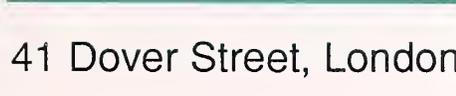




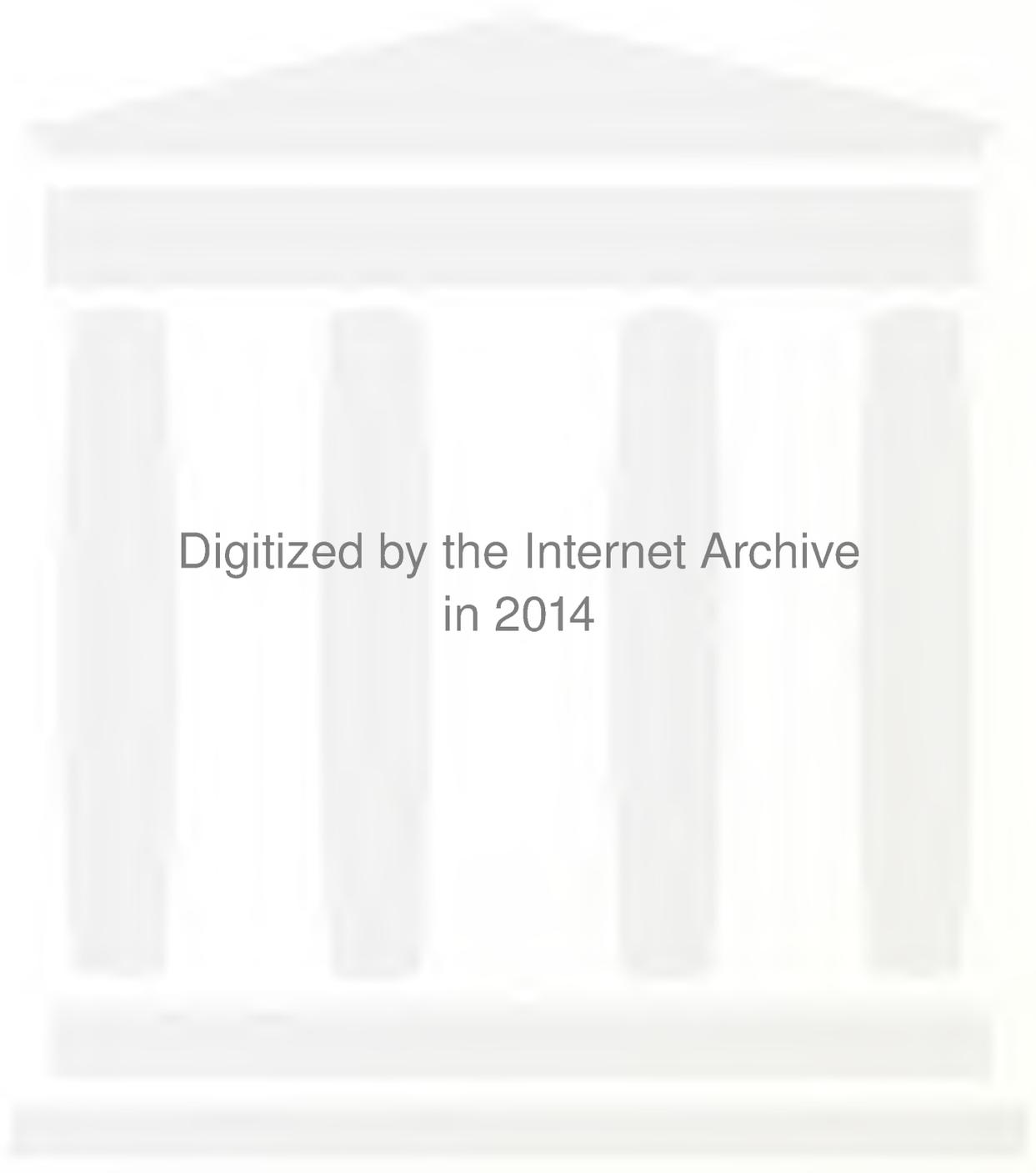
Customer
Service
Programme-
Europe
(CSP-E)



The Role of the Engineer Outside of Maintenance

INPUT[®]

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The Role of the Engineer Outside of Maintenance

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THE ROLE OF THE ENGINEER OUTSIDE OF MAINTENANCE

ABSTRACT

This report looks at the developing role of the engineer outside of maintenance, how the traditional nature of that function is changing, and how vendors are responding.

Information provided by major vendors shows that as hardware maintenance revenues level out, other uses have to be made of service personnel. If, as a result, extra revenue can be generated, then this is an extra bonus.

The changing attitudes to personnel among vendors and a new approach to the types of service staff now being employed are examined.

This report contains 42 pages, including 8 exhibits.

THE ROLE OF THE ENGINEER OUTSIDE OF MAINTENANCE

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I INTRODUCTION

A. OBJECTIVES

- The potential erosion of hardware maintenance revenues is one of the most significant challenges facing customer service management.
- In response to that challenge, management must carefully consider users' likely future service requirements within the context of a consideration of new approaches to the customer service business.
- This report is one of three related and complementary reports that address this issue.
- This report, The role of the Engineer Outside of Maintenance, examines the changing role of the service engineer as user needs and market forces change, the views of customer management, and the new demands on customer service personnel.
- The other two related and complementary reports are:
 - Future Service Market Requirements, which examines vendor attitudes in respect of changing market directions, an assessment of user needs, and the tactical responses of vendors to these new opportunities.

- Strategic Market Directions in Customer Service, which studies the market forces which are creating a changing market environment for customer services, describes a model scenario of revenue growth development, and describes strategic level options for customer service management.

B. METHODOLOGY

- This report, produced as part of INPUT's 1986 Customer Services Programme in Europe, is based upon INPUT's continuing research studies.
- During 1986 this research activity has included over 800 user interviews conducted by telephone and over 60 vendor interviews performed throughout the year with leading hardware manufacturers and third-party maintenance organisations.
- For this particular report 11 vendors were interviewed, 9 on a face-to-face basis and 2 by telephone. Each interview lasted approximately one hour, and vendors were asked to comment on a variety of issues relating to the report.
- INPUT would like to express its thanks to all those companies and individuals who participated in the research undertaken for this report.
- Enquiries and comments regarding this report and any related topics of interest are welcomed by INPUT.

C. REPORT STRUCTURE

- The remaining chapters of this report are organised as follows:

- Chapter II is an executive overview providing a summary of the contents of the entire report.
- Chapter III describes the vendor perspectives of future trends in customer service and service personnel.
- Chapter IV examines new demands on service operations, including the new skills that are being demanded of the engineer and how vendors are responding to change.
- Chapter V analyses employment patterns and the need for new types of personnel.
- Chapter VI provides conclusions and recommendations.

II EXECUTIVE OVERVIEW

- This Executive Overview is designed in a presentation format in order to:
 - Help the busy reader quickly review key research findings.
 - Provide a ready-to-go executive presentation, complete with a script, to facilitate group communication.
- The key points of the entire report are summarised in Exhibits II-1 through II-3. On the left-hand page facing each exhibit is a script explaining its contents.

A. VENDOR PERSPECTIVES

- Market forces acting on customer service organisations are producing trends that cannot be ignored by management.
- Foremost among these is the impact of new technology. Engineers are spending less and less time on hardware fixes as machines become more reliable. The ability to charge percentage maintenance prices is declining as users become more aware of value-for-money in service.
- As a result, the maintenance aspect of a service department can be fairly strictly delineated. A 'critical mass' of service personnel can be maintained to provide the required level of service and other staff can be released for other activities.
- The future points to the fact that more deskilled personnel will be needed in the field for component/board swapping while the skilled field engineer will work out of remote diagnostic or support centres.
- The user is becoming increasingly aware that the engineer is sometimes the only contact he has with the vendor. Management should take advantage of this situation and make sure that the engineer is indeed a true representative of the company.
- This puts pressure on the traditional role of the engineer and on the individual himself. As the emphasis shifts from product support to customer care, increasingly the engineer must adapt.
- Equally, the vendor must be sure that if the current field force cannot successfully adapt, then new types of individuals must be sought, trained, and encouraged in the new skills being demanded.

VENDOR PERSPECTIVES

- **Future Trends**
 - **Personnel**
-

B. NEW DEMANDS ON SERVICE OPERATIONS

- It is established among vendors that the engineer is a suitable vehicle for the promotion of a wide variety of other non-maintenance services. These can all be substantial revenue earners in their own right as well as leading to further sources of revenue.
- In this respect vendors must be wary of user attitudes, as INPUT research shows that first and foremost the user wants the engineer to maintain his equipment as efficiently as possible.
- In order to take advantage of the unique position in which the engineer finds himself, new skills have to be taught. Management must be prepared to invest in time, money, and resources so as to profit from changing market forces.
- The teaching of interpersonal skills was seen by most vendors to be the single most important new concept for the engineer.
- If the current field force does not inherently have these new skills, then they have to learn them. Training programs are being implemented by most vendors to a lesser or greater degree; the most popular type of course was one that involved some aspects of sales and marketing.
- All vendors realised that if they were to profit from utilising the engineer for other activities, then some element of change was necessary in the service department itself.
- These changes could include a drive towards centralisation of all service activities, standardisation of field activities, more efficient use of highly skilled staff, and the increasing use of deskilled staff in the field.

NEW DEMANDS ON SERVICE OPERATIONS

- **Revenue**
 - **Skills**
 - **Training**
 - **Reorganisation**
-

C. EMPLOYMENT PATTERNS

- Vendors recognise that a different kind of service engineer is increasingly becoming necessary. Elementary technical skills can easily be taught while company attitudes and sales skills, though initially difficult to assimilate, can also be acquired.
- In addition, vendors pointed out that spares now accounted for the majority of costs of maintenance compared to labour. This has been in the main due to the increasing trend towards modularisation and board swapping; no longer are fixes carried out at the chip level.
- Vendors were divided on where this new type of individual should come from, what kind of qualifications they should have, and what experience, if any, was necessary.
- All agreed though that a certain type was needed--one who could learn quickly, adapt to new ideas, learn technical skills, and above all be presentable and articulate.
- The day of the hardware specialist in the field is almost over. The customer representative of the future will probably be a young person, well spoken, in company uniform, able to perform elementary diagnostics, swap out components diagnosed remotely as being suspect and advise the user on the company's latest products.
- Certainly it will be cheaper to employ such an individual, and in the long term the vendor that follows such a strategy will be able to take the fullest advantage of changing market forces.

EMPLOYMENT PATTERNS

- Personnel
 - Recruitment
 - Profiles
-

III VENDOR PERSPECTIVES

- This chapter analyses the views of a sample of vendors who were questioned about:
 - The market forces which they considered to be having the most impact on the future role of the engineer.
 - The changing composition within the workforce for customer services.

A. FUTURE TRENDS IN CUSTOMER SERVICE

- Vendors were asked to speculate on the likely trends affecting the future role of the engineer. Seven major factors were identified as a result of this survey and these are listed in Exhibit III-1.
- The most frequently mentioned of these factors was the impact of new technology.
- The increasing use of remote diagnostics, preventive diagnostics, and no-fault or non-stop systems has meant that the engineer is actually spending less time on a fix than ever before.

EXHIBIT III-1

FACTORS INFLUENCING THE FUTURE ROLE OF
THE ENGINEER

INFLUENCING FACTOR	NUMBER OF MENTIONS
1. Technology Trends	11
2. Engineer as Customer Interface	9
3. Use of Deskkilled Personnel	8
4. More Software Cross-Training	5
5. Spares Intensive Rather than Labour Intensive CPS	3
6. Awareness of the User	3
7. Engineer can Generate Extra Revenue	3

Number of Responses 11 (Multiple Answers)

- Indeed, one vendor commented that while five years ago the engineer typically spent 70% of his time on fixes, in five years time this will have dropped to about 10%.
- The second most frequently mentioned factor was that of the service engineer becoming increasingly important as the customer interface.
- More and more the engineer is becoming the sole interface between the user and the vendor and this trend must be fully exploited by service organisations. This relates not only to management but also to the engineer himself, for only by being made aware of his importance as (sometimes) the only link between vendor and user can his true usefulness be exploited.
- The increasing reliability and decreasing cost of new machinery has partly been brought about through economies of scale and modularisation. Vendors feel that in the future there will be less need for a highly skilled field force. This factor was also highly rated by the vendors interviewed on this subject.
- Many vendors envisage these changes, and some have already begun to implement them. These vendors predict a situation in which highly qualified technicians work out of remote support centres and are supported by a deskilled field force capable of elementary board swapping and running simple remote diagnostic routines.
- Another frequently mentioned issue is that of cross-training engineers for software support.
- Most vendors recognise that the engineer's skills are predominately hardware based; however, there is a definite trend towards cross-training for engineers especially in operating system procedures.
- This is all part of an overall strategy reported among all vendors to develop the engineer beyond hardware maintenance.

- Traditionally, the major cost for any customer service organisation has been labour. Now, however, with an increasing emphasis on deskilled staff, there has been a switch to parts intensive costings. This factor also affects the role of the engineer.
- The trend to minimal downtime has led companies to recognise the need to either have a sufficiently large parts inventory or, conversely, a smaller but highly computerised and controlled stock.
- Vendors are aware more than ever before of how the user can drive service. Previously, maintenance was regarded as a necessity that came with the machine and the service department was considered as a cost centre.
- Now the trend is very firmly towards customer care and satisfaction and the notion of service as a revenue-creating opportunity.

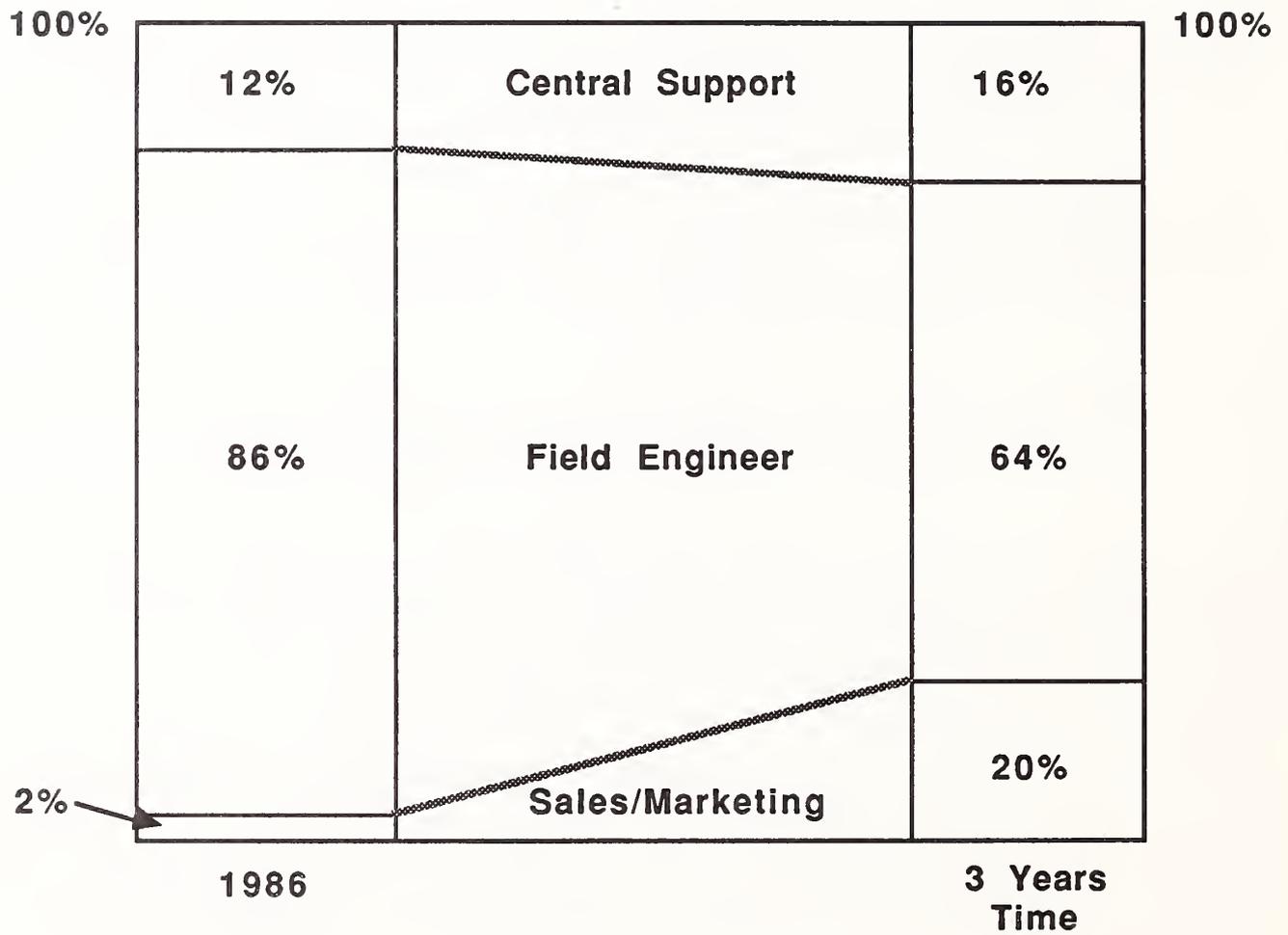
B. THE CHANGING NATURE OF PERSONNEL

- Vendors were questioned about the mobility of their service staff since INPUT believes that there is a change occurring within service organisations relating to the type of staff that are being employed and will continue to be employed in the future.
- The majority of vendors interviewed stated that in the past there had been a steady increase in the overall number of service personnel. Most of these then went on to state that they estimated that this growth would continue, though not necessarily at the same rate, over the next five years.
- A number of vendors had experienced a decline in number over the same period--half of them thought that the decline would continue, the other half of this group thought that the level would remain static.

- All vendors commented on their increasing user base as the reason for either increasing or decreasing their maintenance staff.
- Those who increased their staff pointed out that a larger user base meant more maintenance and, therefore, more staff. Those who decreased staff felt that efficiency and increased productivity had allowed them to maintain more equipment with less staff.
- There are a variety of pressures bearing upon both the numbers of service staff and the skills required. The major objective of vendors is to reorientate the field engineer function from product support to customer support.
- With hardware becoming more reliable and the economies of on-site engineering support changing, the main justification for client visits is becoming one of marketing.
- Whatever the degree of selling and marketing involved, it does entail a change of skill and personality from the traditional field engineer profile.
- Among the major system vendors, the other common objective has been to increase productivity by field staff. This has been largely helped by the centralisation of support resources.
- At field level, engineers are discovering less and less need for their high level fault diagnostic skills and more for simple component exchange. They are becoming more aware that their knowledge is not necessary any more at this level and that their functions are being passed onto less skilled personnel.
- From vendors' responses it can be estimated that the changing mix of skills required will result in considerably fewer field engineers being employed as a percentage of the total field force. This is shown schematically in Exhibit III-2.

EXHIBIT III-2

CHANGING PATTERN OF FUNCTIONAL EMPLOYMENT



- The personnel challenge for vendors is to manage this change and to control these changes in employment structure whilst motivating the individual customer service engineer or support person.

IV NEW DEMANDS ON SERVICE OPERATIONS

A. NEW REVENUE GENERATING ACTIVITIES

- In order to gain insight into the engineer's involvement, or potential involvement, in additional revenue generating activities, vendors were questioned about a number of areas such as professional services and sale of supplies.
- The resulting profile of employment in non-maintenance activity is shown in Exhibit IV-1.
- These new activity areas were divided into technically-based and selling- and marketing-based operations. As a general rule, most vendors were actively involving their engineers in some form of activity outside of maintenance.
- For education and training of the user's personnel, 6 of the 11 vendors interviewed involved the engineer at some point. One vendor envisaged that he would do so at some time in the next two years while the remaining four said they would not do so.
- As for professional services (such as consultancy, site planning, etc.), the vendors were fairly evenly split--six in the affirmative, five in the negative. This is probably because services management feel that such skills are more remote from the engineer's experiences.

EXHIBIT IV-1

**NUMBER OF VENDORS EMPLOYING SERVICE PERSONNEL IN
NON-MAINTENANCE ACTIVITIES - EITHER CURRENTLY OR AS
ANTICIPATED IN THE FUTURE**

TYPE OF ACTIVITY	CURRENTLY		IN 2 YEARS	IN 5 YEARS
	YES	NO		
Education & Training	6	4	1	-
Professional Services	6	5	-	-
Software Support	8	-	2	1
Other Technical Skills	3	-	-	-
Sale of Supplies	6	2	3	-
Sale of Hardware Service Agreements	6	4	1	-
Sale of Software Service Agreements	6	3	-	2
Hardware Upgrades/New Machines	7	2	2	-

Number of Responses 11

- However, three of those who replied negatively to this question did admit that the engineer was consulted sometimes by those responsible for professional services.
- Nearly three-quarters of those interviewed said that engineers were actively involved in software support. The remainder said that they would do so within two or five years.
- These vendors reported that the engineer was encouraged to be involved in other activities such as:
 - Account development.
 - Media selling and telemarketing.
 - Writing of technical documentation.
 - Cable making and laying in installations.
- As far as sales and marketing is concerned, all vendors to a greater or lesser extent involve, or plan to involve, their engineers in some aspect of this activity, although the largest negative response came from the question regarding engineers being concerned with selling or marketing of hardware service agreements.
- Perhaps vendors feel that the engineer should not be seen by the user to be too closely attached to the selling of a service for which the engineer is responsible.
- Some vendors have allowed their engineers for many years to sell supplies and consumables. These vendors anticipated that within two years their engineers will be employed in this function, the remainder had no plans for this development.

- Although a number of the vendors interviewed responded negatively to the idea of having engineers involved in the selling of hardware maintenance agreements, six vendors did have engineers involved in this activity and one other vendor was planning to do so within two years.
- For software maintenance agreements, although three vendors reported that they had no intention of getting the field engineers involved, six vendors encouraged staff to market this service whilst another two were planning to do so within the next five years.
- Seven vendors are currently using their engineers to sell new machines or hardware upgrades and two will do so within two years. This initiative has taken place despite criticisms that it would cause conflict with their sales department.

B. NEW SKILL REQUIREMENTS

- All vendors recognise that the engineer will need to develop new skills if customer service is to stay ahead of the competition. Nearly all the vendors reported that they had either begun training courses for their engineers or were in the process of doing so in order to effect these changes.
- The skills being taught include:
 - Cross-training in software maintenance.
 - Cross-training in hardware maintenance to encourage engineers away from the notion that fixes should be at the chip level.
 - Courses that emphasised preventive and remedial maintenance.

- Problem determination and resolution.
 - Customer care.
 - Account development.
- Of those vendors who operate courses in the last two categories, all maintained that they were the most important to the company. Indeed all vendors agreed that some kind of 'customer care program' was either in operation or well down the line for implementation.
 - Vendors were equally divided as to whether the training should be compulsory or not. Some felt that they should encourage the engineer to see the acquisition of new skills as career progression. Others thought that the learning process should be left to the engineer's personal choice.
 - It was generally recognised by vendors that the older engineers feel that they have nothing to learn about customer care and that they are too old to learn about new technology. However, if financial rewards or gifts in kind are made available, then the take-up for new courses increases considerably from this group.
 - Three vendors reported that they had an excellent response to this kind of training regardless of whether or not the engineers would be rewarded.
 - Customer care skills were perhaps the most difficult to assimilate for the engineer as they depended on a variety of sometimes conflicting abilities and functions.
 - For example, most engineers are encouraged to leave the site within a fixed period if a repair cannot be effected. However, they are also encouraged to maintain contact with the user, attempt to discover his non-maintenance

needs and problems, provide sales literature if necessary on hardware and software products, and generally make sure that he is seen by the user as the person to contact from the supplier.

C. TRAINING PROGRAMS AND RESPONSES

I. TYPES OF COURSES

- Vendors were questioned about the kinds of training programs that they were running and were asked to provide details on:
 - Whether courses were held in-house or not.
 - The frequency and duration of courses.
 - Whether vendors plan to remunerate engineers for revenue generated through extra skills acquired.
 - The response of engineers to these courses.
- As shown in Exhibit IV-2, six vendors were running some kind of course that emphasised customer care. These courses ranged from two-week in-house intensive programs to the relatively casual screening of promotional videos at support centres for any engineer who happened to be there at the time.
- On the whole though, the majority of courses were structured using recognised techniques, were followed up at regular intervals, and placed the obligation on management at the local level to support the program in its entirety.
- One vendor implemented a program which involved middle management taking the course first and then becoming the teachers for the next intake. Some variation on this theme was practised by most organisations.

EXHIBIT IV-2

TYPES OF TRAINING PROGRAMS RUN BY VENDORS

TRAINING PROGRAM	NUMBER OF MENTIONS
Customer Relations	6
Sales and Marketing Techniques	4
Account Development	3
Hardware Skills	3
Software Skills	3
Other	3
Interpersonnel Skill	2

Number of Responses: 10 (Multiple Answers)

- Four of the vendors exposed their engineers to sales and marketing courses. The majority of these were run by external companies well known for the thorough implementation of their training programs. Skills covered everything from 'treating every user meeting as a sales opportunity' to watching for 'buying' signals and how 'not to sell' to the customer.
- Many engineers were being encouraged to work on account development. This meant being aware of developments on the sites where they undertook maintenance as well as attempting to understand the problems inherent in running a business. Three vendors had courses for their engineers along these lines.
- Three vendors also maintained on-going training in hardware skills especially in making the older engineer understand and come to terms with new technology. This cross-training was seen to be very important if the vendor was to retain credibility in the face of competition from third-party maintenance companies.
- Software training (especially in operating systems) was viewed as an important additional skill for the hardware engineer. However, most vendors commented on the difficulties that hardware personnel faced in software cross-training.
- Nearly all vendors reported that it is easier to cross-train a software specialist in hardware than vice versa. There were several explanations as to why this should be so, but the most common related to the belief that software skills were more theoretical than practical. This resulted in differences in the types of staff employed for these different functions.
- Some other training courses undertaken include:
 - Problem determination and resolution.

- Management.
- Consultancy.
- Most of these programs were of a one-off nature and usually specifically designed to meet the needs of particular individuals within an organisation who, it was considered, would benefit from such training.
- Two vendors separated the teaching of interpersonal skills from other training programs particularly those concerned with customer care and account development. These vendors felt that it was important that their engineers should be aware of how to relate to the user as a person, to try and understand his problems, and what drives him as an individual.
- Only one vendor admitted that they did not teach the engineers any specific courses and this was mainly because they had a relatively small newly formed workforce who spent the majority of their time on maintenance. Nevertheless, this company did have plans to introduce programs in the near future especially those relating to customer care and sales and marketing.
- Depending on the type of program, the majority of training courses were carried out in-house by the vendor. Typically, special training departments had been set up for this purpose, usually staffed by ex-engineers to whom the students could more easily relate.
- In two instances the vendor had separate training establishments apart from the main company functions that trained all company employees, be they management, engineers, or other staff. In this case the engineers may find themselves being taught by a variety of teachers, some of whom may have been brought in especially for a particular course.

2. SUITABILITY, ASSESSMENT, AND PRACTICALITIES

- Five vendors had structured programs that were run over a period of time. Progress at one level would determine when a student could move on to the next level. When the engineer returned from a course, he was assessed after a period of time by his manager.
- A typical example is a five-stage training course in software skills for engineers. The first two stages--learning about basic software principles and the company's general philosophy and approach--were compulsory for all engineers.
- The other three stages were selective. These included:
 - Technical fault finding.
 - Engineers as support personnel.
 - Advanced software techniques.
- Only those deemed suitable by way of past performance were allowed to attend these last three stages. In some cases hardware engineers decided that, as a result of the training program, they wished to move permanently to the software side of the company.
- All the training courses comprised:
 - Formal classroom teaching.
 - Videos.
 - Films.

- Role playing.
 - Real life projects.
 - Guest speakers.
 - Talks from senior management.
 - Hands-on experience.
- If it was apparent that an engineer was not able to take full advantage of a course, he could be sent to a refresher course to relearn. If it was apparent that the engineer was in fact gaining from the training courses, then he could be assessed for future ones.
 - The average length of a structured training course was three days. In one case, engineers could face a two-week intensive program but this was meant to be at an advanced level.
 - Five of the vendors operated what generically can be called a 'customer care program'. Typically this meant that on an average of every three months users were questioned on their perception of the engineer who maintained their equipment.
 - The results were analysed and if any problems were apparent a member of senior management would visit the user with the engineer concerned. One vendor kept a database of user comments per engineer so that a chart could be constructed of the engineer's performance over a given period.
 - If it was felt that there was a basic problem between the engineer, then another engineer could be appointed to service that user.

- Eight vendors remunerated their engineers in some way if skills learned on training courses led to increased revenue. Three paid commission directly in the engineer's wage packet, three offered bonuses if certain targets were achieved, and two offered productivity awards at year end after the successful completion of a training program.
- In some cases the engineer's wages could be increased by as much as 15% through successful implementation of new skills.
- The methods used to keep track of the engineer's involvement in revenue generation differed, but most vendors relied on the engineer's willingness to earn money in order to do this.
- One vendor operated a system for hardware sales. If an engineer realised that a user may be receptive to a sale, then he would leave the appropriate literature, log the fact, and report to the local sales team. No selling on the part of the engineer takes place, but if a sale is subsequently made, then the engineer collects a percentage of the commission.
- The response of the engineer to these courses has been divided. Of the ten vendors who replied, five gave a favourable response and five a mixed response.
- The mixed response covered the following possibilities:
 - Course not acceptable and dropped.
 - Not much take-up if voluntary.
 - Hardware engineers having trouble with software course.
 - Resistance to courses altogether.
 - Not efficiently followed up.

- Those courses that were deemed to be successful were very successful with almost 100% take-up by those involved and marked improvement in efficiency and performance afterwards.
- Two vendors reported that since their training programs began three and four years ago, respectively, they have been receiving requests for the first time from service personnel either to go on a particular course that they have heard is worthwhile or for a particular kind of training program to be adopted.

D. REORGANISATION WITHIN THE COMPANY

- All vendors agreed that in order to carry out the programs that have been outlined, some reorganisation must be necessary within the service department. What has happened has been a rationalisation of resources to account for new practices.
- One vendor reports that in the past the company's service organisation was run in a very decentralised and haphazard way with each engineer basically being allowed to run his own operations as he thought fit.
- Now the service operations are highly centralised with, in this particular case, a fleet of service representatives in radio contact with base, driving vans with a complete set of field replaceable units for the types of equipment that they are responsible for covering.
- In addition, these service personnel benefit from being kitted out in company uniforms and so are clearly seen to be representatives of the vendor company.
- As well as reorganising the structure of customer service, vendors are becoming more conscious of sophisticated accounting techniques. This, coupled with an attempt to make the user more aware of their joint contrac-

- tual obligations, has meant that costings and billings are more effectively carried out.
- One vendor realised that his organisation was not charging for on-site overtime even though it was clearly stipulated in the service agreement. The net result was, after some internal paperwork and with little or no customer resistance, an increase in the first 12 months of some \$2 million in revenue that might otherwise never have been claimed.
 - The spread of value-added services have all helped in increasing potential revenue. These include:
 - Unbundling of service products.
 - Training.
 - 'Hot' spares.
 - Guaranteed 'turnaround' time.
 - Centralised service call systems.
 - Remote diagnostics.
 - Non-stop processing.
 - Some resistance has been experienced at the lower levels where maintenance charges may seem excessive compared to the overall cost of the equipment. Here a simple time and materials contract has proved to be most effective.
 - Most vendors reported that third-party maintenance is an area that manufacturers cannot ignore. Both in terms of protecting their user base and providing newer, important sources of revenue, third-party maintenance is set for growth.

V EMPLOYMENT PATTERNS

A. THE NEED FOR NEW TYPES OF PERSONNEL

- As has already been discussed in Chapter III, vendors perceive a change in the structure of their employment pattern in order to meet the challenge of new service demands. One consequence of these changes is the need for a different type of person as a customer service engineer.
- Vendors were, therefore, specifically questioned as to whether their company was looking for new kinds of individuals in this role. With one exception--an organisation that was not currently hiring staff--all those questioned recognised a definite trend in personnel hiring.
- All these vendors had recognised that a different kind of service engineer is needed for maintenance. As machines become more reliable they need less time spent on them by highly skilled engineers. As systems become more modular, the concept of board swapping and plug-in modules becomes more attractive.
- All vendors agreed that whereas costs in the past were more heavily biased towards labour, there has been a turnaround in recent years so that spares are becoming the major cost in maintenance.

- The upshot of this is the realisation that less highly skilled individuals are needed in the field, even perhaps down to those who merely provide a courier service for self-maintenance by the user or for remote diagnostics.
- The corollary of this is that the individual needs to display new skills and this is reflected in the actual title given to the engineer. Typically, he or she (and there is a positive swing towards hiring more female field staff among the majority of vendors) was called a service engineer or a field engineer or something similar.
- Vendors were asked to name the principal title that they gave their field service engineer. As can be seen in Exhibit V-1, there is now a bias towards names like 'customer engineer' that emphasises the concept of customer care and support.

B. TRAINING AND RECRUITMENT

- The new skills demanded mean that the service representative is now being used as a single interface between the vendor and the user. Consequently, emphasis is being placed on the engineer being smartly dressed, articulate, and capable of understanding the user's needs.
- Effective communication with both the user and vendor support groups and management was emphasised by all the vendors as being of paramount importance in customer care.
- Vendors were divided on what kind of individual was ideal for this role and from where they should be recruited.
- For example, four vendors felt that they should be graduates, in any discipline, since university training was considered a good base upon which to build.

EXHIBIT V-1

TITLES GIVEN TO SERVICE PERSONNEL

TITLE	NUMBER OF MENTIONS
Customer Engineer	5
Customer Service Representative	3
Customer Service Engineer	2
Service Engineer	1
Total	11

- Two other vendors thought technical qualifications were important and two wanted individuals with several years business experience.
- All vendors thought that elementary technical skills can be taught to anyone but that attitude and behavioural skills were more difficult to teach than to acquire. They were divided, however, fairly evenly as to whether it is better to take people straight from school to train or to look for those with some kind of work experience.
- Training was seen to be a vital element in the recruitment of new staff; in this respect the ability of the new recruit to absorb new ideas quickly and effectively and then pass them on to the user was seen to be very important to the vendor. Training is expensive and most vendors experience a high rate of attrition among new types of staff.
- It is difficult to pinpoint why this should be, but it was felt that the new kind of recruits being far removed from the old concept of an engineer, were more ambitious, had more drive, and were generally more anxious to move if their ambitions were not being realised within the company.
- Some vendors recognised this problem and moved them to sales for this would appear to serve both the company and the individual in the best way. The engineer would be able to realise his true potential and the company would have gained an experienced new employee.
- All vendors agreed that the trend now, and certainly as remote diagnostics and non-stop processing becomes more widespread, is for the increasing use of low-level technical skill personnel in the field. However, they will need to have a high degree of interpersonal skills and customer awareness. The traditionally skilled individuals will work out of support centres or remote diagnostic units, only occasionally being called out into the field when necessary.

C. EMPLOYMENT PROFILES

- Historically, the field engineer has been someone who came into the business through either an apprenticeship or from the Armed Services, in particular from those areas biased towards electronics skills. Consequently, there has been much emphasis upon technical and practical skills.
- That image is changing rapidly. In the first place it is becoming impossible technically for the engineer to repair at the elementary or chip level. Secondly, and more importantly, the user just does not want to allow downtime to his machine for such a fix.
- Equally, vendors have begun to expect that the engineer, who after all does represent the company, should be capable of delivering more than basic maintenance.
- All the vendors questioned agreed that the engineer from the vendor is usually the only person that the user sees from one month to the next. So, more than ever before, it is vitally important that the engineer represents the vendor in the best possible manner.
- In addition, the fact that a greater number of repairs are being effected remotely (where the user is often unaware that a fix has even been carried out) or by swapping out a board that may have been diagnosed remotely, means that the user effectively sees the engineer on-site for less time.
- Although there is some level of cost reduction during these changes, the fact remains that time spent on repairs is dropping. One vendor commented that whereas five years ago the engineer typically spent about 70% of his time on fixes, in five years time that will have dropped to about 10%.

- Another vendor reports that a certain disk drive serviced by the company needed on average 30 hours of maintenance per annum two years ago. The successor to that drive now needs on average less than one hour of maintenance per annum. In addition, the MTBF of that drive has multiplied by a factor of three.
- The picture that is emerging and the vendors questioned confirm this, is that the traditional role of the engineer as a 'fixer' is rapidly coming to an end. The new type of engineer will need to have some elementary technical skills but will be trained to a considerable extent in customer care and awareness of the fact that he represents the vendor in the widest possible sense.
- It is noticeable among vendors that they are hiring more young women to be 'customer representatives'. Their view is that:
 - Users are more receptive in general to women.
 - Women appear to make better communicators.
- The elementary technical skills can be learned by anyone be they male or female and certainly the vendors report enthusiastic feedback from users for the increasing use of women in the field.

VI CONCLUSIONS AND RECOMMENDATIONS

- All vendors agree that the service sector faces a problem of varying magnitude over the coming years. The problem arises from the growing gap opening up in service revenue from the lower expected growth of revenue derived from pure hardware maintenance within the context of corporate expectations for total service revenue.
- This has come about for reasons that are discussed in detail in the companion report Strategic Market Directions in Customer Service.
- It is clear that what the user wants from service are:
 - Good response and repair time.
 - An articulate service representative.
 - Value for money.
 - The feeling that he is important to the vendor.
- This has been the reason for the success of TPM companies, small systems software houses, and niche-marketing hardware specialists. They provide what the user wants at a reasonable rate.

- If the major vendors are to keep pace with market development, then there are certain strategic decisions that have to be made. In any discussion of the future role of the engineer, vendors have to be aware that users no longer want mere maintenance.
- However, some user studies show that the user feels that sometimes the vendor does not even provide enough hardware maintenance. So it is necessary for the vendor, before launching into new and expensive programs, to be quite sure that the current level of support provided to the user is adequate.
- Only when this has been successfully implemented should the vendor consider other ways in which to utilise maintenance personnel resources.
- As the use of remote diagnostics becomes more widespread, so vendors will become aware that the highly skilled engineer will be needed less and less in the field. Instead the (relatively) technically unskilled service representative will become the sole interface between vendor and user.
- So there is a need for new kinds of service personnel. Those who can be trained in customer care, can present an intelligent, knowledgeable, and above all articulate face to the user. Vendors are divided on where best to find these individuals, but the concept is accepted.
- The field engineer of the future has to be a representative of the vendor company in the widest possible sense. He or she will be a technician and salesperson and will be able to relate effectively with the user.
- It is through the growth in other markets as yet not fully exploited that vendors will find revenues to replace the traditional ones of service maintenance.

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