons are not kept in a way which distinguishes that particular boundary. A number of incompatible and compatible ranges overlap each other in the product catalogue.

- The respondent thought that the threshold lay lower at $15,000.

2. EVOLUTION OF THE MAINTENANCE OPERATION

- The range of equipment which has to be serviced includes all the grades listed on the vendor questionnaire (Q11) except industrial minicomputers and office equipment. The main products exported worldwide are the small business systems, microbased DDP equipment, and personal computers. All except the mainframe and small business machines fall below the $20,000 unit configuration cost threshold.

- In countries where equipment is sold but not maintained the servicing is arranged by the customers themselves either with the dealer or distributor who made the sale, or with an independent maintenance company (TPM). The manufacturer does not intervene in these arrangements by making recommendations or by drawing up short lists of candidates, as is often done in the case of software procurement. Instead it is left entirely to the choice of the customer, whose appointed service agent must apply back to the manufacturer for any advance spares supply required or for the necessary training. In this

respect he will be treated by field service in the same way as any other customer.

- The maintenance function has been as affected by the reorganisation which has been taking place as any other part of the group.

- The main improvements which have been implemented over the past year are:

  - Decentralisation of the field forces into national and regional cost centres.

  - Introduction of multiple service centres equipped with 'phone-in' control disks.

  - Encouragement of user self-maintenance, especially on the low-cost configurations.

- It is perhaps surprising that this company is one of the minority claiming to operate their field service as a cost rather than a profit centre (only three out of 17 vendors interviewed in 1981 for INPUT's Issue Report, Productivity and Motivation in Field Services. Since the time of those earlier interviews in May and June 1981, this organisation has come to grips with the problem of controlling headcount in an expanding situation. Decentralisation has been a useful help in that is has shortened the path between the recognition of fluctuating sales demand and the decision makers, by bringing the decisions to the level of regional management. In this way headcount can be more easily kept in step with demand.

- The use of control desks is in line with good industry practice of the day. These desks allow for problem diagnosis by telephone, particularly the separation of hardware, software, and operator bugs, as well as the purely clerical task of logging calls - a very good example of possible 'job enrichment'.

3. CURRENT STRATEGIES

- Two main strategies were identified:

  - Target for a high proportion of low-cost users taking a 'Return for Repair' option.

  - Provide a greater number of ad-hoc services in addition to the regular contract options.

- The company is still developing its ideas where these ad-hoc services are concerned. The present contract options offered are:

  - Return for repair.

  - On-site visiting contract, standard flat rate charge.

  - Retainer, plus extra charges for call-out on demand.

- The last of these is being offered chiefly because the main competitors also do. An advantage to the user is that it allows the user to optimise between cost and service. It does not, however, afford the user any extra priority over his fellows.

- As one would expect, the application of the Return for Repair product is more appropriate and therefore more prevalent at the small system end of the market, whereas traditional service remains in demand with mainframe users. There are minor variations on each of these themes.

  - With low-cost systems sold through the dealer network the company provides a purpose-built Back-up and Support contract for these trade outlets.

- With some large organisations, a training programme is offered to train a general maintenance section in servicing of the equipment.

- Exhibit VI-1 illustrates the maintenance and support relationships which are emerging as a result of the company's new distribution-channel-orientated philosophy.

- The new course set by the company accounts for the service manager's most pressing current problems.

  - A complete change in company profile is being called for; the company must quickly incorporate into its skill the ability to service high-volume products.

  - At the same time the company must reeducate its users away from the traditional expectations for maintenance.

- Users are tending with the new ranges of equipment to opt initially for standard cover. Only when they become more familiar with the newer products and their better reliability figures, can they be expected to move over to the new options.

4. LOOKING TO THE FUTURE

- Besides continuing to introduce further control desks as new service centres are opened, our respondent quoted other improvements which are being brought in, in the following areas:

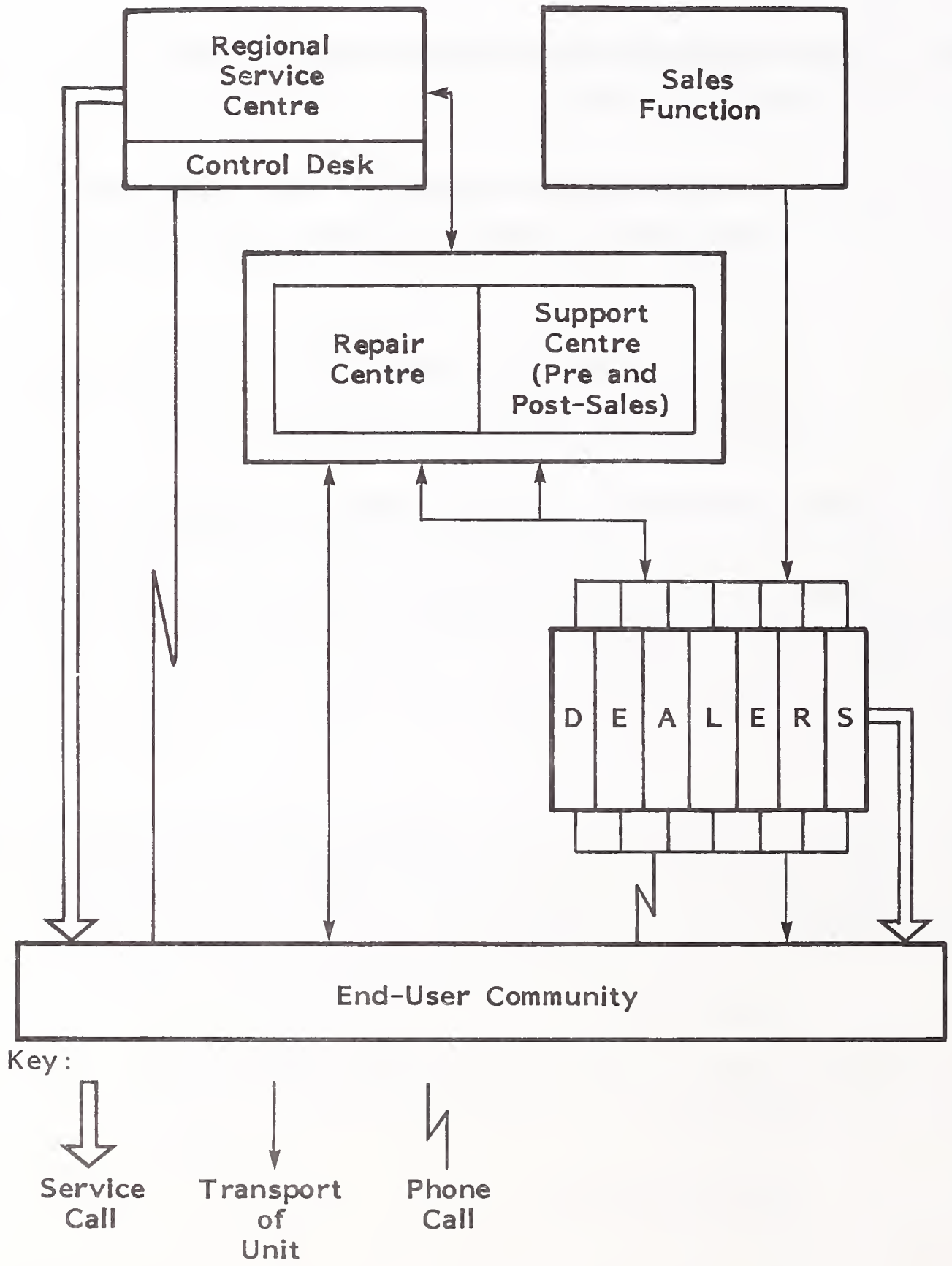
  - Product design.

  - Tools.

  - Despatch methods.

EXHIBIT VI-1

RESPONDENT'S MAINTENANCE NETWORK



- Recruitment.

- These revolve around the introduction of new diagnostic tools which can be used in one of two ways:

  - By the customer himself either before he makes a service call or under instruction from the control desk.

  - By telediagnosis down the line from the desk (using the public switched network).

- The use of this new generation of test gear will allow the correct queuing of faults. Thus the planning of a whole series of site calls on a single engineer tour, with the objective of 100% first-time fixes, will become possible. This policy of 'the right man setting out with the right spare' is key to the success of handling the increasingly complex manufacturer-dealer-customer relationship.

- The management expects to be using more technician grade FEs when these new diagnostic tools are fully operational. They are conscious that this will introduce a skill scale into the career structure which may prevent, or at least limit, vertical movement. At the moment, however, there is a skill shortage at all levels and the career problem is a second priority.

- This was another respondent who stated that price increases have not matched inflation. Costs had been contained by offering the user newer, more reliable equipment in which overall service charges could be kept steady or to a maximum growth of 5% in actual terms.

- The impacts of servicing high-volume products are already requiring:

  - A leaner and more efficient organisation.

- A reduction in the amount of preventive maintenance, which is now tending more and more to be left until an engineer has to make an on-demand visit.

- Two problems which have already had an effect and are testing the quality of the management are:

  - The need to balance loyalty to an accelerating programme of change with a sufficient dose of realism, recognising the time it takes to let changes work their way through the system.

  - Control of cash flow.

- The latest set of service contracts involves payments in advance, whether monthly or annually. Field service management is expecting to be provided with DP systems to aid with cash management as well as in the more usual technical areas.

- These DP tools would be implemented in the new service centres as well as at national and divisional levels.

- The company reported that some factors in low-cost system maintenance were having a larger impact sooner in the major European countries than in the small markets, and some were vice versa. For instance:

  - Benelux, Scandinavia, and the U.K. presented greater inertia to change than France, West Germany, or Italy.

  - U.K. and Italy had greater problems with getting in payments than did France, while the rest of Europe was not particularly difficult.

- There is also a trend evident in the way software maintenance is being handled.

- At present, software is usually sold at a once-off fee, with maintenance for updates and trouble-shooting being a chargeable annual extra.

- Increasingly, a package deal including service on hardware and software is being put forward in the pre-sales period.

5. SUMMARY

- This company had last been interviewed by the same respondent in May 1981. It was possible in the elapsed period of a little over nine months to detect enormous changes in management stances in most areas:

  - All driven by the advent of new low-cost products into their portfolio.

- It is still too early to predict the outcome for field service since the process has only run about 25% of its course. A major question mark hangs over the use of the cost centre approach. INPUT will be surprised if a profit centre is not substituted in time to take over the new service organisation. Without it, profitability and flexibility will suffer in the long term.

B. CASE STUDY OF A MICROCOMPUTER AND COMPONENT MANUFACTURER

1. BACKGROUND TO THE COMPANY

- The establishment at which the interview took place houses both the European and a major national country headquarters of the company, which is also situated in eight other West European countries and has agents in most of the remainder. The respondent interviewed has responsibility for coordinating the implementation of policy across Europe.

- Besides a catalogue of ICs and chips, the company sells, principally through a dealer/agent network, a range of microcomputer systems aimed at the general

business user. The method of selling the systems entails a modular approach, systems being configured as simple desk-tops at the most primitive level and as fully peripheral-equipped multitasking systems with network capability at the other end of the scale.

2. EVOLUTION OF THE MAINTENANCE OPERATION

- Until two years ago there was no service manager in Europe, and support and spares had to be provided from North America once local dealers had exhausted the possibilities of what could be done on the spot. The appointment of a manager to whom both national managers and agents look for support has been shown to be a milestone. It has been possible from that point on to hammer out a policy which is essentially two-pronged:

  - To offer on-site visiting contracts if required.

  - To put the major effort into providing a repair service which underpins whatever first-line arrangements are being made with the end user by distributors, dealers, and the company's own direct sales forces.

- There is a history of dealings with TPMs, inevitably a major source of maintenance when no local arrangements had yet been installed in Europe. That history threw up some areas of dissatisfaction.

  - Being reliant on service as the revenue source, some of the older established TPMs have become labour-intensive and hence unable to adapt quickly to the trend towards the more capital-intensive service operations.

  - This attitude on their part has, moreover, been reinforced by their inability to carry a sufficient spares stock to keep repair times acceptably short, and this has in some instances resulted in the manufacturer being expected to bail out the TPM.

3. CURRENT STRATEGIES

- In view of this history it may appear surprising that the company has chosen recently to use an outside company to support one of its major country customer bases for visiting contracts. This arrangement has been working since the middle of last year and was formalised in December last. The main advantage of this decision is seen to be:

  - That the manufacturer is itself able to concentrate resources and management time onto the problems of running an efficient repair service at the board level.

- The previously experienced disadvantages have been neutralised by the choice of subcontractor, which is itself a major manufacturer but not in the microcomputer and component end of the market. With a substantial organisation already in place and with sufficient financial muscle to withstand the initial requirement for spares investment, there is no reason to suspect their ability to develop their complementary interests.

- The preventive maintenance requirement on the sort of systems being talked about is inclining towards being minimal - often confined to:

  - Cleaning of fans.

  - Alignment of floppy disk heads.

- The structure of the repair service being offered has two parts:

  - The basic service comprises replacement of faulty units returned to the repair centre for a set percentage, approximately one third, of the unit price. Additional costs incurred are a handling charge of $100 and the cost of collection and delivery (say $30 each way by fast courier).

- Another way of getting a similar service is to pay an annual subscription of $300 for each type of machine model and for each location and receive a 24-hour turnaround replacement service, again at the set percentage of the broken unit but this time with the subscription fee covering the handling charges.

- The initial forecast is that in its first year of operation, 1982, there will be hundreds of subscribers to this second class of service.

4. LOOKING TO THE FUTURE

- In the short term two problems appear to be pressing:

  - Managing the evolving spares situation.

  - Keeping up to date on the training side.

- To cater with the first of these it is going to be necessary to monitor closely the actual stock requirements and to maintain the latest equivalent parts. This is a difficult stock control problem requiring a constant look-ahead on the part of the service chiefs at the retrospective changes made to designs as system designers catch up with the more advanced capabilities continually being produced ever more economically by the chip makers. Even with this manufacturer's own organisation there is bound to be a time lag between the production of a new chip and its use in one of the in-house system designs. However, when these designs do catch up there occurs a corresponding potential penalty in duplicating or replicating equivalent spares holding.

- Stock control is expected to remain on a manual system for the foreseeable future as the number of boards stocked does not yet run in thousands. In this there is a difference between the systems and the components sides of this manufacturer's business.

- The second problem is not dissimilar in that it also stems from the pace of innovation. It was reported to be a cause for concern.

- Another more general matter of future improvement lay in the area of the control exercised at the European level. Operating in a matrix-type organisation, the company's coordinates in each major market had only dotted-line responsibility to it, while in the smaller countries it was having to deal with agents who because of the distances involved might often prefer the local fix to the procurement of a replacement with return of the defective part to the repair centre.

- The respondent's view on the trends in user attitudes was that it was already clear that at the micro end users expected to be able to save on maintenance. He also felt that fee savings were being made to the tune of about 5% in real terms. Users' expectations would now level off at around this mark and only by the two-tiered approach would maintenance suppliers be able to contain rising labour costs.

- The general use of redundant systems was not seen. In all but the most critical cases, four-hour response was meeting the average user's needs.

5. SUMMARY

- As one of the world's major names in the microcomputer field, this supplier has gained a significant market position through innovative design backed by credible systems integration of both hardware and software, and by strong marketing and support. After-sales service has lagged behind and this is hardly to be criticised judging by the speed of product introductions since the start of the decade.

- What this case study is witnessing is the attempt to generate and retain a basic service policy which is dictated by the requirements particular to low-cost equipment. In this context, the respondent's view that the ceiling for low-cost equipment for maintenance purposes should be set at $12,000, is

significant since this is a vendor whose products encompass the range from the microprocessor up to and beyond INPUT's provisional definition at $20,000.

- The challenge to the continued health of this radical policy comes from the build-up and pace of innovation at this time. This will be translated in day-to-day terms into a challenge to the flexibility and anticipation of the field service management.

C. CASE STUDY OF A DISTRIBUTOR TURNED INTEGRATOR

1. BACKGROUND TO THE COMPANY

- Originally a supplier of alternative peripheral equipment for the mainframe market, this company then progressed to providing complete mini-based configurations for standalone and distributed applications. The latest addition to its activities has been the integration of microcomputer configurations for small business systems. These systems are partly manufactured in-house, and integration of the bought-in and the manufactured subunits is then undertaken to produce the finished units.

- In 1981, 15% of annual shipments were in the low-cost (less than $20,000) range. This value is expected to exceed 20% by next year. The installed base contained at the end of 1981 around 10% of its sites, with unit values below this threshold, and that percentage is also expected to grow to reach 15% by 1983.

- In contrast, the installed base value below that limit will only grow in the same period from 2.5% to 3%, - an indication that the main preoccupation of the company will remain at least in the short term with the top end.

- This point is reinforced by the analysis of the equipment it sells and maintains - entirely on its own, there being no other intermediary.

  - Mainframes of unit value > $200,000.
  - Small business systems and minicomputers valued > $20,000.
  - Storage peripherals sold separately.
  - Micro-based business systems.
  - System and application software.

2. EVOLUTION OF THE MAINTENANCE OPERATION

- Except for the micro-based and personal computers, with their associated software, all of the catalogue lies above the $20,000 threshold.

- The maintenance function was extended to cover the smaller units when they were brought out in 1979. At the same time application software started to come under the same organisation. Initially this happened in the company's home market, one of the major West European countries, and it was then extended to most of the rest of Europe. Portugal and Denmark are the two countries in which there is no representation either by the company or by third parties.

- The respondent cited three aspects of his field service which had improved since the start of the decade.

  - Improved reliability has been achieved in the new equipment being marketed, as a result of the feedback which has been given to product design on maintainability.

- The siting of service centres has been changed to bring them closer to the areas in which their customer base is most dense.

- A productivity improvement of between 6% and 8% has been achieved, though it was noted that this had not been an easy task.

3. CURRENT STRATEGIES

- The management of this field service operation is one of the most up to date in Europe in terms of awareness of potential problem areas. Of all those interviewed this year and in 1981, it was the one with the most detailed appreciation of the good uses of management information systems. This awareness goes hand-in-hand with a definitive approach to the formulation of strategic policy.

- The current position is that the main driving force which is shaping the future for the field service engineer is the increased reliability of equipment. This trend is, in the company's view, moulding the profile of the engineer of the future. Because he has got to be less necessary, but still not dispensable, his role must encompass other things.

  - Less of a trouble-shooter, he will be a kind of 'partner' to the end-user installation managers.

  - As a systems trained engineer he will be able to advise customers on useful future hardware purchases.

  - He will act as an accessories salesman.

- All this will require a completely new style of training orientated less towards hardware repair, more towards general systems and applications support.

- The company's strategy is to recognise and plan for this change. However, a dichotomy of view is apparent when one examines how this strategy can be applied across the different grades of equipment.

  - At the large system end traditional servicing requirements remain.

  - At the low-cost end, field service is already confronted by the need to provide service at a reasonable cost to both customer and its own management alike.

- The most pressing problems facing this respondent today are:

  - How to reduce the cost of maintenance in future.

  - How to motivate FEs who see themselves replaced by service processors.

  - Continuing with quality assurance in machine design for reliability and maintainability.

- During the past two years the company's users have experienced zero growth in hardware costs, but software and other costs have outstripped inflation, resulting in a 10% per annum real increase which will drop this year and next to a level of 8% in 1983. As a consequence of this, they are now questioning the necessity of mounting new applications. Even if an application is thought cost-effective, in many cases they are delaying implementation until the economic climate improves. This is in marked contrast to the attitude of earlier years, when:

  - 'If it can be computerised, it must be an improvement'.

- Maintenance has contributed 6% to 7% of this cost growth and will continue to do so.

4. LOOKING TO THE FUTURE

- Planned improvements in their maintenance capability, scheduled for implementation over the next two years, include:

  - Educating the customer in the use of central repair shops.

  - Establishing a number of these repair centres in Europe. The scheme is to have at least one in every major country and up to six in their domestic market. This is going to mean 15 to 20 such centres in all.

  - Users will be offered two types of Return for Repair service.

    . A flat rate fee for return of faulty units to a repair centre plus an extra charge for each on-site visit requested or found necessary.

    . No contract, just a charge for each unit brought in and repaired.

- At this stage the availability of spare parts is not seen as a problem.

- Though it is too soon to have registered a serious impact on their organisation, the company is quite clear about what the effect of the growing installed base of low-cost products will be.

  - 'If you handle it the traditional way, you will lose money'.

- However it believes that users' expectations will retard the full onset of this impact, because:

  - Large and medium-sized companies still expect visiting service.

  - New users, such as the professions - doctors, pharmacists, accountants - don't yet know how to fully evaluate the 'cost of ownership'.

- Software is still the major problem area occupying the attention of first-time users, be they professionals or small businessmen.

- Two detailed points emerge from its new-user customer base.

  - Familiarity and the confidence bred of it are inducing the small first-time user to upgrade by adding more secondary storage. As this happens, an increasing number enter the area where data saving and backup become major headaches. This company is putting its faith in cartridge tape as the future medium for this save/restore capability.

  - Inexperienced users often don't know the source of a system fault. Whether it is hardware, software, operator, or environment is a common difficulty which suppliers must address.

- But the number one problem for the vendors, in this company's eyes, is to identify the cost problem of low-unit value equipment and to start to control it. The main plank of its counter-strategy is to educate the user towards the use of newer methods:

  - Remote diagnosis.

  - Return for repair facilities.

  - Self-maintenance (the company uses a floppy disk based interface box to separate hardware from software faults).

- These all come under the general heading of monitoring and control.

- The impact across Europe of these aspects of new equipment varies from country to country.

  - Cost problems are identified first in the smaller countries, Benelux, Scandinavia, then in Italy, and lastly in the 'Big 3'.

- Storage problems advance fastest among the small new users in Italy and filter through the other major countries but have little effect in the small countries.

- Education towards self-maintenance occurs principally in the major countries and in Benelux. Italy and other small countries, such as Austria, Greece, and Spain will use it next, while Scandinavia lags in this respect.

- Software maintenance for small systems is almost entirely tied to the manufacturer's service, but in two years 70% of it will be in the hands of software producers themselves while another 20% will be done by specialist companies. The weak link in the software field is the distribution network; dealers and distributors are not the right people to assume this role. Specialist companies are expected to develop around the popular standard operating systems for micros.

  - Unix, CP/M, MP/M.

- On reflection, during the course of the interview the respondent wished to set the threshold for small units somewhat lower than originally stated - at $15,000.

5. SUMMARY

- This is an efficient and long-sighted maintenance organisation which targets problems as they become visible over the forward time horizon. Excellent to interview because the management is always bursting with ideas and solutions. The structure of organisation used is still the cost centre. As in the case of the others in this minority category, this aspect should come under scrutiny in the future.

D. CASE STUDY OF A NATIONAL 'SUPERMARKET' OR MULTISOURCE DISTRIBUTOR

1. BACKGROUND TO THE COMPANY

- The unit interviewed was the national company of a worldwide division operating in the business of supplying and maintaining office equipment and computer systems. This division is itself part of an international group with varied interests in different parts of the world. The division's turnover last year was approaching $120 million of which the national company interviewed, operating in one of the major European country markets, was responsible for almost 18%, some $20 million.

- This revenue covers all aspects of the company's activities in the country, but only 5% was gained from maintaining the equipment supplied, or about $1 million in 1981.

- The parentage of the company has always been in the hands of a group with a financial orientation. This has led to the use of a flexible approach to financing customer purchases. Leasing and rental arrangements have always been offered, and this has contributed in large measure to the growth of the company. Until last year, the company had gone through a period where 50% revenue growth per annum was the norm and even that was exceeded on occasions.

- In 1981, the recessionary climate coupled with a high nonpurchase element in the revenue led to a retrenchment, and the company is only now starting to work its way out of this and back to its previous style of growth.

- The range of products supplied has been structured progressively away from the smaller office equipment and towards configured computer systems. In the middle of the range the company is supplying word processors and a wide range of terminals.

- The greater part of the catalogue (over 90%) is equipment of U.S. manufacture with names such as Hewlett-Packard and Digital Equipment Corporation (DEC) featuring most prominently.

- The trend is towards supply of the larger systems.

2. EVOLUTION OF THE MAINTENANCE OPERATION

- The company has only offered a maintenance service for something like two years and this accounts for its low percentage of maintenance revenue (5% of turnover), having acquired a considerable installed base serviced by the hardware manufacturers or third-party maintenance companies before the decision was taken to add field service to its offerings.

- This decision was taken quite deliberately after market demand had made it plain that a total service was required. The alternative option, to take prime responsibility for maintenance and subcontract it out, was rejected because it would give the impression of being a cosmetic gesture.

- This decision has not been without its penalties. The company recently lost its main OEM distributorship at a time when the manufacturer adopted a policy of appointing fewer distributors and only appointing those who would look to them for service; in other words they expect their distributors to act like discount warehouses, and not like car dealers and garages. The age of the computer as a 'consumer durable' is being ushered in.

- One way to counter this policy is to purchase the equipment on the international market, and this is being done.

- This move on the part of the manufacturer will force the respondent company to become more of an integrator and even a partial manufacturer. The challenge has been accepted. Meanwhile maintenance remains an integral part of its business and there is added the driving force to get into third-party work.

- At its present stage the company operates a field force of about 40 engineers. This is servicing an installed base of equipment at least 80% of which is in the price range of less than $20,000.

- However, this percentage will fall over the next two years as the company moves up market. Since 50% of shipments in 1983 are expected to be of higher system cost than $20,000, the installed base of equipment will probably be split by the end of that year in the ratio of 2:1 in favour of the low-cost systems rather than the 5:1 of now.

- The spectrum of equipment being serviced is wide, ranging from typewriters, which are now being phased out by means of a high pricing policy, to the latest addition, a personal micro. Software, mainly system software, is maintained by a separate support group.

3. CURRENT STRATEGIES

- The principal thrust is to raise the proportion of company turnover attributable to service from its present lowly value of 5% towards a target of 20%. A major plank in such a programme is:

  - A move into third-party maintenance.

- From the springboard of the wide range of products already supplied, and therefore maintained, the company hopes to make a credible offering at once.

- The intention is to start third-party maintenance on nonsupplied sites of the personal computer which the company has started to sell in 1982.

- Coupled with the company policy to sell more of the larger minicomputer configurations (PDP 11/60 and equivalent upwards), there is a consequent need to build up the maintenance organisation, which has suffered from the uncertainties of the last 18 months.

- Steps have been taken during 1980 and 1981 and include:

  - Putting the accent on better recruitment.

  - Reviewing training procedures.

  - Analysing of engineers' work-sheets using a bureau service, a project which has proved its worth rather quickly.

- Some variations appeared in the ways in which the different types of equipment would be managed:

  - The business system and minicomputer area is where growth is expected and where a high professional standard of maintenance will be provided.

  - Maintenance prices on terminals are under pressure. The challenge is to preserve the standard of service, and this requires volume.

  - The personal computer field will be opened up fast by means of the rental option (rental rates being geared to a 15 months recovery on investment), so this area will bring its problems quickly to the fore.

  - Office equipment maintenance will fall away under the force of the pricing policy.

4. LOOKING TO THE FUTURE

- Two early enhancements to the service are planned:

  - To add a third tier to the levels of response offered; at present four- and eight-hour call-outs are on offer; two-hour call-out is being considered.

  - To test-market a third-party module repair service sometime in 1982.

- The motivation behind this latter is to increase the volume of units passing through the repair centre, following from which would come a natural specialisation in certain types of module. The respondent believes that the outlines of such specialisations are already discernible in the current in-house expertise, and it is natural to want to capitalise on it. The service could be marketed to:

  - End users.

  - Maintenance operations of equipment manufacturers.

  - Other TPM companies.

- Test marketing should resolve:

  - The general viability of the offering.

  - The relative revenue yields to be expected from the different classes of customer.

- In terms of immediate and urgent problem areas, three were listed:

  - Meeting response commitments in the London area.

  - Implementing computer-based support systems.

  - Finding and nurturing management skills in the field force.

- The respondent sees a continuing decrease in the real cost of maintenance to the user of something like 5%, and is of the opinion that the present challenge can be stated as:

  - 'Must the quality of service suffer as a consequence of this competitive situation?'

- The company is already faced with that dilemma. Arriving this year in addition is the challenge posed by the Japanese entry into the British market. This is going to increase the need for TPM but will most likely further depress prices.

- Responses are being made to these impacts by:

  - Using the price mechanism to increase volumes and to induce mini and SBS (small business system) users to remain with on-site call-out contracts.

  - Increasing the volume of 'return for repair' contracts for desktop, personal, and small micro systems.

  - Actively encouraging a higher percentage supply of Japanese manufactured equipment (the target is to have about 10% Japanese equipment in the shipments by the end of this year).

5. SUMMARY

- This company has in INPUT's opinion a difficult task in striking a position in which the service element is as mature as it will need to be to offer creditable maintenance over a wide and fast-changing product range. Historically a very lively company and 'quick on its feet' in market positioning in the current volatile environment, the product turnover being experienced puts a deal of strain on its ability to field a high-calibre, fully trained service force. The best plank in its present strategy is the plan to provide specialisation in depot repair work to a wide customer base.

E. CASE STUDY OF A THIRD-PARTY MAINTENANCE VENDOR

1. BACKGROUND TO THE COMPANY

- The company has sprung from a background of computer supply and maintenance, which goes back to the late 1960s. The move towards third-party maintenance has happened in the course of time and has been fuelled by needs associated with change of ownership, new types of equipment ranging from data entry through plug-compatible peripherals to small business systems having been included at one time or another in the parent company catalogue.

- This has led to the build-up of a solid base of service experience and in turn to the need to operate as a profit centre. At the present time maintenance contracts are split 50:50 between those on the installed base of the group's own supplied equipment and those for other supplier's installations (true TPM contracts). However, in the respondent's eyes all maintenance is negotiated on a true profit centre economy without any special favours being granted to their own company. Moreover, the percentage of work on external suppliers' equipment is increasing.

- Experience has taught the management that it is generally only from year three onwards of a contract that profits start to be earned. This, in their thinking, establishes the requirement to market effectively in order to build a profitable mix of contracts under their own selection and control.

- They believe that TPM is an immature sector of the industry. With substantial reserves of technical skill and experience there now needs to be put an equivalent pool of marketing and selling expertise. The company's objective is to be the first in the national market in which it operates to form this synthesis to good effect.

- A stage has been reached in which a firm business plan originated by the directors needs to be implemented by teams of salesmen and support engi-

neers. At the time of the INPUT interview recruiting was under way to find dedicated sales persons.

- Besides servicing installations the company has striven to provide a range of pre-installation services:

  - Pre-delivery check-out of configuration.

  - Technical assistance in the choice of peripherals.

  - System integration and commissioning.

- These services are thought to be complementary to mainstream maintenance since:

  - An objective is to ensure a five-year maintenance agreement (in order to reap the benefits of profits in all of years three to five of a contract).

- In a similar fashion, it is policy to give pre-sales support to the distributors, in situations where products are being sold via a distribution channel, down which the hardware expertise on the product may become diluted.

2. EVOLUTION OF THE MAINTENANCE OPERATION

- At the present time the majority of the business stems directly from end users but this is expected to decrease. Only 20% comes from other sources and this is split equally between manufacturers and distributors. Conversely, this 20% is on the increase.

- In the end-user market, the company selects its prime targets from the top 1,000 companies in its country.

- The range of equipment now serviced includes:

- Mainframe DEC equipment, but not IBM or any other well known companies from Burroughs, Univac, NCR, Control Data, Honeywell.

- Small business systems of DEC or own supply.

- Micros and personal computers in large numbers of sites for large customers; e.g., a bank.

- Peripherals for storage and input/output.

- Terminals.

- Word processors.

- Micros, peripherals, terminals, and word processors are mainly below INPUT's $20,000 threshold for low-cost equipment. This part of the installed base currently accounts for over 40% of the whole by numbers of sites, though the respondent was careful to point out that this was not the same as 40% of the customer base since large customers were sometimes equipped with hundreds of, say, personal computers.

- The equivalent percentage of the base by value is only 20%, but in the next two years this is expected to grow to 35%, while the growth in numbers of low-cost systems will rise in the same period to 60%.

- The respondent is unhappy with INPUT's threshold for a variety of reasons.

  - Initially, because it should be set lower, at around $10,000.

  - Second, because the increasing use of networks makes it harder to define a system in terms of processors.

- Finally, after reflection during the interview, because to a TPM vendor capital cost is an unreal measure and he preferred to set a threshold at systems which earn less than $1,000 maintenance revenue per annum.

- During the previous two years, the emphasis has settled very decidedly onto the importance of training. The improvements which have taken place in this area have resulted in the recruiting and maturing of a few key senior service personnel; so much so that it is now felt possible to recruit for further expansion on the basis of taking on trainees.

- Documentation is another aspect of technical assistance to the engineer which is very heavily accented, and exceptional stories were quoted in which documentation had been key to the quick diagnosis of problems or to the fast start-up of new contracts with their associated unknown quantities.

- In certain European countries in which the company does not operate, it does give training courses to other maintenance companies. This is an example of a specialist module of the total service facility being used, perhaps in preparation for being marketed as a separate service.

3. CURRENT STRATEGIES

- Partly through the confidence bred of experience and partly as a judgement on the necessities of its position, this vendor has decided to strike out for the number one position in its particular TPM market. The necessity bit is based on its view of the mathematics of the maintenance vendors' situation. It believes that it is inherently more difficult to get revenue growth in maintenance than it is in equipment supply or manufacture, because the first is a function of an installed base which is growing less slowly each year as its overall size increases.

- From this reason stems the objective to grow in real terms and the company has evolved the philosophy to market by selling a professional approach and to reject the appeal to the traditional argument employed by the TPM that he is

the cheaper alternative - an analogue of the plug-compatible argument. This company's approach is:

- Be professional.

- Set the industry's standards.

- Accept industry leadership status because 'there is a vacancy'.

- Exhibit VI-2 shows the rising curves upon which the respondent sees his company and the whole market currently riding. Its own faster growth is closing the gap and increasing its market share from 20% at the start of the decade to at least 35% at the end of 1984.

- The respondent is quick to emphasise the difference between tactics and strategy when it comes to discussing the ways in which the company tackles different market subsectors - for different grades of equipment.

  - 'It is necessary to be single-minded about the application of a strategic policy, for example, when dealing with one's relationships with manufacturers'.

  - 'Varying tactics can be employed for different equipment'.

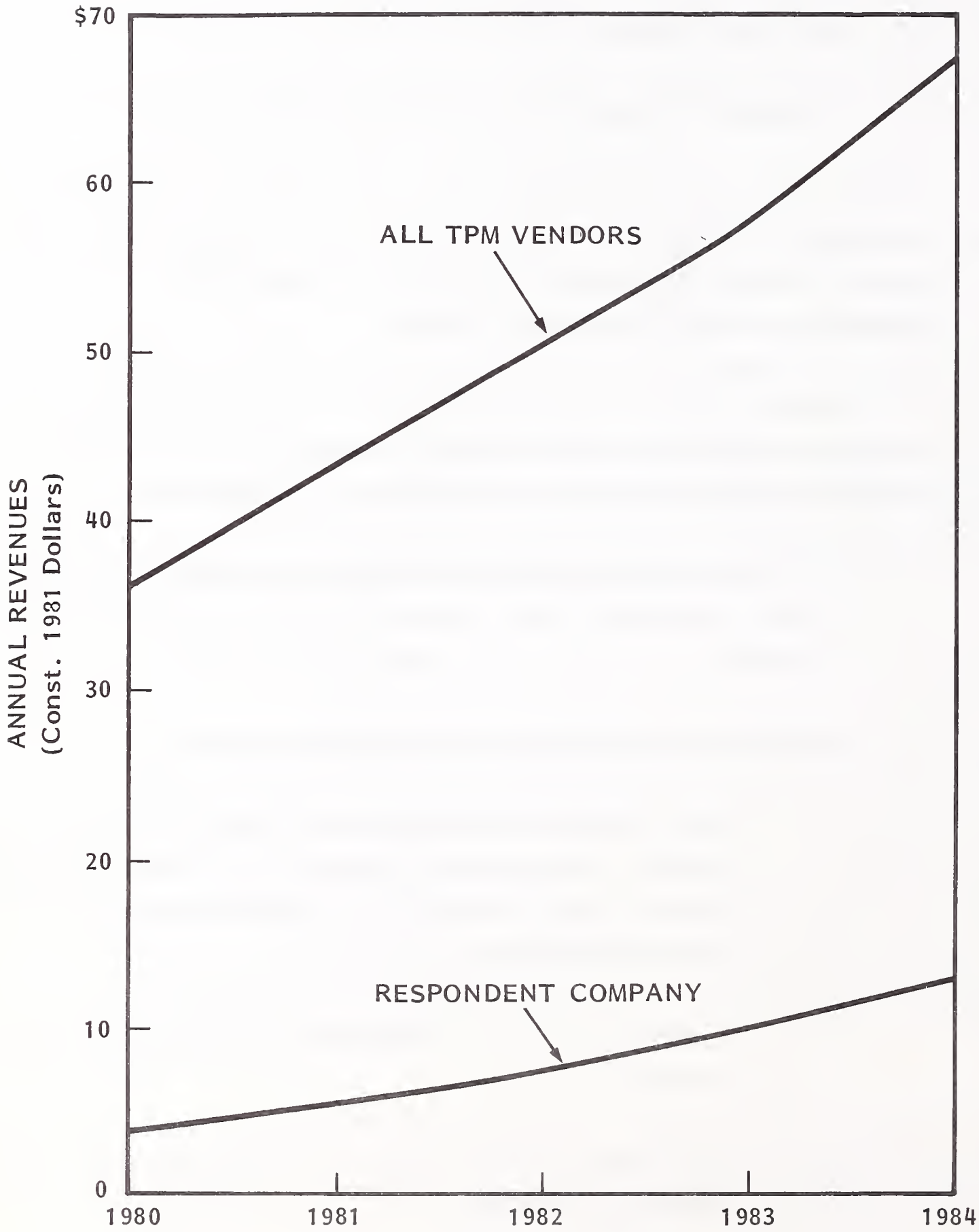
    . Board swapping is perhaps less used by them than in the industry generally. They were the only company interviewed who made the point that the board or part swapped need not be the true source of the problem.

    . In practice, they use a combination of board swapping and on-site repair.

    . The evidence is that 70% of faults reported can be settled without an on-site visit.

EXHIBIT VI-2

RESPONDENT'S VIEW OF ITS INCREASING MARKET SHARE
IN THE UNITED KINGDOM



- Since they find that 60% of their costs are contained in the response to a call rather than in its repair, there is not in this company a cast-iron policy of reducing visits at all costs. The important thing in their view is to be able to apply the right person, the one with the required knowledge, to an alleged problem in the shortest possible time. This is what requires the organisation and the infrastructure to support it.

- Furthermore, selling service is like selling insurance. It presupposes caring customers, and caring DP customers like to see their service engineer from time to time.

4. LOOKING TO THE FUTURE

- The main thrusts will remain in the marketing and sales area.

- Subsidiary effort will be put into:

  - Consideration of automating board repair facilities in the workshops.

  - Enhancing training facilities to make engineers even more aware of what is going on in the company around them.

  - Continuing with the policy of recruiting trainees.

  - Looking at the possibilities of having franchised self-employed groups of engineers as a cost-restraining exercise.

  - Breeding in-house the management skills needed to handle expansion.

- It is felt that in the short term the most pressing problems can be put under the general heading of business management and control.

  - Knowing how to select the kinds of new business which would allow the balance between revenue growth and profits growth to be maintained.

- Maintaining profitability during fast expansion, at a time when cost increases cannot be automatically passed on.

- Excluding software and operations from the calculation, the respondent was of the opinion that the fast decrease in hardware prices of the last two years (some 25% per annum decrease) would level off to around -10% towards the end of 1982. Conversely, the fast increase in maintenance costs (25% per annum was cited) would slow down to a rate of +5% in real terms over the next two years.

- Exhibit VI-3 illustrates the respondent's views on how prices for the main components of computing have altered over the previous decade, taking end-user total expenditures in 1971 as 100.

- In future, as a result of the falling unit cost of intelligence, users will look more critically (this is his view) at the worth of contracted maintenance. It will become more closely related to the criticality of the application. For example, maintenance on weekly payroll machines is more important than that on inventory control engines. Microcomputers will tend to implement single applications.

- A second impact will come if the lifetime of products is reduced below three years. At the moment, with service profits residing mainly in the last three years of a five-year contract, the premium for maintenance is often economic, but increasingly a change to a new generation of equipment brings an attendant decrease in hardware and service expenditures. Hence its justification, but will the pace of technological change outdate the need for maintenance, or rather make it uneconomic to provide, except by way of redundant units?

- The driving force for growth has already been mentioned as the spur which is guiding this company forward. However, this is not a unit-cost dependent feature. One change that is, is the trend to return units for repair. Though not offering such a service at the moment, the company expects to start later

EXHIBIT VI-3

RESPONDENT'S VIEW OF CHANGES IN EXPENDITURE PATTERNS

COMPONENTS OF DATA PROCESSING EXPENDITURE	1971	1981	AAGR (percent)
Personnel	30	103	13%
Hardware	52	100	6
Software	3	10	13
Maintenance	4	21	18
Other	11	26	9
Total	100	260	10%

NOTE: Units are percentage points of EDP user budget in 1971

this year, and anticipates that it will prove a profitable business if properly conducted.

- In the drive for growth, the company is not aware of a regular and consistent set of competition. This is interpreted as being due to the size of the overall maintenance market in which TPMs are as often competing with manufacturers and equipment suppliers as with their own kind.

- The company has been somewhat behind other maintenance operations in its move to offer Return for Repair contracts and this is explained by the 'blue chip' nature of its customer base. In spite of having smaller size configurations than head offices and divisions, the branches of large concerns like to receive the same level of service as the central units and this often is designed to include an on-site visiting contract. Hence in the major organisations there is an inertia keeping the fly-wheel of the visiting contract turning.

- The final comment on the future of service concerned the support given to software.

  - 'Software will become perfect as experience tends to grow. Therefore software won't need maintenance, and an "it's disposable" mentality will reign'.

5. SUMMARY

- This was undoubtedly the most stimulating of all the vendor interviews done for this report. One can quarrel with the bases for certain opinions.

  - It is possible to view the maintenance market as having more, not less, in-built growth than equipment, because of the inflation factor, new services, and the additions to the installed base.

  - Though some software companies have very high reputations, the sources of new software for low-cost systems are proliferating at an

accelerating pace and one must question the quality of many products from these new sources.

- However, here was a company intent to grasp the reins of its own destiny, by sensing a gap in the marketplace and riding through it to success in the form of a significant market share in an emerging sector of the overall information industry.

APPENDIX A: DEFINITIONS

APPENDIX A: DEFINITIONS

- CENTRE OF EXCELLENCE: the concentration at specific locations of the most highly trained and experienced support staff for a given product, hardware or software. Used for customer support and for vendor's own field staff.

- DISTRIBUTED DATA PROCESSING: the deployment of programmable intelligence to the site where the particular data processing function is performed. Computers and terminals are interconnected through a telecommunications network adapted to individual user needs.

- ENGINEERING CHANGE NOTICE: notice of improvements or corrections in a product after it has been released to production or has been installed at the user's site.

- ENGINEERING CHANGE ORDER (ECO): instructions including bill of material and parts required to effect the engineering change.

- FIELD CHANGE ORDER (FCO): see ECO.

- FIELD ENGINEER (FE): individual who responds to a user's call for service and repairs a device or system. FE is used interchangeably with customer engineer, serviceperson, maintenance person, etc.

- FIRST-LINE MANAGER (FLM): individual at the first or lowest level of management in the field organisation, usually at the branch level.

- MEAN TIME BETWEEN FAILURES (MTBF): the elapsed time between reported failures on a device or system.

- MEAN TIME TO REPAIR: the elapsed time between a field engineer's arrival at the user's site and the repaired device's return to full operation.

- MEAN TIME TO RESPOND: the elapsed time between a user's service call and a field engineer's arrival at the user's location.

- REMOTE ASSISTANCE: techniques such as remote preventive maintenance, remote diagnostics, remote error reporting, and remote technical assistance.

- REMOTE DIAGNOSTICS (RD): diagnostics run by the vendor from a remote location without the intervention of the user's operator; diagnostics run by an on-site field engineer tied to a central support center, or by a user tied to a central support center. It can usually isolate a fault to the lowest exchangeable units. Also termed telediagnostics.

- REMOTE SUPPORT: sometimes used by some vendors as a term to describe full system diagnosis (i.e., hardware and software) as opposed to remote diagnostics used for hardware only.

- REMOTE TECHNICAL ASSISTANCE: the provision of symptom matching, to in-field engineers through a telephone network. This is usually a dial-in service to a computerised database of known errors matched with the symptoms they produce.

- SYSTEM SUPPORT CENTER (SSC): a central technical support facility staffed by highly skilled field engineers and accessed over a national hotline number. A system support center is available to both users and field engineers for the analysis of problems in hardware, software, or a combination of the two.

- USER SELF-MAINTENANCE (USM): some involvement by individual users in the installation, diagnosis, and repair of their own installed equipment.

APPENDIX B: QUESTIONNAIRES

M A I N T A I N I N G L O W C O S T E Q U I P M E N T P R O F I T A B L Y

QUESTIONNAIRE

FOR

FIELD SERVICE MANAGERS

IN EUROPE

Your Name

Title

Company

Telephone No.

CATALOGUE NO. | | | | | | | |

PLEASE RING OR FILL IN APPLICABLE ANSWER BOXES

A. GENERAL Q0 WHAT IS THE MAIN LINE OF BUSINESS AT YOUR SITE ? _____

_____

Q1 WHICH EXECUTIVE IS RESPONSIBLE FOR PURCHASE OF SMALL COMPUTERS ?	Input use
- AT GROUP H.Q. _____	
- AT DIVISIONAL _____	
- OR PLANT LEVEL _____	

Q2 WHICH LEVEL IS THIS ?	GROUP	DIVISION	PLANT	OTHER (Specify please)

Q3 HOW DO YOU DEFINE SMALL COMPUTERS ?

BY PRICE	BY SIZE/POWER	BY FUNCTION	OTHER _____ (Specify please)

_____

Q4 IF BY PRICE, WHAT IS THE PRICE RANGE: FROM £ k TO £ k

Q5 DOES PRICE ABOVE INCLUDE:		
SOFTWARE	YES	NO
INSTALLATION	YES	NO
MAINTENANCE	YES	NO

Q6 IF BY FUNCTION, WHICH ONES: ——————

Q7 WHICH EXECUTIVE PURCHASES:

EQUIPMENT	MAINTENANCE			
		DESKTOP CALCULATORS	YES	NO
		PERSONAL COMPUTERS	YES	NO
		WORD PROCESSORS	YES	NO
		TERMINALS	YES	NO
		OTHER COMMS. DEVICES	YES	NO
		OTHER _____ (Specify) _____	YES	NO

Q8 WHO ELSE GETS INVOLVED IN THESE PURCHASES ?

INPUT DEFINES SMALL COMPUTERS AT < $20,000 SYSTEM PRICE

Q9 WOULD YOU SAY YOUR POLICY W.R.T. PURCHASE OF THESE WAS TO:

- Allow complete autonomy to operating divisions/ subsidiaries				Yes	No
- Allow autonomy under certain specified conditions				Yes	No
- Stipulate purchase through	CENTRAL	LOCAL	DP management	Yes	No
- Stipulate purchase through	CENTRAL	LOCAL	Admin. manager	Yes	No
- Other (specify) _____				Yes	No

Q10 WHICH DEPARTMENTS USE SMALL COMPUTERS AND HOW MANY:

Please indicate with the number installed in each department.

Department	No. installed	Value Installed ($ k)	No. on order
TOTAL			
FINANCE			
PERSONNEL			
CORPORATE PLANNING			
R&D/ENGINEERING			
OPERATIONS/MANUFACTURING			
MARKETING/SALES			
OTHER 1.			
(Specify) 2.			

Q11 WHO ARE YOUR MAIN SUPPLIERS OF SMALL COMPUTERS:
Please rank in order of general satisfaction, with the best first.

Supplier Name & Make/Model	Approx. No installed	Supplier of Maintenance
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		

Q12 HOW DO YOU FORECAST YOUR COMPANY'S USAGE OF SMALL COMPUTERS:
Approximate numbers are quite adequate.

TYPE	Next year (1983)			In 3 years (1985)		
	No Purchased	Av. Value $k	Cost of Maintce. $k	No. Purchased	Av. Value $k	Cost of Maintce. $k
DESKTOP CALCULATORS						
PERSONAL COMPUTERS						
WORD PROCESSORS						
TERMINALS						
OTHER COMMS.DEVICES						
OTHER (Specify)_____ _____						

Assume $20k applies throughout to all types.

MAINTENANCE

Q13 WHAT ARE THE MAINTENANCE POLICIES ADOPTED BY YOUR COMPANY:

1. _____	E.g. We Use: Manufacturers own
2. _____	Distributors/dealers
3. _____	Shops/Stores
	TPMs
	Other_____

Comments _____

Q14 PLEASE RATE YOUR EXPERIENCE WITH SMALL COMPUTERS ON A SCALE OF 0 TO 10
(0 = NO EXPERIENCE; 1 = POOR; 10 = SUPERB)

TYPE	Equipment Reliability	Maintenance Service	Software	General Support
DESKTOP CALCULATORS				
PERSONAL COMPUTERS				
WORD PROCESSORS				
TERMINALS				
OTHER COMMS.DEVICES				
OTHER _____ Specify_____				

Comment _____

Q15 IS YOUR LOW COST EQUIPMENT MAINTAINED BY ONE OF THE FOLLOWING CONTRACTS:

TYPE	No. of Shifts	MONTHLY FEE($k or % of purch.price)	TIME AND MATERIALS (Av.Spend/mth $k)	RETURN FOR REPAIR	OTHER (Specify) e.g. NONE...
DESKTOP CALCULATORS					
PERSONAL COMPUTERS					
WORD PROCESSORS					
TERMINALS					
OTHER COMMS.DEVICES					
OTHER _____					

Comments _____

Q16 IS YOUR LOW COST EQUIPMENT'S SOFTWARE MAINTAINED SEPARATELY BY ONE OF THE SAME CONTRACT TYPES:

TYPE	MONTHLY FEE($k or % of purch.price)	TIME AND MATERIALS (Av.Spend/mth $k)	RETURN FOR REPAIR	OTHER (Specify) .....
DESKTOP CALCULATORS				
PERSONAL COMPUTERS				
WORD PROCESSORS				
TERMINALS				
OTHER COMMS.DEVICES				
OTHER _____				

Comments _____

Q17 WHAT LEVELS OF RESPONSE ARE YOU CURRENTLY GETTING ON LOW-COST EQUIPMENT:

TYPE	Mean Time To Respond (hrs)	Mean Time To Repair (hrs)	MTBF (hrs)	Uptime %
DESKTOP CALCULATORS				
PERSONAL COMPUTERS				
WORD PROCESSORS				
TERMINALS				
OTHER COMMS.DEVICES				
OTHER _____				

Comments _____

_____

_____

Q18 AND WHAT ARE THE MINIMUM LEVELS ACCEPTABLE TO YOU:

TYPE	Mean Time To Respond (hrs)	Mean Time To Repair (hrs)	MTBF (hrs)	Uptime %
DESKTOP CALCULATORS				
PERSONAL COMPUTERS				
WORD PROCESSORS				
TERMINALS				
OTHER COMMS.DEVICES				
OTHER _____				

Comments _____

_____

_____

Q19 WHAT TRENDS DO YOU SEE IN YOUR USE OF LOW-COST EQUIPMENT W.R.T.

1. Its purchase _____

2. Its maintenance _____

3. Its reliability _____

4. The criticality of your applications _____

5. User self-maintenance _____

6. Regular maintenance price increases _____

7. Use of Local Area Networks _____

8. Software Maintenance _____

9. Use of redundant (Non-stop) systems _____

10. Relationship to your F.S. Supplier(s) _____

M A I N T A I N I N G L O W C O S T E Q U I P M E N T P R O F I T A B L Y

QUESTIONNAIRE

FOR

USERS AND USER MANAGEMENT

IN EUROPE

Your Name

Title

Company

Telephone No.

CATALOGUE NO. | | | | | | | |

PLEASE RING OR FILL IN APPLICABLE ANSWER BOXES

A. GENERAL Q0 What is your company's main line of business _____

_____

_____

Q1 ARE YOU ALREADY SELLING OR MAINTAINING LOW-COST D.P. EQUIPMENT I.E. WITH UNIT INSTALLATION SYSTEM COSTS BELOW $20,000 (APPROX. £10,000; 100,000FF OR SKr; 40,000SFr OR DM OR Fl; BFr 6M; L 20M):

NOW [YES/NO] OR WILL BE IN NEXT 2 YRS. [YES/NO] ?

IF YES TO EITHER PART, ANSWER Q2-4, OTHERWISE SKIP TO Q5.

1981	82	83

Q2 WHAT % AGE OF YOUR SHIPMENT BY QUANTITY ARE/WILL BE IN THIS RANGE ?

Q3 WHAT % AGE OF YOUR INSTALLED BASE BY VALUE WILL BE IN THIS RANGE ?

Q4 WHAT % AGE OF YOUR INSTALLED BASE BY NO. OF INSTALLATIONS WILL BE IN THIS RANGE ?

Q5 DO YOU THINK THAT $20,000 IS THE CORRECT SYSTEM PRICE LEVEL AT WHICH TO START TALKING ABOUT THE PROBLEMS OF MAINTAINING LOW-COST EQUIPMENT ?

[YES/NO]

IF NO TO 5, WHAT THRESHOLD WOULD YOU PREFER:

Q6 <$ [5,000] : <$ [10,000] ; <$ [30,000] ; OTHER (PLEASE SPECIFY): <$ [ ] k

---

IF YOU ANSWERED NO TO BOTH PARTS OF Q1 YOU ARE OBVIOUSLY NOT CURRENTLY/SOON IN THE LOW-COST EQUIPMENT FIELD. THANK YOU FOR YOUR INTERVIEW.

OTHERWISE; PLEASE CONTINUE: (From now on low-cost ≡ <$ 20k)

Q7 DO YOU | SELL / MAINTAIN / DO BOTH | THIS LOW-COST (< $20k) EQUIPMENT ?

Q8 IF YOU MAINTAIN IT; WHAT OTHER TYPES OF COMPANY ALSO DO SO ,

NONE	OTHER DIVISIONS OF YOUR GROUP	DISTRIBUTORS DEALERS/OEMs	TPMs	OTHER (SPECIFY)_____

Q9 IF YOU ONLY MAINTAIN IT, WHO SELLS IT ?

	OTHER DIVISIONS OF YOUR GROUP	DISTRIBUTORS DEALERS/OEMs	SHOPS/ STORES	OTHER (SPECIFY)_____

Q10 IF YOU ONLY SELL IT, WHO MAINTAINS IT ?

	OTHER DIVISIONS OF YOUR GROUP	DISTRIBUTORS DEALERS/OEMs	TPMs	OTHER (SPECIFY)_____

B. EVOLUTION OF YOUR OPERATIONS

Q11 DO YOU CURRENTLY MAINTAIN, OR SOON EXPECT TO, THE FOLLOWING TYPES OF SYSTEM OR PRODUCT; IN EACH OF THE EUROPEAN SUBMARKETS. Indicate by giving the year in which you first started to, or expect to start; or by a dash if you have no plans for an area.

GRADE	FGR	FRANCE	U.K.	ITALY	BENELUX	SCANDINAVIA	OTHER
Large/Mid Mainframe							
Small Bus. Systems							
Other Minis Process Ctl.etc.							
Micros & Persl.Computers							
Peripherals (sold separately)							
Terminals							
Other Data Comms.Equpt.							
Word Processors							
Other Office Equipment							
System S/W							
Applicn. S/W							
Other							

Q12 In Table above, RING those areas which are installed as low-cost systems.

Q13 IN THOSE COUNTRIES WHICH YOU DON'T COVER NOW DO YOU USE ANY OF THE FOLLOWING:

NONE	OTHER DIVISIONS OF YOUR GROUP	DISTRIBUTORS DEALERS/OEMs	TPMs	OTHER (SPECIFY)_____

Q14 HOW HAS YOUR FIELD FORCE IMPROVED IN THE LAST 2 YEARS ?
(please elaborate)

Prompts
Staff Calibre
Training
Tools
Management information
Morale
Organisation changes
Management, Style/ Purposefullness
Other

Q15 WHAT ARE YOU MAIN STRATEGIES NOW
(please elaborate)

Q16 HOW DO THESE STRATEGIES DIFFER/VARY WITH THE DIFFERENT GRADES/SIZES OF EQUIPMENT ?

MAINFRAME: _____

SBS & MINIS: _____

TERMINALS: _____

DOS & PERSONAL COMPUTERS: _____

DATA COMMS: _____

W.P. & OFFICE EQUIPMENT: _____

SOFTWARE: _____

Q17 WHAT IMPROVEMENTS/DEVELOPMENTS ARE YOU PLANNING FOR THE NEXT 2 YEARS ?

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

5. _____

_____

6. _____

_____

7. _____

_____

8. _____

_____

9. _____

_____

10. _____

_____

FOR INPUT USE ONLY

Product Design
Recruitment
Training
Salary Levels
Career Structure
Attrition
Tools
Cost of Inventory
Spares availability
Despatch methods
Repair times
PM/ECA
Cust.liaison
Depot repairs
Self-maintenance
Escalation procedures
Reorganisation
Resiting centres
MIS
New areas/services
Other: _____

2 _____

3 _____

4 _____

Q18 WHAT ARE YOUR THREE MOST PRESSING PROBLEMS AT THE MOMENT ?

1. _____

_____

2. _____

_____

3. _____

_____

Q19 WHAT DO YOU BELIEVE IS THE INCREASE IN THE REAL COST OF COMPUTING TO THE USER ?

OVER LAST 2 YEARS (80/81)	AAGR
	%

OVER NEXT 2 YEARS (82/83)	AAGR
	%

Elaborate _____

_____

Q20 WHAT % AGE IS/WILL BE DUE TO MAINTENANCE ?

80/81	%

82/83	%

Q21 WHAT DO YOU SEE AS THE MAJOR IMPACTS OF LOWER UNIT EQUIPMENT COSTS ON FIELD SERVICE:

Prompts.

Fall in Unit cost is apparent not real

User expectations rise/fall

Real cost of ownership troubles /does not trouble user

Vendors can't afford standard cover on small units

Users can't afford standard cover on small units

TPMs become the norm

Users purchase redundant units

Driving force to non-stop systems

_____

_____

_____

_____

_____

_____

_____

_____

_____

Q22 ARE YOU GOING TO HIT ANY OF THESE PROBLEMS ?

	Already have	This yr. 82	Next year 83-
1.			
2.			
3.			
4.			

Q23 WHAT ARE YOU DOING/GOING TO DO ABOUT THEM ?

1. _____

2. _____

3. _____

4. _____

Q24 CAN YOU DETECT ANY VARIATION IN THEIR IMPACT ACROSS EUROPE AND VIS-A-VIS THE US ?
Please rate impact High, Mean, Low (H,M,L)

	FGR	FR.	UK.	ITALY	BENEL.	SCAND.	OTHER	USA
1.								
2.								
3.								
4.								

Q25 HOW DO YOU SEE THE FUTURE OF S/W MAINTENANCE FOR LOW-COST EQUIPMENT ?

YEAR	% DONE BY				NOT DONE
	Software producers i.e.manuf., S/W houses, authors etc.	Distribution channels - dealers OEMs	TPM/ specialist coys.	Other (specify in boxes below)	i.e. DIY or Replace @ cost
1982					
1984 (much change)?					

Comments _____

_____

Q26 HAVING GONE THROUGH THE QUESTIONNAIRE, PLEASE RECONSIDER YOUR THRESHOLD FOR DEFINITION OF LOW-COST EQUIPMENT.

$ [5k] $ [10k] $ [20k] $ [30k] $ [.....k]

THANK YOU COMPLETING THE INTERVIEW PLEASE RETURN THE QUESTIONNAIRE TO:

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