STRATEGIES
FOR THE COMPUTER SERVICES INDUSTRY
IN WESTERN EUROPE
1980 - 1989

ABOUT INPUT

THE COMPANY

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important
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STRATEGIES
FOR THE COMPUTER SERVICES INDUSTRY
IN WESTERN EUROPE
1980-1989

"INVESTMENT - REQUIREMENTS AND POSSIBILITIES"

JUNE 1980

INPUT

STRATEGIES
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IN WESTERN EUROPE
1980-1989

"Investment - Requirements and Possibilities"

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STRATEGIES
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"Investment - Requirements and Possibilities"

LIST OF EXHIBITS

1 INTRODUCTION

1 INTRODUCTION

A. THE MAS/EUROPE 1980 PROGRAMME

- This report has been conceived as the introduction (or 'curtain-raiser' if you like) to the new-format European Market Analysis Service (MAS/Europe) which INPUT has brought out for 1980. Having had experience with the traditional format of this subscription programme, in which issues and markets were treated in separate reports and the whole was summarised at the end of the year in a single annual report, INPUT has decided instead to channel both specific-issue and general-market data mainly through individual country reports aimed at the major country markets. In addition, the European-level requirements are being handled in two reports - at the start and at the end of the series.

- The structure of the complete programme for the year is illustrated diagrammatically in Exhibit 1-1. The exhibit also emphasises INPUT's intention to draw comparisons at a continental level between the European market and the market in the U.S.A.

1. RESEARCH

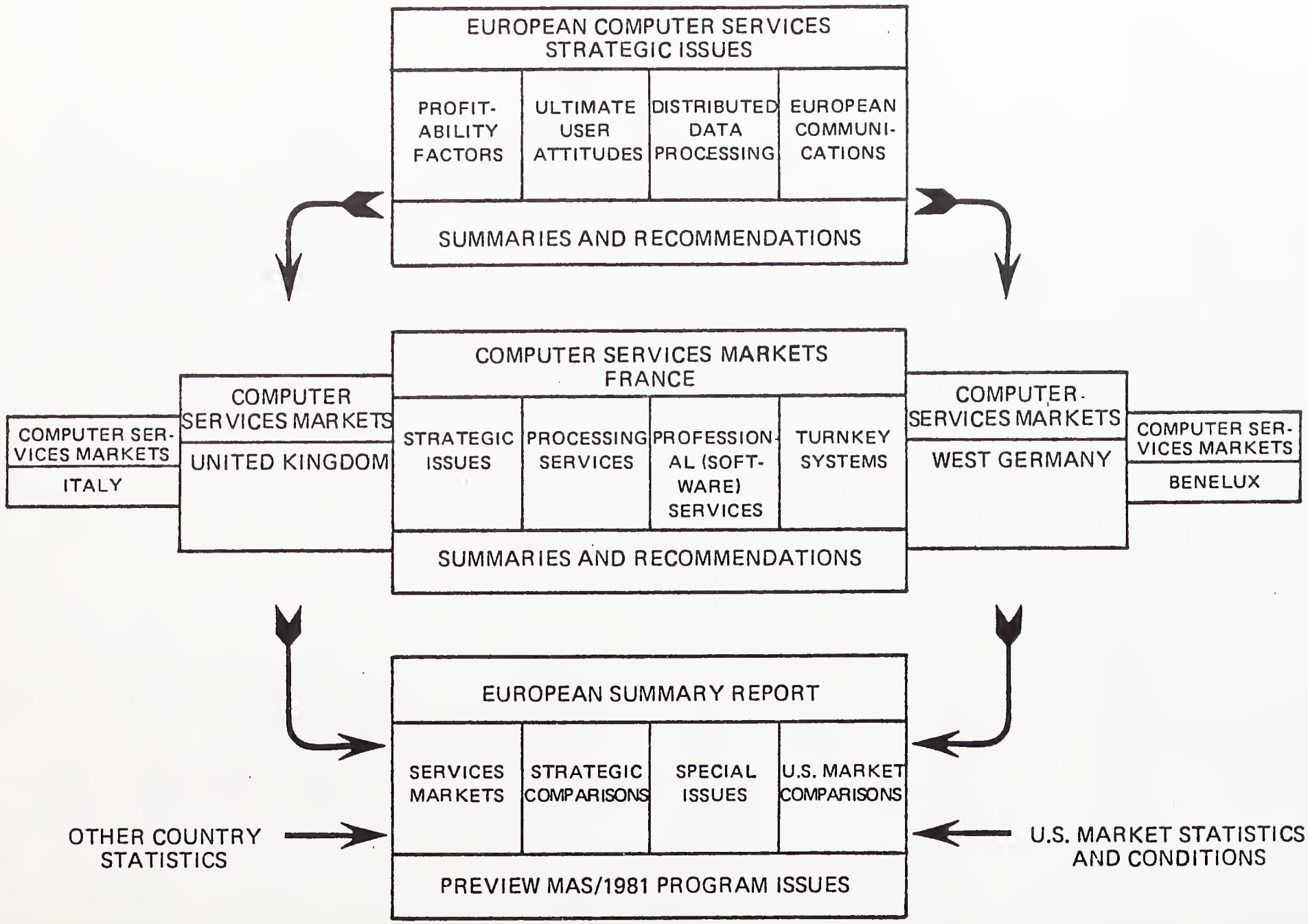
- The service is underpinned in Europe by two programmes of research:

  - User research, aimed at a variety of organisations chosen by reason of their size and structure rather than for their industry affiliation.

EXHIBIT I-1

MAS/EUROPE 1980

REPORTING STRUCTURE AND PHILOSOPHY



- Vendor research aimed at a smaller target sample, but one chosen again principally by size and national coverage criteria.

- Three levels of user interviews are being conducted:

  - Multinational corporations, both those with headquarters in Europe and those based in the U.S.A.

  - Major national companies and major subsidiaries of the multinationals.

  - Smaller national independent and subsidiary companies.

- Vendors meanwhile are being interviewed at two levels:

  - Worldwide and European multinationals, including:

    . Computer manufacturers.

    . Processing services suppliers with European networking capability.

    . Software product suppliers.

    . Professional services companies - systems and software houses, consultancies and turnkey systems suppliers.

  - National companies offering:

    . Processing bureau services.

    . Systems and software.

- The objective behind choosing research participation from companies according to their size and national coverage characteristics is to assess the

impact of the trend towards dispersed or distributed data processing as it affects organisations of varying size and geographic spread.

- An inevitable consequence of this emphasis is that the programme this year puts less stress on the variation of user characteristics by industry sector. However, a broad classification by industry type is being made, namely a division by three major classifications:

  - Discrete manufacturing.

  - Process manufacturing.

  - Service industries and others.

- This sector spread is not intended to disclose significant variations by industry, but to ensure a comprehensive and unbiased choice of user samples.

- The two levels of suppliers being researched include:

  - Corporations with a presence in all five country markets being studied (mainly found among the U.S. companies).

  - Multinationals, strong in one or two countries but with a small or intended presence in the others (mainly European enterprises).

  - National concerns operating in a single home country.

- Exhibits I-2 and I-3 illustrate diagrammatically the user and supplier interview sample hierarchies, and show the sample constituents and targetted numbers.

- Exhibits I-4 and I-5 list the sets of topics which are encompassed by the two types of research.

EXHIBIT I-2

MASTER PLAN OBJECTIVES/EUROPE 1980

USER ATTITUDE RESEARCH

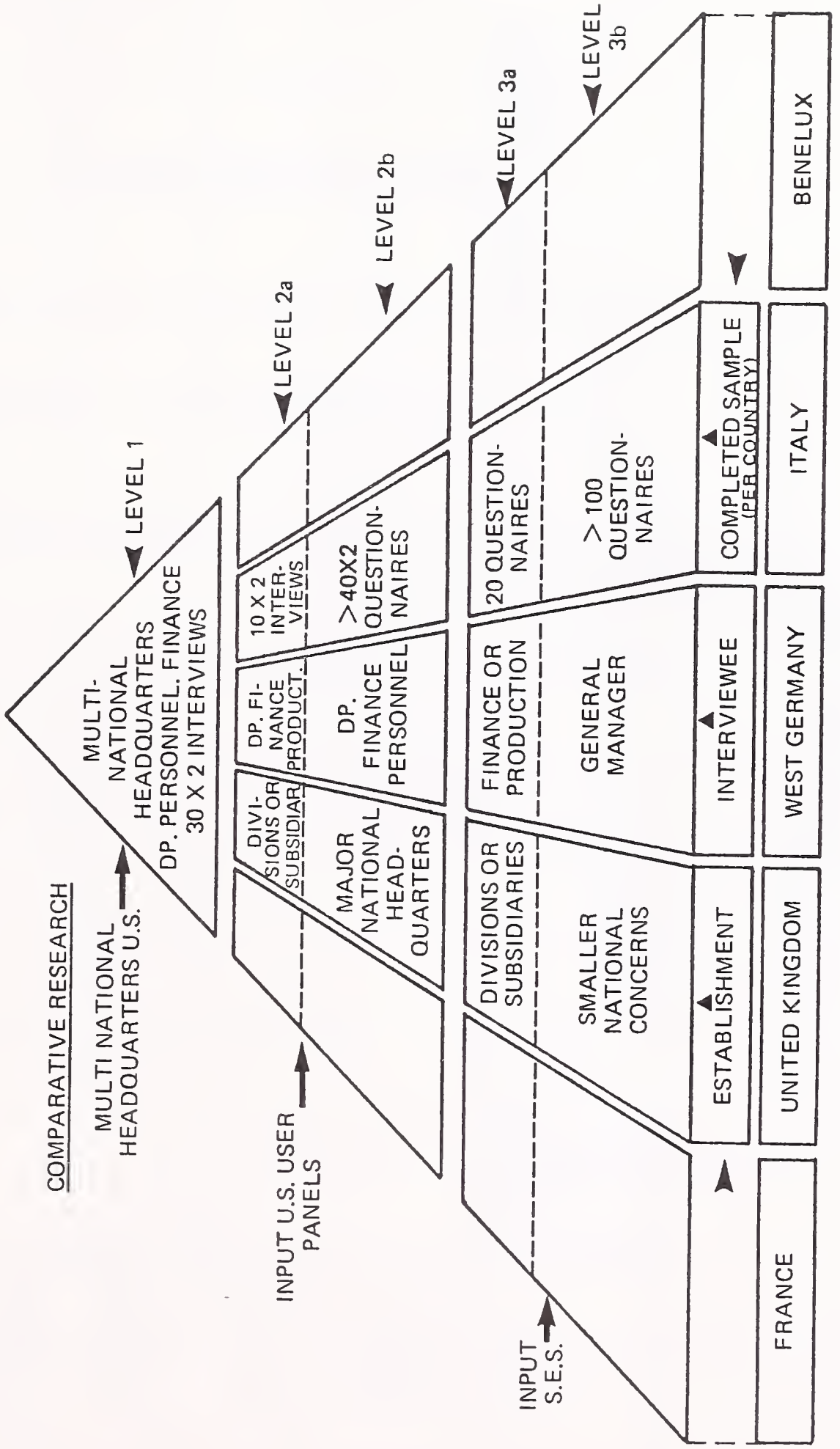


EXHIBIT I-3

MAS/EUROPE 1980

VENDOR RESEARCH ON PROFITABILITY FACTORS

TYPE OF VENDOR	NUMBERS OF INTERVIEWS BY COUNTRY/MARKET					
	MUTLI-NATIONAL	BENELUX	FRANCE	ITALY	UNITED KINGDOM	WEST GERMANY
COMPUTER MANUFAC-TURER	15	-	-	-	-	-
PROCESSING SERVICES	10	5	5	5	5	5
SOFTWARE PRODUCTS	5	5	5	5	5	5
PROFESSION-AL (SOFT-WARE) SERVICES	5	5	5	5	5	5
TURNKEY SYSTEMS	5	5	5	5	5	5

REFERENCE: INPUT'S CAMP DIRECTORIES AND DATA ON OVER 4,000 COMPANIES

EXHIBIT I-4

USER RESEARCH TOPICS

EXAMPLES

- INDUSTRY GROUPING (- MANUFACTURING, DISCRETE)
  (- MANUFACTURING, PROCESS)
  (- OTHER; COMMERCE, SERVICES)
- AUTHORITIES AND RESPONSIBILITIES FOR DATA PROCESSING
- EDP ORGANIZATION AND CAPABILITIES
- TELECOMMUNICATIONS ENVIRONMENT
- COMPUTER USAGE AND PLANS
  - IN-HOUSE COMPUTERS
  - SOFTWARE PRODUCTS
  - PROCESSING SERVICES
  - PROFESSIONAL SERVICES
  - TURNKEY SYSTEMS
- APPLICATION USAGE AND PLANS
- DISTRIBUTED DATA PROCESSING AND COMMUNICATIONS
- VENDOR COMPARISONS
- SELECTION AND BUYING CRITERIA
- ACCOUNT SIZE AND GROWTH

EXHIBIT I-5

VENDOR RESEARCH ISSUES

EXAMPLES

PRICING	- FIXED CAPACITY PRICING
	- TURNKEY PRICING
	- SOFTWARE PRODUCT RECOVERY
	- DISCOUNTS
	- MAINTENANCE AND SUPPORT
	- INFLATION AND COMPETITION EFFECTS
	- IMPACT OF NEW TECHNOLOGY
COMMUNICATIONS	- IMPACT OF PTT POLICIES
	- NETWORK CHARACTERISTICS
TECHNOLOGY	- EFFECT OF COMPUTING AND COMMUNICATIONS TECHNOLOGY ON FUTURE PRODUCTS AND SERVICES
SOFTWARE	- EFFECT OF SOFTWARE DEVELOPMENT ON PRODUCTS AND PRICING
	- CHARACTERISTICS OF SUCCESSFUL SOFTWARE
DATA BASES	- AVAILABILITY
	- "PULL-THROUGH" REVENUES
METHOD OF DELIVERY	- INTERACTIVE
	- REMOTE BATCH
	- ACCOUNT/FACILITIES MANAGEMENT
	- TURNKEY
	- SOFTWARE PRODUCT

2. ANALYSIS

- On all sides it is generally agreed that the boundaries and definitions within the Computer Services sectors of the total DP industry are becoming harder to draw up. Vendors have been traditionally labelled as:

  - Manufacturers.
  - Service bureaux.
  - Data preparation, or other specialist, bureaux.
  - Software houses, or systems houses.
  - Consultancies.
  - Educational and staff-hire agencies.

- The falling cost of hardware has brought to the fore many alternative ways of assembling the components (part product, part services) required to fulfill a user's system function. No longer does the logic of price drive the user automatically to look for 'system responsibility' (a phrase now sadly disused) at the hands of the computer manufacturer. Hence we have the encroachments of one type of supplier onto what were hither to the preserves of another:

  - Systems houses assume more total turnkey responsibility year by year.
  - Processing bureaux provide wider ranges of services, moving more into the areas of the specialist bureau (data capture, COM) and now increasingly providing on-site hardware.
  - Software product specialists compete for system software installations with the manufacturers.

- Staff-hire agencies provide short-term contract specialists in competition with the software and consultancy houses.

- This blurring of boundaries has presented the problem of updating definitions without losing the ability to compare present trends with past market data measurements. For 1980, INPUT has enhanced the set of market sector definitions in the MAS/Europe programme at the same time retaining comparability with results from MAS/US and other INPUT programmes in the U.S.A.

- This has been effected:

  - By introducing one new major sector - turnkey systems.

  - By bringing new services definitions (e.g., USHS) into the traditional sectors to reflect their latest trends.

- The full set of major and sub-major market sectors is shown in Exhibit I-6. In addition:

  - Processing Services will be analysed under the application (functional) headings:

    . Scientific and technical.

    . General business.

    . Utility.

    . Industry specialty.

- A glossary explaining the meanings INPUT attaches to these definitions is found in Appendix A.

EXHIBIT I-6

MAS/EUROPE 1980
COMPUTER SERVICES MARKET SIZES
(CAMP)

COUNTRY MARKET ANALYSIS AND FORECASTS			
PROCESSING SERVICES	PROFESSIONAL (SOFTWARE) SERVICES	SOFTWARE PRODUCTS	TURNKEY SYSTEM
• BATCH • REMOTE COMPUTING - INTERACTIVE - REMOTE • F.M. • USHS • 1980-1984	• CONSULTING • PROGRAMMING AND SYSTEMS DESIGN • EDUCATION • 1980-1984	• SYSTEMS • APPLICATIONS - INDUSTRY-SPECIFIC - CROSS-INDUSTRY • 1980-1984	• CROSS-INDUSTRY • INDUSTRY-SPECIFIC • 1980-1984
KEY COMPETITION	KEY COMPETITION	KEY COMPETITION	KEY COMPETITION
▼			
EUROPEAN MARKET SUMMARY			
EUROPE			U.S.A.
MARKET SIZES GROWTH FORECASTS PRICING COMPARISONS COUNTRY COMPARISONS	◀	▶	MARKET SIZES GROWTH FORECASTS COMPARATIVE ISSUES
KEY COMPETITION			

- The MAS/E Programme for 1980 has retained those traditional client-oriented elements which have done so much to ensure benefits to subscribers:

  - Enquiry consulting service.

  - In-house presentation.

  - Joint client conference (added this year).

B. PURPOSE AND SCOPE OF THIS REPORT

- The aim of the report is to shortlist, highlight and discuss strategic issues for Computer Services vendors operating in Europe. The timeframe which enables one to use the word 'strategic' is the ten-year span of the 1980s. These issues are the ones which will undergo research also at country level during the course of the year.

- Starting from the premise that the decade which has just opened is going to see dramatic changes in the whole DP industry, the report examines the essential ingredients of a company's strength which will allow it to survive in the eighties and, concentrating the focus still further, attempts to isolate the features necessary to ensure growth to a market leadership position during that time.

- The keynote to the report is contained in its subtitle: 'Investment: Requirements and Possibilities'. The intention is to highlight the need to invest for future growth (and over a longer timeframe, growth may make the difference between survival as a separate entity and loss of identity by acquisition or merger). This growth may come by:

  - Internal expansion.

- Acquisition, at home and abroad.

- Setting up overseas operations by any of the other traditional means.

- Whatever the method or methods employed, there will be the need for investment cash to fund the growth steps.

- Inevitably, a requirement for investment will encounter constraints. They may be fundamental or temporary:

  - Climates for raising capital in the markets may be unfavourable.

  - In certain European countries, the DP industry or its services sector may be regarded as a poor investment for good or bad reasons.

- The report examines the nature of some of these constraints and links them to some of the competing influences which are now looking at the computer services sector and seeing what is in most West European countries the fastest growing portion of the economy - at around 20% p.a. compound growth predicted through to 1984.

- The report examines the changing environment in which this investment is going to bear fruit, and particularly the influences from four quarters:

  - Computer equipment manufacturers.

  - European communications authorities (the PTTs).

  - The economic and political climates.

  - The ultimate user.

- Putting together a viable strategy will involve different choices for different companies. Much will depend upon the range of activities or market sectors in

which a company or group has chosen to operate, and the emphasis which is put upon their interrelationships. In other words, does the sum of the parts add up to a coherent image? An example from among the equipment manufacturers will serve to illustrate this point clearly:

- The Philips group has recently restructured its systems activities, in each major country, bringing together divisions responsible for:

  . Small computer systems.

  . Word processing and other office systems.

  . Business communications.

- Plessey, the UK-based multinational, has on the other hand still three discrete presences in the information handling field:

  . Business communications.

  . Add-on peripherals for the OEM market.

  . Data capture systems and terminals.

- It would be too simple to infer from this that Philips will be more successful than Plessey. However, it is justifiable to claim that, by forming a coherent image, the former has placed itself in a better position to increase market share and to survive.

C. METHODOLOGY EMPLOYED

- The interview is the main technique for obtaining up-to-date information in this field. INPUT supplements this by drawing on past data in the company's

database and by using additional data derived from concurrent custom research projects. For the programme in 1980, four questionnaires are being used, two for users and two for vendors. The two user questionnaires are directed at:

- General management.

- DP management.

The two vendor questionnaires address the two types of data being handled:

- Market size and company product data.

- Issue data, consisting of supplier company attitudes: either attitudes taken from its own policies, or attitudes to the market as a whole.

- Appendix B contains the two vendor questionnaires used, while Appendix C gives an analysis of the companies interviewed or approached before this report was produced.

- The report benefits particularly by drawing on the ongoing research programmes from the top end - the multinational users and vendors.

- In order to concentrate the research on the topics of greatest interest to the programme's clients, a one-page questionnaire is being completed by each client on joining the service. The analysis of client opinion at the end of March 1980 gave the following results summarized in Exhibit I-7.

  - European Reports: 'Profitability Factors' tied with 'Trends in Products and Services' for first place, followed by 'European Communications Environment.'

  - Country Reports: 'Applications Areas - Usage and Trends' was first choice for both vendor and user research, followed by 'Revenue Trends'

EXHIBIT I-7

QUESTIONNAIRE - MAS/EUROPE 1980

STRATEGIC ISSUES	% INTEREST			COMMENTS
	HIGH	MED.	LOW	
A. EUROPEAN REPORTS				
. PROFITABILITY FACTORS	86%	13%	-	1st EQUAL INTEREST
. TRENDS IN PRODUCTS AND SERVICES	86	13	-	1st EQUAL INTEREST
. IBM's FUTURE POSITION IN SERVICES MKT.	13	50	37%	
. EUROPEAN COMMUNICATIONS ENVIRONMENT	38	13	49	3rd EQUAL INTEREST
. U.S. COMPARISONS	13	62	25	
. OTHER _____	60	30	10	% OF OTHER TOPICS REQUESTED
B. COUNTRY REPORTS				
- VENDOR RESEARCH				
. REVENUE TRENDS	78	22	-	2nd EQUAL INTEREST
. USER SITE HARDWARE SERVICES	22	56	22	
. PRICING OF PRODUCTS/SERVICES	67	33	-	3rd EQUAL INTEREST
. STAFF SHORTAGE/RECRUITMENT	11	44	44	
. DATABASE SERVICES - A GROWING AREA	56	11	33	
. APPLICATION AREAS - USAGE AND TRENDS	89	-	11	1st EQUAL INTEREST
. COMPETITIVE ANALYSES	67	33	-	3rd EQUAL INTEREST
. OTHER _____				LITTLE INTEREST IN ANY 1 TOPIC
- USER RESEARCH				
. IMPACT OF DDP ON LARGE USERS	44	44	12	3rd EQUAL INTEREST
. BUYING TRENDS OF SMALL USERS	25	63	12	
. USER COMMENTS ON VENDOR SERVICES	63	25	12	2nd EQUAL INTEREST
. APPLICATION USAGE AND TRENDS	87	13	-	1st EQUAL INTEREST
. OTHER _____				

NAME & TITLE EXISTING CLIENT BASE-MARCH 1980

COMPANY NAME _____

STREET ADDRESS _____

CITY & STATE _____

TELEPHONE _____

and 'Pricing' for vendor research, and by 'User Comments on Vendor Services' from user research.

- These results were used to put priorities on questions included in the questionnaires, and questions designed for less popular topics were excluded when space became short.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

- The definition of the market geography for the MAS/Europe programme embraces seventeen sovereign states:

  - 'The Nine' members of the EEC.
  - Three Scandinavian countries.
  - The two countries of the Iberian peninsula.
  - Switzerland, Austria and Greece.

- Western Europe has a greater population than North America. The national product of the EEC countries alone is now comparable to that of the U.S., as shown in Exhibit II-1.

- The West European computer services market has, over the last three years, consistently outperformed the computer equipment market in terms of average annual growth rate. Services have averaged 25% per annum whereas equipment has been nearer to 20%.

EXHIBIT II-1

WESTERN EUROPE - BASIC PARAMETERS

- SEVENTEEN NATIONS
  - EEC - 9
  - SCANDINAVIA - 3
  - IBERIA - 2
  - SWITZERLAND, AUSTRIA, GREECE - 3
- SEVENTEEN CURRENCIES, FIFTEEN LANGUAGES
- POPULATION

	W. EUROPE		N. AMERICA
- EEC	260 MILLION	USA	217 MILLION
-	85 MILLION	CANADA	23 MILLION
	345 MILLION		240 MILLION

- GDP (1978) - EEC $2.002 BILLION - USA $2.049 BILLION
  PER CAPITA $7,700 $9,663

A. THE $20 BILLION MARKET

- In spite of its faster growth, the services sector has, in Europe, largely failed to penetrate to the major buying points of the industry. This failure to oust the computer manufacturers from the number one spot threatens the long-term future of those companies which have grown up and specialised in the services side.

- If services companies continue to be reactive and auxiliary rather than primary movers of the industry, their sector will fall prey to the inroads of the equipment manufacturers.

- To maintain and expand market share, services vendors must develop 'brand name' visibility capable of competing with IBM, Digital, Intel and the rest.

  - Only in France, among the European countries, does this need, and the opportunity that goes with it, appear to have been grasped.

- The French drive to expand the services sector is projected to continue through the five-year forward period and to maintain France's leading position as the largest market for computer services in 1984. With $3,865 million (23%) of an almost $18 billion market for 1984, France will be ahead of West Germany by some 4%. See Exhibit II-2 for a breakdown of the market by major service category.

- By 1985 the West European computer services market is predicted to exceed $20 billion.

- Because of the smaller size of the individual home markets in Europe when compared to the U.S., it is essential to have government sponsorship in one form or another if leading national vendors are to:

  - Survive in the face of competition from multinationals.

EXHIBIT II-2

THE WEST EUROPEAN COMPUTER SERVICES MARKET SIZES,
1979, 1984 AND 1989

TYPE OF SERVICE	1979		1984		CAAGR 1979-1984	1989	
	$ MILLION*	PERCENT	$ MILLION*	PERCENT	PERCENT	$ MILLION*	PERCENT
RCS	1429	20.8	3941	23.1	22.5	9895	24
USHS	NA	-	(280)	(1.6)	-	854	2
BATCH	2962	43.1	5874	34.4	14.7	9038	22
FM	102	1.5	342	2.0	27.4	924	2
ALL PROCESSING SERVICES	4493	65.4	10157	59.5	17.7	20711	50
SOFTWARE PRODUCTS +	703	10.2	2437	14.3	28.2	7437	18
PROFESSIONAL SERVICES	1677	24.4	4486	26.2	21.7	10021	24
TURNKEY SYSTEMS	(336)	(4.9)	(1026)	6.0	(25)	3131	8
TOTAL	6873	100	17080	100	20.0	41300	100

*INCLUDES OVERALL COMPOUND ANNUAL INFLATION OF 10%; USES 1979 DOLLAR EXHANGE RATES.
+INCLUDES H/W MANUFACTURERS PRODUCT LICENSING.
N.A. NOT AVAILABLE.
( ) INDICATES BREAKOUT FROM PREVIOUS LINE.

- Aspire to multinational status themselves.

- One way of winning such sponsorship is to strengthen both the national industry associations and the European Computing Services Association (ECSA). Certainly ADAPSO has been responsible for producing a better image for its members and the industry in general in the U.S. This is a contributory factor to the continuing lead over West Europe which the U.S. is forecast to hold, certainly up to 1984. As shown in Exhibit II-3, the gap between the home markets of the two continents narrows during the period, with Europe ending with 80% of the U.S. revenue base in 1983.

- Some vendors, realising the need to become international as a strategy for survival, have started to look outside their own home shores:

  - DATEMA AB of Sweden has acquired Schroder Computer Services Ltd. of the U.K., having previously only run a subsidiary in West Germany.

  - CIG SA of Belgium is acquiring Lowndes-Ajax in the U.K.

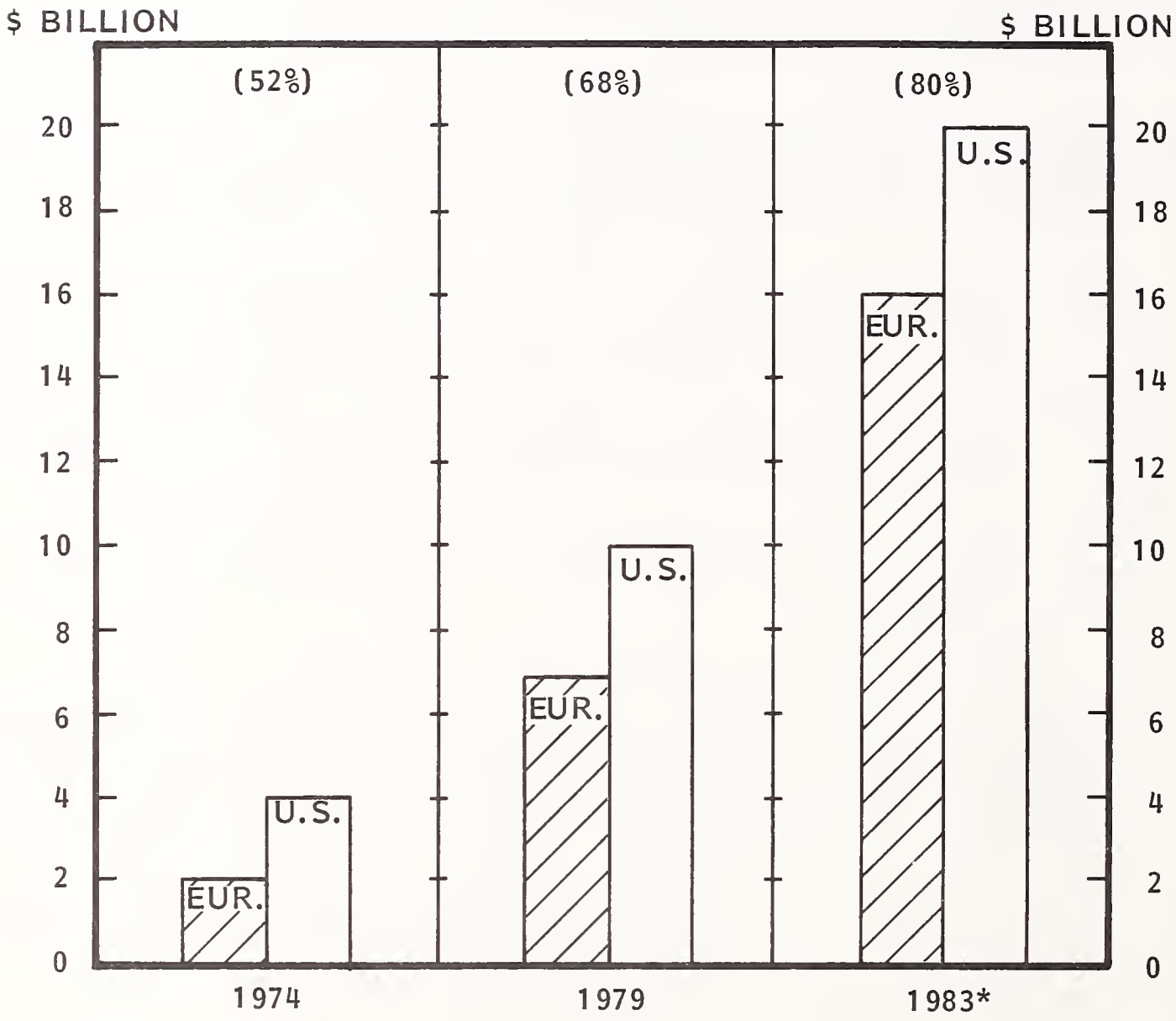
  - BOC, Altergo, ACS and other U.K. vendors have established U.S. presences.

- This is a necessary strategy to achieve growth and presence in an increasingly European context. Without such an aggressive policy, vendors will become relegated to the 'second division' status of a permanently national coverage. This policy should be extended to export selling outside Europe, where the market is expected to grow from $200 million in 1979 to $1 billion in 1984.

- Within Europe, the major influencing factor is going to be the shortage of skilled end user sales people and the sales management necessary to lead them. This will result in consolidation of the industry and a more rational pattern in the distribution process.

EXHIBIT II-3

COMPUTER SERVICES MARKETS
EUROPE - U.S. COMPARISON



*FORECASTING COMPLICATIONS – PRICES
– SOFTWARE PRODUCTS (MANUFACTURERS)

- Major national companies who do not wish to strive for true European or multinational status have still got a major role to play, but this role will include elements of product and system distributorship for the multinationals. Conversely, truly European companies must consolidate their ability to use these and other alternative distribution channels.

B. VERTICAL VERSUS HORIZONTAL MARKETING

- The current concern among industry leaders is with the implementation of industry-specific marketing. While this awareness is good and natural at their present level of business and visibility, it must be seen in the wider context of the longer-term need to develop product-line marketing.

- INPUT believes that to succeed as a leading computing services vendor, the concept of integrating product systems within a 'mainline' must be understood and adopted. The concept is illustrated graphically in Exhibits II-4, where a three-tier marketing structure is proposed to marry the multiplicity of product components to the traditional selling strategies:

  - Account selling.

  - Functional product selling.

  - Industry-specialised selling.

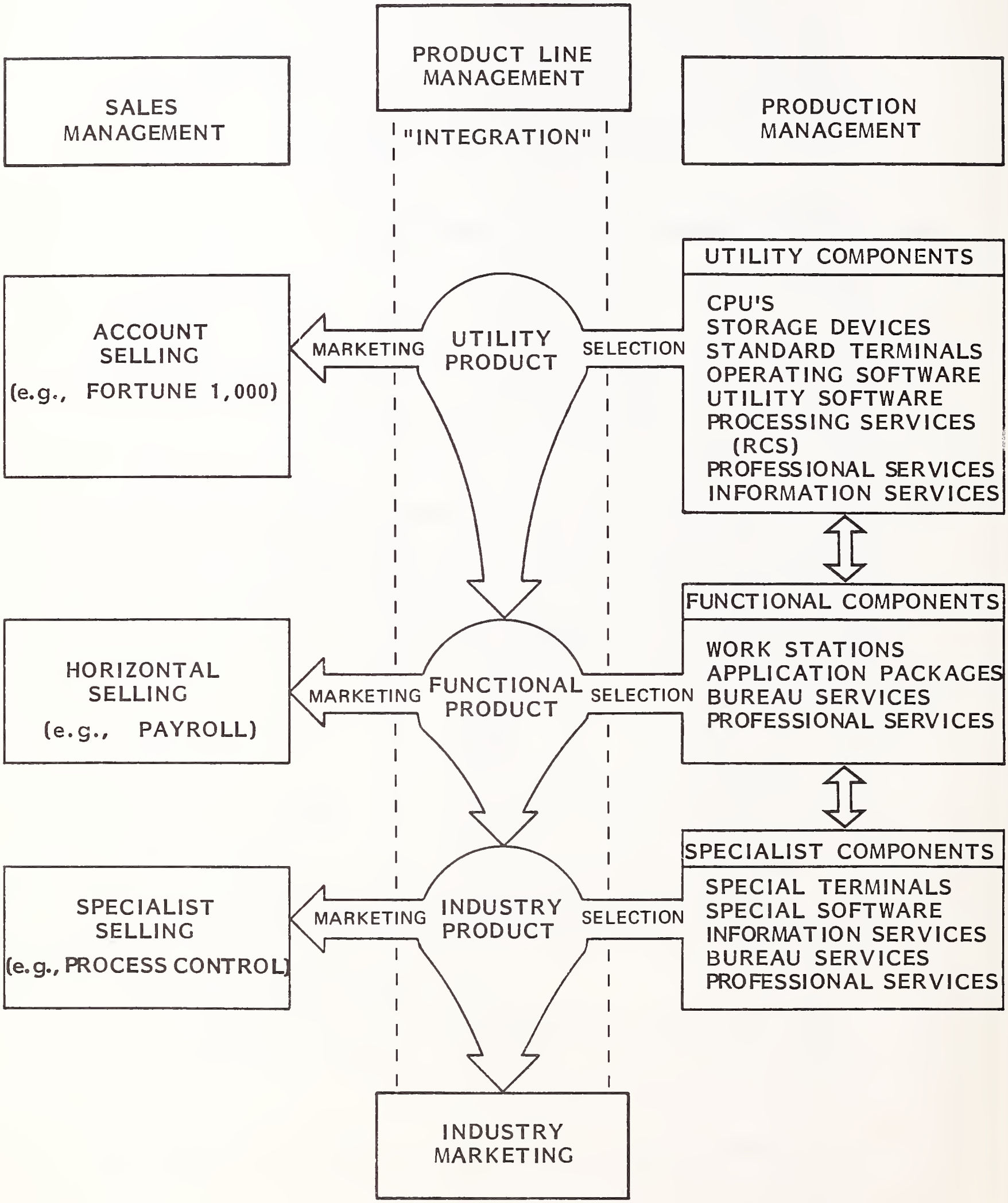
- This strategy involves matrix management with P&L responsibility residing with the product lines.

- Though complicated by the diversity of country environments in Europe, consolidation along these lines must occur if:

  - Limited resources of people and money are to be utilised effectively.

EXHIBIT II-4

FUNCTION AS A 'MAINLINE' COMPANY



- Visibility of services companies both to the traditional and the new buying points is to be increased.

- Growing respectability of the industry as a whole is not to be set into reverse gear.

- Failure to achieve this status will retard the development of the European market vis-a-vis the U.S., Japanese and other developing markets.

C. NETWORKING

- The biggest single factor running in favour of computer service companies is their in-depth knowledge of networking with data communications.

- This is especially advantageous to RCS vendors with network service offerings. Opportunities for capitalising on this expertise will abound:

  - Every small standalone mini will soon be offered with a videotex ('Viewdata') capability.

  - The key is to offer data base information services along with data processing; i.e., to allow the user to plug-in to the wider world outside its own organisation.

D. INVESTMENT

- Those European companies who have shareholders from other industries or from government sources do not have the same pressure on them to make short-term profits. They are thus at a distinct advantage over U.S. rivals or their self-financed competitors. Exhibit III-6 gives the more notable examples of companies with stockholder backing from:

- Banking.

- Insurance.

- Government.

- Manufacturing.

- It goes without saying that this type of funding does not last forever. Even the longest-term investment must be wisely and quickly used to provide the market share and 'brand name' visibility envisaged.

- European management must develop the skills to handle the most complex type of product line structure, which will entail a blend of:

  - Financial management.

  - International nous.

  - Marketing flair.

  - Technological awareness.

E. PROCESSING SERVICES COMPANIES

1. CONCLUSIONS

- Vendors at the top or close to the top of their national rankings must make the choice between 'mainline' and distributor (or secondary) status.

- Processing services vendors are predicted to make the choice both ways. The trend is already discernible in specific instances.

- The sector is forecast to grow at a CAAGR of 17.7% between 1979 and 1984, which is less than the market average of 20%. This means an increase from $4.5 billion to $10.2 billion and involves a loss in marketshare of 5%, down from 65% to 60%.

- While predicting this loss of market share in the sector, INPUT expects the share of leading companies to grow in the period, indicating:

  - Acquisition activity.

  - Diversification into other services and sectors.

- Best potential markets for processing services are:

  - FM (see Section H in this chapter).

  - Traditional RCS.

  - USHS.

2. RECOMMENDATIONS

- Adopt a viable acquisition policy aimed at:

  - Preserving a coherent product image.

  - Developing latent skills in areas such as:

    . Network management.

    . Industry-oriented consultancy.

- Focus on highly targetted opportunities in order to maintain ongoing profitability within the overall plan.

- Consider USHS as a means of developing both market share and FM-type, profit-generating contracts in multiple-quantity sales situations.

- Develop and test plans for utilising alternate distribution channels.

- Take full responsibility, however far back up the 'mainline' this leads; develop skill at the 'make or buy' decision process.

F. SOFTWARE PRODUCTS COMPANIES

1. CONCLUSIONS

- The fact that software products is the fastest growing sector, currently netting over 30% CAAGR in some countries and forecast to average a rate over 28% up to 1984, is largely due to the accelerating rate of software unbundling by the manufacturers.

- Increased competition from the hardware suppliers must be expected as their revenue contributions from processors continues to fall, and revenues from software sales increase.

- At present, the market (at $703 million in 1979) is split by value 65:35 between system products and application products. However, the ratio in terms of number of installations is nearer to 80:20, since small-value systems and utility products abound and high-value applications packages have not obtained market acceptability.

- The market is dominated by large-account, end user selling.

- New opportunities exist in:

  - Small business systems.

- Personal and desktop computers.

2. RECOMMENDATIONS

- Seek alternative distribution channels with site multiplier possibilities. These may be with:

  - Minicomputer suppliers.

  - 'Mainline' services companies.

  - FM contractors.

  - Office equipment vendors.

  - Telecommunications suppliers.

  - Office automation system vendors.

- In competition with 'mainline' vendors, expect to have to adopt a software leasing business. This will affect capital structure and force consolidation on smaller companies.

- Foster entrepreneurial skills in order to minimise product development overheads and to shorten the development cycle in the increasingly dynamic market of the eighties.

- In mixed services vendor companies, the software products division has both a line and an R&D function. Very careful management of this fragile resource is called for.

G. PROFESSIONAL SERVICES COMPANIES

1. CONCLUSIONS

- In Western Europe, the total turnkey systems market for small computer systems in the price range from $20,000-200,000 will rise from $1.5 billion in 1979 to $8 billion in 1984. Some 25% of this market is devoted to software which, in 1979, was split between the manufacturers' software products and independently produced, tailored software from systems and software houses.

- This segment of the market is expected to grow at 25% per annum in the forecast period, giving the second highest rate after software products.

- The major opportunity for professional services companies to become 'mainline' suppliers lies in this sector. Competition, however, must be expected from the European small business systems manufacturers:

  - Philips.
  - Nixdorf.
  - Kienzle.
  - ICL.

- Systime Ltd. in the U.K. represents an excellent example of a company which has transformed itself from a software house into a 'mainline' turnkey business system company. The major hurdle encountered on this path has been the provision of adequate maintenance.

- Companies with the resources of a network or with networking expertise should appreciate the solution presented by remote diagnostics to the problem of servicing small business systems in the dense urban areas of Western Europe.

2. RECOMMENDATIONS

- Seek opportunities in regulated industries where site multiplier possibilities exist.

- Look for major system contracts in:

  - Network development.

  - Government contracts.

  - Integration of office and data processing in leading edge companies.

  - Training in new techniques.

- Foster and subcontract to lively 'start-up' companies with specialist consulting and software skills.

- Reduce expectations of large-scale software deskilling. This will remain a people-dependent sector. Any increase in the ease of code production will be offset by the escalation in the complexity of problems being met.

- Therefore, develop or buy-in the best available design aids, and build a creative working environment.

H. FACILITIES MANAGEMENT

I. CONCLUSIONS

- Two forms of FM are included in INPUT's European definition:
  - Traditional running of DP installations for a single client.
  - Providing a general service to a 'regulated' industry sector or to a number of clients in the same sector who subscribe to a joint industry-sponsored service.
- In Europe, the primary task associated with the first type is installation management. Taking over the customer assets is rare.
  - EDS is attacking this market with some success here and now.
- The second type of FM is primarily a national market since regulations and industry standards differ from country to country.
- The types of business being addressed in this way include:
  - Travel agents.
  - Estate agents.
  - Legal profession.
  - Transportation.
- Examples of this newer definition of FM are:

- Automotive dealer services offered by SLIGOS in France and CMG in Holland.

- Property finance management system for 'notaires' provided by CEA in Holland.

- Building society systems from Centrefile in U.K.

- A prime market for this approach exists in Europe.

  - West Germany should be the chief target.

    - DATEV is a complete organisation founded around this concept.

2. RECOMMENDATIONS

- Big opportunities will open up in the network operations field where this approach may be used to:

  - Provide and run a total networking capability on a franchised basis on behalf of the PTT.

III DEFINITION OF A STRATEGY FOR EUROPE

III DEFINITION OF A STRATEGY FOR EUROPE

- It is difficult, when broaching the subject of a strategy for Europe, to avoid starting from the U.S. experience and dealing with the similarities and differences between Western Europe and the U.S.A. There are two reasons for this being the case:

  - Companies interested in the subject at all are either successful U.S. corporations seeking European expansion or
  - They are growing European companies looking to expand from a national to a continental market and finding themselves immediately in contention with the American leaders.

- While conceding that it is theoretically possible to construct a strategy without taking account of the U.S. market lessons, INPUT believes that there is enormous value in correctly assessing and learning from the example of that huge, very homogeneous marketplace since:

  - So many of the driving forces do apply also in Europe.
  - It is important to know the extent of and the timing associated with these similar developments when they occur in European countries.

- Consideration of the U.S. market then is a good starting point, but it should not be the totality of the picture. Identification of the true driving forces,

some of which stem from the U.S. and some from within Europe, is the essential task. Having isolated the factors driving the market, it is necessary to pursue the logic of where they are leading the market and how they interact with the local environment in order to see the shape of things to come.

- We have seen from Exhibit II-1 how the relative development of the EEC countries during the 1960s and 1970s has increased their GDP to a level comparable to that of the U.S.A. Taking the whole of Western Europe - the 17 nations included in the MAS/Europe market statistics - the GDP is already (1978) larger. However, Exhibit II-2 shows that even by 1983 the computer services industry in Europe is only expected to be 80% of that of the U.S.A.

- There are two explanations:

  - The U.S. had a head start over Europe.

  - The U.S. industry is achieving a higher degree of penetration, showing a greater degree of acceptability of its services/products.

- From the American accountancy profession, there have been recent signs that the larger international companies headquartered in the U.S. expect to increase the percentage of business done in Europe - in the case of Ernst & Whinney, from 20% of their total today to over 40% inside the next five years. This is an indication of the greater maturity of that profession compared to computing services. INPUT expects the U.S. market to remain ahead of its European counterpart until the late 1980s. The reasons for this are indicative and typical of many of the dissimilarities between the two continents, differences which relate to the relative impacts of driving forces.

A. IDENTIFYING THE DRIVING FORCES

- The principal driving forces in the industry are expansionist. There are three important forces, two are economic, and one relates to technology improvement:

  - The continuation of inflation is constantly swelling the size of vendor revenues, though in some cases price increases have not followed inflation as quickly as they might.

  - The world economic recession, which started with the 1974 oil price rises, has already cycled once fully since then in the U.S.A. and is now starting again to become the major topic for serious discussion there. Its effect on computer services appears to be wholly beneficial in terms of increased new business prospects.

  - The strength of computing, serving a functional need with the in-house DP department and stemming from the marketing efforts of the equipment suppliers, is fueling the need for more and more sophisticated attendant services to allow users to reap the benefits of the newer devices which improved technology is putting on the market.

- A second and lower level of driving force determines the ways in which expansion most easily takes place for different types of vendor.

1. PROCESSING SERVICES

- For the processing services vendor, visibility is the main problem. Hence, the main driving force for this type of supplier is the need for sector-specific marketing. A service is never as visible as a product (or system), and the processing bureau is always compared with the in-house hardware solution, and particularly when the product (or system) is a new concept or for a first-time user, the need on the part of the purchaser to get past the conceptual stage to

the concrete product is immense. This applies equally to all the main types of processing vendor - to batch bureaux as much as to RCS.

- Sector-specific marketing, which may be either functional (horizontal) or industry (vertical) specific, has become the accepted answer to this need and is now the norm for the industry in the U.S. For some time, it has also been preached as the conventional wisdom equally applicable in Europe.

- Noticeable, however, has been Europe's lower penetration with this approach. As Exhibit III-1 indicates, there are no firms among the European leaders which could claim the success of the approach which CSC in the government sector and EDS in the assurance sector have obtained in the U.S.A. INPUT contends that this shortfall is due to the lesser size of the individual country markets in Europe when compared to that in the U.S.A. Exhibit III-2 shows how these differ by almost one order of magnitude.

- The interesting question currently under research concerns, 'to what extent this fragmentation into country sub-markets sets a lower ceiling to the penetration of the sector-specific approach.'

2. SOFTWARE PRODUCTS

- For the software products company, the main driving forces continue to be:

  - The enormous and growing investment in software.

  - The way it is locked into the running of organisations which rely on EDP. The impossibility of users even considering the conversion or rewriting of large-scale software lays a constraint on the major manufacturers. They have to operate within the overall framework of their previous system software, and this constraint and its accompanying room for improved efficiency create the market for the independents.

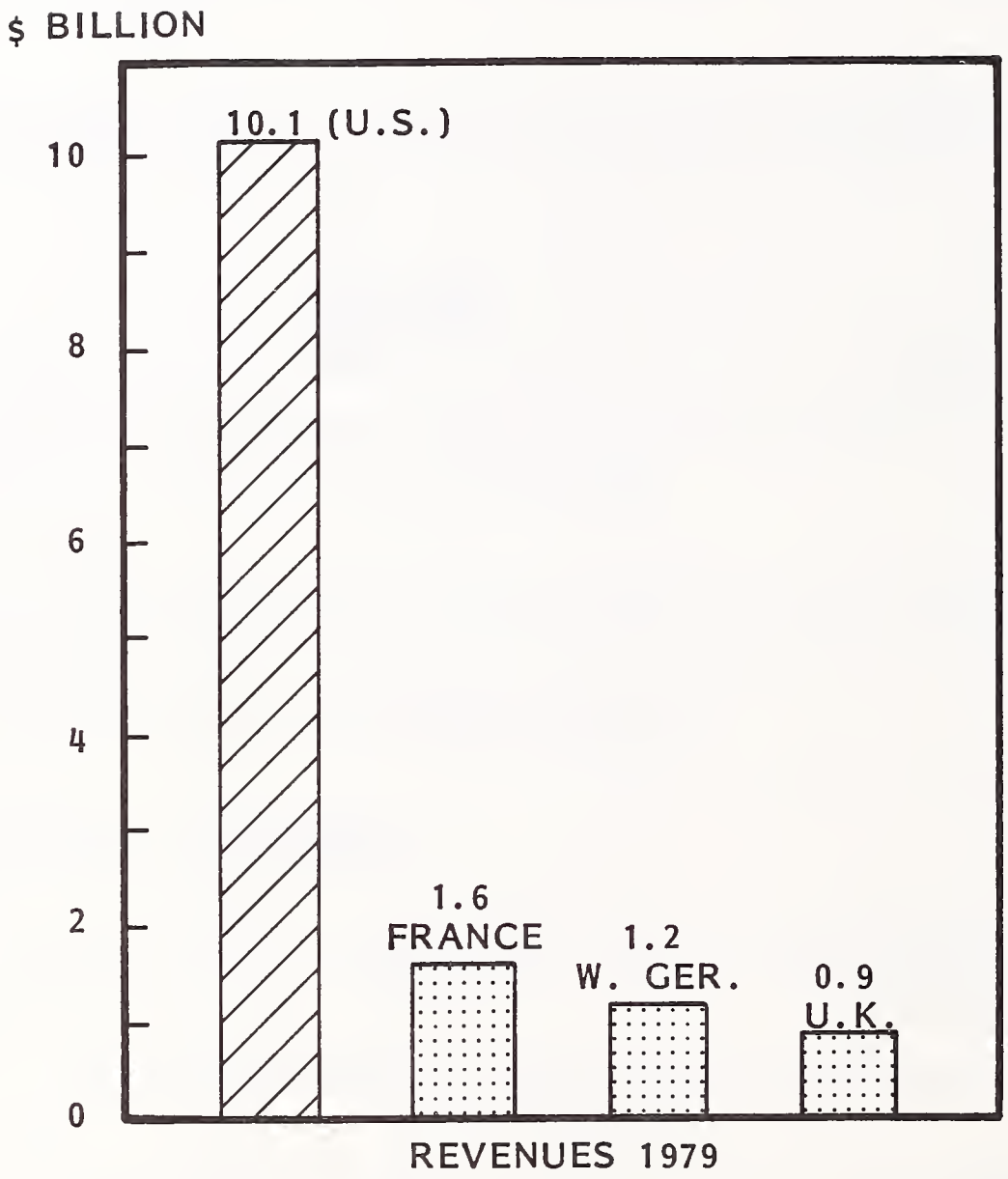
EXHIBIT III-1

PROCESSING SERVICES COMPANIES COMPETITION TABLE -
TOP 10 EUROPEAN INTERNATIONAL SUPPLIERS
(EXCLUDING MANUFACTURERS' SOFTWARE)

NAME	SERVICES REVENUES ($ MILLION)	NATIONALITY
IBM	$350	U.S.
GSI	180	FRANCE
CISI	160	FRANCE
GEISCO	100	U.S.
DATEMA	50 (EST.)	SWEDEN
UCC/AC-SERVICE	46	U.S.
CONTROL DATA	42	U.S.
ADP	24	U.S.
COMSHARE	23	U.S.
TYMSHARE	18	U.S.

EXHIBIT III-2

HOME MARKET BASE



- As hardware prices fall, the achievement of equipment manufacturers' growth targets has required new policies (thus creating powerful industry trends):

  - Increased volumes of equipment sales.

  - Increased contributions to revenue from software products and other services.

- How much of the present high growth of the software products sector is due to manufacturers' unbundling, is being researched in this year's MAS/Europe.

3. PROFESSIONAL SERVICES

- The professional services sector has, over the last five years, been primarily driven by the success of the minicomputer suppliers in penetrating the medium-sized to small businesses, and in spreading the use of equipment from the centre of larger organisations. With the advent of the micro and the desire of users to deal in many instances with one supplier, there is emerging a powerful force inducing software companies to assume the total responsibility for systems; i.e., turnkey responsibility, including the supply and charging for the hardware installation.

- Though many software companies have now changed their title to that of the 'systems house', there is a market reluctance to gear up fully for this work, especially in the small business end of the market where the rewards are not sufficient to balance the costs of dealing with the uneducated user. This reluctance of the professional services sector, except on larger, more lucrative systems, represents a considerable business opportunity to those processing bureaux prepared to enter the USHS sector.

4. TURNKEY SYSTEMS

- Turnkey systems was a concept originally applied to the large, real-time or data communications-based systems supplied for defence or other instrumentation-oriented projects. It involves responsibility for:

  - Hardware supply and installation.

  - System maintenance.

- It is tending to require handling by separate divisions in the larger systems houses, which have the necessary financial muscle to sustain losses from unsuccessful projects. A handful of companies in Europe have diversified from the systems house field into that of office automation 'bureautique.' It is significant that their move into this sector has been accompanied by the inclusion of a hardware capability.

B. PLANNING AT THREE DIFFERENT LEVELS - CORPORATE, MARKETING AND PRODUCT

- What is of most importance in the context of determining a strategy for the future lies at the intermediate level of marketing with a coherent image. The marketing director (or manager) inherits his total situation from two sources:

  - The board has decided long-term growth targets and these are handed down.

  - There is a pool of products/services in his current offering which acts as a starting point.

- His objective is to advise on how to get from the starting spot, the present, to the goal(s) for the company. He has to adopt the top-down and the bottom-up approaches:

  - Top-down, in that the goals should be set without great regard to the detail of their achievement.

  - Bottom-up, in that he has to interface to the existing product range.

- The situation is reminiscent of that child's game in which you are given five steps to change one five-letter word into another, and at each step you have to make a genuine, intermediate word.

- Defining the three levels as corporate policy, marketing, and product planning, the corporate goals are achieved by proceeding from a range of products/services earning current revenues to the targetted objectives by means of a series of product-range 'stepping stones.' Each intermediate objective must be clear-cut and definable. It must arise from answering in the affirmative the following two questions:

  - Does the projected product range add to the correct company image and stature?

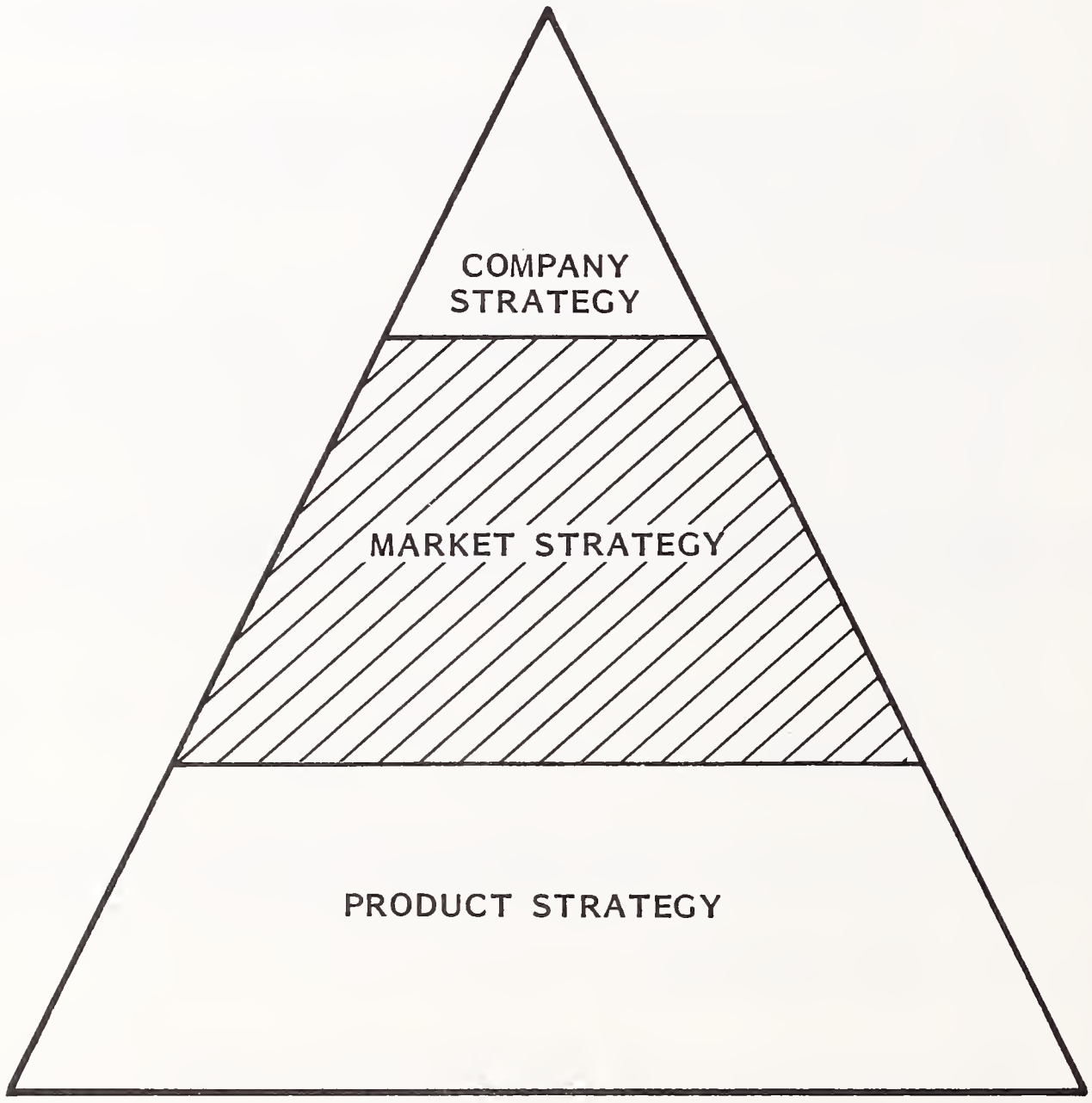
  - Is the position it gives us in the marketplace on the straight-line path to our longer-term objective (or is the deviation at least minimal for the options available)?

- And, of course, the whole set of objectives is subject to annual update, the classic moving target.

- This whole problem is one of product mix. Another way of stating it is to call it, 'putting it all together,' as shown in Exhibit III-3.

EXHIBIT III-3

PUTTING IT ALL TOGETHER



- A good illustration of how this difficulty affects users' perceptions of vendors is given by the diagram in Exhibit III-4. This shows the range of delivery mode orientations attributable to some of the major processing suppliers in Europe. Those chiefly into the batch or timesharing sectors, the top and bottom four respectively, are more easily identified as such. Those whose 'centre of gravity' lies in the central (remote batch) band are the ones whom you would spontaneously find it hard to pigeon-hole. In other words, certain roles are more visible and more identifiable than others; while visibility is not the only requirement for leadership, it is a major one.

C. COMPETITIVE ENVIRONMENT

- During the seventies, the European environment has been more hostile to companies of North American origin than to the indigenous suppliers. See Exhibit III-5 for comparative amounts of growth between 1972 and 1979. Leaving out IBM (which is, as usual, off the graph), the top six European companies, four of them French, have grown more than the top six American-based suppliers. A major contribution to this performance has been French government policy to discourage foreign acquisitions. This has left the field free for the native companies and, if size be the criterion, has been a successful thrust to achieve, if not pole position, at least parity of opportunity during the eighties.

- Measuring these leading French companies against the requirement for a coherent image and product mix leads to the inescapable conclusion that they don't have either. Neither does the UK's leading growth company, BOC. The simple truth is that all have indulged in an 'acquisition at all costs' policy, without proper planning to produce the necessary synergies. This is in contrast to the U.S., where acquisition is now more professionally carried out. The European leaders have now, therefore, got considerable problems in:

  - Day-to-day profit management.

EXHIBIT III-4

MODE-OF-ACCESS ORIENTATION
(SUBJECTIVE ANALYSIS)

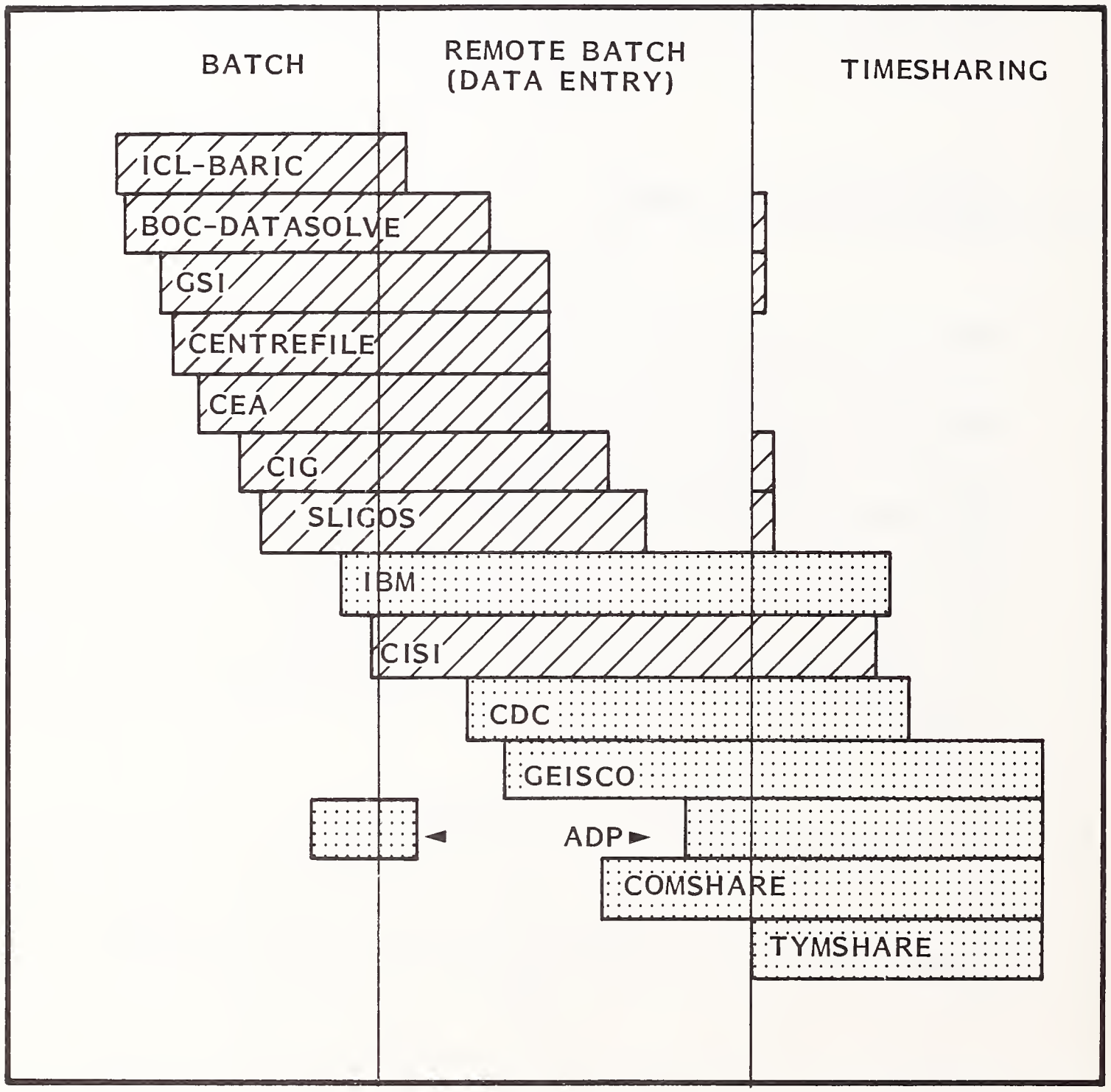
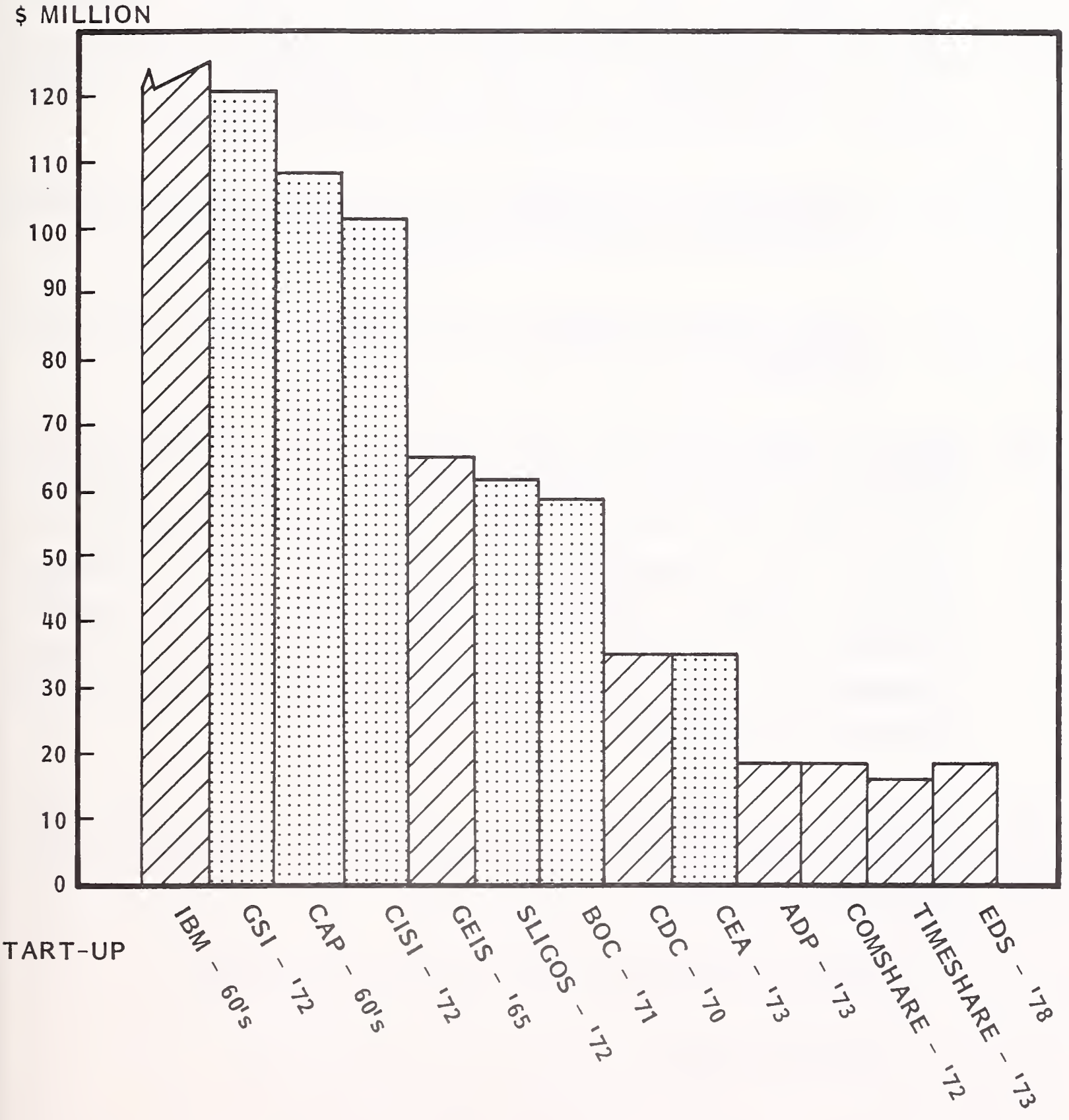


EXHIBIT III-5

EUROPEAN SERVICES OPERATIONS LEADING REVENUE GROWTH - '72-'79



- Building a corporate image for internal and external consumption.

- It should be noted that many of the larger American firms went through a similar phase of helter-skelter acquisition in the mid-1970s.

- These mistakes must be avoided in the 1980s by more judicious use of 'the money weapon.' It needs to be understood that in the less homogeneous marketplace of Europe, there is a proliferation of 'general purpose, all things to all men' enterprises. This makes rash acquisition a risky business. Acquisition, to be successful in Europe, requires one of two things:

  - Careful search for companies with sector-specific activities which add to market share or to desirable diversification.

  - Careful planning to integrate general-purpose companies into a corporate cadre.

- There is evidence that the second rank of European multinationals have learned from watching the experiences of their larger rivals. Nevertheless, there is still, too frequently, a trigger-happy approach to acquisitions and mergers. INPUT concludes that this immaturity on the part of European companies presages a resurgence for acquisitions by North American companies during the eighties. INPUT strongly recommends that European companies bring a more sophisticated and less mechanical management style to Europe in this next round.

- Apart from the leading positions of CAP/Sogeti, GSi, and CISI, North American companies dominate the European industry in those sectors where it can be made 'continental':

  - Remote computing, particularly interactive timesharing.

  - Software products.

- Indigenous companies lead in the traditional areas of:

  - Batch services (even when batch bureaux are installing remote data entry devices, the service being bought by the customers is perceived as a batch one, irrespective of delivery mode).

  - Professional services (the only market sector where Europe has overtaken the U.S. in revenue terms, see 'European Computer Services Industry Annual Report, 1979,' pages 19 and 20).

- During the first half of the eighties, batch services is forecast to grow less quickly than the rest of the market, and to go into decline in the second half as USHS becomes accepted.

- Professional services (without the inclusion of turnkey systems) is expected to continue to grow during the whole of the eighties, fuelled by:

  - Intense need for education, training, and other non-implementation services.

  - Technical consultancy requirements.

  - New installation services.

  - Continued software development and maintenance.

- Another prominent feature of today's European scene is that the national rankings are led by national companies with the possible exception of IBM in certain instances. In many cases, these leaders are companies with no international intentions. At this stage, this is to be expected; there are already clear signs, however, that over the last two years this attitude has been eroded. Though national markets are buoyant, the leaders are conscious that multinational suppliers can move into their markets almost overnight via the acquisition route. This realisation acts as an incentive to develop an overseas expansion policy of one's own.

- It is, therefore, to be expected that during the eighties a series of battles will be fought towards different ends:

  - The well-known timesharing companies will fight to hang on to their existing market sectors.

  - Those North American companies that haven't yet reached top-ten ranking in Europe will fight to win such placings.

  - Indigenous market leaders will fight to prevent themselves from being overtaken by incoming multinationals.

  - Truly European companies (i.e., headquartered in Europe and with operations in most European countries) will contend for overall market leadership with the U.S. leaders.

D. FINANCE AND OWNERSHIP

- Strategies will obviously vary with the size and market position of different enterprises. In analyzing the 3,000 companies currently in its CAMP/Europe Directory, INPUT is accustomed to subdividing the sector categories by size into A, B, C, and D companies. Category A companies are those currently turning over more than $10 million per annum, of which there are normally about 10-20 in each of the major countries. Companies in categories C and D turn over less than $1 million and $0.1 million respectively, and are what would be usually termed start-up enterprises run by their founder entrepreneurs. B type companies occupy the middle ground between $1 and $10 million. They may be:

  - Growing national enterprises.

  - Spinoff ventures from other industries.

- Foreign subsidiaries of larger companies based abroad, which haven't yet grown to major stature.

- This report will confine its attention to discussing strategies for Category A companies, though it also covers their diversification into other sectors and other geographies by means of smaller subsidiary operations.

- The sort of leadership battles which will be fought during the eighties, and the fast pace of technological change expected to continue throughout the decade, will make demands on corporate finances. There is every indication that the resources of the leading companies will be stretched.

  - Processing services and software products will require cash for new product development and for promotional and sales activities.

  - Systems, software, and turnkey suppliers are going to go on hiring quantities of expensive people and, in addition, will be financing an increasing involvement with hardware, such as development kits, customers' machines, spares stock, and maintenance aids.

- Cash, and the management ability to handle it effectively, is a key factor in determining the winners in the leadership stakes. While not necessarily decisive in the outcome, in situations where other aspects are equally matched, the possession of financial resources is bound to improve ones competitive position in new markets or old.

- It is instructive to examine the equity situation in the front-rank companies in Europe because it shows the strength of their backers. Exhibit III-6 gives some examples of the involvement of other sectors of the economy as investors in the computer services industry. The three major entrants are:

  - The banking sector.

  - Manufacturing industry.

EXHIBIT III-6

SOURCES OF INVESTMENT AND MANAGEMENT

SOURCE (NATIONALITY)	BANKING	INSURANCE	GOVERNMENT	INDUSTRY	OWNERSHIP	
					OWNER(S)	PERCENT
SOCIETE GENERAL (F)	X				GSI SG2 CCMC	24% 49 40
CREDIT LYONNAIS (F)	X				SLIGOS	80
CREDIT COM-MERCIALE (F)	X				GSI	24
SOCIETE GENERALE (B)	X				CIG	50
NATWEST (UK)	X				CENTREFILE	100
ABN (NL)	X				ARC	100
SAVINGS BANK (SW)	X				SPADAB	100
CENTRAL-BEHEER (NL)		X			CEA-CSR	100
CEA (F)			X		CISI	100
NEB (UK)			X		NEXOS INMOS ETC.	50
CGE (F)				X	GSI	52
BOC (UK)				X	DATASOLVE SOFTWARE SERVICES KNIGHT COMPUTING	100
JOHNSON GROUP (SW)				X	DATEMA	100
MBB (WG)				X	MBB DATEN-SERVICE	100
THOMSON-CSF (F)				X	TSIL SEMS	100
BP (UK & WG)				X	SCICON SCS	100

- Central government agencies.

- Banking is a prominent investor in France, the U.K., Scandinavia, and the Benelux countries. Other commercial concerns which have put in funds include the insurance companies.

- Manufacturing groups have bought into or spun off ventures in all countries of Europe.

- Central government's involvement, though the subject of much publicity, is often indirect; i.e., through a nationalised industry. But one needs to distinguish between:

  - The active role of the French government, through its atomic energy authority's (CEA) ownership of CISI (and through their shareholding in CAP/Sogeti, having also an interest in the professional services side).

  - The sort of public sector involvement in the U.K. in which it is incidental that the parent body is public; e.g., Compower (spinoff of the National Coal Board), and the Central Electricity Generating Board's computer centre.

- In both West Germany and the U.K., government has up to now seen the number one priority to nurture the local computer equipment supplier - Siemens and ICL respectively.

- Among all the computing services companies with European origins there is not one so far which has obtained or sought a public stock exchange quotation. This is in contrast to the U.S.A. where the larger home market had, as of 1979, at least two companies - CSC and ADP - with revenues in excess of $400 million. These sales totals would be sufficient to gain them entry into Fortune's 500 list for 1980 had they been industrial and not service companies. (Rank No. 444 in the current list is the first with over $500 million in sales; No. 500 has $409 million.)

- The big financial question for leadership in the market concerns the extent to which ownership and the backing it can give will help or hinder towards attaining goals. INPUT believes that finance is one of those secondary factors which don't ensure success, but certainly add to its probability if other things are equal. It is then a necessary but not a sufficient condition for success.

E. SUMMARY

- When talking of success in the big league of European computing services companies during the 1980s, a number of aspects enter:

  - First, it won't be possible to stand still in a market growing at around 20% per annum.

  - It is essential to understand the nature of the driving forces.

  - It is necessary to grasp the levers of the industry by adopting a positive, product-oriented approach; the old concept of following industry leads will not allow sufficient control of market forces.

  - Product orientation must consider the product mix, its coherence, and its presentability to the market.

  - A number of interests from outside the industry have large stakes in it at present.

    . Government and manufacturing industry would be more easily persuaded that they are dabbling.

    . The banking industry sees synergy and complementarity in this other service industry, but their long-term presence may fade, or be legislated against if electronic funds transfer becomes at all

widespread for the smaller (and more numerous) financial transactions.

- Finance and backing is a major asset, but won't be enough to offset poor management or poor marketing.

- To establish, manage, and continually update a winning product mix, it is necessary to understand the conflicting interests which are at work in the DP industry as a whole. Data processing is currently about systems, and systems require:

  - Hardware.

  - Software.

  - Services.

- The following chapters examine the other 'guests at the party' to see how they are all going to be satisfied by cuts off the DP cake:

  - The manufacturers.

  - The PTTs.

  - Government policymakers who realise the social import of computing.

  - The users themselves.

IV INFLUENCES FROM THE MANUFACTURERS

IV INFLUENCES FROM THE MANUFACTURERS

- It has only been in the last five years that the computing services sector has emerged from the shadow of the equipment manufacturers and gained respectability in its own right. This gain in stature has been due to two main factors:

  - The aggressive management of the industry leaders, first in the U.S.A. and now more recently also among the Europeans.

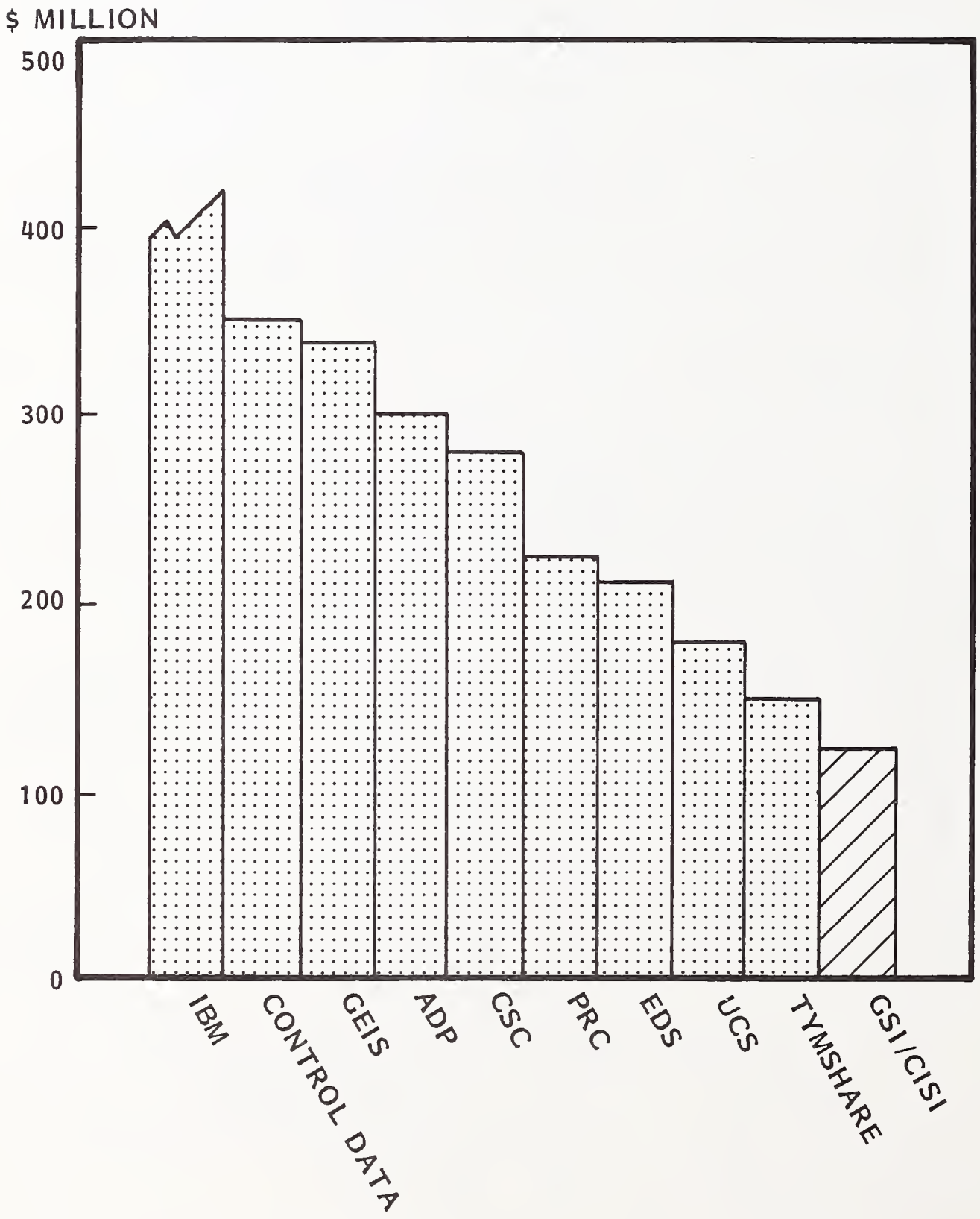
  - The increased viability of data networks, and the parity of glamour which this has brought to remote installations and remote services, when compared to local information engines.

- In spite of this achievement on the part of the services industry, INPUT forecasts that the equipment manufacturers will retain their position at the centre of the stage in the eyes of press and public. Their influence on technological developments will be such that they will remain one of the main driving forces throughout the whole decade. Their ability to command attention derives from their product orientation, and their ability to manage the product life cycle.

- Exhibits IV-1 and IV-2 illustrate an interesting comparison. The first shows the worldwide revenues of the services sector leaders, ranging across one order of magnitude from IBM's $1.8 billion to GSi's $0.16 billion. The second gives comparative revenues for equipment supplied by the major manufacturers operating in Europe, ranging from over $7 billion for IBM down to $0.25

EXHIBIT IV-1

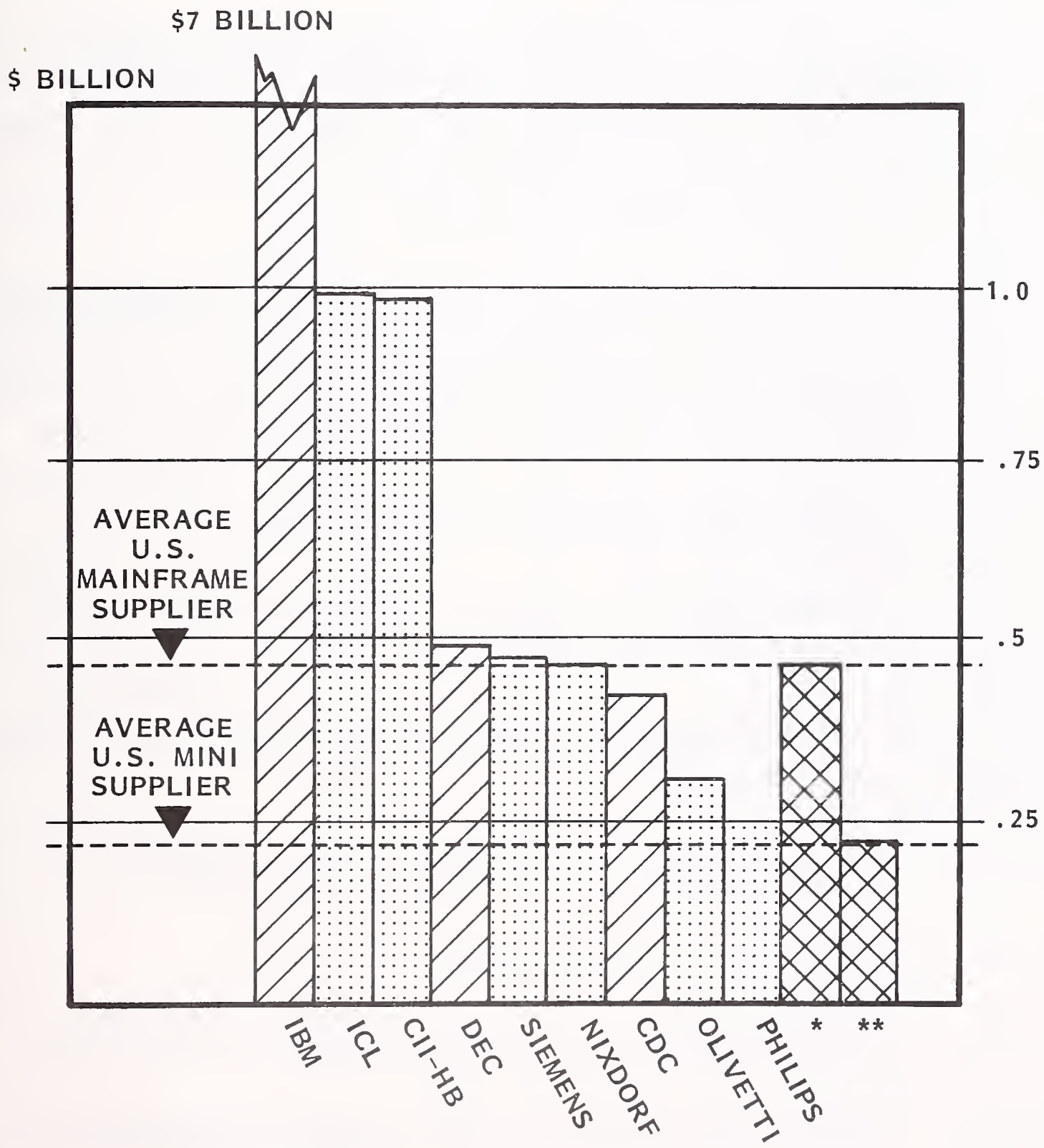
LEADING COMPUTER SERVICES COMPANIES'
WORLDWIDE REVENUES 1978



SOURCE: INPUT CAMP DIRECTORIES

EXHIBIT IV-2

COMPUTER MANUFACTURERS' WEST EUROPE INFLUENCE



ESTIMATED 1979 REVENUE WEST EUROPE

* - BURROUGHS, UNIVAC, HONEYWELL, NCR

** - DATA GENERAL, HEWLETT-PACKARD, PRIME, ETC.

SOURCE: INPUT EUROPE DATABASE

billion for a typical, U.S.-based, mini manufacturer. Taken together, they demonstrate that the average minicomputer supplier turns over more in Europe than the largest European-based company (GSi) turns over worldwide. (As we have seen from Exhibit II-3, of the companies operating in Europe, in 1979 only IBM's services revenues in Europe exceeded GSi's.)

- The revenue profiles of equipment sales by indigenous manufacturing companies follow very much the same pattern as those of the computing services home market bases given in Exhibit III-2. IBM turned over around seven times more than ICL, CII-HB, or Siemens and Nixdorf combined, while IBM services turned over eleven times the revenue of GSi.

- Looking through to the end of the decade, and comparing the positions projected for the market leaders, one gets some idea of the possibilities by using historical growth rates as reported in their annual accounts. INPUT's projection is given in Exhibit IV-3 for eight important industry names:

  - IBM, by virtue of its present commanding lead.
  - Xerox, representing the potential of the convergence between office products and data processing.
  - Honeywell, the leader among the other mainframe suppliers, the 'seven (now five) dwarfs'.
  - CDC, like IBM, big in both mainframe and services sectors.
  - Digital, the leading mini supplier.
  - Intel, representing the computer-on-a-chip.
  - ADP and GSi representing U.S. and European services respectively.

- Obviously, such an analysis leaves out important companies:

EXHIBIT IV-3

PROJECTED REVENUES - INDUSTRY LEADERS

NAME	CAAGR*		REVENUES ($ BILLION) 1979	1984	1989
IBM	HIST.	17%	$22.9	$50.2	$110.1
	CONS.	10%		36.9	59.4
XEROX	HIST.	27	7.0	23.1	76.4
	CONS.	20		17.4	43.3
HONEYWELL	HIST.	13E	4.2	7.7	14.3
	CONS.	10		6.8	10.9
CDC	HIST.	21.5	2.2	5.8	15.4
	CONS.	20		5.5	13.6
DIGITAL (DEC)	HIST.	38	1.8	9.0	45.1
	CONS.	20		4.5	11.1
INTEL	CURR.	60	0.66	6.9	72.6
	CONS.	25		2.0	6.1
IBM (S/W AND PROCESSING)	HIST.	25	1.8	5.5	16.8
	CONS.	20		4.5	11.1
ADP	HIST.	22.5	0.37E	1.0	2.8
	CONS.	18		0.84	1.9
CDC (SERVICES)	HIST.	21.5	0.40	1.1	2.8
	CONS.	20		1.0	2.5
GSI	CURR.	30	0.16	0.60	2.2
	CONS.	22		0.43	1.2
IBM EUROPE (PROCESSING)	HIST.	18E	0.31	0.70	1.6
	CONS.	13		0.57	1.1
(SOFTWARE PRODUCTS)	HIST.	28E	0.27	0.90	3.2
	CONS.	22		0.73	2.0

*NOTE: HIST. = HISTORICAL CAAGR; CURR. = CURRENT CAAGR; CONS. = CONSERVATIVE; CAAGR = SEE TEXT; E = ESTIMATED

SOURCES: FORTUNE 500 DIRECTORY, INPUT PROJECTIONS

- Texas Instruments, Hewlett-Packard, Storage Technology, CSC, and Philips to name a few, who would claim to have a unique contribution to make to the future of the industry.

- The companies used were selected as landmarks to chart the development of key sectors.

- In order to test the possibilities for change in leadership status in the various sectors, two rates of compounded growth were used for each entrant in the table:

  - An historical rate based on sales revenue growth since the company entered the Fortune 500 Directory (this has had to be replaced by an estimated or current growth rate where the historical rate was not known); this rate reflects an upper limit on predicted performance, the contenders having reached present status on the strength of it.

  - A conservative rate predicted by INPUT to indicate poor or average performance.

- The analysis shows that:

  - Xerox, Digital, and Intel on present course could all be closing on IBM by the end of the decade.

  - Of these three, Xerox has the longest track record to back such a proposition.

  - Neither ADP's nor CDC's services revenues will be able to catch up with IBM's taken worldwide, but the two are more likely in the U.S. market to be watching each other (initially at least, or until IBM returns to the processing services market in the U.S.).

- On present performance, GSi can overtake IBM's processing revenues in Europe, but not until the second half of the eighties.

- IBM will experience multiple contention for its leadership position in individual market sectors from:

  . Xerox, for both current and future office systems (OPD).

  . DEC, for the small business market (GSD).

  . Intel, challenging IBM's policy of vertical integration of components.

  . The Japanese, in the medium and large systems end (DPD).

  . Storage Technology (STC), for the lucrative future disk markets.

- The only areas where IBM would appear safe from serious challenge are:

  - Processing services, which it can now (post-1979) reenter in the U.S.

  - Software products, where there is still further room for unbundling and where IBM has a great deal of control over its customer base.

A. IBM - 1979 A WATERSHED YEAR

- With its announcement of the 4300 Series processors in January, 1979, IBM's DPD took a mammoth swipe at the plug compatible manufacturers who had attempted to siphon off more and more of its traditional commercial customers. However, by setting its prices for the series as low as it did, IBM also succeeded in impacting its own two computer divisions to some extent:

- GSD, by pricing 4331 so close to the new System/38.

- DPD itself, by setting off speculation regarding the imminence of the 'H' Series launch, so delaying closures on 3030 Series prospects.

- By the end of the year, IBM had had the satisfaction of seeing Itel sell off its computing interests, and both Amdahl and Memorex struggling for profits, but at the same time had itself:

  - Seen a greater proportion of systems installed on a rental or lease basis than budgetted.

  - In consequence, had for the first time in its history to go to the money market for loan capital.

  - Reported a fall in the rate of growth of its net earnings, another first in its record.

- Industry watchers began to debate whether these were the long-awaited signs of a crack in the giant's facade, indicating that IBM was past its best.

- 'IBM watching' has grown as an industry to a point where, to justify its own existence, it tends to engender a feeling that 'the crash is coming'. IBM has been so successful that one is bound to harbour doubts of its ability to continue in this way indefinitely. INPUT's view is that IBM's management is excellent, its prospects for the future are superb, its misjudgement of the correct price level to set for the 4300 was an error but was only wrong by a few percentage points. Yes, there are plenty of problems and battles ahead for IBM, but the problems it is experiencing are within its capability to solve and are the type of difficulty any enterprise must expect from time to time. You don't have to be a superman to be excellent.

- A long-standing industry forecast concerning IBM's future proposed that the company's eventual role will be that of the leading world computer utility.

According to this theory, once IBM, through its shareholding in SBS (Satellite Business Systems) has got the capability to 'pipe' computing power into every establishment and home on the globe, it will change the emphasis from selling equipment to the task of selling computer power. In other words, it will move from being principally a manufacturer to being a network services supplier. How many years, the theory's advocates ask, have the processing service bureaux got before their market is taken from them by IBM?

- INPUT's view on this theory runs as follows:

  - It is certainly an option that IBM wishes and will attempt to keep open.

    . To this end, IBM will reenter the U.S. services market in the next three years.

  - It presupposes that equipment supply has become a poor market for IBM.

  - IBM would not do it until worldwide equipment sales had become nearly saturated.

- The decision would, therefore, be tied to a downturn in its equipment market share, an event which is not likely until the end of this decade, given the undeveloped world markets for all three of IBM's divisional products. Exhibit IV-4 presents a list of IBM's main European characteristics.

B. DEC AND ITS RIVAL MINI MAKERS

- In one important respect, Digital is a more mature company than IBM or any of the other smaller mainframe suppliers. DEC has already picked up a wealth of experience of working with a classical distribution network:

EXHIBIT IV-4

IBM IN EUROPE

- REMOTE COMPUTING REVENUES
  - W. EUROPE - 1979 = $350 MILLION (EST.) INCL. CAPTIVE
- NATIONAL ORIENTATION
  - (FRENCH GROWTH IN 1979 = 34%)
  - CALL + VSPC
  - PROGRAM PRODUCTIVITY SERVICE (SOFTWARE SUPPORT)
  - OECD DATA BASE
  - TERMINAL BUSINESS SYSTEMS
  - I/S (INSTRUCTION SYSTEM)
- EPCS (EUROPEAN PERSONAL COMPUTING SERVICE)
  - TOTAL EUROPEAN COVERAGE
  - SNA PROTOCOL
  - ZOETERMEER, NETHERLAND BASE

- OEM systems houses.

- Terminal and component distributors.

- Up to the present point of its development, the company has grown at almost 38% per annum since it first entered the Fortune 500 Directory in 1973. It has done this with a product range which covered all sectors of the equipment market, mainframe, mini, components, and latterly microprocessors. Its machines have been put to work in commercial, scientific, and real-time applications, and in all industry sectors. This achievement could certainly not have happened without at the same time fostering a loyal network of software houses, distributors, and users.

- Recently, there has been speculation that Digital wished, over the course of time, to lower its dependence on the third parties and to increase its end user sales. This was certainly the case not so very long time, but this was a a time when its end user involvement had dropped to a point where it was in danger of being unresponsive to user needs, because it was out of touch with them.

  - Digital has found it fairly difficult to increase its end user sales in the PDP/11 range, but both DEC System 20 and the VAX markets are susceptible to traditional direct selling.

  - In addition, DEC is opening retail stores for LSI/11 based products and peripherals.

  - The company has decided that it must have a balanced ratio of direct to indirect sales at a time when the market is volatile and subject to overnight introduction of new technology.

- The OEM market for DEC, Data General, and other manufacturers is buoyant and will remain so for the rest of the decade. DEC estimates that there are two million small businesses in the U.S. with annual sales of over $100,000, and another 12 million with equivalent sales under that figure.

- In the first of these, DEC will be in contention with IBM's GSD as well as the other small business computers.

- In the latter, LSI/11 based products competition will be from the personal computer suppliers; IBM will not enter this market until a true consumer market has been established.

- Digital aims to be number two to IBM in the industry. It will certainly achieve that goal unless, through convergence with office systems and consequent redefinition of the market, Xerox gets there first. Along that route, DEC will create markets for:

  - Systems and software suppliers in both turnkey and joint-bid situations.

  - Software product companies, chiefly as component suppliers to the distribution network.

- Processing bureaux cannot expect to receive revenue via the mini suppliers; to them the relationship is that of a source of 'power supply'. DEC claims currently to be the number two supplier worldwide to the service bureau community.

C. THE PERIPHERAL SUPPLIERS

- There are three main classes of suppliers specialising in peripheral equipment:

  - Data communications.

  - Terminals and off-line data capture.

  - Storage devices.

- In all three classes, both large and small companies operate, and in some cases whole systems with built-in intelligence (e.g., retail POS sector) are supplied.

- This sector is not in competition with the computing services companies for business. Exhibit IV-5 indicates that its significance as a market force is related to the falling cost of file storage, and the effect this is having of bringing the larger companies even more into contention with IBM.

- As processor power increases and its attendant costs fall, manufacturers need to find new revenue sources. Shifting the burden of installation cost away from processors and onto storage peripherals is one way of doing this. INPUT has calculated that up to 80% of central site systems cost will be attributable to storage peripherals by 1984.

- In the late sixties, IBM was challenged by the PCM suppliers in its lucrative disk market and the challenge was beaten off with casualties on both sides. The eighties will see a similar battle, this time with the Japanese taking part as well. The outcome is not certain; IBM's success or failure in the mass market for storage devices will play an important part in any decision to switch in 'plan B' to move seriously into the computer utility market.

D. MICROPROCESSORS AND THE INSIDUOUS CHIP

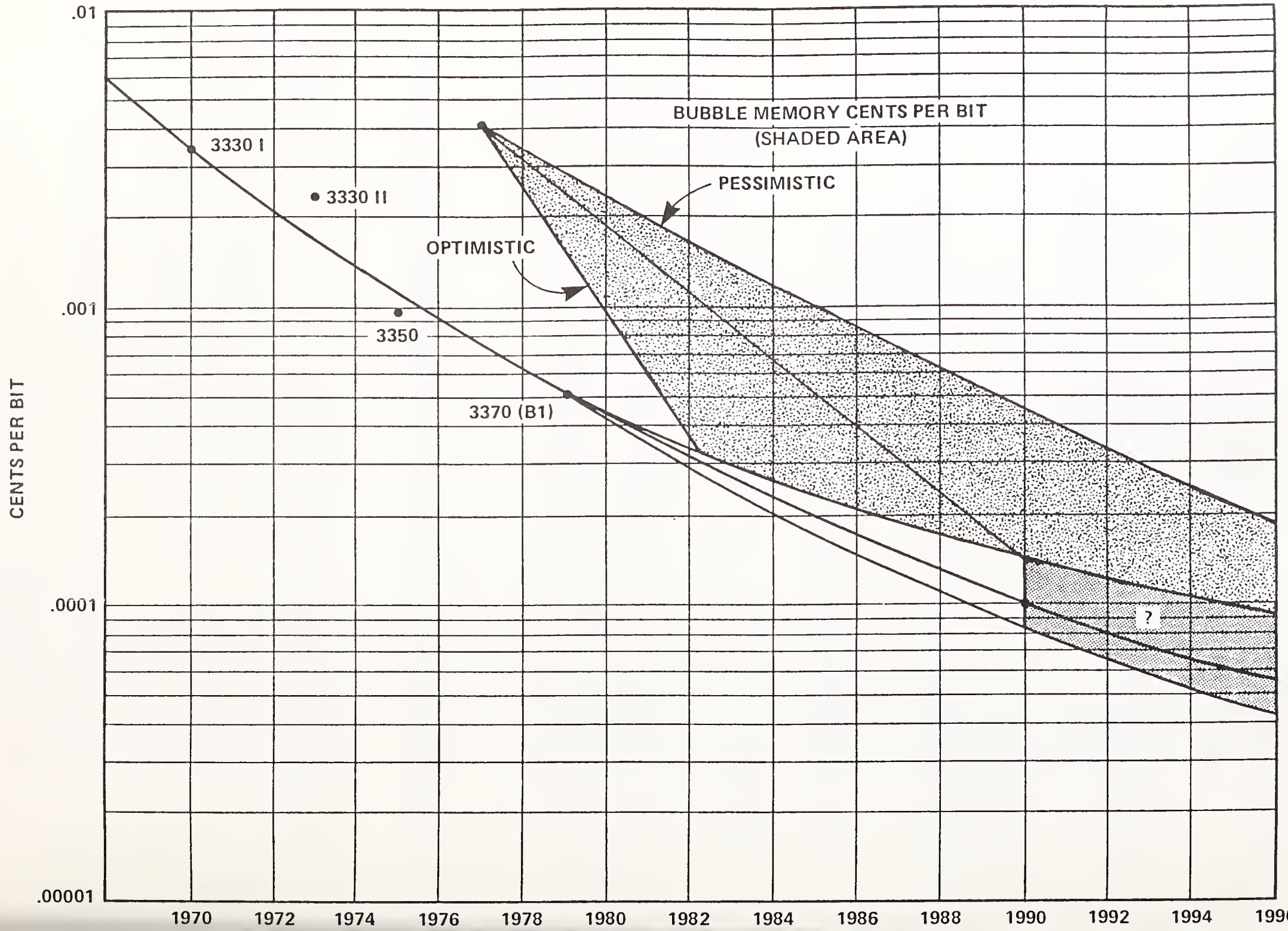
- Microprocessors came to the public attention in a blaze of publicity. Expected at first to replace mainframe and minicomputers, what we have seen is an absorption of the power, flexibility, and cost effectiveness of these and other devices-on-a-chip into the whole range of equipment now being offered by all classes of systems suppliers. Instead of replacing existing systems they have:

  - Enhanced their flexibility in succeeding generations.

  - Allowed them to be upgraded in more sophisticated ways.

EXHIBIT IV-5

STORAGE COST PROJECTIONS



- Opened up new markets for the packaged versions of themselves, the personal computers.

- The successes of Intel, National Semiconductor, and Motorola are typical of the different paths which companies have taken on the back of this new wave. One thing they have in common is the need to distribute their products through a network. They are more like DEC than IBM in this respect.

- The true consumer market for personal computers has not yet been created. The problem is one of a situation looking for a problem. Personal computers have, therefore, had to take stock and aim for volume sales at the very small business systems (VSBS) field.

- Opportunities exist for services companies in:

  - The VSBS market as defined.

  - The supply of packaged routines to the micro manufacturers.

  - The 'slot machine' hire of games based on personal computers.

- Some of the difficulties with these markets are:

  - The size of the added value.

  - The fact that they are down-market.

  - The loss of the habit among service companies of thinking in really large volume terms.

- The impact of the chip on service companies is more indirect than direct:

  - It doesn't remove any markets from them.

- It opens up new possibilities for users from which service companies must profit.

- It permits more varied and cost effective USHS offerings to be made.

- The microprocessor's largest single sphere of influence throughout the eighties will be in association with the office automation boom where:

  - Opportunities for system and software providers will be greater than for processing services.

E. OFFICE EQUIPMENT SUPPLIERS

- Word processing has spearheaded the move of the office products suppliers to automate their traditional offerings. The economics of office automation have been well documented:

  - Office costs have gone up.

  - The office has become the last refuge of the working human being. (We are all now clearly visible as a cost target for suppliers casting around for benefits on which to sell their kit.)

  - Having automated the factory, the office is the natural next port of call.

- System designers, social workers, trade unionists, and others don't see the automated office in such simple terms. INPUT is closer to their point of view. The office as the organisation's nerve centre and decision makers' residence is a lot more complex in human terms than at first sight appears to the well-trained HIPO mind.

- For this reason, INPUT foresees multiple opportunities associated with office-of-the-future installations:

  - A resurgence of OEM and systems analysis.

  - Systems supply on a turnkey basis.

  - Consultancy and education facilities.

  - Communications and network installation services.

- The reaction of the equipment suppliers will be initially to try to sell and install preprogrammed, modular kits. Later, as the market develops, they will vet and recommend ancillary services from third parties. Services companies have three options:

  - To wait for the manfuacturer to approach them for help.

  - To offer complete turnkey systems, perhaps on a kit of their own name; e.g., as Logica/VTS has done in the U.K.

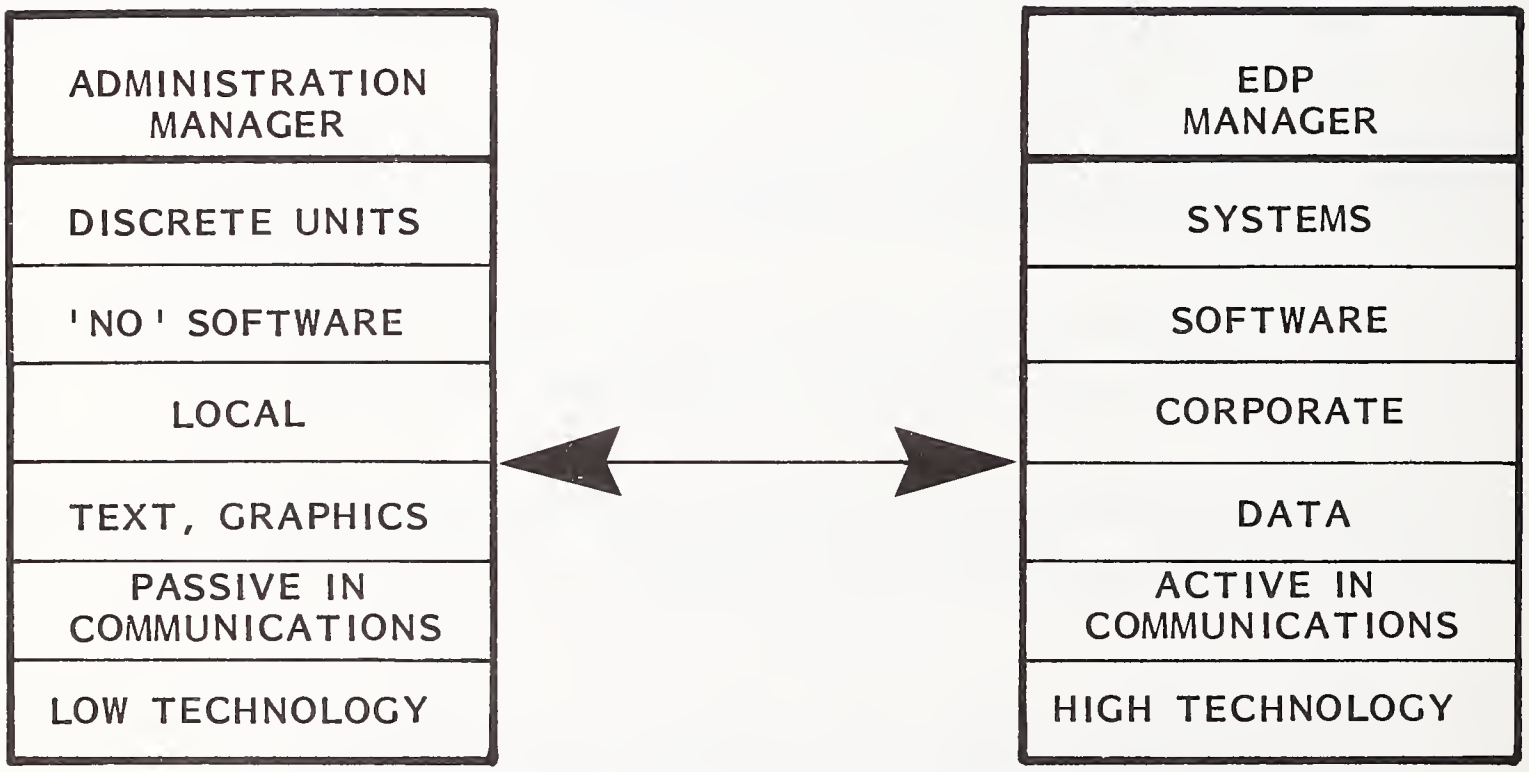
  - To offer specific office automation facilities in conjunction with their own small business systems offerings.

- The first two of these routes are high risk; the third is the classic, piggyback solution so appropriate to a volatile, fast-moving situation.

- The MAS/Europe programme is researching this field with users and vendors. Exhibit IV-6 illustrates marketing channels not normally tapped by CS vendors.

EXHIBIT IV-6

OFFICE OF THE FUTURE



A KEY QUESTION - MARKETING

THE RCS COMPANY OFTEN CALLS ON NEITHER

V INFLUENCE OF THE COMMUNICATIONS ENVIRONMENT

V INFLUENCE OF THE COMMUNICATIONS ENVIRONMENT

- The European communications environment is at a stage of development where many observers find it hard to see the woods for the trees. The multiple demands upon the PTTs from competing organisations and converging technologies have placed the problem of defining the best strategies for a particular group of suppliers upon an altogether different plane of complexity. In this situation - where a maximum range of options is available, but there is a high degree of confusion about which will be winners (aren't winning options those that are chosen by 'winner' individuals?) - a number of approaches are valid, ranging from:

  - The conservative approach, which is to retrench on current product offerings, waiting until confusion subsides and watching carefully both for short-term opportunities along the way and for the long-term trends.

  - The bold approach, which strikes out in a particular direction in the manner of a leader, so inducing others and competitors to follow suit.

- Which of these approaches is taken will depend not only on the temperamental inclinations of a company's decision-makers, but also on the amounts of money required to go through with a more or less bold approach. Finance being the prerequisite, the bold approach will only be available as an option to the already established leaders; but this is not to imply that the path of the other option is any easier.

- Retrenchment around the current offering does not mean stagnation. It means above all else:

  - Cultivate your current customer base; they are the people that a supplier must turn to for guidance when the future is opaque.

A. THE EVOLUTION OF NETWORK TECHNOLOGY

- It is necessary to understand the driving forces which impinge on the European telecommunication suppliers - the monopoly-holding PTTs - at this time. Some of the pressures are commercial, some technical, some political. The reactions to them have not been uniform across Europe, and, in the final analysis, the political strain has been the most powerful and influential. PTTs have reacted in ways which are most characteristic of each nation.

- INPUT perceives three underlying and very basic driving forces which are creating the almost insatiable demand for telecommunications facilities:

  - The historically unique example of the U.S. mass market.

  - The impact of TV as a mass medium.

  - The power of big corporations, which affect the working lives of such a large proportion of the working populations of the industrial world.

1. THE U.S. MASS MARKET

- The power and momentum for growth of the U.S. mass-market economy has, since the second world war, created two free-world partner-rivals.

  - The Japanese, who threaten always to take over any stabilized, mass-consumer market.

- Western Europe, loosely confederated in a number of different ways - EEC, EFTA, Council of Europe.

- In political circles of the EEC, both the U.S. and the Japanese have for some time been seen as threats to the continued prosperity of the comparatively fragmented European economies.

- EEC Commission policy has, among other objectives, aimed to counter this trend. Three major projects initiated by them stand out as examples which have met with varying degrees of success:

  - The attempt to create a European computer manufacturing enterprise capable of matching IBM, the ill-fated Unidata organisation.

  - The attempt to create a European telecommunications network, the partially successful Euronet project (discussed further below).

  - The move to standardise telecommunications procurement procedures across all EEC PTTs, the Davignon Report, thereby ending the de facto support by individual authorities of their native suppliers (e.g., support by the U.K. Post Office for GEC, Plessey and STC).

2. TELEVISION

- The influence of television has conditioned modern, industrial humanity to accept information about remote events as readily and easily as Phileas Fogg used to read his 'Times'. Our ability to be unconcerned, some would call it objective, about what we see on the small screen is well known and marked; in contrast, local and national news is not treated with the same indifference. The penetration of TV sets per household is extremely high (above 90%) in all industrial nations and does not seem to vary according to relative poverty levels within these communities. This has a very important impact on the next round of computerisation because:

- The computer is not an acceptable device in the way that TV is.

- Information on a screen has a glamour which computer hardware no longer has.

3. LARGE COMPANIES

- The larger, 'leading edge' companies have over the years largely fought and won their battles with the European PTTs to set up company networks for data communications, telegraph and facsimile transmission. Their immediate concerns today are:

  - To extend their existing networks.

  - To ensure that present and future PTT policies do not cause degradation of existing facilities.

  - To loosen PTT monopoly positions, in particular, to give degrees of freedom to implement 'office-of-the-future' applications. A specific example revolves around the issue of electronic mail, expected to experience very sharp message-volume growth in the next five years.

- Exhibit V-1 depicts the different classes of network which are supported by the PTTs at present: in some, they are themselves represented as suppliers of end user network services, while in others, the majority, they are only the providers of the transmission capability. Currently, at least one PTT is offering the following:

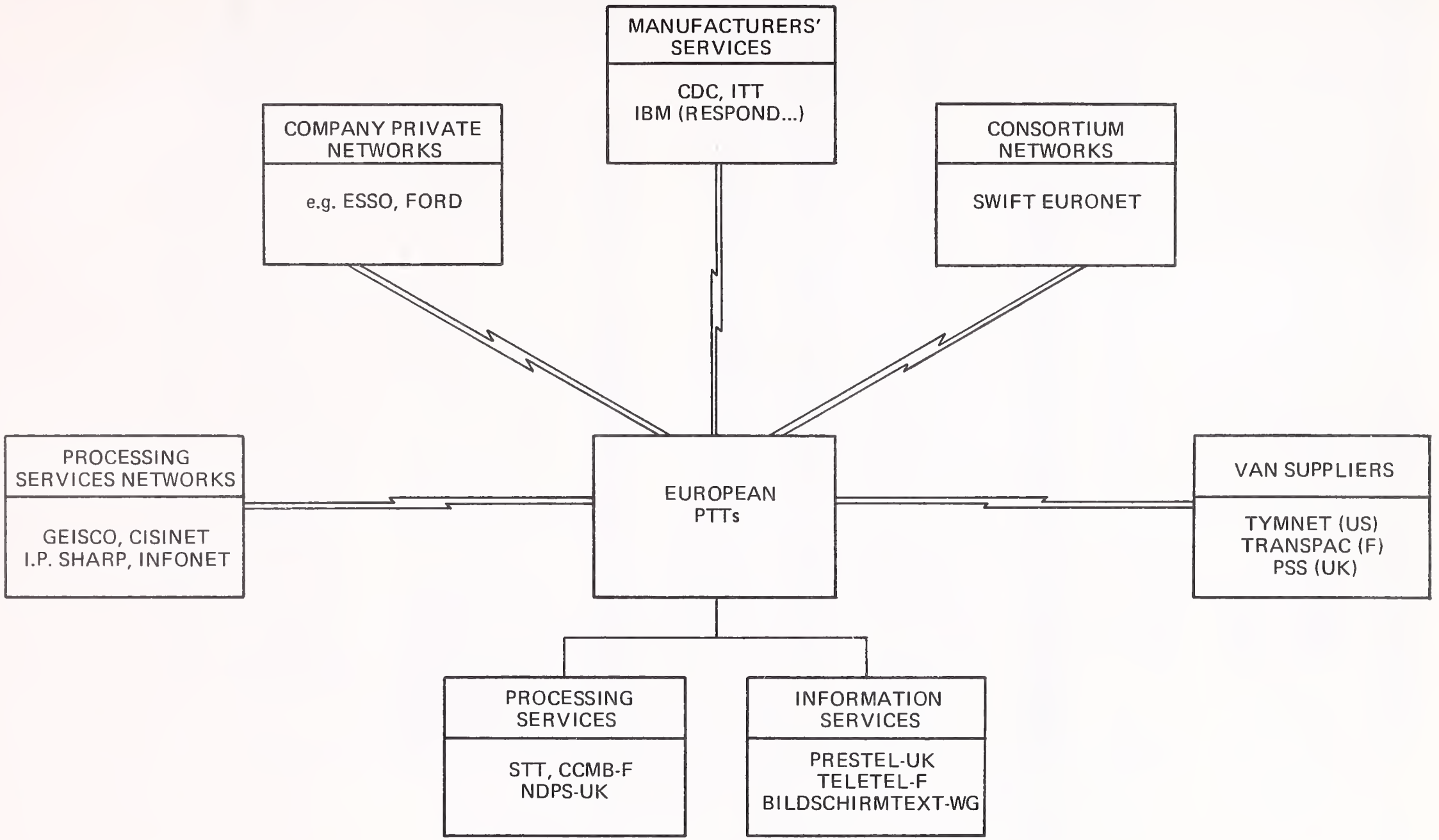
  - Traditional computer services, whether batch or RCS.

  - Information services, whether database or videotex.

  - Value added networks (VAN), now coming to be known in Europe as Public Data Networks (PDNs).

EXHIBIT V-1

EUROPEAN COMMUNICATIONS SCENE



- The diagram does not include the well-established PTT services provided by:
  - Telephone.
  - Telex.
  - Facsimile.

B. MONOPOLISTS, COMPETITORS OR PIONEERS?

- Until very recently, computing and communications in the U.S. were separate industries and identifiable as such:
  - The one hotly competitive and subject to little restrictive legislation.
  - The other a virtual monopoly, operating in a closely regulated environment.
  - Neither activity had anything to do with the mail or postal system.
- This separation was initially good for computing and so was the strong monopoly position of AT&T. Both enabled U.S. data communications skill to develop rapidly, sustained by high-quality transmission facilities at reasonable cost and uniform availability across most of the continent.
  - The present loosening of both the telephone company's monopoly position and the constraints placed on it not to compete outside its prescribed fields, owes as much to the competitive pressures from data processing and to the speed of technological development as it does to any shortcomings in AT&T's past performance.

- Monopoly privilege and the necessity for regulation have not so much been discarded as deemed inapplicable; it is more a case that the industry (information rather than communication) to be regulated is still in embryo and cannot yet be discerned, still less the aspects and the parties which need regulation.

- This particular trend in the U.S. has crossed into Europe. A debate on the future of the monopoly position of the PTTs has been going on in U.K. circles since the election of the Thatcher government. So far the only tangible result has been the decision to split the P from the TT in the case of the British Post Office; and it is rumored that both halves, the mail and the telecommunications side, are likely to feel the winds of private competition.

- The question then arises of whether other authorities will follow suit, and whether there will be a state of deregulatory legislation which will improve the commercial freedom of processing services suppliers across mainland Europe. INPUT thinks not. There is no evidence that the arguments of the demonopolists hold any weight in continental countries.

- France is embarking on a major overhaul of its outdated telecommunications equipment and had, by the end of 1979, made enormous strides in this direction. France's plans have included:

  - Millions of new subscriber telephones and telephone lines.

  - Improvements to the Telex network.

  - Set-up of a standard (CCITT group 2) facsimile service, Telefax, to be supplemented later by message-switching facilities and eventually by public fax.

- Enhancements to data transmission facilities, culminating in the commissioning, at the end of 1978, of the Transpac packet-switching network, on which have already been implemented three value added services - STT, CCMB, and Simplexcom.

- Group teleconferencing capability.

- An interactive videotex service (telebureautique) called Teletex.

- A community text processing service.

- A national telecommunications satellite, Telecom-1.

- The plans of the French are aimed also at commercial opportunities for their domestic equipment abroad both in developed and developing countries.

- West Germany, which has always had the best (most comprehensive and most reliable) communications in Europe, has recently shown no sign of moving toward a 'less regulated' position. On the contrary, the Bundepost has announced its intention in 1981 to enforce a regulation on transborder data transfer, to the effect that only data which has been 'processed' in West Germany may be exported.

- The Scandinavian countries have installed a Nordic Public Data Network (NPDN) based on circuit-switching techniques and are currently enhancing this to cope with X.25 packet switching. The mutual arrangements agreed between the four countries make it difficult for a loosening of regulations to take place without prior consultation with the other network partners, so that one must expect these countries to move slowly, if at all, towards dismantling the PTTs' monopoly. Another factor retarding such a move is the Swedish government's sensitivity to the privacy and security issues, because of its stated wish to retain neutral status in any third world war.

- Italian telecommunications are probably the least developed in Europe and could profit by being subjected to private competition.

- The Spanish authority (CTNE) was one of the first to recognize the usefulness of packet switching. In fact, Spain's RETD packet network was implemented before the X.25 standard became current and has had to be modified to go over to the international standard. The Spanish have a record of working well with foreign telecommunications contractors (e.g., ITT, CSC). Now that the French have bought into the computing services industry (GSi purchased Seresco in 1979, see INPUT report, "Acquisition Policies For Europe"), the growth of the country's economy coupled to the presence of a packet network makes Spain an opportunity market for the first half of the eighties, particularly for RCS vendors with a down-market, USHS offering. Alongside these developments one can expect to see an accommodating attitude on the part of the PTT.

- The Benelux countries, being small and strategically placed for international communications, are more dependent on their neighbors when it comes to decisions on data communications. In Belgium, the attitude toward private telecommunications contractors is more relaxed than in Holland.

- Exhibit V-2 ranks the European countries in terms of the current and likely future attitudes toward monopoly positions of their PTTs. The U.K. heads the list while two Scandinavian countries are the least "liberal."

- Exhibit V-2 also tabulates the present and planned Public Data Network offerings of the fifteen most important countries:

  - Five countries (U.K., Spain, Belgium, Netherlands, and France) will be relying mainly on packet switching techniques at least until 1985.

  - Eight countries (Italy, Austria, Switzerland, West Germany, and the four Scandinavian) will offer circuit-switching techniques as the basis of the networks, though West Germany also offers packet switching.

EXHIBIT V-2
MAJOR PUBLIC DATA NETWORK FACILITIES FROM THE EUROPEAN PTTs

COUNTRY	NETWORK NAMES AND IMPLEMENTATION DATES				
	PS	CS	MS	EURONET	IVT
UNITED KINGDOM	PSS (1980)	PSDS (1984)	ILTMS (1981*)	(1980)	PRESTEL (1980)
SPAIN	RETD(1972) (1979*)	(1984)	–	(1980)	–
BELGIUM	(1981)	(1985)	(>1983)	(1980)	–
NETHERLANDS	DN-1 (1979)	(>1982)	–	(1980)	–
ITALY	via EN (1981)	(1979-1982)	–	(1980)	–
FRANCE	TRANSPAC (1978)	–	TELETEX (1979)	(1980)	TELETEL (1981)
NORWAY	via NPDN (>1981)	NPDN (1979)	–	via NPDN (>1981)	–
AUSTRIA	–	(1979, 1981*)	–	–	–
SWITZERLAND	via EN (1980)	EDWA (1979) EDWS (1982)	SAM (1981) via EDWA/S	(1980)	–
WEST GERMANY	DATEXP (1979)	DATEXL (1978)	via IDN OR DIREKTRUFNETZ	(1980)	BILDSCHIRMTEXT (>1981)
LUXEMBOURG	–	–	–	(1980)	–
DENMARK	via NPDN (>1981)	ODN (=NPDN) (1979)	–	(1980)	–
IRELAND	–	–	–	(1980)	–
FINLAND	via NPDN (>1981)	NPDN (1979)	–	via NPDN (>1981)	–
SWEDEN	via NPDN (>1981)	NPDN (1979)	–	via NPDN (>1981)	–

SOURCE: EURODATA FOUNDATION AND INPUT ESTIMATES

KEY: PS = PACKET SWITCHING
CS = CIRCUIT SWITCHING
MS = MESSAGE SWITCHING
IVT = INTERACTIVE VIDEOTEX (VIEWDATA)
EN = EURONET
* = MAJOR UPGRADE
> = NOT BEFORE

- Two countries (Ireland and Luxembourg) have to rely on Euronet for any facility at all.

- This set of choices over the existing technologies creates a split in Europe down a line represented roughly by the rivers Rhine and Rhone, with countries to the West of the line mainly going for packet-switching and countries to the East, for circuit-switching.

- International interworking of networks is the next major problem facing the PTTs. Having (for a combination of political and technical reasons) rejected the Euronet solution, the alternative of bilateral agreements is having to be painfully worked through.

  - The CCITT Recommendation X.75 allowing for interfacing between X.25-based packet networks is expected to be issued in 1980.

  - Arrangements between the East-side, circuit-switching countries networks are being made piecemeal.

  - It will not be until the second half of the decade that the U.K. will introduce a fully integrated network based on digital transmission and the System X SPC exchange. At that stage, the U.K. will be able to offer connections to most other country networks.

- At the same time, the mid-1980s, France will be upgrading its transmission network to digital techniques, but has not so far announced any plans for a synchronous, circuit-switched network. To this extent, France, like Spain, will remain a major networking country slightly behind the rest of its European peers. However, its choice of technology (TDM switching - sometimes called semi-electronic) allows it to encourage a domestic equipment supply industry which is producing the most cost effective solutions for third-world countries wishing to update their telephone systems quickly without an immediate requirement to support for more sophisticated computer applications.

- On the other hand, the U.K., having opted for a full-function network for the late eighties, has most affinity to:

  - The U.S., where implementation of integrated speech, image, text, and data networks will be under way by 1990.

  - Italy, which has the opportunity to leap-frog a technological generation or two, and go immediately for a full-function network.

- Many processing services vendors fear some form of direct competition from the PTTs now that the Public Data Networks are coming on-stream. INPUT does not regard this as a serious threat in the sense that the PTTs will enter the market to offer competitive services except in two situations:

  - Local instances (e.g., NDPS in the U.K. where a micro-based USHS offering is now being made as an upgrade to previous services).

  - The importation of new services based on U.S. practices, such as the situation VAN suppliers face today.

- The assertion that mainstream PTT policy will be to restrict them to their own areas, is justified by assessing the efforts PTTs must make:

  - To update and maintain the private and public network structures they have got.

  - To provide full interworking between these networks.

  - But most of all, to undertake the massive task of replacing analogue with digital transmission methods.

C. OFFICE AUTOMATION - A DEMAND STIMULUS FOR IMPROVED NETWORKING CAPABILITY

- Examining the requirements of the electronic office for communications capability, there are a number of distinct areas whose requirements differ from each other, and may also vary depending on the size of establishment or enterprise being served. The main functional application areas for automation are:

  - Text processing.
  - Information storage and retrieval.
  - Message transmission.

- All information is regarded as falling into one of four categories.

  - Data.
  - Image.
  - Voice.

- A large number of permutations can be made between these four types of information (and partial combinations of them) and the three functional areas. Hence, the equipment and systems possibilities for the automated office are quite numerous. Leaving aside the equipment possibilities, one finds that system possibilities fall into two classes:

  - Standalone systems.
  - Communicating systems.

- Each of these may be implemented in a single information context or a multi-information-type context. The latter requires multifunction equipment for its adequate automation.

- This leads to an analysis of the characteristics of each type.

- Text processing systems are characterised as follows:

  - Information types - chiefly data and text.

  - Class - standalone.

  - Context - chiefly single or dual information type.

  - Organisation - all sizes of establishment.

- Information storage and retrieval (IS&R) systems:

  - All information types.

  - Class - standalone.

  - Context - multi-information type.

  - Organisation - large enterprises.

- Message transmission:

  - Information type - data, text, image, or a combination.

  - Class - Communicating.

  - Context - chiefly single information type.

- Organisation - all sizes of establishment.

- Message transmission as described is more commonly referred to as the electronic mail application, currently serviced by:

  - The Telex (public, national and international, circuit-switched) network in all sizes of establishment.

  - Private telegraph networks in large organisations.

  - Facsimile transmission in large and specialist organisations.

  - Message-switching systems with store-and-forward capability in very large-scale and specialist applications.

- Data processing has generated an enormous volume of communication since it became automated. Text processing is now starting to undergo a similar revolution. Referring back to Exhibit V-2, and noting that the third column shows a great dearth of facilities, one is led to the conclusion that text is likely to go through a similar crisis of communication, with the PTTs unable to provide the necessary capability. This requirement for electronic mail facilities is not likely to be met until full-function, synchronous, circuit-switched digital networks are implemented widely. The temporary opportunity which this presents to processing services companies with an international network is unfortunately not available to them because it cuts across the PTTs' monopolies. The only solution to this problem would be to approach the PTTs on the basis of providing an 'arms-length', technology-bridging service under franchised, bilateral arrangements.

- The other areas of office automation act as the feeders to the main telecommunications requirement. There will also be a requirement during the 1980s for local networks, restricted to an office building, a trading estate, or even part of a town. The facilities required would be offered by specialist network companies franchised by the PTTs.

D. DATA BASE SERVICES

- The provision of data base services by computer services companies involves entry into the Information Industry. This is a general term for the information publishing structure covering:

  - Publishing companies.

  - Libraries.

  - Research associations and professional research services.

  - Government and private statistical agencies.

- Although there is a small overlap with the Broadcasting Industry, the Information Industry is chiefly characterized by the selling of an information end product from whatever source, in hard-copy form; the service may, however, be a two-stage one of:

  - Locating the whereabouts of the information.

  - Providing the material located (either on loan or for purchase).

- Database services are thus the automated counterpart of a library where:

  - Source databases (sometimes referred to as databanks) are equivalent of the reference section.

  - Reference databases (sometimes just databases) are the equivalent of the card index, giving reference to the fiction, non-fiction, etc., on the shelves.

- Providing access to these types of service is an encroachment on an already established medium with a well-tried industry infrastructure to support it. Exhibit V-3 shows the modification to the normal publishing process which is introduced when the system goes on-line. There are:

  - More producers to be supported by the two consumers - library and user.

  - A need to add value at each production stage if an individual producer is to remain viable.

- The present status of database services in Europe can be summarized as follows:

  - Some 1,200 databases are available, of which approximately 575 are reference databases and 625 source databases. Source databases are being mounted faster than reference databases.

  - Of the source databases, 50% are on-line, but the majority of these (88%) originate outside Europe, mainly in the U.S.

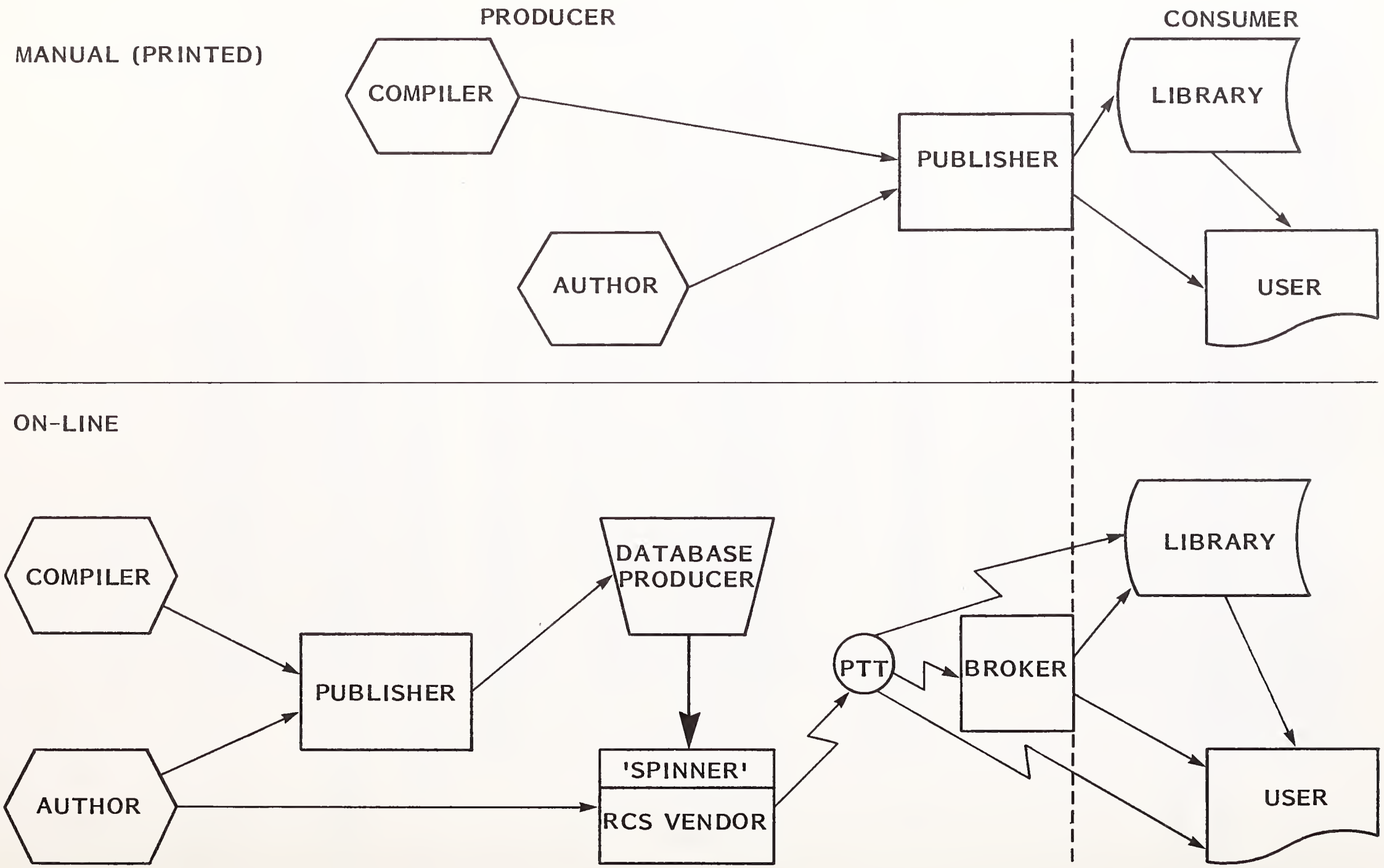
  - Of the reference databases, 45% are on-line, and 53% of these originate outside Europe.

  - Revenues from searches of reference databases amounted to only $6 million in 1977, and this is expected to grow to $30 million by 1982; i.e., at 38% AAGR. Source databases are reckoned to be a more profitable business than reference, though the risks inherent in setting up new databases are not causing any of the European vendors to feel comfortable at the present stage of market development.

  - Europe has experienced an adverse balance of payments in database revenues since:

EXHIBIT V-3

COMPARISON OF MANUAL AND ON-LINE DATA BASE SERVICES



. A majority of databases are provided from the U.S.

. Most on-line operators are U.S.-based companies.

- Europe's position is approximately five years behind the U.S. in this field, and the gap is widest in the usage of commercial source databases.

- The EEC Commission's efforts to make Europe self-sufficient in databases has resulted in the Euronet network currently serving some 50 host centres in the Euronet-Diane organisation. This service is most visible at the top end of the market where reference databases are most common.

- Three types of vendor (or spinner, as it is called) organisations are present in Europe.

. Government-sponsored; e.g., CNRS in France, CAB, FAO.

. Non-profit-making bodies; e.g., research organisations.

. Profit-making ventures; e.g., INFOLINE, Fintel.

- This whole prospect does not yet add up to an important market. Even if source database usage grows at the same rate as reference database - a conservative estimate - the total market in 1984 will only be $142 million throughout the whole of Western Europe. This is approximately 4% of projected RCS revenues for that year. However, there are two good reasons why processing services vendors should be interested in the sector:

  - Database services generate extra revenue since data drawn from the database is susceptible to further processing. (Note that this is more true of source than reference databases - another point in their favour).

- Computer services companies will be in competition with traditional publishing houses for this market segment; early establishment of a foothold is essential.

- Regarding a strategy for entry, one should note that entry into an industry with an established infrastructure, and its subsequent automation, entails marked disruption of traditional methods and procedures. The question of copyright is typical of the thorny problem which can arise. Entry in these cases is best made by acquisition.

E. CONSUMER COMPUTING IN THE 1980s

- The second half of the seventies saw the emergence of computing equipment and computing systems aimed at the mass market, which looks like attempts to build and sell the Model T Ford of the computer industry. The first wave of these systems came in the U.S. with the influx of microprocessor-based hobbyist and personal computers. The second wave crossed the Atlantic and set up a similar submarket in Europe, starting with the U.K. and spreading very quickly onto the mainland. Software and servicing became immediate problems to the purchasers of these systems in Europe. Though initially sold through multiple-dealer outlets, some structure has now been put into the distribution network with the setting-up of franchised distributors through whom the dealers are obliged to purchase.

- Software and servicing opportunities have been created by:

  - The lack of reliable, proven software.

  - The lack of DP knowledge on the part of the distribution chain.

- At the same time as this development occurred on the back of the cost/performance improvements caused by new technology, a new class of network,

initially called Viewdata, was pioneered in the British Post Office. This is an on-line, computer-based network using a modified TV set linked to PTT transmission lines. Aimed to start with information retrieval applications, it has the potential, given correct pricing, to become a universal remote information network providing information of all types to the mass-consumer market located in the home. Conceived originally as a means of increasing usage of the U.K. telephone system, it has started to be copied:

- On continental Europe.

- In Japan.

- Also, but for more dedicated applications, in the U.S.

- It is too soon in its life to be sure of its mass appeal. Rather like the personal computer, it appears to be meeting the same sort of reaction against attempts to attack the mass market at once. Today's systems are therefore being targetted at the business community.

- Ironically, both personal computers and Viewdata (the new generic term for this class of system is Videotex - see Appendix E for a full terminology) will find even more fertile ground once they have crossed the Atlantic; one going East, the other West.

  - The U.K. PRESTEL system has been licensed to GTE, whose TELENET network will allow easy access and inexpensive transmission costs.

  - Europe's multitude of small businesses will, during the course of the eighties, absorb hundreds of thousands of standalone small computers.

- The Interactive Videotex market will open up opportunities for:

  - Telesoftware providers.

- Provision of database links into the network.

- More substantive database services, once users are familiar with the concepts.

- Repeat/royalty sales of software on networks installed abroad.

- These opportunities will not be substantial until 1983.

VI POLITICAL INFLUENCES

VI POLITICAL INFLUENCES

- The social implications of computing have, in recent years, come to the attention of government. When added to the perceived need to ensure that national capability in a high-technology industry is not eroded by the forces of international competition, there is a definite requirement to form a policy towards the industry. The computing services sector has not, in general, received adequate attention from government, usually because it was neither perceived nor understood.

- The impact of governmental factors can be considered at three levels:

  - European national governments.

  - The supranational level of the EEC.

  - Factors external to Europe.

A. NATIONAL AND CENTRAL GOVERNMENT POLICIES IN EUROPE

- The governments of the major national market countries in Europe have not had a unified policy towards high technology in general nor to computing as a specific case. This has resulted in Europe being increasingly dependent on U.S. suppliers and U.S. technology. The fact that policies of individual govern-

ments are rooted in their local situations has caused an uneven penetration of computing services in national economies, with Scandinavian countries having the highest penetration and West Germany one of the lowest. See Exhibit VI-1.

- The policy of the Federal German government to support the local supplier Siemens has (coupled with Siemens' policy of following IBM practice and compatibility) led to its share of the West German hardware market rising from 10% to 20% in the last ten years. The services sector has not been affected one way or the other by this move towards purchasing IBM-compatible hardware from an indigenous supplier. West Germany remains one of the lesser developed markets for services; exploitation of this market by multinational concerns will continue in the first half of the decade.

- French policy towards the industry has been marked by a realisation that, though the country did not have the resources to overcome the influx of U.S. equipment, it would be possible to encourage a strong services industry. Implementation of this policy has taken place by encouraging the formation of very large units. At the same time, the plan to upgrade the country's telecommunications system has opened the opportunity to exploit the growing convergences between:

  - Computing and communications ('telematique').

  - Office equipment, computing, and communications ('telebureautique').

- The third convergence which is being encouraged is that of information or data base services; i.e., the convergence between computing, publishing, and communications.

- Because of their government's ability to anticipate convergence, French computer services can expect to exploit fully all the future markets for services and software which will spring up as a result of the new technologies. Many of these services will be for small, local businesses in provincial France;

EXHIBIT VI-1

PERCENTAGE PENETRATION OF COMPUTER SERVICES IN TERMS OF TOTAL NATIONAL ECONOMY

COUNTRY	PENETRATION (SERVICES MARKET AS PERCENT OF GNP)		
	1979	1984*	PERCENT CHANGE
WEST GERMANY	0.20%	0.35%	75%
FRANCE	0.33	0.41	24
UNITED KINGDOM	0.30	0.35	17
ITALY	0.26	0.26	0
SWEDEN	0.53	0.75	42
NETHERLANDS	0.33	0.52	58
DENMARK	0.49	0.61	24
BELGIUM/LUXEMBOURG	0.33	0.53	61
SWITZERLAND	0.19	0.40	110

SOURCES: HENLEY CENTRE FOR FORECASTING; INPUT ESTIMATES.

*CONSTANT 1979 DOLLARS

without a local presence or local agents, multinational services vendors will be unable to reach these markets. INPUT recommends the use of local agents and the French PDN as a successful combination for penetration of these markets with industry-specific products.

- The U.K. has built a strong nucleus of computer services companies in the London and South-Eastern region, unaided by any government support but helped by the influx of North American corporations, some of which offer an 'off-shore platform' for RCS services to the continent. Away from the metropolitan regions, many processing bureaux come into contention with the public-service, spin-off ventures. The two largest of these, Compower (National Coal Board) and NDPS (Post Office), have such a high proportion of captive revenue that they are excluded from the top ten country ranking.

- The more successful of the well-known U.K. systems and software houses (of which Logica, CAP-CPP, SPL, Scicon are examples) were aided in their formative years by the procurement policy of central government which, through the Central Computer Agency (CCA), now renamed CCTA (Computer and Telecommunications), was responsible for commissioning many advanced systems. This help enabled the best of these companies to establish strong export capability, especially in Middle Eastern countries. With the present cut-back in the level of government spending, fewer of these larger projects will be put out.

- U.K. government's support for ICL in the mainframe sector has enabled that company to establish a strong European base of operations. Withdrawal of its privileged status (due to end this year) is, therefore, less harmful to its prospects than would have been the case a few years ago. ICL's strong presence in the services sector may be expected to follow the pattern of its hardware sales, by tending to become more heavily weighted in favour of non-U.K. revenues.

- In the Benelux countries, public sector involvement in the computer services field is based more upon local authorities and public utilities than it is upon

central government support and procurement. In Belgium, for instance, a set of batch processing bureaux are being set up at regional, local government level. Authorities are encouraged to get their general business applications run on these centres.

- Exhibit VI-2 contains some highlights of government support policies around Europe.

- France's political leadership within the EEC (based on the Franco-German alliance) means that its DP policies have that much more relevance to multinational companies.

B. THE POLICY OF THE EEC COMMISSION

- Past and present policies of the Commission (of the European Communities) have been angled almost entirely towards the hardware manufacturing side of the DP industry. The Commission has felt that its primary objective should be to prevent European manufacturing capability being swamped by the superiority of American and Japanese know-how to a stage where it could never recover. Hence (as was noted in Chapter V, Section A) the concentration has been on bringing unity into the European supplier base for:

  - Hardware systems.

  - Telecommunications.

  - Semiconductor technology.

- Weapons used to futher these policies have been:

  - Standardization.

EXHIBIT VI-2

EUROPEAN PUBLIC SECTOR INFLUENCE

- OUTLAWED RESTRICTIVE BIDDING PRACTICES (EEC)
- GOVERNMENT DIVESTMENT (UK/ICL)
- GOVERNMENTAL INVESTMENT (NEB, DIELI)
- INVESTMENT GRANTS
- LOCAL AUTHORITY PROCESSING CENTRES-BELGIUM
- DIRECT PARTICIPATION
  - TELESYSTEMES
  - CISI
  - NDPS
  - DATACENTRALEN (DENMARK)
- PRESTEL, TELETEL
- PUBLIC DATA NETWORKS (PDNS)
- SOME RELAXATION OF MONOPOLIES (PTT)
- FRENCH "ATTITUDE"

- Outlawing restrictive bidding practices in individual countries.

- Though these weapons are crude and slow to work, it is to be expected that during the course of the next ten years they will take effect, supported in this by the federating influences of the EMS (European Monetary System) and the European Parliament. However, there is no evidence that the job-creating opportunities of the computing services industry have been realised by Brussels civil servants, probably because there is no strong lobby to this effect. ECSA does not yet have the necessary pull within the commission's councils.

C. LONGER-TERM WORLD ECONOMIC TRENDS

- In the research programme, specific questions have been asked of both users and vendors in the areas of:

  - Inflation's effect on the services sector.

  - Recession in Europe and the world economy generally.

- Judging by the replies so far obtained from vendors, neither of these factors appears to influence strategic thinking to any great degree. Inflation's effect on costs is now accepted as a normal hazard of business planning - the inflation mentality. The prospect of recession continuing or even worsening appears to hold no fear - at least for the executives interviewed to date.

- Consideration of the trends in the three major industrial blocs - North America, Europe, and Japan - leads INPUT to make the following projections for export opportunities:

  - Competition in the third-world, developing countries will increase between U.S. and Japanese equipment manufacturers.

- While Japanese suppliers increase their share of the North American equipment market, capital investment into that area from European services suppliers will continue throughout the decade.

- Competition within the European services market will be mainly between existing and new entrant U.S. companies on the one hand, and the present national European leaders on the other.

- The French government policy for 'informatique' includes provision to invest in RCS facilities in North African countries and France's former Central African colonies. The markets in these countries have yet to be created, but the move (in tune with French awareness of the North-South divide) could position national suppliers well for any expansionist tendencies in that part of the world.

- The recommendations for technology transfer embodied in the Brandt Report are likely as the decade proceeds to appear increasingly attractive to developing countries as they become more aware of the widening technology gap.

VII THE INFLUENCE OF THE ULTIMATE USERS

VII THE INFLUENCE OF THE ULTIMATE USERS

- In theory, it should be true that the requirements of the user of the computing system should determine the features of what is offered in the market. In practice, however, it is far from being so simple, primarily because:

  - The technical possibilities opened up by new equipment are constantly changing the targetted user.

  - The problem, then, at any state is to identify the user. This need shapes the marketing requirement for both services and equipment.

- Because of the current shift in emphasis from corporate computing to more decentralised operations, the dynamic of the industry is still largely in the hands of the vendor side, and this is unlikely to change as computing becomes more dispersed. However, the requirement for more 'user-friendly' systems is affecting all aspects of equipment and service supply. This is no new requirement to the services companies, but its impetus will increase and ensure that their products are marketable throughout the decade.

- INPUT recognises three levels at which user influence is brought to bear:

  - The DP department at which corporate policy is laid down.

- The end-user department (which may in a large group be represented as high as at divisional or subsidiary level), which sets the specific functional requirment for an application.

- The ultimate user, who may be manager or clerk or engineer, the person who needs information to fulfill his role.

- These levels apply only to computing as an aid to the producer. Computing for the consumer is at an earlier stage of development and during the eighties will continue to be a secondary concern of the major suppliers.

A. MANAGEMENT INFORMATION AND OPERATIONAL COMPUTING

- Lord Kelvin's dictum that it is 'first necessary to measure something before being able to say anything positive about it, let alone control it' should be music to the ears of the management accountant. Much of corporate data processing is given over to measuring the performance of the organisation, and so falls into the area of corporate control. This is the field of Management Information.

- From its earliest days in the hands of the accountant, the computer has also been required to undertake Operational Computing, the production of data as part of the day-to-day company operations. Payroll is an example. In fact, this aspect has always been equally well-developed.

- Data processing developed for a long time without the differences between these two aspects, and their implications, being recognised. This distinction now needs to be highlighted and understood if the new and future trends in the industry are to be profitably implemented in organisations:

  - Data base management.

- Distributed processing.

- Text processing and office automation.

- Eventual integration of networks for data, text, image and speech.

- The distinction is based upon management information being:

  - Required to be as quantitative as it is possible to be, always remembering that the measurements of human performance in an organisation will only be quantified to within a certain confidence factor.

  - Characterised, therefore, by a high content of numeric data.

- Operational computing, on the other hand, is a process with which the whole workforce is intimately involved in their work routines. It stems from giving the assistance of automation - in its broadest sense - to the worker, of all grades and types; and it interacts with all types of information as it flows through the organisation:

  - Data.

  - Text.

  - Image.

  - Voice.

- Operational computing is concerned with such aplications as:

  - Order processing.

  - Invoicing.

- Warehouse control.

- Shop-floor progressing.

- Whereas management information is more related to the following:

  - Sales statistics and analysis.

  - Inventory control.

  - Financial analysis.

  - Accounting.

- If the human being in the place of work could be totally replaced by automated devices, the operational computing, according to this definition, would all disappear into the control programs of the robots, the automated assembly lines, the process plants and the offices, but the requirement for management information would remain. Such an imaginary event serves to reinforce the concept behind this distinction.

B. DATABASE - THE MISSING LINK

- Fifteen years ago, there was much talk in DP circles of Integrated Management Systems. This concept originated at the time that many individual applications had been separately computerised and confusion was beginning to be discerned. To the movement which started at that time we owe the development of the first database system, IDS, - originally developed for GE computers before they acquired the Honeywell name. Over the years, there has followed the building and marketing of the whole range of DBMS software tools which is now available to mainframe installations and increasingly being implemented also in minicomputer environments.

- The implementation of data base management software involves a lot more than the restructuring of a company's file storage. DBMS requires a range of adjustments to be made by different types of personnel associated with the DP function:

  - General Management, to agree to the necessary management controls over the definition and handling of data.

  - DP management, to accept responsibility for data base integrity and security.

  - The data base adminstrator function, to be set up and given day-to-day control of the format and contents of the data base.

  - Systems and programming personnel, to adapt their traditional techniques to accomodate the separation of data definition from data manipulation.

  - End-users, to agree amongst themselves to the commonest and most useful definitions of items.

- These changes have inevitably not been implemented overnight. Many organisations still only use database software for a subset of their data resources, and in smaller organisations the exercise has not been judged economic. Even very large organisations report that they have incurred enormous investment costs in converting to the new technology, with payoffs still to come.

- At the same time as these improvements in data independence have been affected, the economics of new hardware technologies have introduced different and to some extent opposing factors into the equation:

  - Minicomputers have been installed as 'operational computing' engines at the local level.

- DDP has become an acceptable strategy (since data processing costs have fallen more swiftly than data communications costs). Having now got itself into the position of being able to manage a large central data resource, the next round of development for DP management involves decentralisation and small computers.

- The fact that wave one has not completely subsided before wave two has started on its way, has created the crisis of credibility for the DP manager and the DP department. Having achieved a capability to provide timely management reports (though not timely implementation of new 'operational computing' applications), the DP professionals are in danger of being swept away by the requirement to give back to the periphery the responsibilities so recently integrated. Of course, this is how it looks superficially. In reality, the answer lies in the corporate database, as the source or repository of all management information:

  - Fed and updated from operational computing systems.

  - Drawn on and maintained by the central data management service, a part of the total DP or management service function.

- Coupled with the data communications possibilities, the database concept allows:

  - Centralised data management and audit.

  - Centralised management reporting.

  - Decentralised data entry.

  - Decentralised operational computing.

- Obviously the line between central management information and local operational data must be drawn carefully to suit individual circumstances, but the trend towards separating these two entities is discernible today.

- Opposing this trend, but eventually susceptible to being integrated, is the fashion for senior executives to run their own personal computers and to mount individual operational databases on them.

C. THE EDP DEPARTMENT

- An evolution towards both handling a wider range of tasks and requiring a great breadth of skills is happening throughout all DP departments. The revolution which would put the DP manager out of a job is not appropriate, and even in cases where centralised hardware has been removed, say in preference to a processing service operation, there remains the coordinating role and the reporting interface to central management. Responsibility for information, rather than mere responsibility for its supporting machinery, is the future role of the DP management, management services directors, information coordinators, or whatever they are going to be called.

- Services companies need to understand and take note of this changing role, which is:

  - Supported by the major manufacturers.

  - Amenable to encouragement from services companies also.

- Bypassing in-house central services, whether it be DP management,the office manager or the communications manager, is indicative of the acceptance of a secondary or auxiliary role, and is the single most inimical trait militating against achieving leadership status. By the middle of the decade, 'winner' services companies will be routinely calling on these buying-points and gaining business through and from them.

- Software and systems providers are naturally better equipped to assume this marketing stance, since:

  - Their products may be equally supportive of central and end-user systems.

  - They are more adept at tailoring a sales situation to a local set of conditions and many of the DP manager's requirements over the next decade will be by way of 'gap-plugging' as he strives to increase integration of information services in a decentralised environment.

- On the other hand, processing services vendors will become less distinct from systems companies as both:

  - Productise their services for sector-specific marketing.

  - Introduce new added value implementation services to cover requirements which have not yet (in 1980) matured into worthwhile market sectors.

D. THE TERMINAL USER

- The evolution towards on-line computing has caused the emergence of different categories of terminal, ranging from the simplest timesharing page-printer, through the gamut of standard data processing sets to the most

complex interactive graphics systems. Different classes of terminal tend to be used by different subsets of users:

- Timesharing by executives and professionals.
- VDUS by clerical and data entry staff.
- Industry-specific terminals by counter staff.
- Industrial terminals by blue-collar workers.
- Graphics sets by designers.

- A number of trends will be evident during the decade:
  - Intelligent terminals will experience fastest growth as end-users opt to combine network access with local data editing facilities.
  - Colour and limited graphics will become a standard and not an option on VDUs following IBM's launch of the 3279.
  - Wireless communication between terminals and their controllers will be a standard alternative to the present-day cable connection.
  - Multifunction workstations aimed at office workers will become common.
- The war of words which now rages round the end-user department over whether to buy its own mini or to use the in-house service, will be transferred to the ultimate user, where the question to be asked will be:
  - Should I go for the self-sufficiency of my own personal computer or get an intelligent terminal for accessing the in-house and other networks?

- Exhibit VII-1 illustrates the way all this will look to the central DP management by the mid-1980s.

E. THE END-USER DEPARTMENT AND DDP

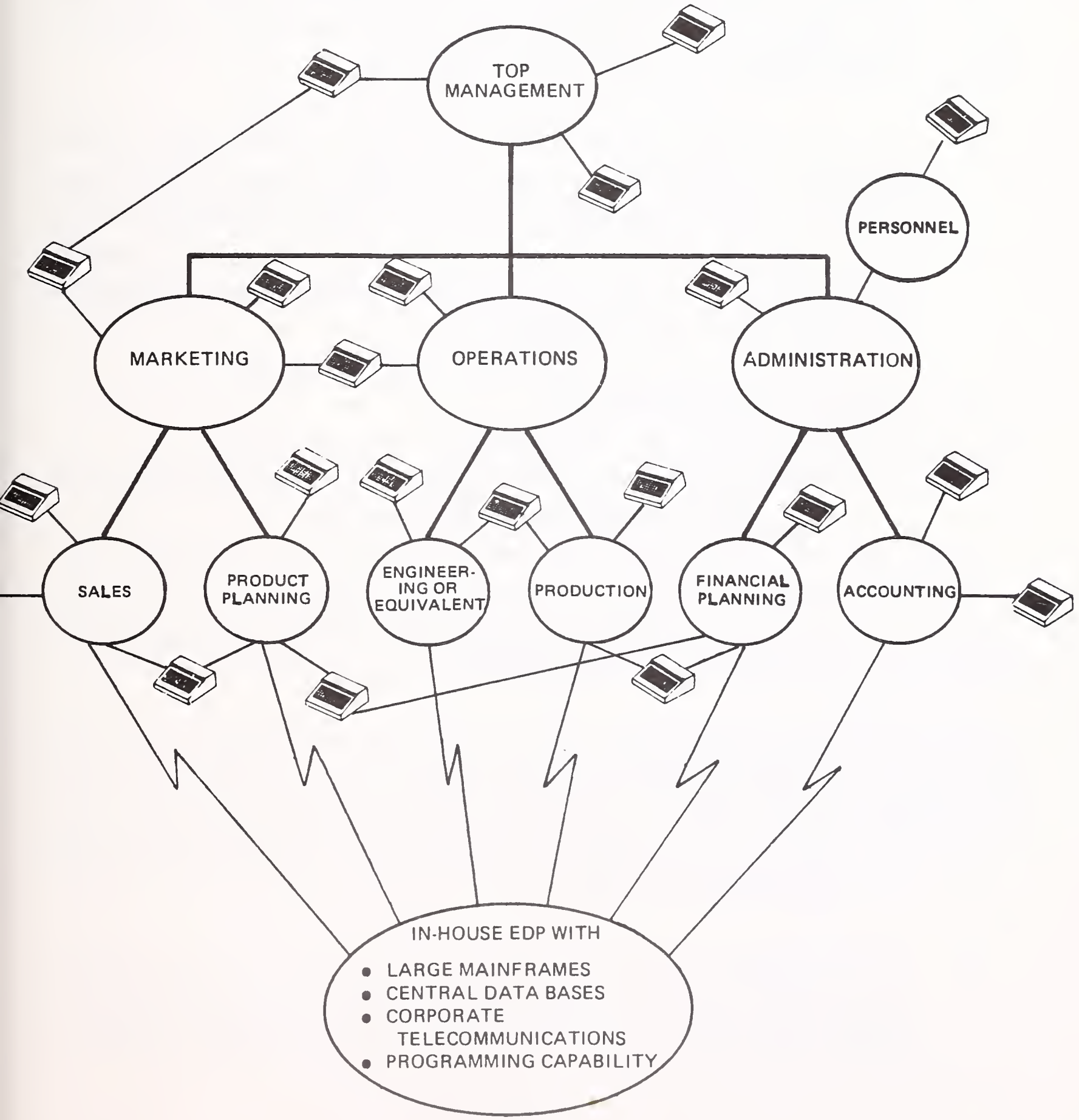
- In its classical definition, DDP is taken to concern the larger organisation with at least a medium-range mainframe installation and an attendant EDP department. There is another use of the initials DDP to denote 'dispersed' data processing, by which is meant the more general trend for computing to take place in smaller and smaller working units, be they independent enterprises or branches and establishments of a larger organisation. This more general move affects the marketing tactics of the computing service company just as much as the more limited use of the term, but in different ways according to the type of vendor:

  - Processing services companies can aim their strategies at:
    - Either the first-time user within whose budget the falling cost of hardware will increasingly bring the possibility of computing.
    - Or the end-user department, divisions or subsidiaries.
  - Software product companies find themselves increasingly acceptable to DP management for mainframe products, but they also need to sell through intermediaries for mini-based products, while having to use direct mail selling techniques for the mass market created by micros.
  - Professional services vendors are going to be more and more put to it to justify their added value as the entry-level price for computing drops.

- Recent (1980) user research conducted by INPUT in Europe among subsidiaries of larger companies has indicated a continuing groundswell of opinion against

EXHIBIT VII-1

THE VIEW OF THE EDP MANAGER AS SMALL COMPUTERS PROLIFERATE IN A LARGE CORPORATION



using the central DP deparment for their day-to-day computing. The chief reason cited has been the need for information to run, manage or control the local operation. Patience is now exhausted; excuses regarding productivity or software or hardware are no longer believed. DDP is being used as the lever to prise open the entry-level door at the departmental level. The increased viability of data communications in Europe is allowing standalone systems to be installed on the understanding that links to the central mainframe or network can be put in when the local system is bug-free.

- The type of system being implemented on a mini or small business system is more than a single application engine. It combines elements of operational computing and local mangement information as those terms have been defined in this chapter. It therefore generates a requirement for local database management, which when viewed from the centre is seen as a breakdown of the control of the corporate database.

- This trend is inevitable, because:

  - Devolved management control implies that local or divisional management has special skills and knowledge to deploy.

  - Totally centralised corporate data bases require the data base administrator to understand the interpretation as well as the format of all corporate data, an impossible task.

  - Shared usage of the data resources of an organisation means a more dynamic approach is required to the provision of management information with consequent involvement of the other information types - text, image and voice - and the added dimension of the business communication network.

- The DP management that opposes, rather than embraces, this trend is going to be branded as Luddite by its fellow general managers. Such a stance would confirm their suspicions that DP professionals know little or nothing of

business, and in any event it is not going to be supported by the major manufacturers.

- DEC has always been an advocate of DDP.

- IBM, which originally with the 3790 and 8100 offerings attempted to limit DDP by limiting the spread of programmability, can no longer maintain this stance with the success of System/34 now installed in numbers both standalone and in SNA networks.

- Exhibit VII-2 tabulates the different methods of implementing applications in a multi-establishment organisation, according to:

  - Their siting, in a central DP system or dispersed locally.

  - Linkage, standalone or connected to a corporate network.

  - System control, whether it is in the hands of local management or of the central DP function.

- There are eight theoretical possibilities, of which seven are found in practice.

- The study of this table clarifies the position taken up by the leading mainframe vendors and their rivals, the minicomputer manufacturers:

  - IBM's DPD and the BUNCH* manufacturers have all operated over the past decade in the top left-hand quadrant, cells 1 and 2, with repeated forays down into cell 6 to try to get self-sufficient departmental systems on-line via the terminal network.

* Burroughs, Univac, NCR, Control Data, Honeywell

EXHIBIT VII-2

DEFINITION OF TYPES OF APPLICATION SYSTEM BY LOCATION, COMMUNICABILITY AND MANAGEMENT CONTROL

CONTROL \ SITE / LINK	SYSTEM SITING AND LINKAGE			
	CENTRAL		DISPERSED	
	STAND-ALONE	NETWORKED	STAND-ALONE	NETWORKED
CENTRAL	BATCH MAINFRAME	ON-LINE MAINFRAME	'APPLICATION ENGINES'	
DISPERSED	N.F.	ON-LINE DIVISIONAL/ DEPARTMENTAL SYSTEM	DISPERSED DP	DISTRIBUTED DP

N.F. = NOT FEASIBLE

- DEC, Hewlett-Packard, Data General and IBM's GSD (now more recently with the IBM System/30 machines) have concentrated with their commercial offerings on the bottom right-hand quadrant, cells 7 and 8, where by contrast with the lack of success in cell 6 they have loosened the grip of the centralised philosophy.

- The 4300s mark an attempt on the part of IBM DPD to counter-attack against the mini whilst allowing central EDP to retain control (the earlier sally into the mini field itself with Series/1 is to be discounted as a tactical move now overtaken by much larger events). However, the 4300s are not breaking new ground for two reasons:

  - GSD with System/34 is immensely more successful than DPD in selling to the uneducated parts of a large organisation.

  - The 'application machine' concept requires two auxiliary components (as recognized by IBM but not yet successfully supplied):

    . Simple operating system software to enable users to do without that rare resource, the systems programmer.

    . Suitable application software.

- Instead, the 4300 is being mainly installed in traditional central-site environments to replace or duplicate existing System/370 hardware or, in many instances, to beef up the system development capability by taking that load off the previous single processor.

- Computer service companies must position themselves to take advantage of the coming developments in the two viable quadrants - top left and bottom right. In both there is considerable room for development.

- It is interesting to note that the 'application machine' concept will come into its own with the development of 'office-of-the-future' applications, since:

- Local programmability is a low requirement.

- Replication of similar systems in multiple sites is made possible by the fairly simple nature of individual applications:

  . Text processing.

  . Information storage and retrieval.

  . Electronic mail.

- This situation becomes less clear-cut as organisation size decreases, and the economics dictate greater integration of text and data processing.

- Again, service companies must position themselves relative to these end user-generated characteristics.

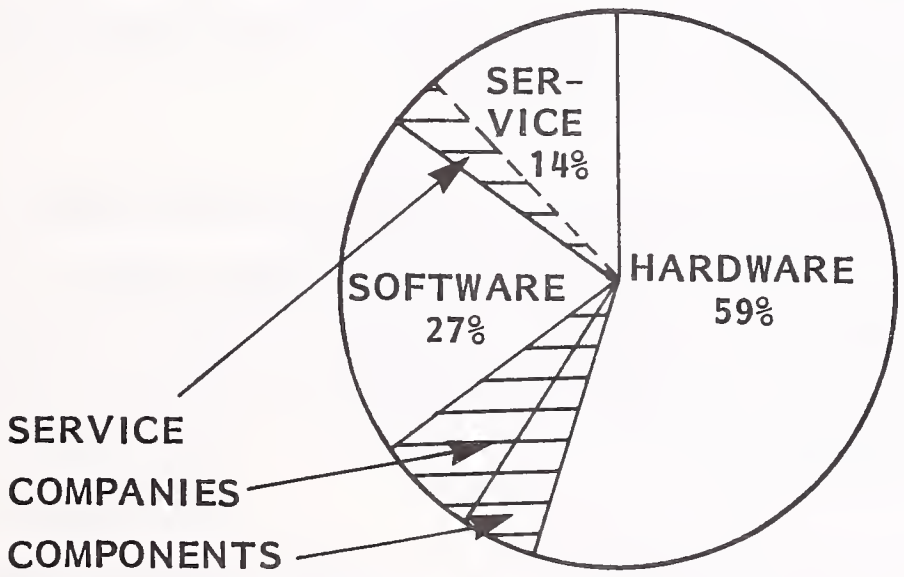
F. COMPUTERS IN SMALL ORGANISATIONS

- Everything said so far in this chapter has related to multi-establishment enterprises. But the greatest number of installations for general purpose applications remains with the small and very small businesses which have only one or at most two establishments. With something over one-half of a million minicomputers and a similar but smaller number of small business computers (SBCs) installed in the U.S. alone by the end of 1979, and an estimated total unit population of around two million, this remains one of the most prolific and only partially tapped sectors for exploitation during the 1980s.

- Exhibit VII-3 shows the growth of the turnkey systems element among the mini and SBC market between 1979 and 1984. From around 60,000 systems valued at a total of $4 billion last year, the market will grow to over one-quarter of a million systems in 1984, grossing $19 billion.

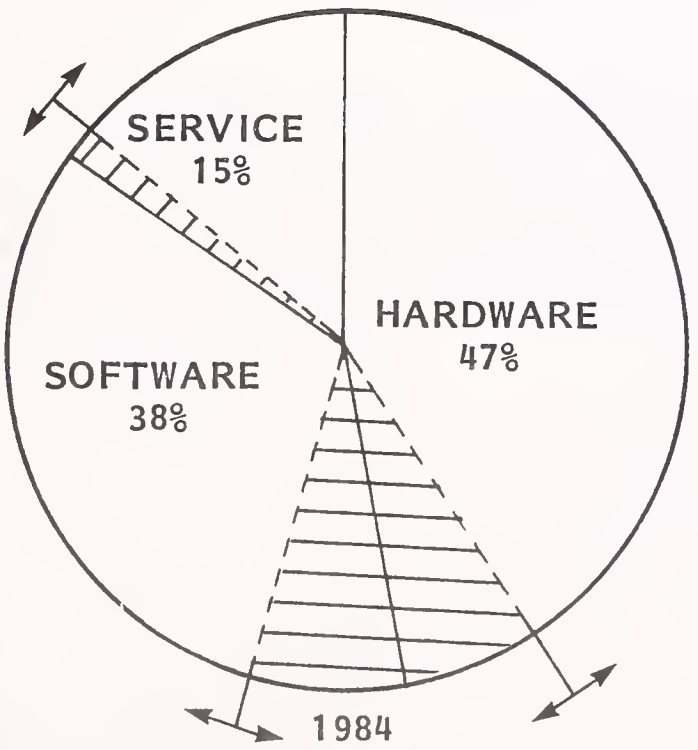
EXHIBIT VII-3

U.S. TURNKEY SYSTEMS MARKET FORECAST: VALUE OF SHIPMENTS



1979

$ 4 BILLION
60,000
SYSTEMS



$19 BILLION
280,000
SYSTEMS

- This type of system is taken to lie somewhere in the price range from $20,000-200,000, with an average being around $65,000 with service included. At present the market is shared between two types of prime contractors:

  - Mini and small business computer manufacturers who can provide hardware and service it, but may need to buy in software services. Many are now claiming, however, that 80% of their software requirements can be covered by package products they have already developed.

  - Systems and software houses who can supply the hardware and software components, but have difficulty with the hardware servicing, for which they may have to refer the customer back to the manufacturer or to a third party maintenance (TPM) firm.

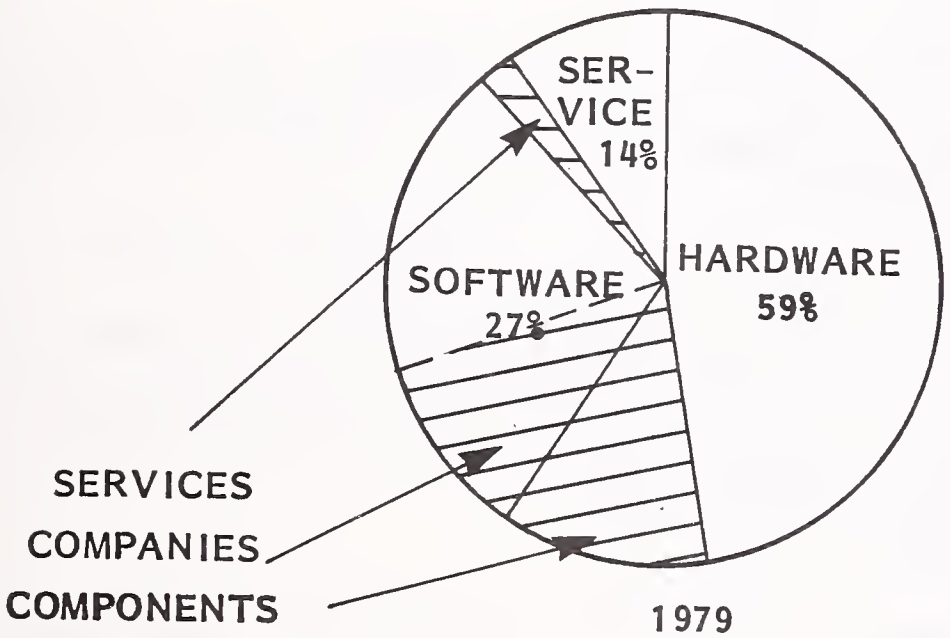
- The shaded areas of the exhibit indicate the portions of the market which are serviced by computing services companies. The pendulum effects are included on the diagram to indicate the straight competition which exists between the two types of vendor. The proportion of market share which each gains is to be decided on their relative merits.

- Exhibit VII-4 shows the equivalent figures for Western Europe with similar percentage shares of the market going to the computing services industry, but with one very distinct difference:

  - In a market rising from $1.5 billion in 1979 to $8 billion by 1984, an annual growth of 40%, the average system price will fall from $38,000 to $32,000, indicating the intensely competitive nature of this market and the stripped-down, entry-level price tag which is the rule in Europe.

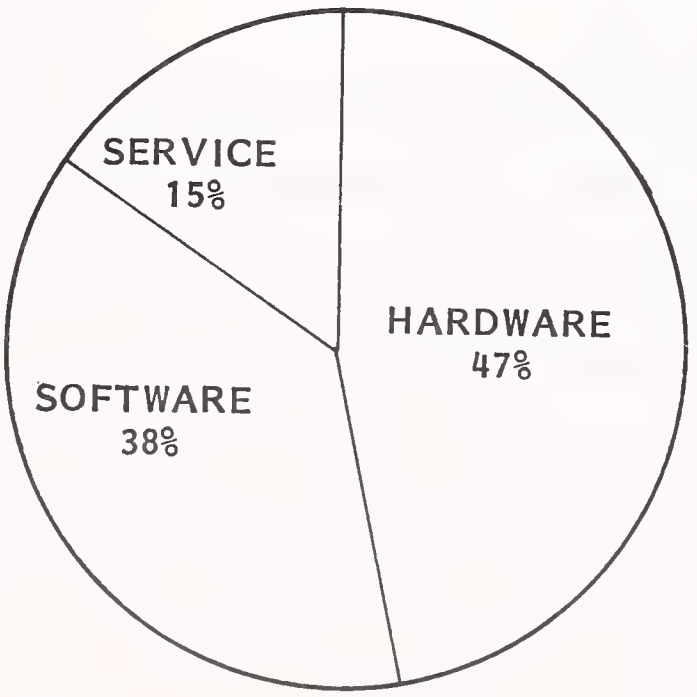
EXHIBIT VII-4

WEST EUROPEAN
TURNKEY SYSTEMS MARKET FORECAST: VALUE OF SHIPMENTS



$1.5 BILLION
40,000
SYSTEMS

1979



$8 BILLION
250,000
SYSTEMS

1984

- Another area which will affect services companies in the forward period is the portion of the RCS processing revenues which will go to User Site Hardware Services (USHS). These systems will range in price on either side of the $20,000 divide, since the equipment on offer can vary between the $100,000 worth of DEC System 2020 for an ADP ONSITE System, to the $7,500 TI 700 Series being offered to first-time users by a number of continental bureaux.

- The provision of these services leads the RCS vendors into playing the role of the OEM and in some cases of retailing systems via local agents. Ongoing research indicates that:

  - Most leading bureaux are now offering these systems, though they are still only being supplied in relatively small numbers, around or less than 50 systems in 1979.

  - Market acceptance is particularly good at the small system end, where the mix of work between local processing for daily routines and remote (even batch) bureau processing for monthly or other periodic peaks is found to match requirements well.

  - Straight purchase of the hardware and software is the normal payment method.

- Figures available concerning the U.S. market derive from a 1979 INPUT study of the topic; they show a range of estimated market values for the sector in 1984. More recent indications are that the top end of the range illustrated in Exhibit VII-5 is more likely to be attained than the lower. Industry Specialty and Utility are the most important subsectors.

- Taken together or separately, these two sectors offer, in the period to 1984, the greatest opportunities for service companies to assume a leading role in the systems market.

EXHIBIT VII-5

1984 USER SITE HARDWARE SERVICES (USHS) MARKET IN THE U.S.

TYPE	1984 USHS REVENUE ($ MILLION)
GENERAL BUSINESS	$ 50 - 110
SCIENTIFIC & ENGINEERING	$ 40 - 70
INDUSTRY SPECIALTY	$440 - 650
UTILITY	$190 - 290
TOTAL	$720 -1,120

SOURCE: INPUT USER SITE HARDWARE SERVICES STUDY

VIII RESEARCHING FOR A STRATEGY

VIII RESEARCHING FOR A STRATEGY

- The choice of strategy for leading companies involves an accurate assessment of one's own position and how one is regarded by both competitors and customers. Strategy selection is at least a medium-term, and often a long-term, commitment. Leaders cannot afford to be chopping and changing strategy from year to year.

- Research, therefore, has two main purposes relative to strategy:

  - To maintain an up-to-date view of how one's position is changing with relation to the main competitors.

  - To gain intelligence on the wider perspective of strategic issues and trends.

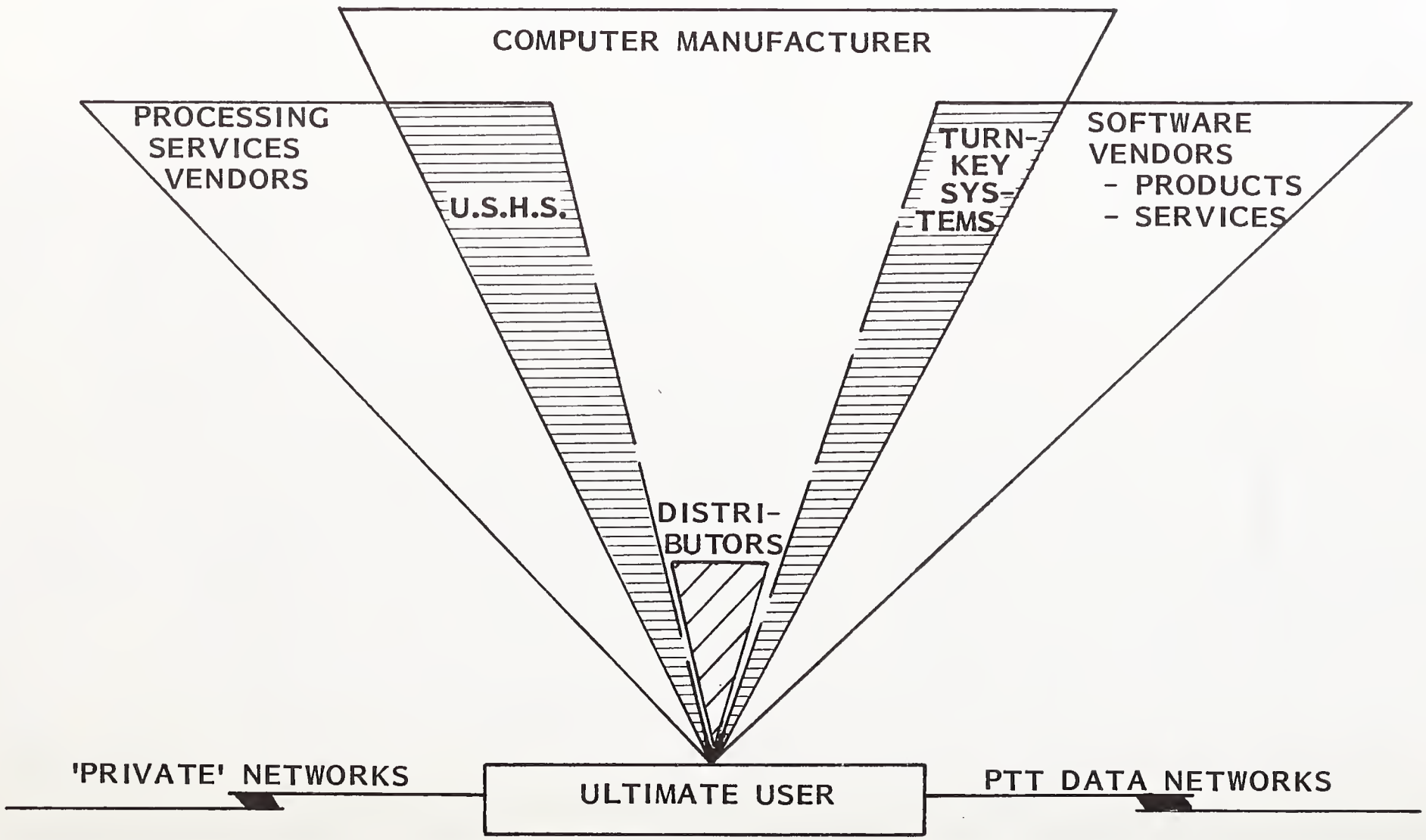
- MAS/Europe research into strategic and short-term issues aims to satisfy both of these objectives.

- This report has dwelt at some length on the competitive scramble for 'ultimate user' market share which is currently engaging the attention of different types of vendor. This convergence on the customer is summarized in Exhibit VIII-1, which shows the user approached by:

  - Manufacturers.

EXHIBIT VIII-1

MAS/EUROPE 1980
RESEARCHING AREAS OF COMMON INTEREST AND
COMPETITION IN THE SUPPLY OF COMPUTER SERVICES.



- Bureaux.

- Software companies.

- Distributors.

A. THE NEED TO SET MILESTONES IN THE LANDSCAPE OF THE FUTURE

- During the coming decade, certain major trends will be more pronounced in the first half (up to 1985), and others will only grow to prominence in the second half. Exhibit VIII-2 highlights the important milestones of the 1980s.

- Scheduled for immediate attention on the part of the computer services companies are:

  - Making a reality of sector-specific marketing.

  - Using public data networks as a new delivery vehicle.

  - Profiting from the continuing inroads of minis into general-purpose DP applications.

  - Understanding the implications for in-house DP of the yet-to-be-announced DBMS software expected from IBM in the 1980-1981 time-frame. This software is expected to extend the use of relational techniques as well as consolidate the migration paths for IMS and DL/I users.

- During the first half of the decade, both personal computers and viewdata systems will be targetted mainly at the business user. Later in the decade these systems will be more widely used in the home environment, with consequent increases in the numbers of sets sold.

EXHIBIT VIII-2

MILESTONES OF THE EIGHTIES

U.S.

1985 SCS SATURATION REACHED

1986 SERVICES COYS. NATURAL OUTLET FOR SCS, VSCS

1987 INTEGRATED NETWORKS START TO BE IMPLEMENTED

1989 HOME COMPUTING FLOURISHING

EUROPE

1984 SCS TURNKEY SYSTEMS' MOST ACTIVE SECTOR

1986 VIDEOTEX IN 50% OF FRENCH HOMES

1989 SCS MARKET SECTOR 67% SATURATED

SCS = SMALL COMPUTER SYSTEMS ($200k-$20k)
VSCS = VERY SMALL COMPUTER SYSTEMS (<$20K)

- Up to 1984, office automation techniques will be on trial in mainly leading-edge companies but, thereafter, the necessary systems expertise will have been acquired by the vendor companies to enable them to package their products in modules which can be simply integrated within the communications environment of different sizes of enterprise.

- INPUT's immediate research will be concentrated on the issues now affecting strategies.

B. PROFITABILITY FACTORS

- Research into profitability factors will vary according to the type of vendor company, using the four standard types with which the MAS/Europe Vendor Questionnaire has been split into modules:

  - Processing services.
  - Professional services.
  - Turnkey systems.
  - Software products.

- The programme aims to measure the support for different costing/pricing techniques and to relate these to type of business and profit performance, thus quantifying the ability of different vendor groups to respond to investment requirements.

- Initial research yields the fact that companies have not in the immediate past (two years) increased their prices in step with inflation. There has been a marked reluctance to upset the customer relation. Reports have even been encountered that prices have not been increased in three years.

- The present fast growth of software products markets might be thought detrimental to profits. However, so far only one respondent notices such an impact. Manufacturers' unbundling is emerging as the major driving force behind this rapid growth.

- A particular aspect being researched is the alleged gap between manufacturers' low-pitched software products' prices and the higher levels normally set by independents. As unbundling continues, it should be possible to detect a general lifting of prices for an individually priced set of routines from a manufacturer, so closing the gap with the equivalent set or package from an independent.

- Profitability related to professional services companies has traditionally been dependent on the size of the project and the stringency of the contractual terms. Research aims to quantify the contribution to profit from:

  - Method-orientated productivity techniques.

  - People-orientated motivation.

- The degree of product-orientation which is practised or planned is very pertinent to investment requirements. There is a distinct trade-off between the product-and the project-orientated sides of a business to:

  - Determine the required level of investment to achieve corporate targets.

  - Iron out the fluctuations in spare capacity which occur as a result of peaks and troughs of sales input. Vendors are being asked to specify the maximum percentage of revenue earned from products which they perceived being achieved.

- Another aspect of the research covers the requirement for planned investment to support turnkey systems with:

- Manufacturing/assembly/test facilities.

- Development hardware installations.

- Spares stock.

- Software products.

- Exhibit VIII-3 lists some of the areas in which there are differences, not so much of kind but of degree, between European and U.S. practice. Each can have its effect on the variation of profitability between the individual country operations in a multinational enterprise.

C. STRUCTURES AND BUYING PATTERNS WITH INCREASING DISPERSAL

- Falling hardware costs continue to fuel the expectations of users further and further down the pyramid of enterprises, as shown in Exhibit I-2. This translates to a need on the part of vendor companies to understand and organise a response to the changes in buying patterns which may result.

- Exhibit VIII-4 illustrates in approximate terms the relative importance of the different hardware market sectors as categorised by size of system and its value. As average unit price decreases, so the total potential number of installations goes up. This causes the total potential market in each category to vary with a tendency to peak at the third band (desktop and very small business systems). However, since the justification of system purchase is easier in large organisations and only follows later in smaller, the development of the overall market has started from the top bands and is working its way down the chart. The exhibit gives the status of the market at the end of 1984 and is showing that:

EXHIBIT VIII-3

DIFFERENCES OF DEGREE BETWEEN EUROPE AND U.S.

- COSTS
- PRODUCTIVITY
- EMPLOYMENT LAWS
- PRICING
- TAXES AND DUTIES
- INVESTMENT GRANTS

EXHIBIT VIII-4

SITE SATURATION - EUROPE

SYSTEM CATEGORY	MARKET FACTORS								
	PRICE ($ THOUSAND)			UNITS (MILLION)			PENETRATION	MARKET ($ BILLION)	
	FROM	TO	AVERAGE	TOTAL POPULATION	NEW SITE SHIPPED 1984	POPULATION BY END 1984	PERCENT	SHIPPED VALUE 1984	ANNUAL SHIPMENTS 1984
MAINFRAME	200	-	250	0.2	SMALL	0.15	HIGH	100	10
MINI & SBS	20	200	30	3	0.2	0.8	27	30	10
DESK & VSBS	2	20	5	30	1.0	3	10	15	5
TERMINALS	0	2	1	60	1.5	4	7	4	1.5
HOME SETS	0	1	0.5	125	1.0	3	2	1.5	0.5

- Mainframe and mini market sectors are by that time of equal importance in terms of dollar yield.

- Smaller system bands have comparatively lower site penetration factors.

- Since computing services companies in the main derive their viability by providing alternative or ancillary solutions to problems initially seen in hardware terms, the variation in buying habits is compounded with the problem of distributing the system product in an economic way. Questions aimed at assessing trends in unit sales costs, third-party distribution plans, and the acquisition of new business are all included in this year's vendor research.

D. INFORMATION PROCESSING ORGANISATION

- Within the context of the larger organisation, the questions to be researched cover:

  - Responsibility for DP at board level.

  - Attitudes to DDP at board level.

  - Familiarity with computer service companies at board level.

  - Trends towards office automation.

  - Satisfaction with service and software suppliers.

  - Integration of office automation into the DP management function.

- Whilst not all of these topics relate directly to service companies, two key questions need to be examined and quantified in order to set the overall framework for any strategy for selling to the educated user:

  - What obstacles are there to the extension of DP management's responsibilities, especially for communications areas?

  - Are present software productivity constraints changing DP management's attitudes to the use of outside services?

- The relative weight which can be assigned between selling to educated organisations and selling to first-time users is an important element of an overall strategy for a 'leader' company. The difficulties of selling to the spectrum of situations which exist between these two extremes can be more easily quantified when these questions have been answered.

E. COMMUNICATIONS IN EUROPE

- This topic is not amenable to the same types of vendor and user research which are used elsewhere, because of the influence of the PTTs as third parties. The main thrust of investigation has been to probe the perceptions of vendors on the subject.

- Preliminary results indicate that most of the suppliers feel there is a threat to their continued growth coming from PTT monopolies. However, some regard it as a containable threat which has always been around, not especially increasing nor diminishing. The element of possible competition from the public data networks is discounted; it is seen rather, as it was intended to be, as an opportunity.

- The commonest thread of complaint against the authorities is that they are unable to function efficiently as suppliers, with long lead times on equipment,

necessitating the upkeep of higher stocking levels than are usual, for instance, in the U.S.

- Office-of-the-future applications are not attracting great interest from processing services vendors and do not feature in many five-year plans at this stage. A common sentiment expressed is that companies have all the growth they can handle at the moment, and further diversification would lead to dilution of management effort. One respondent expressed the view that it was good for its image to be seen to be somewhat selective; though he added that a connection through a parent company might evolve into eventual involvement.

F. COMPARISONS WITH THE U.S.A.

- The programme is designed to make comparisons at a European level with the overall continental developments and trends in the U.S. This will be achieved by making use of the statistics issued with the MAS/U.S. Annual Report in November of each year.

- For 1980 these will be taken from the 1979 report and will cover the five-year forecast period from 1980 to 1984. The figures will be compared and contrasted with the aggregated European figures in the European Summary Report at the end of the programme.

- One of the key topics of general interest is the present status of sector-specific marketing in Europe. Early results of the research do not indicate any strong pattern, though in the processing services sectors there is a weak correlation being exhibited between the proportion of first-time users in the customer base and a tendency to develop functional rather than industry-specific products.

- Any definitive judgement on the pros and cons of horizontal and vertical products for Europe will need to be compared with the U.S. pattern to derive

the correct product strategy for exporters (both ways) between the two continents.

- A similar 'compare and contrast' tactic is being mounted to discern the extent and nature of the FM requirement in Europe. Originating in the U.S. as a large-user, in-house operation, it has now developed along the lines of capturing the market for particular applications over a segment of a regulated or semi-regulated industry (health insurance claims, for example). The strategy is to sell out-of-house processing over a wide catchment area, and going beyond that into the realms of providing the total service of which data processing is only one part. This has required, in some cases, the acquisition of the companies for whom the service was originally being provided. EDS is a notable example of this successful approach.

- It's hard to find companies in Europe which have felt strong enough to make such a step. The movement has all been in the opposite direction: outside interests buying into a segment of the DP industry. FM represents the nucleus of a strategy whereby a result similar to that in the U.S. might be achieved. Without such a trend, conglomeration of computer services with other more general types of service and with the manufacturing industry is likely to remain the policy for national leader companies in the business.

- Exhibit VIII-5 contains a comparative table of user expenditures on hardware and other services. Europe is currently 54% by gross value of the U.S., and will grow to 64% by 1984. Hardware expenditures are measured from central EDP expenditures and would, therefore, exclude some end user systems revenue.

- Exhibit VIII-6 shows the current (1979) percentage breakdown of the European and U.S. services markets by major product sectors.

EXHIBIT VIII-5

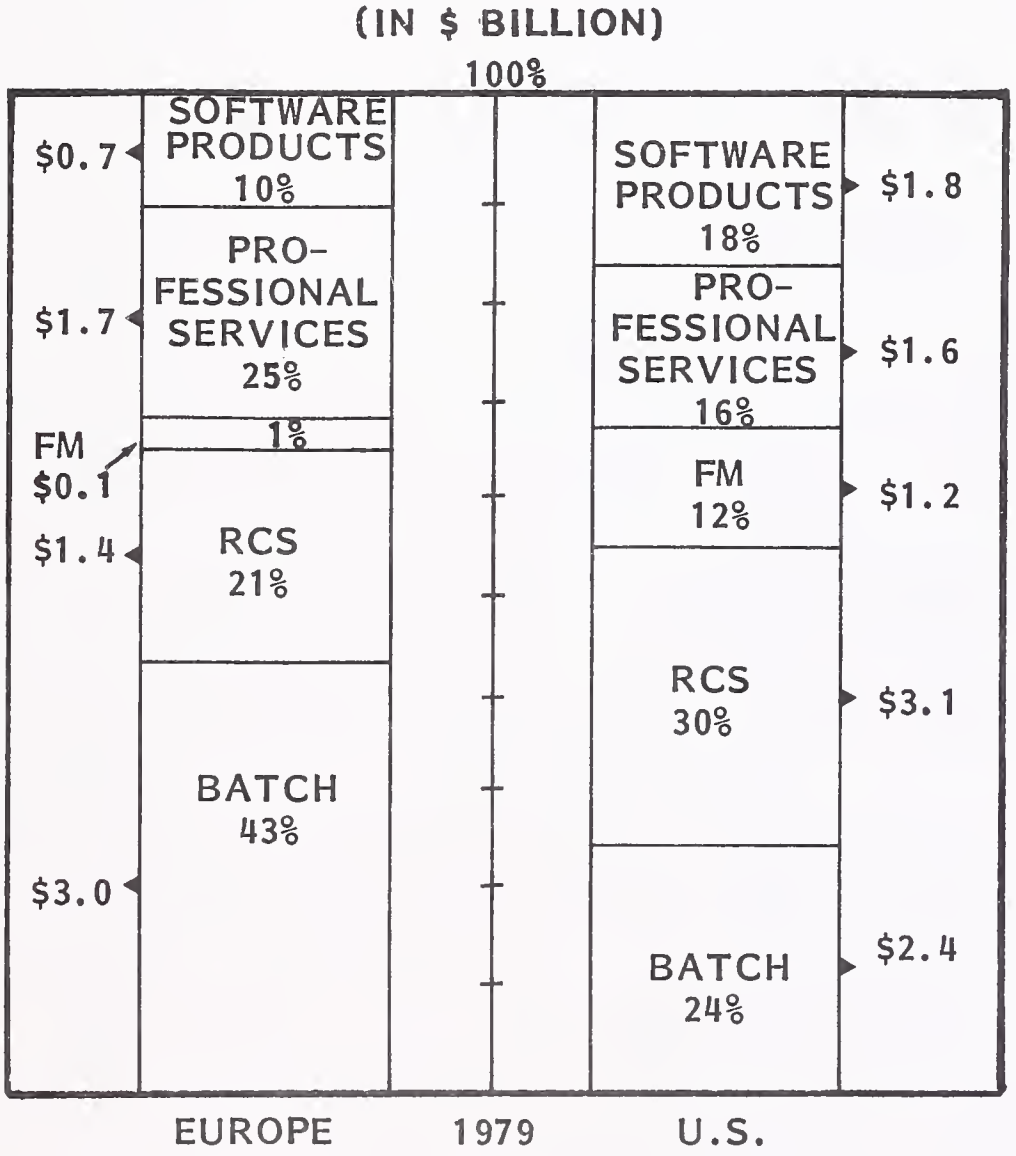
DATA PROCESSING
INDUSTRY MARKET VALUE
(IN $ BILLION)

SECTOR/CATEGORY	1979		1984	
	WEST EUROPE	U.S.A.	WEST EUROPE	U.S.A.
EQUIPMENT				
ON-LINE				
1. MINICOMPUTER	$1.68	$4.35	$4.85	$7.00
2. GPC	5.04	7.92	8.00	14.00
3. PERIPHERALS	1.85	4.75	3.40	7.00
SUBTOTAL	8.57	17.02	16.25	28.00
OFF-LINE				
1. DATA ENTRY/ COMMUNICATIONS	1.15	2.00	3.00	4.20
SUBTOTAL	9.72	19.02	19.25	32.20
DESKTOP, OR PERSONAL	0.11	0.50	0.75	1.00
SUBTOTAL	9.83	19.52	20.00	33.20
LINE CHARGES	1.40	2.50	3.00	5.00
HARDWARE MAINTENANCE	2.80	5.00	8.00	12.00
SOFTWARE AND SERVICES	6.50	10.10	17.18	24.50
TOTAL	$20.53	$37.12	$48.18	$74.70

SOURCE: INPUT ESTIMATES

EXHIBIT VIII-6

PRODUCT SECTORS



G. COUNTRIES NOT RESEARCHED IN DETAIL

- The following countries will be researched for basic market data only, and these data will be included in the statistics for the European Summary Report:

  - Denmark.
  - Eire.
  - Greece.
  - Finland.
  - Norway.
  - Portugal.
  - Spain.
  - Sweden.
  - Switzerland.

- The methodology for data gathering will consist of telephone interviews with selected leading vendor companies in each country on the basis of a CAMP Directory entry. This information will be supplemented by general market information and discussions with consultants operating in those markets.

APPENDIX A: DEFINITIONS

APPENDIX A: DEFINITIONS

- **Small Business Computer**, for the purpose of this study, is a system that is built around a Central Processing Unit (CPU), and that has the ability to utilise at least 20M bytes of disk capacity, provides multiple CRT work stations, and offers business-oriented system software support.

- **A Systems House** integrates hardware and software into a total turnkey system to satisfy the data processing requirements of the end user. It may also develop system software products for license to end users.

- **A Turnkey System** is composed of hardware and software integrated into a total system designed to fulfill completely the processing requirements of one or more applications.

- **An End User** may buy a system from the hardware supplier(s) and do his own programming, interfacing and installation. Alternately, he may buy a turnkey system from a manufacturer, systems house or hardware integrator.

- **A Hardware Integrator** develops system interface electronics and controllers for the CPU, sensors, peripherals and other ancillary hardware components. He may also develop control system software in addition to installing the entire system at the end user site.

- **A Small Business Computer Manufacturer** builds its system around a proprietary CPU and provides systems software. It may make or buy peripheral

equipment and semiconductor devices. Distribution to the end user may be through its company field sales offices, a network of distributors, or both.

- **A Distributor** purchases the small business computer on an OEM basis from the manufacturer and markets it to the end user. He may or may not provide a turnkey system.

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

- **A Minicomputer** is usually a 12-, 16- or 18-bit computer which is provided with limited applications software and support and may represent a portion of a complete larger system or network.

  - The larger minicomputers (often with 24- or 32-bit architecture) are sometimes called Midicomputers; they have the power of a small mainframe and are often used standalone for specialist applications.

- **Distributed Data Processing (DDP)** "Distributed processing is the deployment of programmable intelligence in order to perform data processing functions where they can be accomplished most effectively, through the electronic interconnection of computers and terminals, arranged in a telecommunications network adapted to the user's characteristics."

- **Computer Services** are services provided by vendors which perform data processing using vendor computers or assist users to perform such functions on their own computers.

- **Processing Modes** are of three types: facilities management, remote computing services and batch services.

  - Facilities Management (FM) is the management of all or part of a user's data processing functions under a long-term (not less than one year)

contract. To qualify, the contractor must directly plan and control as well as operate the data processing facility provided to the user on-site through communications lines, free-standing or in mixed mode. Simply providing resources, even though under a long-term contract and/or for all of a user's processing needs, does not qualify as FM.

- Remote Computing Services (RCS) are the provision of data processing to a user by means of terminals at the user's site(s) connected by a data communications network to the vendor's central computer. The three sub-modes of RCS are:

  . INTERACTIVE (Timesharing) is characterized by interaction of the user with the system, primarily for problem solving time-sharing, but also for data entry and transaction processing - the user is on-line to the program/files.

  . REMOTE BATCH is where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements.

  . DATA BASE is characterized by the retrieval of information from a vendor-maintained data base which may be owned by the vendor or a third party.

- Batch Services include data processing performed at vendors' sites on user data which has been physically transported (as opposed to electronically by communications lines) to those sites. Data entry and data output services, such as OCR and COM processing, are also included.

- **Processing Services** encompass FM, RCS, and batch services. They are categorised by type of service (as distinguished from mode of delivery) bought by users, as follows:

- General Business services are processing services for applications that are common to users across industry categories. Software is provided by the vendor; this can be a complete package, such as a payroll package, or an application 'tool', such as a budgeting model, where a user provides much of the customising of the finished product it uses. General business processing is often repetitive and transaction-oriented.

- Scientific And Engineering services are the processing of scientific and engineering problems for users across industries. The problems usually involve the solution of mathematical equations. Processing is generally problem solving and is non-repetitive, except in the sense that the same packages or 'tools' are used to address different, but similar, problems.

- Specialty Applications services provide processing for particular functions or problems unique to an industry or industry group. The software is provided by the vendor either as a complete package or an application 'tool' that the user employs to produce its unique solution. Specialty applications can be either business or scientific in orientation; data base services where the vendor supplies the data base and controls access to it (although it may be owned by a third party) are also included under this category. Examples of specialty applications are: seismic data processing, numerically-controlled machine tool software development, and demand deposit accounting.

- Utility services are those where the vendor provides access to a computer and/or communications network with basic software that enables any user to develop its own problem solution or processing system. These basic tools include terminal handling software, sorts, language compilers, data base management systems, information retrieval software, scientific library routines, and other systems software.

- **User Site Hardware Services (USHS) Or On-Site Computing** (or Combination Processing) is a relatively new type of service which consists of offering a mixed solution to a user's requirements, comprising:

  - Remote Computing on a vendor's mainframe for applications best suited to mainframe power.

  - Installation of On-Site Hardware - usually comprising a minicomputer or small mainframe at the user's site for local processing of applications best performed on a local machine.

  User Site Hardware may be supplied on a turnkey or OEM basis; it acts as the terminal or terminal cluster controller for the remote computing part of the service.

- **Professional Services** include management consulting related to EDP, systems consulting, systems design and programming, and other professional services; e.g., education and training. Services can be provided on a basis of 'Time and Materials' whereby the user pays for the time used of an individual on a daily or other fixed rate, or 'Fixed Price', where the user pays a fixed fee for a specific task or series of tasks.

- **Software Products** are systems and applications packages that are sold to computer users by equipment manufacturers, independent vendors, and others. They include fees for work performed by the vendor to implement a package at the user's site.

- **Captive Revenue** is taken as revenue from services sold to parent companies (in a private sector organisation) or to parent bodies/organisations (in the public sector). It is excluded from available market revenues. Revenue from associate companies in a group or from subsidiaries on the same or a lower level in a group is not classed as captive revenue, because it is usually gained in competition with other vendors.

- **Export Revenue** is revenue earned in one country (the 'destination') by a vendor based in another (the 'source'). Export revenues form part of the available market in the destination country but are excluded from that of the source.

- **Available Market** is the sum of all revenues except captive and export.

APPENDIX B: VENDOR QUESTIONNAIRES

CATALOG NO. M E O I

INPUT / CAMP (UPDATE 1980)
Company Analysis And Monitoring Programme

Interviewer
Tele-phone ☐ Post ☐ Interview ☐
Date ☐☐ : ☐☐ : ☐☐
Respondant _____
Title _____

1. COMPANY BACKGROUND DATA

COMPANY NAME/MAIN LOCATION	BRANCHES/OTHER LOCATIONS
Co. Name _____	
Address _____	
_____	
_____	
_____	
Tel. No. _____ Telex: _____	

KEY EXECUTIVES

Chief Exec: Name ..... Title .....
Other Execs: Name ..... Title .....
Name ..... Title .....
Name ..... Title .....
Name ..... Title .....

OWNERSHIP AND SUBSIDIARIES

Date trading started ...../19.... Company Type: Private ☐ Public ☐ Subsidiary ☐

Major Shareholders:

Co/Name ..... ☐ %
Co/Name ..... ☐ %
Co/Name ..... ☐ %
Co/Name ..... ☐ %

Subsidiaries/Shareholdings:

Company ..... ☐ %
Company ..... ☐ %
Company ..... ☐ %
Company ..... ☐ %

STAFF NUMBERS

Total This Country ..... ☐ of which: Marketing/Sales ..... ☐
Analysts/Programmers ..... ☐ Operating ..... ☐
Engineering/Support ..... ☐ Total group ..... ☐
(approx./if known)

CATALOG NO. MEOT

2.(a) FINANCIAL DATA (LOCAL CURRENCY PLEASE)

OFFICE USE ONLY

TOTAL REVENUE, FINANCIAL YEAR ENDING ...../...../.....							GROWTH %	
European/ This Country	Year Before Last 1978		Last Year 1979		Current Year (Predicted) 1980		Last Year/ Previous Year	Current Year/ Last Year (Anticipated)
	Rev.	% Captive	Rev.	% Captive	Rev.	% Captive		
EXPORT EUROPE								
OUTSIDE EUROPE								
TOTAL GROUP								

2.(b) BREAKDOWN OF REVENUE

EUROPEAN / DOMESTIC REVENUE BREAKDOWN (LOCAL CURRENCY or PERCENT)			
TYPE OF SERVICE	Local Currency	% Last Year	% In 2 Years Time
RCS: Interactive ----------			
Remote Batch ----------			
BATCH SERVICES (including Data Preparation) ----------			
FACILITIES MANAGEMENT (FM) ----------			
U.S.H.S. (On-Site Computing) (including Terminal Rental) -------			
SOFTWARE PRODUCTS: Application			
Industry Specialised -------			
Cross Industry ----------			
System ----------			
PROFESSIONAL SERVICES: Consulting ----------			
Tailored s/w development -----			
Education/Training ----------			
TURNKEY SYSTEMS: Industry specialised ----------			
Cross industry ----------			
HARDWARE MAINTENANCE ----------			
OTHER (please specify)			

COMPUTER HARDWARE INSTALLED Please specify the hardware that you have installed by supplying the name, model, quantity and mode of use (prime function).

MODELS MAINFRAMES (usually for vendor's bureaux)	QTY. now installed	Mode of Use (✓) PROD.	DEV.	COMMS.
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
TERMINALS				
		☐	☐	☐
		☐	☐	☐
Number of Terminal Sites				

MINIS/MICROS (usually on customer sites)	Qty installed during 1979	Average h/w price per system

LANGUAGES Please list those languages which you use and in which your staff have substantial competence.

....

....

KEY PRODUCTS AND SERVICES ACTIVELY PROMOTED Please describe the name and function of products and/or services which form the most important part of current business.

6. INDUSTRY EXPERTISE Please indicate the percentage of your 1979 revenue obtained, and the marketing of industry-specific products if any (✓) in the following industry sectors:

INDUSTRIES	Rev. %	Prod. (✓)		Rev. %	Prod. (✓)
Agriculture/Fishing/Mining			Wholesale/Distribution		
Food/Drinks/Tobacco Mfrs.			Retail Trade/Restaurants/Hotels		
Textile/Clothing/Footwear			Transport and Storage		
Wood Products/Furniture Mfg.			Communication/PTTs/Broadcasting		
Paper Mfg./Printing/Publishing			Financial Institutions/Banks		
Oil/Chem./Coal/Plastic Products			Insurance		
Non Metallic Mineral Products			Real Estate/Business Services		
Basic Metal Industries			National Govt./Defence		
Fabricated Metal Products			Local Government/Community		
Other Manufacturing			Education/Research Medical		
Electricity/Gas/Water			International Bodies		
Construction			Other e.g. Leisure		

7. APPLICATION AREAS Please indicate the percentage of your 1979 revenue obtained, and the marketing of cross-industry software/system products (✓) in the following application areas.

APPLICATION AREA	Rev. %	Prod. (✓)		Rev. %	Prod. (✓)
Industrial/Milit. Control Systems			Accounting/Costing/Audit		
Engineering/Tech./Design/R. & D.			Financial Analysis/Planning		
Order Proc./Purchasing/Point of Sale			Portfolio/Asset/Cash Management		
Production/Inventory Control/Manuf.			Office Autom./Admin./Comm.		
Distribution/Transport			Database Services		
Marketing/Sales			Data Communications		
Payroll/Personnel			Other utility e.g. system devel.		

Would you be interested in learning more about INPUT? Yes ☐ No ☐

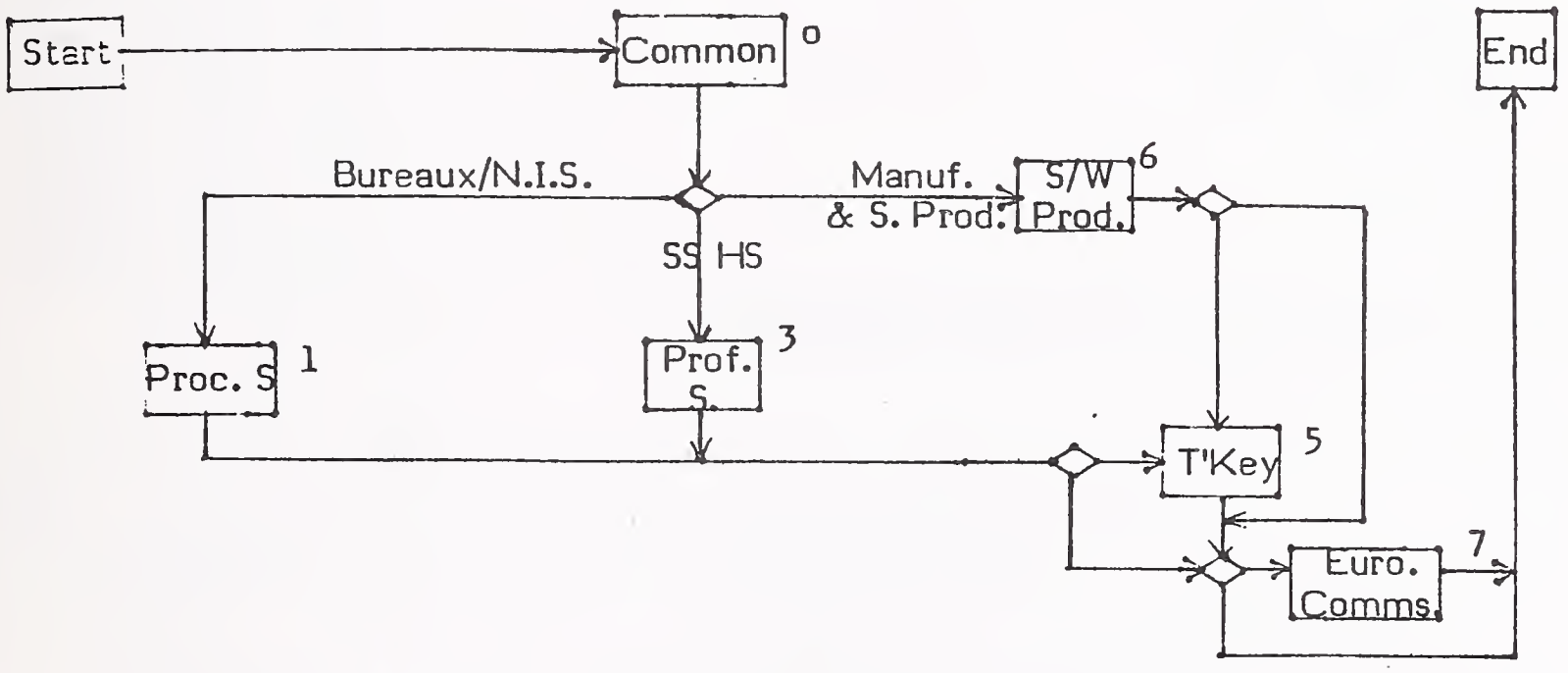
May we be on your mailing list for brochures, announcements, annual reports? Yes ☐ No ☐

Thank you for completing this CAMP Update questionnaire.

MAS/EUROPE 1980 VENDOR QUESTIONNAIRE

QUESTIONNAIRE MODULE FLOW BY VENDOR TYPE

Q. 0. Please indicate (✓ box) modules applicable to your business:



M 0. COMMON ISSUES

Q. 1. Are you placing emphasis in product development (applications) more into cross-industry (X) products or industry speciality (IS) products or is it about equal? [X] [IS] [=]

What will %age split be in 2 yrs. [ ] [ ]

What will %age split be in 5 yrs. [ ] [ ]

Comments

Q. 2. Is your average revenue per customer declining (so leading to increased unit sales cost)? [YES] [NO]

Q. 3. Do your strategic plans take into account the possibilities of:

- continuing inflation (if so please specify how) [YES] [NO]
- continued recession (if so, specify impact) [YES] [NO]

		Real	Perc.	No
Q. 4.	Is staff shortage a real or perceived obstacle to your growth?			
	If so, in which grades (please rate impact High, Medium, Low)			
	- Sales	H	M	L
	- Sales support	H	M	L
	- Software professionals	H	M	L
	- Operations staff	H	M	L
	- Tech. Support/Engineers	H	M	L
	- Managerial	H	M	L
	- Other	H	M	L

Q. 5. Which are your three most serious competitors?

a. ---------- b. ---------- c. ----------

M 1. PROCESSING SERVICES (Bureaux, Data Prep, COM & OCR Services)

Q. 10. Defining "real new business" as revenue from new accounts nett of price increases and lost accounts rev., is the rate of growth of your "real new business" slowing down? YES NO Est. ___ %

- will it be doing so in 2 years time? YES NO Est. ___ %

Comments

Q. 11. Is in-house DDP impacting your large coy. user-base? YES NO No. of Lost A/cs. ___ %

If so, is it mostly migration to:

- Stand-alone mini equipment ___ %
- Connection to in-house networks ___ %
- Batch processing on central in-house mainframes ___ %

Comments

Q. 12. Are you finding that new types of user e.g. small businessmen, professionals, dept. heads prefer a mini/micro-based solution YES NO

If so, in what %age of new account prospects do you estimate you lose to:

- another processing bureau Est. ___ %
- in-house equipment - mini/micro Est. ___ %
- in-house equipment - mainframe Est. ___ %

Comments

Q. 13. U.S.H.S. (User Site Hardware Services) - is it the answer to the processing bureau's growth? - (please rate its capabilities High, Medium or Low) H,M,L

- now (i.e. is it happening) ___
- in 2 years time ___
- in 5 years time ___

Comments
(Check H/W. module)

Q. 14. F.M. (Facilities Management) - is/will there be a need for bureaux to offer complete packaged contracts including, hardware, operators, education, software etc.

- now YES NO
- in 2 years time YES NO
- in 5 years time YES NO

Comments

Q.15. Is your business more costly to obtain than in the past? YES NO

If so, please, give an approximate annual %age increase per unit sale ☐ %

Q.16. Are you considering retailing your services through 3rd-parties? (please also give %age annual rev. thus retailed)

- already do YES NO Est. ☐ %
- will in 2 years time YES NO Est. ☐ %

Comments

Q.17. What pricing elements do you use?

- Computer Resource Unit (CRU) YES NO
- Filespace Unit YES NO
- Connect time YES NO
- Printer Usage YES NO
- Other (please specify) ..... YES NO

Comments

Q.18. Do you use fixed Capacity Pricing Techniques YES NO

	AIM	ACTUAL
If so, what %ages of C.P.U. do you aim to/actually load in this way	☐ %	☐ %

Q.19. Which pricing method do you use?

- Historical Cost-plus YES NO
- Market value YES NO
- Other (please specify) ..... YES NO

Comments

Q.20. Over how many accounts/sales do you normally expect to recover software procurement/development costs

- applications packages ☐
- utilities ☐

Q.21. What %ages of your software do you obtain from the sources below:

	Use Manuf'er's	Buy	Build
- system software	☐	☐	☐
- applications	☐	☐	☐
- utilities	☐	☐	☐

Comments

Q. 22. To what extent have your recent profits been bolstered by external or temporary factors e.g. by:

- already depreciated equipment	High	Med.	Low	effect
- falling hardware costs	H	M	L	
- price increases matching inflation	H	M	L	
- Other (please specify)	H	M	L	

Comments

Q. 23. As a team, do you feel you spend too much time on day-to-day profit management to the detriment of:

- medium term planning (next 2 years)	YES	NO
- longer-term planning (next 5 years)	YES	NO

Comments

Q. 24. May we have a copy of your current services tariff structure/price list. If YES, please send to INPUT's Piccadilly office.

YES NO

M 3. PROFESSIONAL SERVICES

Q.30. To what extent has hardware revenue contributed to your recent growth? ☐ %

Comment

Q.31. Will the computer services sector get its fair share of new business/applications opened up by the microprocessor? YES NO

If so, will it be mainly from: (please also give estim. % of new business likely to be gained.

- new accounts (first-time users) YES NO Est. ☐ %
- new accounts (established users) YES NO Est. ☐ %
- existing accounts YES NO Est. ☐ %

Comments

Q.32. What types of contract do you offer:

- Fixed price YES NO
- Time and materials YES NO
- Body hire YES NO
- Other (please specify) ..... YES NO

Comments

Q.33. What productivity aids/methods do you employ: (Rate usage High, Medium, Low)

- Structured techniques e.g. M. Jackson H M L
- Reusability of modular code H M L
- Improved languages H M L
- Application system generators e.g. H M L
- Personal motivation H M L
- Other (please specify) ..... H M L

Comments

Q.34. What factors contribute to your profitability Cont. %

- Software productivity techniques ☐
- Project management methods ☐
- Calibre of your staff ☐
- Other (specify) ..... ☐

100%

Comment

Q. 35. Do you see your company becoming fully product-orientated?

in 2yrs 5yrs Never

(Please also give estim. max. rev. % achievable from products Max. ☐ %

If so, would you trade-off end-user orientation for productisation? YES NO

Comment

Q. 36. What approximate %ages of your software is developed using the following languages:

- Assembler ☐ %
- Traditional high-level - COBOL, FORTRAN, BASIC, ALGOL 60, RPG ☐ %
- Newer high-level e.g. - PL1, CORAL 66, RTL2, PASCAL, APL, ☐ %
- Non-Procedural e.g. Query languages, non-host DBMS ☐ %
- Other (please specify) ..... ☐ %

100%

Q. 37. What types of system acceptance testing do you enforce?

- Agree spec. in writing with user YES NO
- Design acceptance tests jointly with user YES NO
- Get user to agree to a formal set of acceptance tests YES NO
- Undertake formal 'factory' tests on your site YES NO
- Undertake formal tests on user's site YES NO
- Enforce formal spec. modification procedure YES NO

Q. 38. What changes in skill requirements are you noticing - particularly for the new decentralised applications - DBMS, DDP (Data Comms), Office Automation?

Q. 39. Do you employ freelance staff (or subcontract work out) in any of the following grades?

	Sometimes	Often	Never
- Specialist consultants	☐	☐	☐
- Analysts & programmers	☐	☐	☐
- Operators	☐	☐	☐
- Other	☐	☐	☐

Q. 40. How do you train your staff - (please also give approx. %age usage of training method)

- Your own courses YES NO ___ %
- Manufacturers' courses YES NO ___ %
- Courses from Independent training companies YES NO ___ %
- 'On the job' training YES NO ___ %

Q. 41. What trends in consultancy assignments are you noticing? - towards:

- general implementation advice YES NO
- equipment selection YES NO
- specialist e.g. performance measurement YES NO
- Other ..... YES NO

Comments

M 5. HARDWARE SERVICES (Turnkey, Integrators, Distributors, TPM - Third Party Maintenance)

Q. 50. Do you provide your own hardware/engineering facilities?
If so, are they used for:

	YES	NO
- Manufacture	YES	NO
- Integration	YES	NO
- Commissioning	YES	NO
- Maintenance	YES	NO
- Other	YES	NO

Q. 51. Do you have a policy of vertical integration of systems? (i.e. make as much as poss. yourself of a product line) YES NO

	In-house	Bought-in
What is %age breakdown of systems cost between 'made in-house' and 'bought in'?		%

Q. 52. Do you differentiate between working and investment capital? YES NO

Comments

Q. 53. Do you provide up-front investment for system cost components?

- Software products - system	YES	NO
- Software products - application	YES	NO
- Hardware systems, pre-sale stock of	YES	NO
- Spares stock	YES	NO
- Other	YES	NO

OMIT Q. 54 IF ANSWERED MODULE (PROF. SERVICES)

Q. 54. What types of system acceptance testing do you enforce?

- Agree spec. in writing with user	YES	NO
- Design acceptance tests jointly with user	YES	NO
- Get user to agree to a formal set of acceptance tests	YES	NO
- Undertake formal 'factory' tests on your site	YES	NO
- Undertake formal tests on user's site	YES	NO
- Enforce formal spec. modification procedure	YES	NO

Q. 55. Do you offer warranty? and for what period on:

			Mths	Days
- hardware	YES	NO		
- software	YES	NO		

CATALOG NO. MEOI

M 6. SOFTWARE PRODUCTS

Q. 60. Which are your three most heavily used products?

Approx. No of installations

1 ..... ☐

2 ..... ☐

3 ..... ☐

Q. 61. Do you expect to experience the same high annual growth rates for your products as at present (20 - 30%):

- in 2 years time? YES ☐ NO ☐ Est. ☐ %
- in 5 years time? YES ☐ NO ☐ Est. ☐ %

Q. 62. Is profitability impacted by this fast expansion? YES ☐ NO ☐

Q. 63. Over how many systems/sales do you normally expect to recover software development costs?

- systems software ☐
- applications packages ☐
- utilities ☐

Q. 64. Is your new business more costly to obtain than in the past? YES ☐ NO ☐

If so, please, give an approximate annual %age increase per unit sale ☐ %

Q. 65.&66. INDEPENDENTS ONLY

Q. 65. Manufacturers software appears less expensive than independents.

Do you use their pricing as a guide to your own? YES ☐ NO ☐

If so, what factor of difference between the two do you consider the market will tolerate? + ☐ %

Comments

Q. 66. Do you anticipate increased competition from IBM's and other manufacturers' products?

- Short-term i.e. next 2 years YES ☐ NO ☐
- Long-term i.e. next 5 years YES ☐ NO ☐

If so, how will you counter it. _____

Q. 67. May we have a copy of your current price list?
If YES, please send to INPUT's Piccadilly office. YES ☐ NO ☐

Q. 68. Support/servicing activities are crucial to productivity? Do you use or are you planning to use:

- phone-in support centres Use ☐ Plan ☐ No ☐
- remote diagnosis/fixing on-line Use ☐ Plan ☐ No ☐

If neither, how else do you expect to contain escalating personnel costs _____

M 7. EUROPEAN COMMUNICATIONS ENVIRONMENT

Q. 70. Do you see your growth prospects adversely affected by PTT monopoly positions?

- short-term i.e. over next 2 years — YES / NO
- long-term i.e. over next 5 years — YES / NO

Q. 71. Which aspects impact your business most:
(please rate severity of impact High, Medium, Low, Negative (i.e. good for you)

	H,M,L,N
- Tariff increases	
- Provision of leased lines degraded (i.e. nos., quality, servicing etc. poorer)	
- Trans-border data flow obstructed by legislation or restrictive practices	
- Network connections more rigorously/legalistically vetted	
- Increased competition from Public Data Networks (Transpac etc.)	
- Increased competition from PTT as services suppliers (e.g. N.D.P.S.)	
- Viewdata and videotext applications	
- Other (please specify)	

Comments

Q. 72. If your answer to Q. 70 was YES in either part, what are your strategic plans to offset the loss of business?

- to diversify into other areas — YES / NO
- try to improve your own competitive edge — YES / NO
- Other (please specify) ..... — YES / NO

Comments

Q. 73. Do you expect to enhance your product range within the next 2 or 5 years by adding one or more of the following services to your repertoire:

	Yes within 2yrs	5yrs	No	Already Do
- addition of a network to your bureau centres				
- use of Public Data Networks (PDNs) to offer added-value services				
- offering Viewdata type services				
- use of Euronet for supply of Database services				
- offering Database services by some other means				

Comments

Q. 74. Do you see opportunities for computer services in connection with 'Office of the Future' business communications?

If so, in connection with:

- User-site word-processing centres/networks YES NO
- Electronic mail YES NO
- Facsimile/telecopier YES NO
- Image processing systems/CRT graphics YES NO
- Multi-function equipment e.g. intelligent PABX YES NO

Comments

APPENDIX C: INTERVIEW PROFILE

APPENDIX C: INTERVIEW PROFILE

A. MANUFACTURERS

- DEC.
- Philips.
- Storage Technology.
- Computer Technology.
- ICL.

B. COMPUTER SERVICES COMPANIES

- ICL/Bavic.
- GSI.
- CISI.
- Telesystemes.
- IP Share.
- CMG.
- UCC.
- UCS.
- Boeing Computer Centres.
- Fides.
- Sligos.
- Transpac.
- Scicon.
- SCS.
- CAP/Sogeti.

APPENDIX D: EXCHANGE RATES

APPENDIX D

DOLLAR EXCHANGE RATES USED IN THIS REPORT -
ONE DOLLAR EQUALS:

COUNTRY	RATE			UNIT SYMBOL
	1977	1978	1979	
FRANCE	4.92	4.74	4.31	FRANC FF
FEDERAL REPUBLIC OF GERMANY	2.33	2.11	2.0	DEUTSCHMARK DM
UNITED KINGDOM	0.57	0.51	0.50	POUND STERLING £
ITALY	882	853	824	LIRA L
SWEDEN	4.46	4.42	4.36	KRONER SKr
NORWAY	5.33	5.20	5.11	KRONER NKr
DENMARK	6.00	5.25	5.25	KRONER DKr
NETHERLANDS	2.46	2.27	2.03	GUILDERS Fl
BELGIUM/ LUXEMBOURG	35.94	32.70	30.35	FRANC BF
AUSTRIA	16.62	15.18	13.74	SHILLING AS
SWITZERLAND	2.43	2.07	1.71	FRANC SFr
SPAIN	75.21	71.30	67.38	PESETA P
PORTUGAL	38.21	42.00	45.91	ESCUDO ESc
FINLAND	4.01	4.00	4.00	MARKKA FM
GREECE	-	-	35.00	DRACHMA D
JAPAN	-	-	250.00	YEN ¥

APPENDIX E: GLOSSARY OF DATABASE SERVICES AND VIDEOTEX TERMS

APPENDIX E

GLOSSARY OF DATA BASE SERVICES AND VIDEOTEX TERMS

1. DATA BASE SERVICES

Information Industry: the commercial generation, operation and use of data bases and data banks. (Thus newspapers, periodicals and books are not included but printed abstracts, journals, data compilations and indices are included as products of data bases and data banks as well as on-line services.)

TYPES OF INFORMATION OPERATIONS

Reference data bases Bibliographic data bases Referral data bases Data bases (used alone to differentiate from data banks)	Contain representations of the original information; indicate where it may be found
Source data bases Full-text data bases Numeric data bases Hard data bases Data banks (used to differentitate from data bases)	Contain the original information. This may be numeric, full-text or other but is distinguished by providing information directly, not by reference to another source of information.
On-line services On-line vendors On-line suppliers Hosts (EURONET)	Provide on-line access, mainly to reference data bases.

GLOSSARY OF DATA BASE SERVICES AND VIDEOTEX TERMS

TYPES OF INFORMATION OPERATIONS

Network information services Remote computing services	Provide on-line access to source data bases or data banks and often allow users to manipulate on-line data retrieved.
Integrated services	When the organisation producing the data base also provides the on-line service. These are more frequently source data base producers and time-sharing services.
Custom information services Information brokers Information retailers Intermediary information services Information consultancies	Providing on-demand computer searches, SKI, special reports and analyses of information research studies.

2. VIDEOTEX

GENERAL

Videotex: A communication system in which digitally encoded frames are transmitted for reception by a modified TV set where a limited number of frames are stored and displayed. Most systems have a colour capability employing the fundamentals red, green, blue (on or off) in any combination, thereby giving eight colours (black, white, red, green, yellow, blue, magenta, cyan).

Broadcast Videotex: The generic name for Videotex systems employing one-way communication. The entire set of frames is transmitted repeatedly, the user specifies and the receiver selects, stores and displays the required information. Most systems at present are inserting the information in the interframe blanking

GLOSSARY OF DATA BASE SERVICES AND VIDEOTEX TERMS

GENERAL

of a TV signal transmitted over the air.

Interactive Videotex: The generic name for Videotex systems employing two-way communication. Users are able to communicate with the system to specify their requirements. Single frames are transmitted to the receiver, where they are stored and displayed. Most systems at present are using the public telephone network with a modem (modulator/demodulator) at a speed of 1200 bit/s from the system to the receiver and at 75 bit/s from the receiver to the system (1200/75 bit/s).

Note: These expressions are not the ones used currently within CCITT (Comité Consultatif International de Télégraphique et Téléphonique) but it is likely that they might be used by this committee in the future.

EXISTING VIDEOTEX SYSTEMS

Teletext: The UK system for the broadcast Videotex agreed by the BBC (British Broadcasting Corporation), IBA (Independent Broadcasting Authority) and BREMA (British Radio Equipment Manufacturers Association).

Viewdata: The system of the UK developed by the UK Post Office Telecommunications Department for the interactive Videotex.

Antiope: Antiope is the Videotex system (both the broadcast and the interactive) for France which is developed by the CCETT (Centre Commun d'Etudes de Télévision et de Télécommunication) in Rennes.

Telidon: This is the Canadian proposal for an interactive Videotex system.

GLOSSARY OF DATA BASE SERVICES AND VIDEOTEX TERMS

VIDEOTEX SERVICES (operational or planned)

Ceefax: The broadcast Videotex service offered in the UK by the BBC using the Teletext system.

Oracle: The broadcast Videotex service offered in the UK by IBA using the Teletext system.

Prestel: The public interactive Videotex service offered by the UK Post Office since early April this year using the Viewdata system.

Télétel: The experimental interactive Videotex service of France offered by the French PTT in a field trial in Vélizy (a suburb of Paris) using the Antiope system.

Bildschirmtext: The experimental German service of interactive Videotex which uses at present the Viewdata system, the character generator of which will be adapted for special German needs (e.g. ä, ö, ü, ...) for the field trial to be conducted around Düsseldorf.

APPENDIX F: RELATED REPORTS AND THEIR HIGHLIGHTS

APPENDIX F

RELATED INPUT REPORTS AND THEIR HIGLIGHTS

MAS/E - 1979 PROGRAMME

REPORTS:

- IBM SERIES 1 - A COMPUTER SERVICES OPPORTUNITY
- APPLICATION SOFTWARE DEVELOPMENT IN EUROPE
- ACQUISITION STRATEGIES IN EUROPE
- IMPACT OF MARKETING ON COMPANY PERFORMANCE
- REMOTE COMPUTING SERVICES MARKETS IN EUROPE
- THE BENELUX COMPUTER SERVICES MARKETS
- ANNUAL REPORT OF THE EUROPEAN COMPUTER SERVICES INDUSTRY - 1979

MAS/E - 1979 ANNUAL REPORT, IDENTIFICATION OF MAJOR ISSUES

- RELATIVE SLOW-DOWN IN GROWTH IN TRADITIONAL SERVICES MARKET SECTORS - EXCEPT SOFTWARE PRODUCTS.
- IDENTIFIABLE AND USHS PRODUCT OFFERINGS SUPPORTING SOFTWARE SERVICES AND RCS GROWTH.
- 1978 INCREASE IN PROFITABILITY (89% IN W. EUROPE) SHORT-TERM - NEW INVESTMENT AFFECTING FUTURE.
- SHORTAGE OF QUALIFIED STAFF HAVING MAJOR IMPACT ON BUSINESS DEVELOPMENT.
- FALL IN MARKET SHARE BY MAJOR MULTINATIONAL SUPPLIERS IN FAVOUR OF INDUSTRY-SPECIALIZED NATIONAL VENDORS.
- CONTINUING STRENGTH OF FRENCH MARKET AND INCREASING INTERNATIONAL ACTIVITY BY FRENCH SUPPLIERS.
- U.S. BECOMING KEY EXPORT MARKET FOR EUROPEAN COMPANIES.

APPENDIX F (CONT.)

INPUT's MARKET ANALYSIS SERVICE/EUROPE (MAS/E)

1979 ANNUAL REPORT

HIGHLIGHTS

CONTINENT/COUNTRY	PERCENT* GROWTH TO	($ MILLION) 1978	PERCENT FUTURE GROWTH
U.S. MARKET			
PROCESSING SERVICES	19%	$5,765	15% (1)
SOFTWARE SERVICES	15	1,362	17 (1)
SOFTWARE PRODUCTS	23	981	65 (1)
EUROPEAN MARKET			
PROCESSING SERVICES	21	3,682	19 (2)
SOFTWARE SERVICES	25	1,450	22 (2)
SOFTWARE PRODUCTS	37	336	28 (2)
U.K. MARKET			
PROCESSING SERVICES	25	411	18
SOFTWARE SERVICES	27	239	21
SOFTWARE PRODUCTS	34	56	36

*AFTER DEDUCTION OF 8% FOR DOLLAR DEVALUATION

(1) = TO 1979 ONLY

(2) = TO 1983

MAS/E 1979 ANNUAL REPORT HIGHLIGHTS - MAJOR EUROPEAN PROCESSING SERVICES MARKETS

COUNTRY	BATCH SERVICES**			RCS SERVICES		
	PERCENT*	1978 ($ MILLION)	1983 (PERCENT)	PERCENT*	1978 ($ MILLION)	1983 (PERCENT)
FRANCE	41%	$ 631	15%	40%	$ 280	22%
W. GERMANY	43	505	19	42	167	22
UNITED KINGDOM	21	223	14	38	188	22
ITALY	17	297	12	28	59	21
SWEDEN	10	200	11	26	86	22
NETHERLANDS	30	142	15	51	80	20
DENMARK	8	138	10	25	45	19
BELGIUM	38	84	11	67	62	23
OTHERS	15	310	19	23	165	26
TOTAL	27%	$2,530	15%	37%	$1,132	22%
U.S. MARKET	14%	$1,976	19%	23%	$2,707	13%

* INCLUDES $ DEVALUATION EFFECT

**FM/US = 1,082 @ 14% (EUROPE = 102)