

EUROPEAN  
COMPUTER SERVICES INDUSTRY  
ANNUAL REPORT - 1979

**INPUT EUROPE**



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### EUROPE

#### INPUT

Airwork House (4TH FLOOR)  
35 Piccadilly  
London W1V 9PB  
England

01-734-2156

01-776

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#### INPUT, West Coast

Dayshore Boulevard,

California 94303

400

#### INPUT, East Coast

via West-1

Clark, New Jersey 07662

071

Input Service Company, Ltd

Building, No 12-7 Kita Aoyama

Minato-Ku

10

### AUSTRALIA

Infocom Australia

Highland Centre, 7-9 Merriwa Street

P.O. Box 110, Gordon N.S.W. 2072

(02) 498-8199

000006

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## I. INTRODUCTION





## I. INTRODUCTION

### A. THE MAS SERVICE

- This report is produced as part of the Market Analysis Service (MAS/EUROPE) for the Computer Services Industry in Western Europe.
- The purpose of this report is to present forecasts and analyses of markets and development trends in the computer services industry.
  - These characteristics are described qualitatively and their impact is reflected by computer services market size forecasts through 1983.
  - Because of the increasing overlap of hardware and services, the coverage of hardware issues is being, and will be increasingly, expanded.
- The base year for forecasting is 1978.
- This report provides information on four major types of computer service category:
  - Remote Computing Services (Interactive and Remote Batch),
  - Batch Services,(including Data Preparation and Facilities Management)
  - Software Products (Systems Software and Application Software),
  - Professional Services (including Turnkey Systems, and Education and Training).
- The types of service are forecast separately and combined.

- The data on which this report is based comes from:
  - Information from over 500 personal and telephone interviews INPUT staff have carried out during the past year with computer services users in Europe and executives of computer user companies.
  - Information from over 2000 personal and telephone interviews INPUT has undertaken during the past year with computer services vendors in Europe, in establishing and maintaining the CAMP/EUROPE database.
  - Continuous interchange and contact with both vendors and users over the previous year.
- The report is primarily an analysis of this data based on the experience and expertise of INPUT staff.
- This is the first Annual Report within the European MAS Programme.
- A companion volume containing INPUT's Annual In-House Presentation is included for subscribers as part of the MAS Programme.
- Enquiries and comments from clients on the information presented are requested. Suggestions for changes in the structure and contents of the reports for later years are also welcomed.

## B. MAS REPORTS ISSUED IN 1979

- Reports issued this year for the MAS Programme are:
  - Impact Report entitled "Application Software development in Europe" (issued February 1979).



- Impact Report entitled "IBM Series/1, A Computer Services Opportunity" (issued March 1979).
- Market Report entitled "Remote Computer Services Markets in Europe" (issued July 1979).
- Market Report entitled "The Benelux Computer Services Market" (issued August 1979).
- Impact Report entitled "Acquisition Strategies for Europe" (issued September 1979).
- Impact report entitled "Impact of Marketing on Company Performance" (to be issued December 1979).

### C. THE CAMP SERVICE

- CAMP provides immediate access to detailed information about the computer services industry. The service currently covers at least 80% by number of the significant computer service companies in Western Europe.
- The service includes:
  - A separate manual for each country which contains:
    - a directory of companies,
    - indices for quick reference to hardware installed, industry and application expertise, geographical location, services and products,
    - detailed company profiles for the major companies.

- Updates to the manual.
  
- Access to INPUT's Consultancy staff to obtain additional information by means of an enquiry service. INPUT's staff are in contact with over 2500 computer service companies in Western Europe and are regularly talking on an annual basis to at least 750 of these vendors.
  
- o The CAMP service is available to both suppliers and users of computer services and equipment.
  
- o Information contained in CAMP is acquired through personal and telephone, interviews with computer services vendors and continuous interchange ensures the validity of the information.
  
- o The CAMP manuals available to date are:
  - West Germany,
  - UK/Eire,
  - France,
  - Italy,
  - Belgium/Luxembourg,
  - The Netherlands,
  - Austria,
  - Switzerland.

## II. EXECUTIVE SUMMARY





## II. EXECUTIVE SUMMARY

### A. EUROPEAN COMPUTER SERVICES MARKET GROWTH

- The computer services market in Western Europe in 1978 was \$5.4 billion and is forecast to have grown 21% in 1979 to \$6.6 billion in current dollars.
  - This excludes IBM software and services revenues sold through DCS and RCS Departments of \$0.27 billion.
  - It also excludes captive revenues of \$0.8 billion and export revenues of European companies of \$0.15 billion.

For definitions of captive and export revenues, see Appendix C.

- Exhibits II-1 to II-3 show the country market breakdowns by major services sector for 1977, 1978 and forecast for 1979.
- For the five-year forecast period from 1979 through 1983, the compounded growth is 19% with the market doubling to \$13.4 billion by 1983.
- Of considerable significance are the wide differences in growth rates within segments of the total market.
  - For processing services, general business and industry specialty delivered in an RCS mode will grow at 26%, while scientific and engineering delivered in a batch mode will grow at 6%; other combinations of types and modes of services will have intermediate growth values to yield the key overall market figures shown in Exhibit II-4.
  - Industry sector markets, vary widely in relative size.

WEST EUROPEAN COMPUTER SERVICES MARKET GROWTH, 1977 - 1978

COUNTRY	1977 (\$ MILLIONS) x						1978 (\$ MILLIONS) x						ANNUAL GROWTH RATE (%) 1977 - 1978					
	RCS**	Batch	S/W Prod.	Prof. Serv.*	Total	RCS**	Batch	S/W Prod.	Prof. Serv.*	Total	RCS**	Batch	S/W Prod.	Prof. Serv.*	Total			
FRANCE	\$200	\$ 449	\$ 50	\$ 207	\$ 906	\$ 280	\$ 631	\$ 76	\$ 279	\$1266	40%	41%	52%	35%	40%			
GERMANY	118	354	44	156	672	167	505	61	203	936	42	43	39	30	39			
UK/EIRE	136	185	33	184	538	188	223	56	239	706	38	21	70	30	31			
ITALY	46	254	35	96	431	59	297	51	143	550	28	17	45	49	28			
SWEDEN	68	181	8	74	331	86	200	10	99	395	26	10	25	34	19			
NETHERLANDS	53	111	10	58	232	80	142	17	80	319	51	30	70	40	38			
DENMARK	36	128	6	52	222	45	138	10	71	264	25	8	67	37	19			
BELGIUM/LUX.	37	61	5	28	131	62	84	8	53	207	67	38	60	89	58			
OTHERS +	134	270	36	215	655	165	310	47	283	805	23	15	31	32	23			
WESTERN EUR.	828	1993	227	1070	4118	1132	2530	336	1450	5448	37	27	48	36	32			

\* Turnkey Systems included

\*\* IA - Interactive and RB - Remote Batch

x Captive Revenues are excluded. Exchange rates are "Current" (see Appendix A).

+ OTHERS refers to the countries listed in Exhibit II-2.

WEST EUROPEAN COMPUTER SERVICES MARKET GROWTH, 1977 - 1978 continued

COUNTRY (All under \$200M)	1977 (\$ MILLIONS) x					1978 (\$ MILLIONS) x					ANNUAL GROWTH RATE (%) 1977 - 1978				
	RCS**	Batch	S/W Prod.	Prof. Serv.*	Total	RCS**	Batch	S/W Prod.	Prof. Serv.	Total	RCS**	Batch	S/W Prod.	Prof. Serv.*	Total
SWITZERLAND	\$ 41	\$ 68	\$ 10	\$ 33	\$ 152	\$ 49	\$ 73	\$ 13	\$ 45	\$ 180	20%	7%	30%	36%	18%
SPAIN	30	50	10	30	120	35	57	13	38	143	17	14	30	27	19
NORWAY	27	50	2	25	104	30	58	3	30	121	11	16	47	20	16
FINLAND	23	45	2	18	88	24	54	2	25	105	4	20	24	39	19
AUSTRIA	7	32	9	15	63	10	35	12	20	77	43	9	33	32	22
PORTUGAL	3	9	2	2	16	4	11	2	3	20	31	23	22	70	26
GREECE	1	8	1	2	12	3	8	2	3	16	85	12	45	60	33
OTHER +	2	8	-	90	100	10	14	-	119	143	500	75	-	32	43
TOTAL	134	270	36	215	655	165	310	47	283	805	23	15	31	32	23

\* Turnkey Systems included

\*\* IA - Interactive and RB - Remote Batch

x Captive Revenues are excluded.

+ OTHER includes Iceland, and manufacturers' professional services adjustment figures.

EXHIBIT II-2



- Central Government and Manufacturing are the largest industry markets, as shown in Exhibit II-5.
- Banking and Finance is a major market, which has not grown recently as fast as it did in the past due to the increasing pull of services in-house.
- Transportation and education are the lagging sectors, with the remaining eight sectors forming a middle group.
- Software products are forecast to grow at 28%, driven by several forces:
  - The increasing willingness of EDP managers to use packaged software as a partial solution to a growing applications backlog.
  - The profusion of small computers, and now even personal computers.
  - The continued investment by U.S. software companies in research and development and the tendency to market their products directly in Europe rather than through agency agreements.
  - The emergence of DBMS and implementation language software as programming languages to replace or supplement the purely procedural languages COBOL, BASIC AND ASSEMBLER.
- In MAS programmes during 1980 and later years, INPUT will include hardware manufacturers unbundled software products in the market sector instead of excluding it as has been done in 1979. Figures will then be more easily compared to those of the U.S.A.
- A more aggressive sale of software by IBM and other hardware vendors would cause actual market growth to exceed the forecast.



WEST EUROPEAN COMPUTER SERVICES MARKET GROWTH, 1978 - 1979

COUNTRY	1978 (\$ MILLIONS) x					1979 (\$ MILLIONS) x					ANNUAL GROWTH RATE 1978 - 1979				
	RCS**	Batch	S/W Prod.	Prof. Serv.*	Total	RCS**	Batch	S/W Prod.	Prof. Serv.	Total	RCS**	Batch	S/W Prod.	Prof. Serv.*	Total
FRANCE	\$ 280	\$ 631	\$ 70	\$ 285	\$1266	\$ 350	\$ 801	\$ 85	\$ 334	\$1570	25%	27%	21%	17%	24%
GERMANY	167	505	61	203	936	217	636	79	254	1186	30	26	30	25	27
UK/EIRE	188	223	56	239	706	233	260	76	296	865	24	12	36	24	23
ITALY	59	297	51	143	550	77	350	61	186	674	31	18	20	30	23
SWEDEN	86	200	10	99	395	109	229	12	125	475	27	15	20	26	20
NETHERLANDS	80	142	17	80	319	108	192	26	116	442	35	35	53	45	39
DENMARK	45	138	10	71	264	55	149	14	89	307	22	8	40	25	16
BELGIUM/LUX.	62	84	8	53	207	84	101	11	77	273	35	20	38	45	32
OTHERS +	165	310	53	277	805	196	346	59	200	801	19	12	11	-28	-10
WESTERN EUR.	1132	3530	336	1450	5448	1429	3064	423	1677	6593	26	21	26	16	21

\* Turnkey Systems included

\*\* IA - Interactive and RB - Remote Batch

x Captive Revenues are excluded. Exchange rates are "Current" (see Appendix A).

+ OTHERS refers to the countries listed in Exhibit II-2.

- Professional services are forecast to continue to grow at a high rate, 22%. There are indications that this growth will be on an accelerating curve as users turn to outside consulting, programming and systems analysis to assist in implementation of more complex communications-based or industry specialty systems. Consultancy and training are in great demand as the nature and complexity of the environment changes. This sector is currently responsible for many small company start-ups as entrepreneurs detect market opportunities.
- One of the most significant factors in the growth of professional services in particular, and computer services in general, is the continuing lack of skilled EDP personnel. Two traditional sources of staff, central government and computer manufacturers, are still providing a number of trained people but not in the quantity that flowed into the computer services industry five years ago. The flow of inexperienced graduate personnel is now the main source of new entrants to the European industry.

## B. ISSUES AFFECTING COMPUTER SERVICES MARKETS

- Distributed data processing (DDP), the distribution of programmability and applications processing over a telecommunications network, is an emerging force in applications development:
  - The driving force behind this process comes from the success of the mini-computer manufacturers in placing small business computers in all types of environment,
  - IBM has responded during the period 1978 to 1979 to this force by announcing a whole array of products to cover the DDP field.
- The major announcement of 1979 was IBM's launch of the 4300 Processors on a price-performance curve which first dismayed the competition and then provided a backlash to IBM in the form of delayed 303X system orders due to anticipation of the 'H' series launch in 1980 with a similar price-performance.

COUNTRY	1979 (\$ MILLIONS)						1983 (\$ MILLIONS) ***						AVERAGE ANNUAL GROWTH RATE 1979 - 1983					
	RCS**	Batch	S/W Prod.	Prof. Serv.*	Total	RCS**	Batch	S/W Prod.	Prof. Serv.	Total	RCS**	Batch	S/W Prod.	Prof. Serv.*	Total			
FRANCE	\$ 350	\$ 801	\$ 85	\$ 334	\$1570	\$ 781	\$1385	\$ 193	\$ 753	\$ 3112	22%	15%	23%	23%	19%			
GERMANY	217	636	79	254	1186	481	1285	226	517	2509	22	19	30	19	21			
UK/EIRE	233	260	76	296	865	516	435	257	635	1843	22	14	36	21	21			
ITALY	77	350	61	186	674	166	542	142	443	1293	21	12	24	24	18			
SWEDEN	109	229	12	125	475	241	348	34	259	882	22	11	30	20	17			
NETHERLANDS	108	192	26	116	442	221	332	71	253	877	20	15	28	21	19			
DENMARK	55	149	14	89	307	110	218	38	210	576	19	10	28	24	17			
BELGIUM/LUX.	84	101	11	77	273	190	156	25	177	548	23	11	23	23	19			
OTHERS +	196	346	59	200	801	497	695	148	435	1775	26	19	26	21	22			
WESTERN EUR.	1429	3064	423	1677	6593	3203	5396	1134	3682	13515	22	15	28	22	19			

\* Turnkey Systems included

\*\* IA - Interactive and RB - Remote Batch

+ 1983 dollars are expressed as "Constant", 1979 Dollars. "Current" 1983 dollars will be higher or lower depending on the actual inflation rates, and exchange rate fluctuations.

x Captive Revenues are excluded.

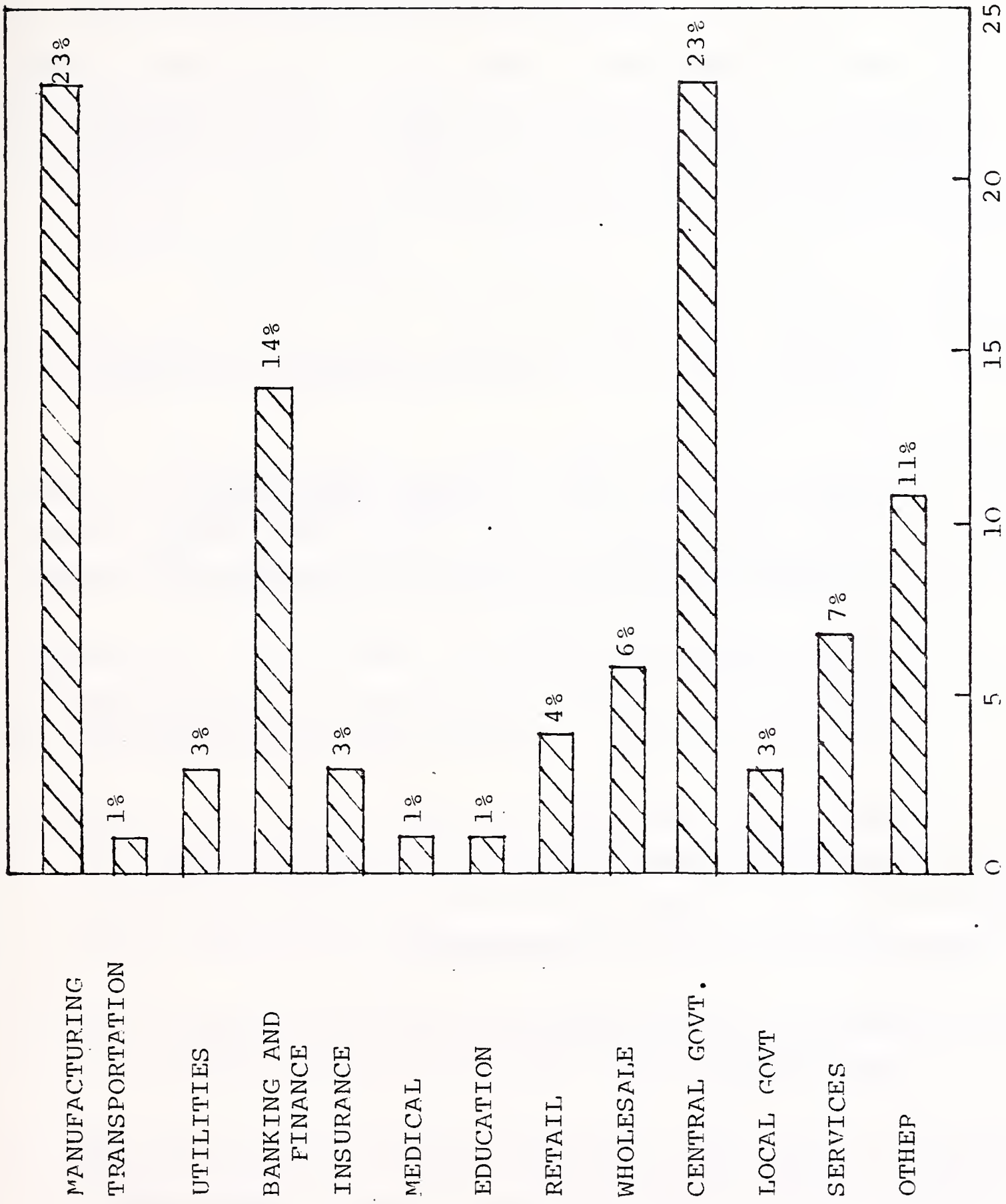
+ OTHERS refers to the countries listed in Exhibit II-2.



- More significant, however, than price performance is the way IBM is shifting revenue earning away from processors as their price falls and into peripherals, especially storage peripherals. Better price performance in processors is fuelling the move towards the information-storage orientated systems of the late 1980's.
  
- As user management increases its demand on EDP, both in-house departments and computer services companies must respond:
  - Distributed services, such as GEISCO's MARKLINK, are ready to be sold in Europe,
  
  - Industry specialized services which solve immediate user needs, are a growth opportunity, but in Europe national differences, which prevent economies of scale, are retarding the trend in this direction when compared to the U.S.
  
- Less expensive hardware continues to be both a threat and an opportunity to services companies:
  - IBM's policy of selling stand-alone replicated 4100s directly to end-user departments, with System IPO/E system software packages opens an opportunity for support work by software service vendors, and presages the rebirth of FM under a distributed format,
  
  - Smaller processing service companies feel vulnerable because they are largely batch bureaux and predictions for batch growth are universally low in all European countries,
  
  - Larger processing services companies see less expensive hardware as an opportunity and are starting to offer hardware direct to users for local DDP or even stand-alone use.



EUROPEAN INDUSTRY CONCENTRATION



% OF TOTAL 1978 REVENUES

EXHIBIT II-5

- Communications expenditures and small computers/programmable terminals are growing as a percentage of EDP budgets. This is accelerating the confrontation between the network suppliers (the PTTs) and the Remote Computing Services network vendors, including IBM.
  
- Communications problems have a political dimension in Europe:
  - Transborder data flow is affected by national attitudes and by the security issue,
  
  - Whereas France has opted to embrace wholeheartedly the network concept ('Telematique'), the U.K. with its more dispersed software orientation is looking to the micro-revolution to provide future impetus,
  
  - Japanese companies are looking for a mode of entry to the European market, and may find such in partnership with U.K. software houses at some early future date,
  
  - West Germany, potentially the largest services country market, is starting to develop as a market of interest to foreign vendors.
  
- Larger companies are exploiting new technology:
  - CAP-CPP has MICROCOBOL as a development tool for a number of microprocessors.
  
- Services companies are in a position to exploit the proliferation of growth in hardware and communications options, and in number of potential users.
  - Some services companies are already offering turnkey systems,
  
  - Success to date of such systems is mixed with problems arising from maintenance and software support.

### C. KEY CHARACTERISTICS OF IN-HOUSE EDP

- The EDP manager continues to be a threat to services as he presses to move processing services in-house. He is a significant market, however, for software, maintenance and education services, all of which are growing at greater than 20% annually.
- The EDP manager is being pressed increasingly with a corporate management responsibility as DDP is implemented.
  - The EDP manager is playing a wider role through providing centralized control of DDP systems.
  - Processing services companies can broaden their access to total client information needs by cultivating the in-house EDP management.

### D. THE COMPETITIVE ENVIRONMENT

- The better profit performance of the computer services industry has been reflected by a growth in profits from \$374 million in 1977 to \$708 million in 1978 - up 89% in current dollars values;
  - similar growth is not expected to be achieved in 1979 as some market leaders' profits have come under increasing pressure.
- IBM still remains the clear market leader due to its service bureaux activities in all countries.
- New services companies are being formed, but there is a marked shift to the formation of software and professional services companies rather than new entrants to the ranks of processing services companies which was a characteristic of the late 1960s.

- Acquisitions are being made at an increasing pace by leading companies in France, the U.K. and the Netherlands: as a means of adding capability, client base and geographical coverage. GSI, CAP/Sogeti and BOC stand out as European companies with active acquisition programmes. The impetus of U.S. companies to make acquisitions in Europe has lessened during 1979, due to:
  - increasing difficulty in finding suitable partners in what is a different computer service environment.
- IBM is projected to be over \$600 million per year in computer services by 1983. The process of industry consolidation will accelerate over the next five years.

#### E. RECOMMENDATIONS

- The continued growth of the industry is dependent on attracting and retaining competent personnel.
  - Improved recruiting techniques are required, particularly to reduce the high turnover rates many vendors are experiencing with both operational and sales personnel.
  - Vendors must invest more in in-house training.
- Vendors should increasingly target all information processing, including data, text and graphics.
  - Existing offering can be enhanced by adding new capabilities, particularly graphics.
  - Planning must include recognition of possible changes in the communications field, and must expect the PTTs to resolve their positions on the thorny questions of security, standards and pricing.



- Broader information processing requirements are one element of a viable acquisition strategy.
- All services companies will benefit by developing closer relationships with hardware companies (computer, communications, office equipment, and high technology companies).
  - They can specify and integrate special hardware in services offerings.
  - Equipment companies are a market for software and applications expertise.
  - Maintenance is growing in importance both as a market opportunity and as a part of the service/equipment/software environment.
  - Network capability is mandatory for equipment companies.
- Processing services companies in particular must promote an image as a competitive alternative to in-house processing to combat the migration of services to in-house systems.
  - Emphasize sale of a total service, not a product which compares directly to a hardware equivalent.
  - Unbundle and price service elements separately, showing reductions in some cases.
- Vendors must continually re-evaluate a wide range of opportunities for current or future exploitation, even if these opportunities have been rejected in the past, including:
  - Overseas markets, especially for large companies in the U.S., and in Europe with cross-industry products for smaller vendors.
  - Maintenance services.
  - Education services.
  - Consumer/small business markets.



III. THE EUROPEAN COMPUTER SERVICES MARKET  
COMPARED TO THE UNITED STATES AND JAPAN.





### III. THE EUROPEAN COMPUTER SERVICES MARKET COMPARED TO THE UNITED STATES AND JAPAN

#### A. GROWTH RATE COMPARISON

- Exhibits III-1, III-2 and III-3 give comparative figures for years 1978 and 1979 on the three largest world markets for computer services:
  - U.S., Western Europe and Japan.
- In the case of Japan, only a provisional estimate based on JIPDEC supplied information is available. JIPDEC is the Japan Information Processing Development Center, Tokyo, Japan.
- Comparisons between the U.S. and Europe show that the U.S. has exceeded Western Europe's growth rate in the period 1978 - 1979. Two factors have contributed mainly to this:
  - very fast growth of software products in the U.S.,
  - a resurgence of growth in the batch processing services sector in the U.S.
- Comparisons with Japan show that that market is relatively undeveloped, but qualitative indications are that with the increasing element of text in the current d.p. mix, Japan's industry will now be growing at the fastest rate of the three blocs.

THE WEST EUROPEAN COMPUTER SERVICES MARKET SIZES,  
1978 AND 1979

TYPE OF SERVICE	1978		1979		ANNUAL GROWTH RATE %
	\$M *	%	\$M *	%	
RCS	1132	19.9	1429	20.8	26.2
BATCH	2441	42.8	2962	43.1	21.3
FM	89	1.6	102	1.5	14.6
ALL PROCESSING SERVICES	3662	64.3	4493	65.4	22.7
SOFTWARE PRODUCTS +	586	10.3	703	10.2	20.0
PROFESSIONAL SERVICES	1450	25.4	1677	24.4	15.7
TOTAL	5698	100	6873	100	20.6

SOURCE: CAMP/EUROPE AND INPUT ESTIMATES

\* AT CURRENT EXCHANGE RATES

+ INCLUDES HARDWARE MANUFACTURERS' PRODUCT LICENSING

EXHIBIT III-1

THE U.S. COMPUTER SERVICES MARKET SIZES,  
1978 AND 1979

TYPE OF SERVICE	1978		1979		ANNUAL GROWTH RATE %
	\$M *	%	\$M *	%	
RCS	2707	33.4	3050	30.9	12.7
BATCH	1976	24.4	2360	23.9	19.4
FM	1082	13.3	1230	12.5	13.7
ALL PROCESSING SERVICES	5765	71.1	6640	67.3	15.2
SOFTWARE PRODUCTS +	981	12.1	1620	16.4	65.1
PROFESSIONAL SERVICES	1362	16.8	1600	16.2	17.5
TOTAL	8108	100	9860	100	21.6

SOURCE: CAMP/EUROPE AND INPUT ESTIMATES

\* AT CURRENT EXCHANGE RATES

+ INCLUDES HARDWARE MANUFACTURERS' PRODUCT LICENSING

EXHIBIT III-2

## B. SERVICE CATEGORY MARKET COMPARISON

- In all three countries Processing Services is by far the largest major subdivision of the market.
- In Europe and Japan, Batch Services form the largest subsector, and in the case of Europe they are expected to remain so during the forecast period. On the other hand, in the U.S. RCS is the major subsector. Japan is expected to rapidly move to a similar position:
  - with RCS overtaking Batch Services before the end of 1983.
- Software Products is the smallest major category except in the U.S. where it has in 1979 overtaken Professional Services.
- Professional Services is still growing at a good rate in the more developed markets of Europe and the U.S., but is currently the fastest growing area in Japan, where software services vendor companies have been starting-up in numbers since 1977.

## C. THE RELATIVE SHARE OF EACH VENDOR BLOC IN THE OTHERS' MARKETS

- Exhibits III-4, III-5 and III-6 give the positions for the revenues gained in 1978 by companies in each bloc for services sold in the other two.
- As is to be expected, the U.S. is far and away the biggest exporter, with in 1978 a revenue 11.2 and 3.4 times respectively the export revenues of Japan and Europe.



THE JAPANESE COMPUTER SERVICES MARKET SIZES,  
1978 AND 1979

TYPE OF SERVICE	1978		1979		ANNUAL GROWTH RATE %
	\$M *	%	\$M *	%	
RCS			496	27.2	N.A.
BATCH	N.A.	-	842	46.1	
FM			-		
ALL PROCESSING SERVICES	N.A.	-	1338	73.3	N.A.
SOFTWARE PRODUCTS +	N.A.	-	200	11.0	N.A.
PROFESSIONAL SERVICES	N.A.	-	287	15.7	N.A.
TOTAL	N.A.	-	1825	100	N.A.

SOURCE: JIPDEC, AND INPUT ESTIMATES (PROVISIONAL)

\* FOR EXCHANGE RATE SEE APPENDIX A

+ INCLUDES H/W MANUFACTURERS PRODUCT LICENSING

N.A. NOT AVAILABLE

EXHIBIT III-3

- Europe's internal (among its member countries) export revenue is 1.3 times the revenue it exported to the rest of the world.
- Export revenue growth rates are graded as follows:
  - SLOW = 0 - 15%
  - MEDIUM = 15 - 25%
  - FAST = 25+%.

#### D. WORLDWIDE TRENDS

- The major driving forces in the computing industry, and its allied areas of information processing, remain today as in previous years:
  - the need for immediately available data-processing facilities to end-user personnel - the "ultimate users",
  - the ever-decreasing cost of technology.
- New factors, which have recently entered upon the scene, will continue increasingly to influence growth in the five year forward period:
  - opening up of the office products field to the use of intelligence -driven devices,
  - commissioning of viewdata services in major countries,
  - sharper definition of what is meant by 'personal computing', and its classification into different sectors,
  - increasing respectability for systems and software companies as turn-key implementation of small business systems gains in user demand,

EUROPE'S INTERNATIONAL  
MARKETS FOR COMPUTER SERVICES

AREA OR BLOC	1978 EXPORT REVENUES		1978-79 GROWTH RATE
	\$M	%	
US	55	37	FAST
JAPAN	+	-	FAST
EUROPE (INTRA-EUROPE)	N.A.		N.A.
OTHER	95	63	(MEDIUM) SLOW
TOTAL	150	100	MEDIUM

+ = very small

EXHIBIT III-4

U.S. INTERNATIONAL  
MARKETS FOR COMPUTER SERVICES

AREA OR BLOC	1978 EXPORT REVENUES		1978-79 GROWTH RATE
	\$M	%	
US	N.A.		N.A.
JAPAN	80	16	FAST
EUROPE	236	47	FAST
OTHER	190	37	FAST
TOTAL	506	100	FAST

EXHIBIT III-5



JAPAN'S INTERNATIONAL  
MARKETS FOR COMPUTER SERVICES

AREA OR BLOC	1978 EXPORT REVENUES		1977-78 GROWTH RATE
	\$M	%	
US	22	49	FAST
JAPAN	N.A.	-	N.A.
EUROPE	4	9	SLOW
OTHER	19	42	FAST
TOTAL	45	100	FAST

SOURCE: JIPDEC AND INPUT ESTIMATES (PROVISIONAL)

EXHIBIT III-6

- realisation on the part of equipment vendors of the revenue earning capability of field maintenance,
  - more visible use of services companies as alternative distribution channels as manufacturers face the increasing cost percentages of sales and sales support.
- It all adds up to a bright future for the mixed services vendor groups, since:
    - pure services vendors now need to take greater notice of equipment possibilities e.g. the move into USHS for a processing services vendor,
    - pure equipment vendors equally need to look to the yields of their service department in terms of profit rather than cost centres.
- For different types of services vendor, future development may be retarded by one or more factors:
    - processing services vendors have less flexibility for short-term changes of posture because of their need to capitalise on previous central hardware investment,
    - third-party maintenance (TPM) companies are still at an early stage of development without many established reputations to point to.
- On the other hand:
    - except in the U.S. and some notable European exceptions, systems and software houses still in the main suffer from a lack of investment finance for productising of previous system products, and no in-house capability in the hardware maintenance area.

#### IV. EUROPEAN COUNTRY MARKETS (1978 - 1983)





A. FRANCE



#### IV-A. FRANCE

- France is the largest European computer services market, but in contrast to the distributed nature of its nearest rival, West Germany, 75% of all business done on the French market is done in the greater Paris area (Paris and its "banlieue"). This has led to the development of a group of very large computer services companies (in European terms). This group is now using its large resources to expand into the U.S. market.
- With around 600 vendors in the market, competition is very keen. But more importantly, the French market is still influenced by the "old boy" network in effect, whereby who you know in business circles is almost as important as what you know about the business in question. This is particularly true of the banking, government, and para-public sectors.
- Thus, two of the largest computer services vendors in France, CISI, which is 100% owned by CEA (Government Atomic Energy Commission), and CAP/-GEMINI/SOGETI (the largest European software company, owned 34% by CISI) swear they are competitors and operate at arm's length, while simultaneously holding regular joint planning meetings.
- This combination of government (CEA), Batch, Remote Batch, and Interactive Services (from CISI), and professional services and software products (from CAP/GEMINI/SOGETI), has been extremely effective. They jointly capture revenues equivalent to 20% of the French market (22% of this revenue coming from foreign markets).

- In spite of the strength of French vendors, the French government has decided to reject applications by US-owned RCS companies to set up in the French market. This results from their view that indigenous vendors are still not strong enough to withstand competition from such companies as GEIS and IBM.
- Excluding the equipment manufacturers who offer services, nearly 60% by number of the vendors in France are limited companies (Societes Anonymes) with a further 28% established as limited partnerships (Societes a responsibilite limitee).
- The French market is characterized by strength in two major submarkets: RCS and Software Products (SP). The latter has rapidly developed into the largest software products country market in Europe, with Paris headquartering many foreign (and U.S.) software products vendors.
- In 1978 the French RCS market was worth \$280M.
- Batch Services account for half of the total computer services market and was worth \$631M in 1978.

## 1. ECONOMIC BACKGROUND

- The French economy has in the last two years undergone a period of inflation with the inflation rate increasing steadily. Firm central government measures to counter this trend were taken in the summer of 1979, but there has not yet been sufficient time to assess the impact of them.
- Exhibit IV-A.2 shows the last two years' values of the basic economic statistics.
- Exhibit IV-A.3 shows the number of organisations in France broken down by industry and size.



FRENCH COMPUTER SERVICES MARKET 1978

TOTAL = \$1266M

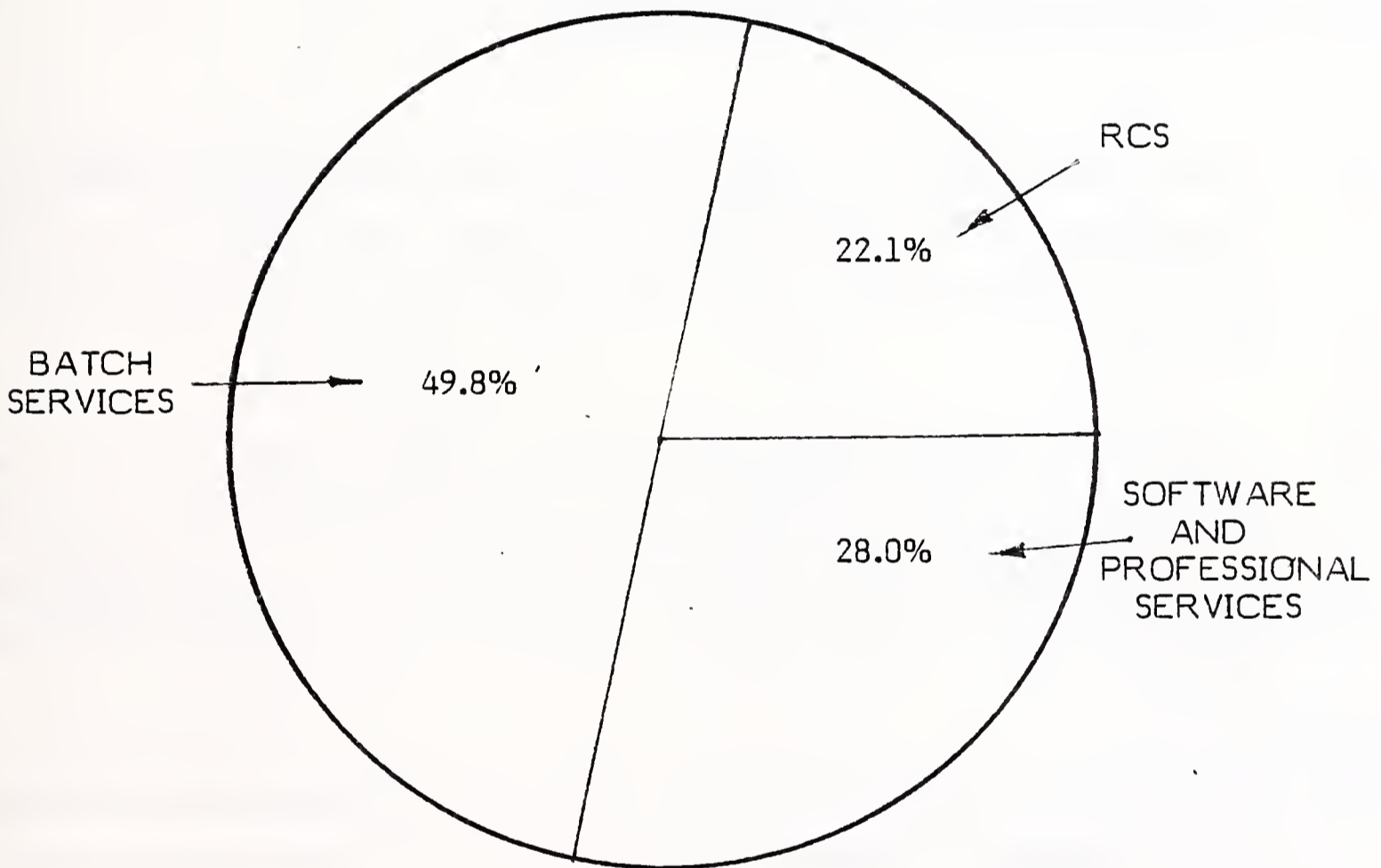


EXHIBIT IV-A.1

## 2. USER CHARACTERISTICS AND REQUIREMENTS

- In comparison with other European countries France is in the middle of the league for usage of in-house and external services.
- The growth rate in France for in-house expenditure (i.e. both centralised and distributed) are the highest of all large organisations sampled in Europe.

### 2.1 COMPETITION FOR THE USER'S BUDGET

- From a total sample of 783 user companies interviewed, only 41% were users of computer services of one category or another. The vast majority of these (75%) are Batch Services users, and relatively few use Remote Computing Services.
- A total of 39 RB users were found out of the total computer services user sample of 318, an order of magnitude smaller than the Batch Services sample. Two sectors out of the fourteen accounted for 46% of the user base: Petrochemical/Coal/Rubber/Plastics and Metal Industries/Mechanical/Engineering.
- Above and beyond these two sectors, the proportion of Remote Batch Services usage to computer services usage in other service categories is low. French Banks and Credit Banks, while a small market, show significant user growth potential. This is in contrast to the Foreign Banks where no usage was found.
- Interactive Services users represent 20% of the computer services users interviewed and show the highest growth trend of all three services categories. Of the Interactive population, 57% expect growth in their expenditures, and only 17% a drop in usage.

BASIC ECONOMIC STATISTICSFRANCE

<u>INDICATOR</u>		<u>YEAR</u>	
		<u>1977</u>	<u>1978</u>
GDP +	FFB	1630	1826
	\$B**	333	385
Population (millions)			
	- Total	53.3	53.7
	- Total Working	20.95	21.00
	Agriculture, etc.	2.18	2.11
	Manufacturing	8.16	8.09
	Service Industries	10.61	10.80
No. of organisations *		-	895,500
(thousands)			
No. of establishments *		-	2,301,000
(thousands)			

+ At market prices

\*\* At current exchange rates

\* These figures include the numbers engaged in agriculture, forestry and fishing, but exclude businesses run from home premises.

SOURCES: INSEE and INPUT estimates

EXHIBIT IV-A.2

- It should be noted that some reluctance was found on the part of French users to disclose information on the subject of Remote Computing Services usage. Thus usage figures for Remote Batch and more particularly Interactive Services are likely to be understated.
- Some industry sectors are very frequent users of Batch Services and exceed the average by around a factor of 2. These are Real Estate/Business Services, Foreign Banks, French Banks and Mining/Quarrying.
- The above average Remote Batch users are to be found in Clothing/Textiles, Chemicals/Petroleum and Public Administration; the latter industry sector is also well above average in its usage of Interactive Services.
- In European terms France is mid-way on the counter-balancing scale of in-house and external services usage. Some sectors are well above the national average.

HIGH EXTERNAL SERVICES

Foreign/French Banks  
Real Estate/Business Services  
Public Administration  
Mining/Quarrying

HIGH IN-HOUSE USAGE

Wood products  
Textiles/Clothing  
Chemicals/Petroleum  
Fabricated Metal Manufacturing

- Overall, the ratio of distributed to centralised hardware installations is relatively high in France. Industries which are notably advanced and show an early commitment to a DDP approach are:

Wood Products,  
Paper/Printing/Publishing,  
Manufactured Metallic Products,  
Basic Metal.



DISTRIBUTION OF ENTERPRISES BY SIZE AND INDUSTRYFRANCE

ISIC Code	Industry	Enterprise by Size of Annual Turnover (FF)			
		<5M	5.0 - 50M	>50M	Total
11 - 13	Agriculture/Forestry/ Fishing,	94,500	5,000	500	100,000
21 - 29	Mining/Quarrying	3,655	1,300	45	5,000
31 - 39	Manufacturing	79,200	30,000	800	110,000
41	Electricity/Gas etc.	250	200	50	500
50	Construction	118,000	16,835	165	135,000
61 - 63	Wholesale/Retail	193,615	8,000	385	202,000
71 - 72	Transport/Comm	200,000	10,800	100	210,900
81	Financial	950	1,800	350	3,100
82	Insurance	400	1,150	200	1,750
83	Business Services/ Professions	120,000	4,800	200	25,000
91	Government	1,400	800	50	2,250
	TOTAL	811,970	80,685	2,845	895,500

SOURCE: INPUT ESTIMATES

EXHIBIT IV-A.3

## 2.2 IN-HOUSE COMPUTING - EXPENDITURES

- A substantial proportion of large organisations (18%) do not have in-house installations; many of these are heavy users of external computer services, however, and are thus within the EDP market in its larger sense.
- Nearly half (49%) of the population have a single computer, and of these 22% have no terminals. IBM has a clear market lead (54% of the sites) in all computer and terminal categories, followed by Honeywell in second place.
- IBM is also the most popular target for plug-compatible terminals, although Honeywell, Univac, Burroughs and DEC also support "foreign" devices at their sites.
- In terms of user expenditure categories, IBM has a larger share than anyone in all but two of the expenditure categories (i) the smallest, less than 100,000 francs per annum and (ii) the middle group 1M to 2M francs per annum. This dominance is particularly evident in the largest user EDP budget, where IBM has more installations than all other vendors put together.
- Honeywell sites are mainly without terminals, and when they do have them, they are Honeywell's own make. This is a big improvement over the situation five years ago. Excluding IBM, Honeywell has a very large share of the sites (23%).
- ICL is surprisingly strongly represented, often in medium-sized (400,000 to 1M francs per annum) sites but also in the higher echelons. With the exception of the odd Olivetti terminals, ICL has been remarkably successful in maintaining its computer sites free from "foreign" terminals.
- Burroughs is less fortunate and frequently supports Logabax and Sintra terminals at its sites. There are some sizeable Burroughs installations in France, however, evenly distributed throughout the different industry sectors.

LARGE ORGANISATIONS' PROCESSING SERVICES USAGE BY INDUSTRY

FRANCE

ISIC	INDUSTRY	RESP %AGE	EXTERNAL SERVICES USAGE				IN HOUSE
			ALL	B	RB	I	
11 - 13	Agriculture/Fishing	-	-	-	-	-	-
21 - 29	Mining/Quarrying	33%	50%	50%	-	-	50%
31	Food/Drink/Tobacco	62%	21%	14%	2%	7%	90%
32	Textiles/Clothing	48%	21%	14%	14%	7%	90%
33	Wood Products	100%	13%	-	-	13%	100%
34	Paper/Print/Publ.	66%	33%	29%	5%	5%	86%
35	Chem./Petrol/Coal	67%	34%	25%	12%	9%	93%
36	Non-Metallic Prod.	66%	32%	21%	5%	5%	90%
37	Basic Metal	67%	31%	25%	6%	13%	84%
38 - 39	Fabricated Metal Prod.	61%	36%	24%	7%	11%	91%
41	Electricity/Gas	-	-	-	-	-	-
50	Construction	56%	22%	19%	7%	7%	89%
61 - 63	Wholesale/Retail	64%	28%	16%	3%	7%	84%
71 - 72	Transport/Comm.	63%	37%	32%	*	*	74%
81	Financial/Banks	45%	60%	56%	5%	8%	58%
81	Foreign Banks	76%	63%	49%	2%	12%	79%
82	Insurance	-	-	-	-	-	-
83	Business Services	34%	67%	66%	2%	3%	23%
91	Government	55%	50%	33%	11%	22%	75%
	OVERALL WEIGHTED AVERAGE	57%	41%	30%	5%	9%	79%

EXHIBIT IV-A.4



- Of the plug-compatible vendors, Data 100 has been the most successful. In fully 4% of the total sample of 783 sites, Data 100 terminals are found on IBM processors. Honeywell, Univac, NCR and DEC also support these devices.
- ITT has had moderate success, exclusively on IBM. Logabax has had widespread penetration of Honeywell, Univac and Burroughs sites. Sintra has been successful with IBM, Univac and Burroughs.

### 2.3 EXTERNAL COMPUTING SERVICES - EXPENDITURES

- Batch Services users show a marked tendency towards stabilisation with 52% of the current user base expecting no growth in their usage and 24% a decline. On the other hand, both segments of the Remote Computing Services markets show good growth demand from current users.
- In overall terms demand for Batch Services will decline in large organisations over the next 2 years. The industry sectors chiefly responsible for this trend are the Paper/Printing/Publishing and Chemical/Petroleum/Coal/Rubber sectors.
- Community Services and Administration is the only strong sector for Batch Services in the Top 1500 companies.
- The Remote Batch Services market in France is obviously far from being substantially developed and at present does not warrant a great deal of attention. Some notable Batch Services market suppliers have made an attempt to transfer their Batch revenues to a Remote Computing network, but have not succeeded in achieving anything more than remote data capture.
- Remote Batch Services users generally expect growth; however, they represent only 13% of the 318 users interviewed. Within this small RB population, 58% expect growth, and 11% a decline in usage equivalent to a growth in large organisation demand of +13%.

USER ESTIMATES OF GROWTH - INTERNAL SERVICES

FRANCE

MODE	EXPENDITURE RANGE (F.Francis)					OVERALL
	<100K	100K - 400K	400K - 1M	1M - 2M	2M - 4M	
Centralised	+ 43%	+ 31%	+ 49%	+ 21%	+ 16%	+ 19%
Distributed	+ 26%	+ 38%	+ 38%	+ 51%	+ 31%	+ 63%
						+ 20.9%
						+ 50.8%

EXHIBIT IV-A.5



USER ESTIMATES OF GROWTH - EXTERNAL SERVICES

FRANCE

SERVICE	EXPENDITURE RANGE (F.Francs)						OVERALL
	<10K	10K-50K	50K-200K	200K-500K	500K-1M	>1M	
Batch	+ 1%	- 17%	- 11%	- 18%	- 12%	- 11%	- 12.3%
Rem. Batch	- 10%	-	+ 16%	- 5%	+ 13%	+ 14%	+ 12.6%
Interactive	+ 5%	-	- 18%	- 20%	+ 33%	+ 8%	+ 10.1%
On Site	0%	-	-	+ 50%	+ 20%	- 4%	+ 18.3%

Note:

The percentages under specific expenditure ranges are simple averages of respondent estimates; the "Overall" figures are weighted averages according to expenditure range.

EXHIBIT IV-A.6

- The Remote Batch Services market grew steadily in 1978 and 1979. The implementation of on-site hardware in the form of minicomputers used as nodes of the network should enhance this from 1980 onwards.
- Out of the total of 318 users found using Computer Services, 64 were users of timesharing services. Of these, the vast majority expect to see good growth in their present usage although those who quantified this view could only put a +10% figure on this trend.
- Excluding the extremes in the sample (100% growth from a user in Wood Products and zero growth from two users in the Construction sector), the top four sectors for Time Sharing are:
  - Petro Chemical/Coal/Rubber etc.,
  - Food/Drink/Tobacco,
  - Basic metal Industries,
  - Metal Products/Mechanical/Engineering.
- In addition the Community Services/Administration group show a high level of usage, although with mixed intentions from the current users.
- Growth rates do of course vary according to size of organisation.
- Overall, there is no pattern of concentration of computer services expenditures in any one of the annual expenditure bands; users are spread evenly throughout all bands in each of the service categories.

#### 2.4 APPLICATION AREAS - USAGE AND TRENDS

- The two main groups of (i) industrial companies (ii) financial organisations were examined for their present and future usage of their main applications, and the type of processing internal computer, external services and combined (minicomputer as internal computer and used as a node to a services network).

- In the industrial group, there is a strong market for General Accounting/Payroll on internal computers and, relatively speaking, on outside services also. Marketing/Sales is a rapidly expanding application market, rising to the level of Production/Inventory Control, and Personnel Processing, both of which are second level applications with 60+% usage each.
- Relatively, the use of in-house minicomputers for external service data transmission/connection is growing with an across-the-board interest for such "combination" services in all application areas. Stated in other terms the use of "combination" services is attractive, independent of the type of application in use.
- In the financial companies, the contrast of external services-based applications is striking, in comparison with the industrial group. General Accounting/Payroll is a popular application for outside services (three times stronger than all the others). It is also the strongest growth area by a factor of almost two to one.
- There are very few areas of decline in either industrial or financial companies.

### 3. MARKET DEVELOPMENT 1978

- The total Computer Services market for France in 1978 amounted to \$1266M at 1978 dollar exchange rates.
- During the year the market continued to grow, showing an overall growth over 1977 revenues of 40%. This very healthy looking figure should be regarded in the light of current European inflation rates and the recent steady fall in the international value of the dollar.
- The annual growth rate of 40% is accounted for by:
  - 4% - average fall in the dollar,

THE FRENCH COMPUTER SERVICES MARKET SIZES,  
1977 AND 1978

TYPE OF SERVICE	1977		1978		AVERAGE ANNUAL GROWTH RATE %
	\$M *	%	\$M *	%	
RCS PROCESSING	200	22.1	280	22.1	40%
BATCH SERVICES	449	49.6	631	49.8	41%
SOFTWARE PRODUCTS	50	5.5	76	6.0	52
PROFESSIONAL SERVICES	207	22.8	279	22.0	35
TOTAL	906	100	1266	100	40%

SOURCE: CAMP/EUROPE AND INPUT ESTIMATES

\* AT CURRENT EXCHANGE RATES

EXHIBIT IV-A.7



- 12% - average domestic price rises for equivalent products,
  - 20% - true growth in terms of new business or additional business from existing accounts.
- Exhibit IV-A.7 shows the growth between 1977 and 1978 in terms of the different types of services sold.

### 3.1 PROCESSING SERVICES

- Work completed in Batch mode, defined to include off-line Data Preparation and Encoding, remained as the single largest revenue earning service at 49.8% of the total. This major category includes approximately 4% by market value of contracts which are properly classed as Facilities Management.
- RCS processing continued to grow at 40%, thereby maintaining its market share at 22.1%.

### 3.2 SOFTWARE PRODUCTS

- The growth of software product sales is very strong in France at 52% between 1977 and 1978. Such a high growth rate is not expected to continue at this level, but because of its relative lack of development the sector will lead the growth rate chart for the next two years.
- In European markets as a whole the revenues earned by the separate sale or licence of software products are small - of the order of 5%. Where income is earned, it is usually from one of:
  - system software products, (usually operating systems or language compilers),
  - utility programs and routines, including DBMS.



EXTERNAL PROCESSING SERVICES GROWTH BY COMPANY SIZE: OVERALL MARKET

FRANCE

SIZE	BATCH	REM. BATCH	INTERACTIVE	ON SITE
Large	-12%	+13%	+10%	+18%
Medium	+5%	+10%	+8%	N/A
Small	+15%	+3%	+5%	N/A
OVERALL	+20%	+6%	+24%	N/A

Note: 0 Entirely new user growths not quantified by organisation size are included in the overall figures.

EXHIBIT IV-A.8

### 3.3 PROFESSIONAL SERVICES

- Growth in absolute terms between 1977 and 1978 was up from \$207 million, a 35% increase. Professional Services are expected to continue at this level of growth; any decrease in tailored systems market share being taken up by increases in:
  - consultancy, education and turnkey systems.

### 4. MARKET TRENDS

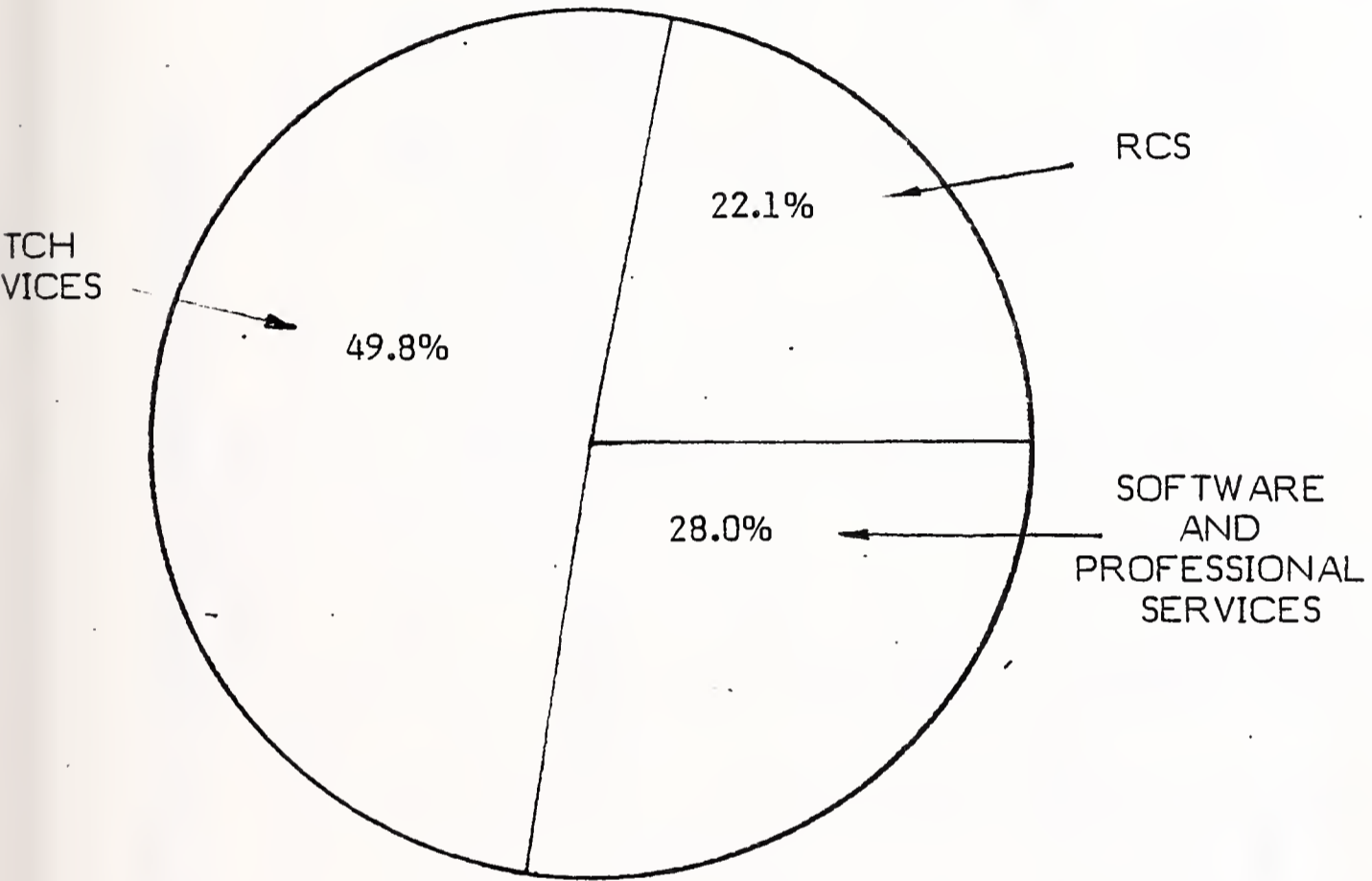
- Batch Services users show a marked tendency in the Top 1500 companies towards stabilisation. On the other hand, both Remote Computing Services market segments show good growth demand from current users.
- Community Services and Administration is the only strong sector for Batch Services.
- Remote Batch Services users generally expect growth.
- The implementation of on-site hardware in the form of minicomputers used as nodes of the network has in 1979 started to enhance the RCS market.
- The vast majority of Interactive users expect to see good growth in their present usage.

### 5. COMPETITION AND VENDOR MARKET SHARES

- The French RCS market was worth \$200 million in 1977, rising to \$280 million in 1978 - a growth of 40%. IBM had an estimated 17% of this market, slightly ahead of CISI. The latter does 70% of its business with public sector clients such as the CEA, EDF (Electricity Co) and BMP (Banque Nationale de Paris, i.e., national bank).

THE FRENCH COMPUTER SERVICES MARKET 1978

ALL VENDORS



THE TOP TEN

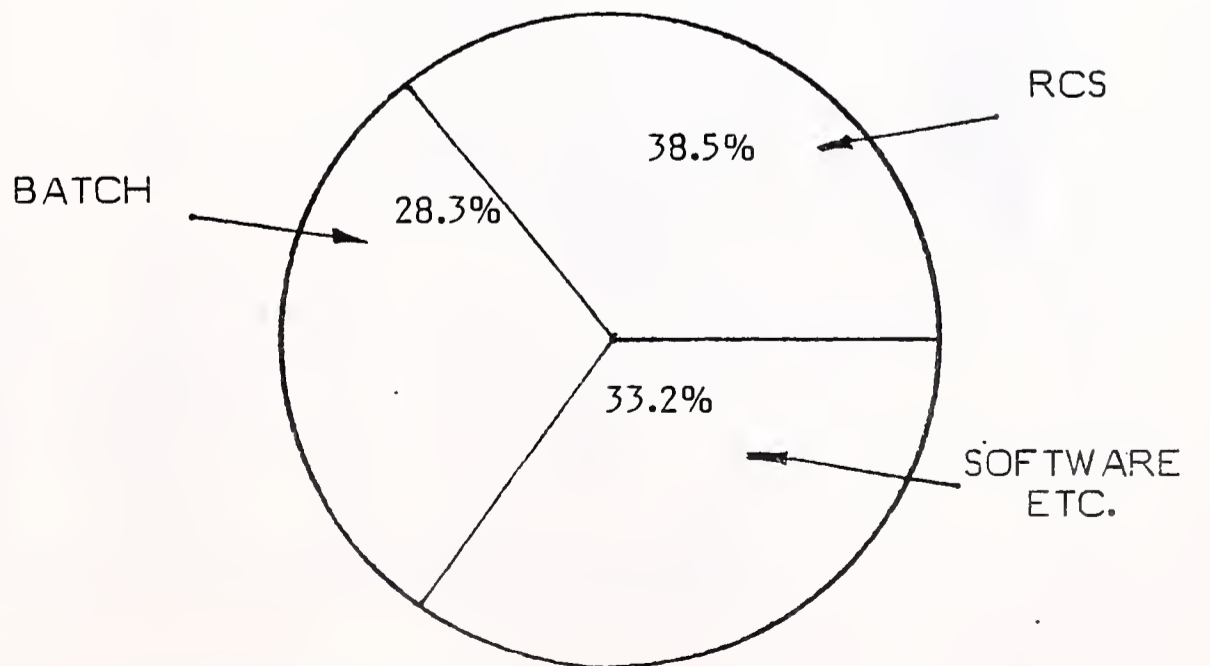


EXHIBIT IV-A.9

**DISTRIBUTION OF SAMPLE COMPUTER SERVICES COMPANIES IN  
FRANCE BY 1978 TURNOVER AND PRINCIPAL ACTIVITY**

TURNOVER (US \$) MAIN ACTIVITY	>10M A		10M - 1M B		1M - .1M C		<0.1M D		ALL WITH T/O.	SAMPLES as % of EST. TOTAL POPN.	
	15	1.2%	61	15.0%	30	7.4%	3	0.7%			
RCS BUREAU	7	1.7	22	5.4	61	15.0	2	0.5	109	26.8%	81% of 135
BATCH BUREAU	5	1.2	46	11.3	103	25.4	4	1.0	158	38.9	74% 213
SOFTWARE AND PROFESSIONAL SERVICES	3	0.7	14	3.4	28	6.9	2	0.5	47	11.6	84% 56
OTHER (EG COM, DATA PREP.)	30	7.4	143	35.2	222	54.7	11	2.7	406	100	78% 520
ALL WITH T/O.											

SOURCE : CAMP/EUROPE

THE TOP TEN COMPUTING SERVICES VENDORS

- FRANCE 1978

SOURCE: CAMP/EUROPE

RANK	VENDOR	REVENUE IN MILLIONS OF FRENCH FRANCS (FFM)			
		BATCH	RCS	SOFTWARE & PROFESSIONAL	ALL SERVICES TOTAL
1	CAP/SOGETI	-	-	510	510
2	CISI	236	198	40	474
3	GSI	258	109	62	429
4	SEMA/METRA	30	-	390	420
5	SG2/TELSYS	200	30	80	310
6	SLIGOS	127	131	-	257
7	IBM	102	97	28	227
8	TELESYSTEMES	45	25	104	174
9	CCMC	123	28	20	171
10	TSIL (Thomson Group)	35	15	98	148

EXHIBIT IV-A.11



- Exhibits IV-A.11 to.14 detail the present competitive rankings in France.
- GSI's revenue is the consolidation of all of its holdings in DATEL (Germany), CRC (UK), and GSI-Europe (which includes GSI-Switzerland, mainly composed of the former SISCO operations and EAD, an Italian subsidiary). The analysis of remote batch revenue is, therefore, misleading at the holding company level, and merely serves to indicate the size of the GSI operations, not its French market share (or competitiveness in that market).
- HB-NIS (now GEIS), in France, has a policy of pursuing only large/very large companies, and some of this is "fall-out" from their large 66 Series system equipment marketing/sales activities.
- G-CAM does 75% of its business with Caisse de Depots, of which it is a subsidiary. The main operational entities are Artemis, Sinorg, and IMI. Sinorg aims almost exclusively at the African and Middle East markets. Therefore G-CAM, despite its size, cannot be counted as serious competition on the open market.
- Batch Services offer the widest selection of vendors of all three categories. Whereas most vendors offer a variety of applicational capabilities, the two most popular suppliers, SITB and CCMC are both specialists: SITB in banking services, CCMC in accountants' services.
- AMI, SG2 and GSI emerge as the second tier of Batch suppliers in France. None of these has a clearly dominant position, but the vendors have been ranked, in approximate order of popularity. SG2, GSI, CISI and IBM figure prominently in all three service categories (Batch, Remote Batch and Interactive).
- CISI, SG2 and CCMC are all gradually installing a nationwide network capability in France to share computing power between their own processing centres. This decentralisation of processing has yet to be achieved at the user level.

TOP SUPPLIER RANKING BY SERVICE TYPE

FRANCE - 1978

BATCH	REMOTE BATCH	INTERACTIVE	SOFTWARE & PROFESSIONAL SERVICES
GSI	SG2	GEIS	CAP/SOGETI
CISI	IBM	CEGI/TYMSHARE	SEMA/METRA
SG2	CISI	IBM	TELESYSTEMES
SITB	Alliance	SG2	TSIL
CCMC	Natel	Sligos	SG2
AMI	SP1	Alliance	GSI
Ordina	CERG	CISI	CISI
Sofragem	AGI	SPI	IBM
Natel	AFI	Telesystemes	
Sligos	UFL2	CERG	
Eurosoft	AIHPO	GSI	
GFI	GSI	CETI	
CIFE A			

SOURCE: CAMP/EUROPE

EXHIBIT IV-A.12

- The number of individual vendors supplying Remote Batch Services to the top companies is greatly reduced in comparison with the Batch Services market. The top three suppliers to this level of company are SG2 (easily the most frequently referenced), IBM (a close second) and CISI.
- Among the Interactive Services suppliers most frequently mentioned by users, CEGI-TYMSHARE is the clear leader followed by IBM and HB-NIS (GEIS). The number of vendors involved in Time-Sharing supply to the French market is on the increase.
- Cegi-Tymshare is owned 51% by Credit-Lyonnais and first became profitable in 1974. Since then its presence on the interactive market has grown considerably and it is now the undisputed second largest interactive vendor in France.
- SG2 includes Telsys and Franlab references. Along with SLIGOS, CISI and GSI, it forms the second tier of time-sharing suppliers. The majority of all references to time-sharing vendors are for 'sole source' supply, a feature that is rare in other Western European markets.
- Among the remainder, SLIGOS and CDC are the most important open-market competitors. Telesystemes is for all practical purposes a PTT subsidiary, and offers interactive, remote batch, and what is almost a value added network: "Transplex". CCMC is largely batch-oriented but is expanding its remote batch operations.
- Finally, NATEL, a 90% owned subsidiary of BNP, is the result of adding Honeywell Bull services (20 computer centers) to a group of data entry centres (Saisinfor, Perinfor) and Natio-Services (created in September 1971). In 1973, five other groups were added (CAM, CELORAM, CERTI, SPINATIC, and STAMIC). The Philips data centres were added in 1974. The conglomerate thus achieved, has taken three years to reorganize and was still not profitable -a factor which perhaps led to acquisition by GSI in 1979.

IN FRANCE 1978

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES TOTAL (\$M)
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	CISI	41.4	4.6	46.0	110.0
2	SLIGOS	20.0*	10.5*	30.5	59.7
3	GSI	23.2	2.0	25.2	99.5
4	IBM	15.1*	7.4*	22.5*	52.6*
5	GEIS	+	14.5*	14.5*	14.5*
6	CEGI TYMSHARE	0.5*	7.1*	7.6	7.6
7	SG2/TELSYS	4.0	3.0	7.0	71.9
8	CCMC	6.5	-	6.5	39.7
9	G-CAM	6.0	-	6.0	12.4
10	TELESYSTEMES	1.7*	0.7*	2.4	18.5

SOURCE : INPUT CAMP/EUROPE 1979

NOTE:

\* INPUT ESTIMATE

+ SMALL VALUE

CAPTIVE REVENUES WHERE KNOWN ARE OMITTED



- The exclusion of captive revenues makes the vendor shares in the French market somewhat lower in many cases than their total revenues would suggest.
- Forty-five per cent of CISI's revenue is captive; thus, though in total RCS revenue they have the largest share, after subtraction of captive revenue they have the fourth largest.
- IBM, CEGI/Tymshare, SG2/Telsys, CCMC and G/CAM all have significant proportions of captive revenue.
- Exhibit IV-A.14 represents the net market shares held by the leading RCS vendors.
- In the cases of CISI and GSI, market shares are slightly overstated due to export revenues.

#### PRICING

- The absence of any computer services industry leader with a dominant position, (equivalent to IBM in the computer equipment industry), means that there are no pricing standards by which to judge the "market level" of a given user service.
- Basically, vendors charge what they want, within reason, for non-standard (or specific) applications. Only in machine time sales is there a semblance of the "going rate" (e.g. for an hour of machine time).
- Whereas for specific applications the variance is towards how high the vendor can raise charges before disturbing the client, raw time sales tend to be an area of highly competitive discounting of machine time that has been amortized on other activities.
- However, some vendors refuse to enter into price cutting for activities they are not interested in, - GSI, for example.



RCS MARKET SHARES OF MAIN FRENCH FIRMS

COMPANY	SHARE OF RCS MARKET (%)	
	INTERACTIVE	REMOTE BATCH
CISI	5.6	20.9
SLIGOS	12.8	10.1
GSI	2.4	11.7
IBM	9.0	7.6
GEIS	17.7	+
CEGI-TYMSHARE	8.7	0.3
SG 2/TELSYS	3.7	2.0
CCMC	+	3.3
G-CAM	+	3.0
TELESYSTEMES	0.9	0.9

\* INPUT ESTIMATE

+ SMALL VALUE

EXHIBIT IV-A.14

- In France, pricing for Computer Services has little to do with performance. In general, bureaux charge widely varying prices for identical services, with little to fear from customer back-lash.
- Vendors, as a rule, charge customers at a level compatible with their status in the market. The more important the status the higher the price that can be charged. This is evidenced by the appearance of the GSI, IBM, CISI group near the top of all price comparisons; prices quoted varied by as much as 4.6 to 1 for Fortran compilation between the highest and lowest prices.
- It is a matter of company policy as to when pricing changes occur for a given service but it is probable that a 10%-15% increase could be made, without any noticeable impact on the customer base.
- The principles of pricing and discounting vary very considerably from one supplier to another although most of the IBM-based vendors use the same basic method to determine a basic "Unit of Charge".
- Not all bureaux operate a variable charging system. For those companies which modulate the tariff according to priority, the tariff increases by a factor of up to 2 with respect to the normal rate.
- Discounts for business volumes in excess of 1MF of sales per annum can be between 20 and 40 percent.

## 6. MARKET FORECASTS BY SERVICES CATEGORY

- Good growth is anticipated in all market sectors for France in the forecast period. The lowest sector growth rate will be experienced in Batch Services. However, with an average annual rate of 15% this sector will still be the dominant sector in 1983 taking a 44% market share. Beyond this period, growth will turn into a decline.
- Software Products and Professional Services both grow at the above average rate of 23%.
- Exhibit IV-A.15 shows the detailed five-year forecasts, the whole country market having a 19% AAGR.

THE FRENCH COMPUTER SERVICES MARKET  
- FORECASTS BY TYPE OF SERVICE, 1979 - 1983

TYPE OF SERVICE	MARKET FORECASTS IN \$ MILLIONS									
	1977 **	1978 **	GROWTH 77 - 78 (%)	1979 *	1980 *	1981 *	1982 *	1983 *	AAGR (%)	
RCS PROCESSING	200	280	40	350	438	534	651	781	22	
BATCH SERVICES	449	631	41	801	978	1124	1259	1385	15	
SOFTWARE PRODUCTS	50	76	52	85	97	119	154	193	23	
PROFESSIONAL SERVICES	207	279	35	334	436	523	628	753	23	
ALL	906	1266	40	1570	1949	2300	2692	3112	19	

\* = CONSTANT 1979 DOLLARS; \*\* = CURRENT EXCHANGE RATES

**B. WEST GERMANY**





#### IV-B WEST GERMANY

- There are at least 550 computer services companies in West Germany. The stable nature of the German economy over the past eight to ten years has done little to force consolidation. Add to this the distributed nature of the business community served, and there emerges the picture of a market spread relatively evenly over seven major regions :

- Stuttgart
- Hamburg/Bremen\*
- Hannover/Bremen\*
- Frankfurt
- Munich
- Ruhr-Gebiet (Dortmund, Essen, Cologne, Dusseldorf, Duisberg)
- Berlin

\* Bremen near enough to both to be served by either

- Each major town within these areas is served by a large variety of batch bureaux, each with its own speciality and near enough to the local clientele to allow fast turnaround. Germany's communications costs are the highest in Europe and do not encourage the development of RCS. Nonetheless, with Germany's inflation rate being lower than that of other major European countries, there is an influx of French RCS vendors wishing to tap this increasingly lucrative market.
- For all of these reasons, there are few very large German computer services vendors. Despite the fact that Germany is the second largest market in Europe, there are a few sizeable and easily attainable market areas that are now divided between a multiplicity of small companies, all operating locally.

- The structure of the market, therefore, is that of a few large companies (DATEV, FIDUCIA, Mannesman, MBB, Taylorix, IBM) followed by several medium sized companies (AC-Service, MKD, DVO, GEISCO, etc.) followed by innumerable very small local operations (most of which are privately held).
- For the Geographic reasons already given, the German market is batch orientated. In 1978 the market for Batch Services was worth \$505M; this market will grow at an average annual rate of 19% over the period 1979-1983.
- The market for RCS is relatively undeveloped, being worth in 1978 \$167M; this market is expected to grow at an annual rate of 20% in the case of Interactive Services and 15% in the case of Remote Batch.
- The quality of the German PTT network services is the best in Western Europe and is continually being improved. Quality is expressed as measuring:
  - the reliability of the lines provided,
  - speed of support for installation modification,
  - line capacity available for expansion,
  - short delay in obtaining a line.

The importance, to a businessman, of this feeling of "communicability" cannot be overstressed.

- Unfortunately, this very high quality and availability of German communications has a stiff price. PSN line costs are up to two and one half times the cost of the peak rate for equivalent lines in the UK.
- This section of the report describes:
  - the development of the West German market in 1978.
  - the structure of the customer base,
  - overall market and sector trends,
  - the structure of the vendor organisations already in the market-place,
  - the forecasts through to 1983.

WEST GERMANY COMPUTER SERVICES MARKET 1978

TOTAL = \$936M

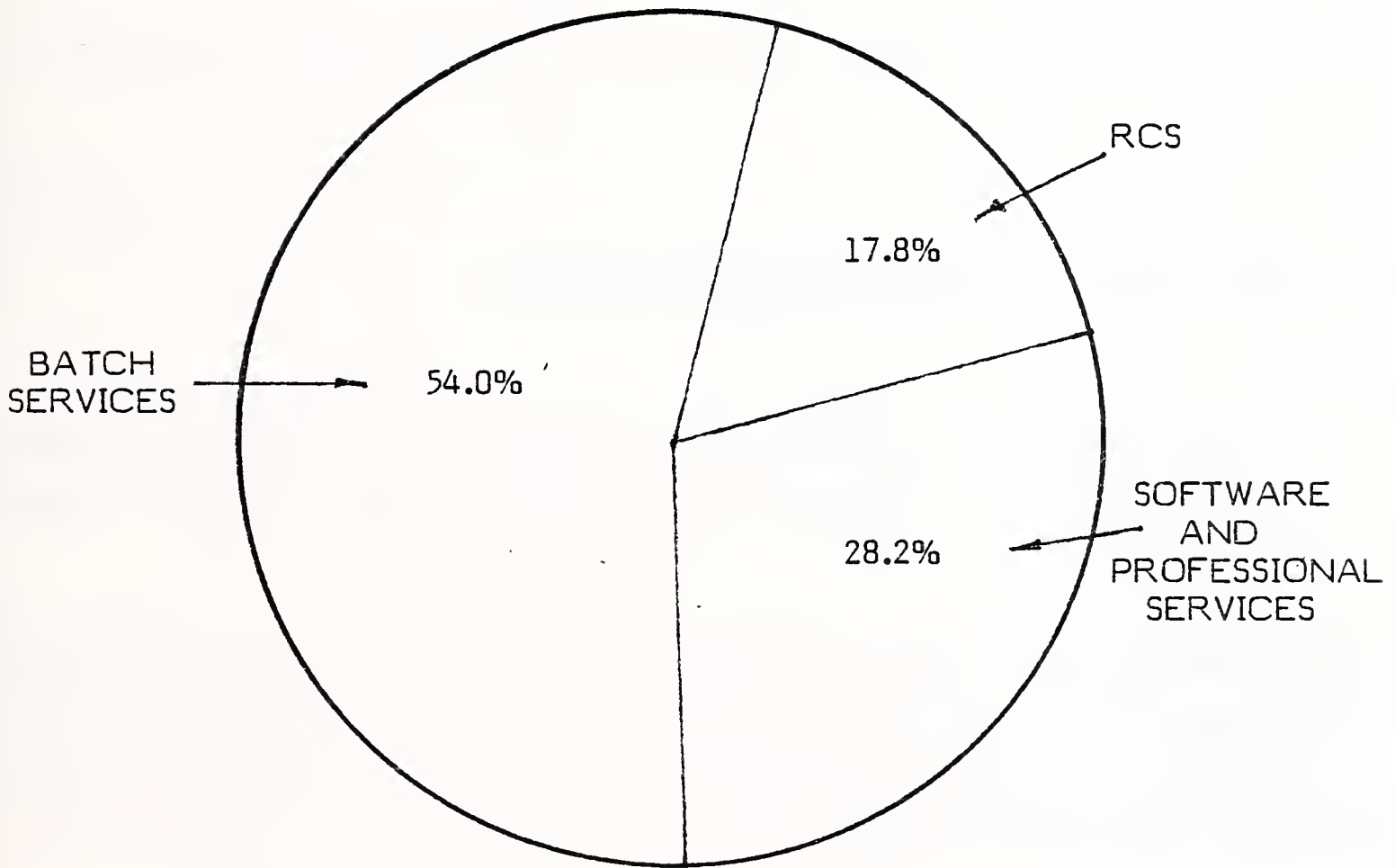


EXHIBIT IV-B.1

## 1. ECONOMIC BACKGROUND

- The West German economy has been one of the most stable in recent years, providing an example to other countries of how to manage the inflation problem. Nevertheless, the country's industrial and business leaders are concerned about keeping unemployment at an acceptable level.
- Exhibit IV-B.2 shows the previous two years' value of certain basic economic indicators.
- Exhibit IV-B.3 gives a table of organisations in West Germany, broken down by industry and size.

## 2. USER CHARACTERISTICS AND REQUIREMENTS

- Germany has the lowest usage by large organisations in Europe of external computing services ; conversely this country has the highest usage of in-house installations.
- IBM dominates both the supply of external services and the supply of in-house hardware. 15% of users use both in-house and external services. In most other countries the comparative figures are very similar i.e. Belgium/Luxembourg 15%, UK 16% and France 20%.
- Of the large organisations which use external services in Germany 52% use Batch services, 24% Remote Batch and 44% Interactive. Compared with some other countries, this is a relatively low Batch usage and a relatively high usage of Remote Computer Services.
- The largest usage of external services is to be found in the following industries:
  - Financial Institutions/Banking (54%)
  - Construction (47%)



BASIC ECONOMIC STATISTICSWEST GERMANY

<u>INDICATOR</u>		<u>YEAR</u>	
		<u>1977</u>	<u>1978</u>
GDP +	DMB	1018	1154
	\$B**	437	547
Population (millions)			
	- Total	61.40	61.28
	- Total Working	25.02	24.99
	Agriculture, etc.	1.66	1.56
	Manufacturing	11.33	11.30
	Service Industries	12.04	12.13
No. of organisations *		-	1,300,000
(thousands)			
No. of establishments *		-	1,700,000
(thousands)			

+ At market prices

\*\* At current exchange rates

\* These figures include the numbers engaged in agriculture, forestry and fishing, but exclude businesses run from home premises.

SOURCES: German Chamber of Industry and Commerce and INPUT estimates

EXHIBIT IV-B.2

DISTRIBUTION OF ENTERPRISES BY SIZE AND INDUSTRYWEST GERMANY

ISIC Code	Industry	Enterprise by Size of Annual Turnover (DM)			
		<1M	1M - 100M	>100M	Total
11 - 13	Agriculture/Forestry/ Fishing,	284,000	2,990	10	287,000
21 - 29	Mining/Quarrying	495	1,500	5	2,000
31 - 39	Manufacturing	76,776	27,800	424	205,000
41	Electricity/Gas etc.	1,850	100	50	2,000
50	Construction	60,000	2,400	100	62,500
61 - 63	Wholesale/Retail	529,990	9,927	83	440,000
71 - 72	Transport/Comm	168,000	6,905	95	175,000
81	Financial	12,000	1,780	220	14,000
82	Insurance	2,420	900	180	3,500
83	Business Services/ Professions	102,000	2,924	76	105,000
91	Government	2,530	1,315	155	4,000
	TOTAL	1,240,061	58,541	1,398	1,300,000

SOURCE: INPUT ESTIMATES

EXHIBIT IV-B.3

- Business Services (44%)
  - Paper/Printing/Publishing (40%)
- The largest usage of Interactive Services is found in the following industries:
    - Paper/Printing/Publishing (30%)
    - Insurance (29%)
    - Financial Institutions/Banking (23%)
    - Business Services (18%)
    - Food/Drink/Tobacco (17%)
  - The Insurance industry appears to use only Interactive Services.

## 2.1 IN HOUSE COMPUTING - EXPENDITURE

- Site occupancy by IBM equipment is 60% of all organisations with in-house installation ; Siemens is the second most popular supplier. Since IBM installations tend to be larger their share in value is probably higher and could well be around 70%. However in the last 10 years Siemens as local supplier has seen its market share overall in West Germany rise by 10%.
- Two thirds of all in-house installations have terminals connected ; nearly half of these have more than 20 connected. Just over one third (35%) of installations with terminals are supplied by IBM. Only SEL/ITT and Siemens feature significantly besides ; they have 11% and 12% site occupancy respectively ; Siemens supplies almost exclusively to Siemens installations; SEL/ITT supplies almost exclusively to IBM installations and must therefore be regarded as the leading PCM supplier. Other PCM's such as Data 100, Memorex and Data Saab are insignificant on the German market compared with their positions elsewhere.
- Just over half of the large company in-house installations are in the 200K to 1M DM annual expenditure category ; more than one third are above this level.

- Centralised computing will experience a relatively high growth rate over the next 2 years; the German 17% is at the high end of the European range of values from 10% to 21%. This growth rate is largest at the lowest and highest expenditure levels.
- In complete contrast, Distributed Data processing will develop at the slowest rate in Europe, namely 22%. Other countries (except Holland) are at least 50% higher than this level.

## 2.2. EXTERNAL COMPUTING SERVICES - EXPENDITURE

- The prospects for conventional external services are relatively poor compared with the prospects for the in-house and external services interpretations of decentralised computing.

### APPLICATION AREAS - USAGE AND TRENDS

- The most significant observation on application areas is that there is a mild, and, in some cases a strong trend On Site Services over the next 2 years. The trend is strongest in large organisations in the Food/Drink, Non-Metallic and Fabricated Metal manufacturing industries ; the application areas which are particularly affected by this trend are :
  - General Accounting/Payroll
  - Financial Analysis/Planning
  - Production/Inventory Control
- In all application areas (excepting Portfolio Management) conventional external services as the source of supply will decrease ; clearly some, or all of this reduction will be absorbed by the trend towards On Site Services. Indeed the most frequent use of external services is currently in those application areas (as above) which are the best growth prospects for On Site Services.



LARGE ORGANISATIONS' PROCESSING SERVICES USAGE BY INDUSTRY

WEST GERMANY

ISIC	INDUSTRY	RESP %AGE	EXTERNAL SERVICES USAGE				IN HOUSE
			ALL	B	RB	I	
11 - 13	Agriculture/Fishing	33%	0%	0%	0%	0%	100
21 - 29	Mining/Quarrying	43%	0%	0%	0%	0%	100
31	Food/Drink/Tobacco	42%	34%	24%	3%	17%	90
32	Textiles/Clothing	42%	12%	7%	-	4%	100
33	Wood Products	47%	14%	14%	-	-	100
34	Paper/Print/Publ.	42%	40%	10%	-	30%	90
35	Chem./Petrol/Coal	41%	19%	6%	2%	10%	98
36	Non-Metallic Prod.	35%	25%	13%	-	13%	87
37	Basic Metal	33%	15%	5%	-	-	85
38 - 39	Fabricated Metal Prod.	31%	22%	8%	9%	7%	95
41	Electricity/Gas	47%	12%	12%	6%	-	94
50	Construction	32%	47%	33%	7%	13%	80
61 - 63	Wholesale/Retail	43%	19%	7%	4%	7%	100
71 - 72	Transport/Comm.	44%	14%	7%	7%	7%	100
81	Financial/Banks	35%	54%	54%	23%	23%	77
81	Foreign Banks	-	-	-	-	-	-
82	Insurance	41%	29%	-	-	29%	100
83	Business Services	56%	44%	35%	9%	18%	90
91	Government	-	-	-	-	-	-
	OVERALL WEIGHTED AVERAGE	38	25	13	6	11	90

EXHIBIT IV-B.4



USER ESTIMATES OF GROWTH - INTERNAL SERVICES

WEST GERMANY

MODE	EXPENDITURE RANGE (DM)					OVERALL
	< 50K	50K - 200K	200K - 500K	500K - 1M	1M - 2M	
Centralised	+ 20%	+ 16%	+ 16%	+ 18%	+ 15%	+ 19%
Distributed	+ 15%	+ 20%	+ 59%	+ 13%	+ 23%	+ 19%
						+ 17.0%
						+ 21.7%

EXHIBIT IV-B.5

USER ESTIMATES OF GROWTH - EXTERNAL SERVICES

WEST GERMANY

SERVICE	EXPENDITURE RANGE (DM)					OVERALL	
	<50K	50K-250K	250K-500K	500K-1M	1M-1.5M		>1.5M
Batch	- 2%	- 17%	- 28%	+ 10%	+ 7%	+ 10%	+ 3.6%
Rem. Batch	- 21%	- 36%	+ 17%	- 8%	0%	0%	- 0.1%
Interactive	- 5%	0%	+ 97%	+ 4%	0%	+ 11%	+ 12.1%
On Site	+ 19%	0%	0%	+ 15%	0%	0%	+ 10.2%

Note:

The percentages under specific expenditure ranges are simple averages of respondent estimates; the "Overall" figures are weighted averages according to expenditure range.

EXHIBIT IV-B.6

- In terms of overall computerisation regardless of source the application areas which are currently and in 2 years the most frequently computerised are :
  - General Accounting/Payroll
  - Financial Analysis/Planning
  - Production/Inventory Control
  
- The application areas which offer the best growth prospects for all external services (including On Site) are :
  - General Accounting/Payroll
  - Financial Analysis/Planning
  - Production/Inventory Control

The latter two are subject to less variation to meet the needs of different European countries and thus represent investment potential.

### 3. MARKET DEVELOPMENT 1978

- The total Computer Services market for West Germany amounted to \$936M at 1978 dollar exchange rates.
  
- During the year the market continued to grow, showing an overall growth over 1977 revenues of 39%. This very healthy looking figure should be regarded in the light of current European inflation rates and the recent steady fall in the international value of the dollar.
  
- The annual growth rate of 39% is accounted for by:
  - 10½% - average fall in the dollar,
  - 4% - average domestic price rises for equivalent products,
  - 21% - true growth in terms of new business or additional business from existing accounts.

THE WEST GERMAN COMPUTER SERVICES MARKET SIZES,  
1977 AND 1978

TYPE OF SERVICE	1977		1978		AVERAGE ANNUAL GROWTH RATE %
	\$M *	%	\$M *	%	
RCS PROCESSING	118	17.5	167	17.8	42
BATCH SERVICES	354	52.7	505	54.0	43
SOFTWARE PRODUCTS	44	6.6	61	6.5	39
PROFESSIONAL SERVICES	156	23.2	203	21.7	30
TOTAL	672	100	936	100	39

SOURCE: CAMP/EUROPE AND INPUT ESTIMATES

\* AT CURRENT EXCHANGE RATES

EXHIBIT IV-B.7

- Exhibit IV-B.7 shows the growth between 1977 and 1978 in terms of the different types of services sold.

### 3.1 PROCESSING SERVICES

- Work completed in Batch mode, defined to include off-line Data Preparation and Encoding, remained as the single largest revenue earning service at 54% of the total. Though Batch experienced a very large increase from 1977 to 1978, this is not expected to continue.
- The RCS sector also experienced strong growth in the period, and this growth is expected to continue at a good pace.

### 3.2 SOFTWARE PRODUCTS

- The growth of software product sales at 39% between 1977 and 1978, is on the total market rate.

### 3.3 PROFESSIONAL SERVICES

- Growth in absolute terms between 1977 and 1978 was up from \$156 million, a 30% increase. Professional Services are expected to continue at this level of growth; any decrease in tailored systems market share being taken up by increases in:
  - consultancy, education and turnkey systems.

## 4. COMPETITION AND VENDOR MARKET SHARES

- Exhibits IV-B.9 and IV-B.10 illustrate the breakdown of the services market by type of service and size and type of company.



EXTERNAL PROCESSING SERVICES GROWTH BY COMPANY SIZE: OVERALL MARKET

WEST GERMANY

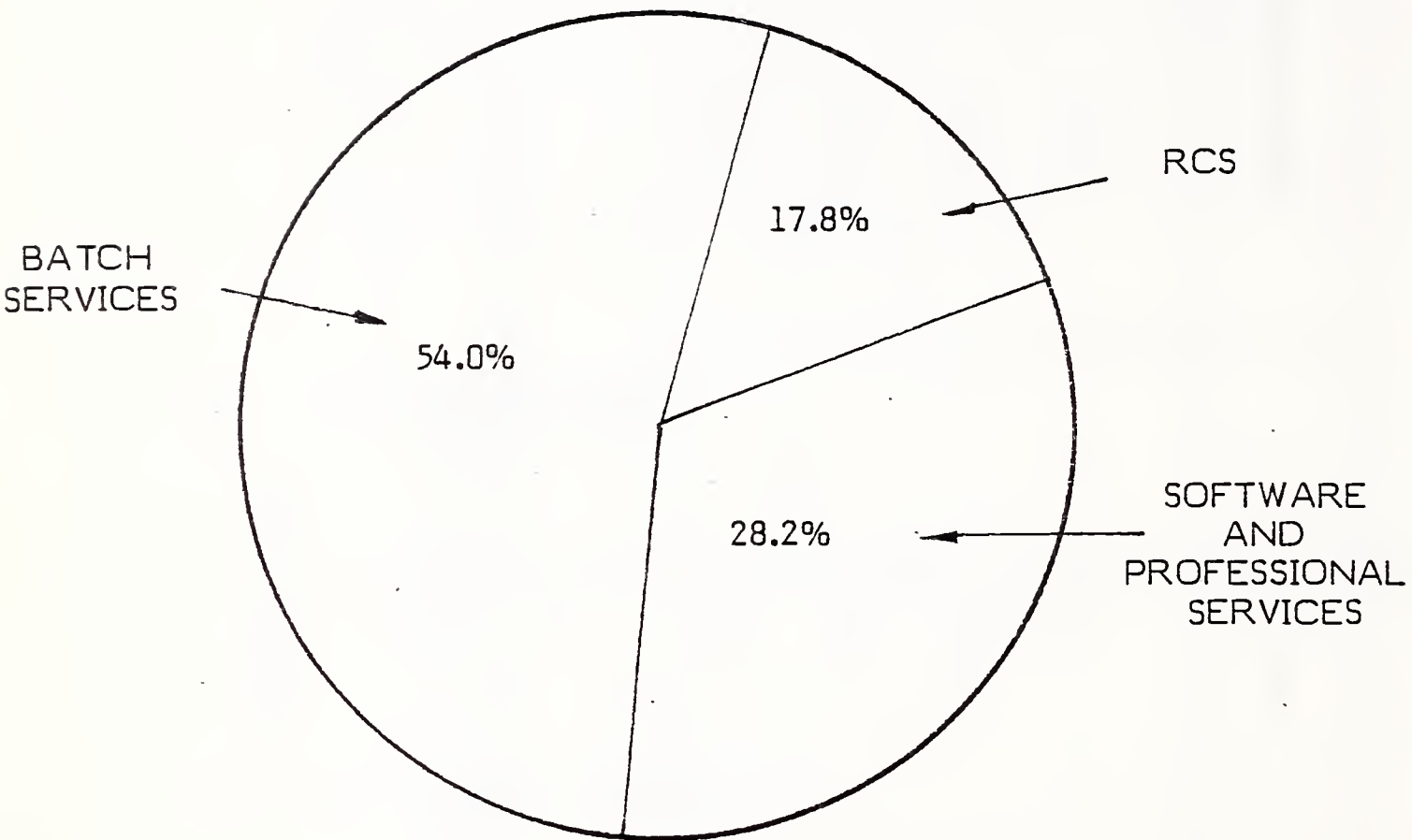
SIZE	BATCH	REM. BATCH	INTERACTIVE	ON SITE
Large	+4%	0%	+12%	+10%
Medium *	+15%	+20%	+18%	N/A
Small *	+20%	+15%	+10%	N/A
OVERALL	+18%	+14%	+15%	N/A

Note: 0 Entirely new user growths not quantified by organisation size but included in the overall figures.

EXHIBIT IV-B.8

THE WEST GERMAN COMPUTER SERVICES MARKET 1978

ALL VENDORS



THE TOP TEN

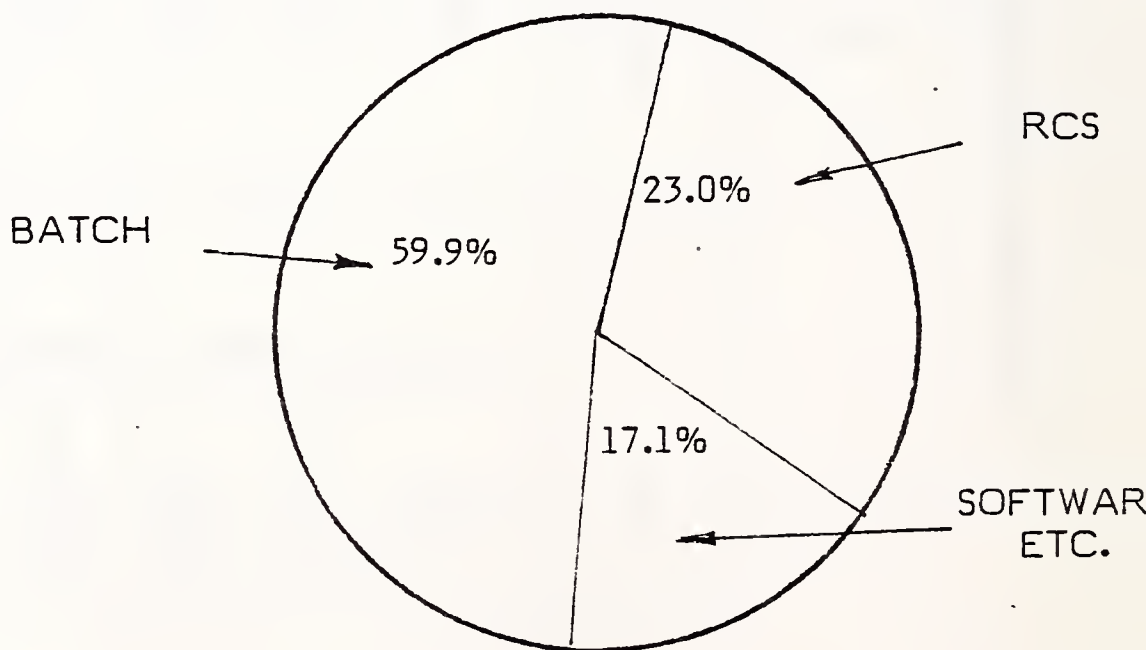


EXHIBIT IV-B.9

DISTRIBUTION OF SAMPLE COMPUTER SERVICES COMPANIES IN  
WEST GERMANY BY 1978 TURNOVER AND PRINCIPAL ACTIVITY

TURNOVER US \$	> 10M		10M - 1M		1M - .1M		< 0.1M		ALL WITH T/O	SAMPLES as % of EST. TOTAL POP. N.	
	A	B	C	D							
MAIN ACTIVITY											
RCS BUREAU	13	3.2%	19	4.7%	5	1.2%	-	-	37	9.2%	73% of 51
BATCH BUREAU	5	1.2	148	36.8	115	28.6	3	0.7	271	67.4	48% 375
SOFTWARE AND PROFESSIONAL SERVICES	4	1.0	32	8.0	20	5.0	2	0.5	58	14.4	78% 714
OTHER (EG COM, DATA PREP.)	1	0.2	13	3.2	22	5.5	-	-	36	9.0	72% 50
ALL WITH T/O.	23	5.7	212	52.7	162	40.3	5	1.2	402	100	73% 550

EXHIBIT IV-B.10

- IBM's dominance of the in-house installations is reflected in their equally dominating position in the external services market. (See Exhibit IV-B.11). In Batch Services IBM has a margin of 4 to 1 over its nearest rival (AC) as measured by number of accounts ; in Interactive Services IBM's margin is narrowed to 2 to 1 over its nearest rival (GEIS). An exception to this dominance occurs in the Remote Batch Services area where IBM runs second with many others to CDC ; however, the Remote Batch market is much less significant than the other two - perhaps, because IBM does not try so hard.
- IBM and GEIS, holding 75% of the Interactive accounts in the sample of large organisations, together completely dominate the market - particularly in the manufacturing, construction, banking and insurance sectors.
- CDC's market position is diametrically opposed to that of IBM ; they are top of the Remote Batch suppliers but bottom of the Batch and Interactive suppliers.
- Although IBM is the market leader in external (Batch, Remote Batch and Interactive) services, Honeywell is a strong second. Indeed, in the supply of Interactive services, IBM and Honeywell are together holding 75% of the accounts with top companies.
- Datev holds the largest share of the German RCS market, closely followed by IBM. (See Exhibit IV-B.13)
- Datev's rise to the top is due to the conversion of much of the manual delivery/over-the-counter batch business, coupled with good growth of those tax consultants that are already on-line.
- The industrial company subsidiaries Messerschmidt-Bolkow-Blohm, Mannesman, Mathiesen-Kienzle-Datensystems, Taylorix and Datenverarbeitungs-Service Oberhausen (subsidiary of the German Babcock group) have a combined market share of 12% of the 1978 remote batch market. Much of this work is captive (40% on average) but their financial strength makes them serious competitors.

THE TOP TEN COMPUTING SERVICES VENDORS

- WEST GERMANY 1978/79

SOURCE: CAMP/EUROPE

RANK	VENDOR	REVENUE IN MILLIONS OF DEUTSCH MARKS (MDM)				ALL SERVICES TOTAL
		BATCH	RCS	SOFTWARE & PROFESSIONAL		
1	IBM	76.4	38.0	12.2	126.6	
2	DATEV	69.8	39.4	3.2	112.4	
3	MANNESMANN	68.8	7.8	6.1	82.7	
4	FIDUCIA	28.6	16.6	3.3	48.5	
5	SCS	-	-	38.6	38.6	
6	MBB	10.7	21.0	-	31.7	
7	KIEN BAUM	-	-	27.5	27.5	
8	DATEL	23.0	2.5	0.5	26.0	
9=	FISCHER	24.9	-	-	24.9	
9=	SPL	-	-	24.9	24.9	

EXHIBIT IV-B.11



## 5. MARKET TRENDS

- BATCH SERVICES will overall tend to stagnate although there are distinct differences in the trends at either end of the expenditure range. (See Exhibit IV-B.6.)
- REMOTE BATCH SERVICES is a less attractive option to the large organisation user than Batch Services. The least negative area to target is the medium to large end of the expenditure range.
- On the basis of individual growth rate, INTERACTIVE is probably the only traditional service which can continue to stand alone with good growth and relatively little erosion, since it is already a de-centralised computer service (i.e. controlled by the user not the data processing department). The best prospects for future growth will be found in the next 2 years in :
  - Food/Drink\*
  - Paper/Printing
  - Chemicals/Petroleum
  - Fabricated Metal\*
  - Business Services
- The industries asterisked (\*) in the above list are also those which offer the best growth prospects for On Site services which will grow at 10% per annum. (The Non-Metallic products industry is also a good growth prospect). A two pronged marketing drive for both Interactive and User Site Hardware services as complementary services in these industries would give the best return for marketing investment.
- In no other country is the Interactive user proportion so close to the proportion of Batch (the largest in all cases).
- The best Interactive service growth prospects by industry are in the following sequence :

TOP SUPPLIER RANKING BY SERVICE TYPE

WEST GERMANY - 1978

BATCH	REMOTE BATCH	INTERACTIVE	SOFTWARE & PROFESSIONAL SERVICES
IBM	DATEV	GEIS	SCS
DATEV	IBM	IBM	KIENBAUM
MANNESMANN	MBB	MKD	SPL
FIDUCIA	FIDUCIA	FIDUCIA	MBP
FISCHER	AC-SERVICE	SIEMENS	ADV/ORGA
RBG	CDC	I.P.SHARP	SOFTWARE AG
DATEL	MANNESMANN	MBB	
MKD	MKD	FIDES	
AC-SERVICE	RBG	MANNESMANN	
		CDC	

SOURCE: CAMP/EUROPE

EXHIBIT IV-B.12

RCS MARKET SHARES OF MAIN WEST GERMAN FIRMS

COMPANY	SHARE OF RCS MARKET (%)	
	INTERACTIVE	REMOTE BATCH
DATEV	+	14.2
IBM	22.5	9.1
MBB	2.1	7.1
FIDUCIA	2.9	5.4
GEIS	23.9	+
SLIGOS	5.4	2.5
AC-SERVICE	+	2.9
CDC	1.4	2.6
MANNESMANN	1.4	2.5
MKD	3.6	0.5

\* INPUT ESTIMATE

+ SMALL VALUE

EXHIBIT IV-B.13

- Business Services
- Food/Drink/Tobacco
- Textiles/Clothing/Leather
- Fabricated Metal/Machinery
- Paper/Printing/Publishing
- Chemicals/Petroleum

- All percentages referred to so far refer to the trends in large organisations. Exhibit IV-B.8 provides a framework for relating the growth/decline rates for different organisation sizes to the overall market forecast.

## 6. MARKET FORECASTS BY SERVICES CATEGORY

- In recent years because of its tendency to regionalism and its characteristic propensity to stay with traditional Batch services, the German market has tended to stagnate in terms of innovation and interest for multi-national vendors interested in spreading into and throughout Europe.
- This is now changing, and the sheer size of the West German sector and its potential for development are causing a much more buoyant situation and awakening the interest of non-German companies in getting established there.
- Market sector growths are shown in Exhibit IV-B.14.

THE WEST GERMAN COMPUTER SERVICES MARKET  
 - FORECASTS BY TYPE OF SERVICE, 1979 - 1983

TYPE OF SERVICE	MARKET FORECASTS IN \$ MILLIONS									
	1977 **	1978 **	GROWTH 77 - 78 (%)	1979 *	1980 *	1981 *	1982 *	1983 *	AAGR (%)	
RCS PROCESSING	118	167	42	217	265	323	394	481	22	
BATCH SERVICES	354	505	43	636	789	947	1117	1285	19	
SOFTWARE PRODUCTS	44	61	39	79	103	134	174	226	30	
PROFESSIONAL SERVICES	156	203	30	254	299	356	428	517	19	
ALL	672	936	39	1186	1456	1760	2113	2509	19	

\* = CONSTANT 1979 DOLLARS; \*\* = CURRENT EXCHANGE RATES



C. UNITED KINGDOM/EIRE



#### IV-C. UNITED KINGDOM AND EIRE

- The remote computing services (RCS) market is extremely well developed in the United Kingdom (and Eire) and growing rapidly (22% per annum). In 1978, Remote Computing services revenues were \$188 million, of which \$102 million was for Remote Batch services.
- The Batch services component of the market, was worth \$270 million in 1978. The services market total of \$706 million in 1978 makes the UK/Eire the third largest 'country market' in Western Europe.
- The Irish (Eire) component of this total is small - some \$25 million.
- Exhibit IV-C1 shows the breakdown of the total market in 1978 into the three major services categories.
- A 1977 analysis of the largest U.K. companies showed that there is still a high number of important organizations spending upwards of \$20,000 per month on EDP services, who are prepared to switch to a competitive service, providing guarantees of reliability are offered and the new service economically justified.
- The computer services industry in the U.K. is composed of over 580 active companies. Over 900 are known to the National Computer Centre (NCC) to have existed at one time or another over the last five years; many have merged or been acquired and appear under different names today.
- A large proportion of the remainder have gone out of business, showing the U.K. market now presenting the profile of a market that has achieved a measure of consolidation and maturity. With this maturity has come a period of growth in RCS, where the impact of vendor pressure as a factor in market expansion is clearly visible.

U.K./EIRE COMPUTER SERVICES MARKET 1978

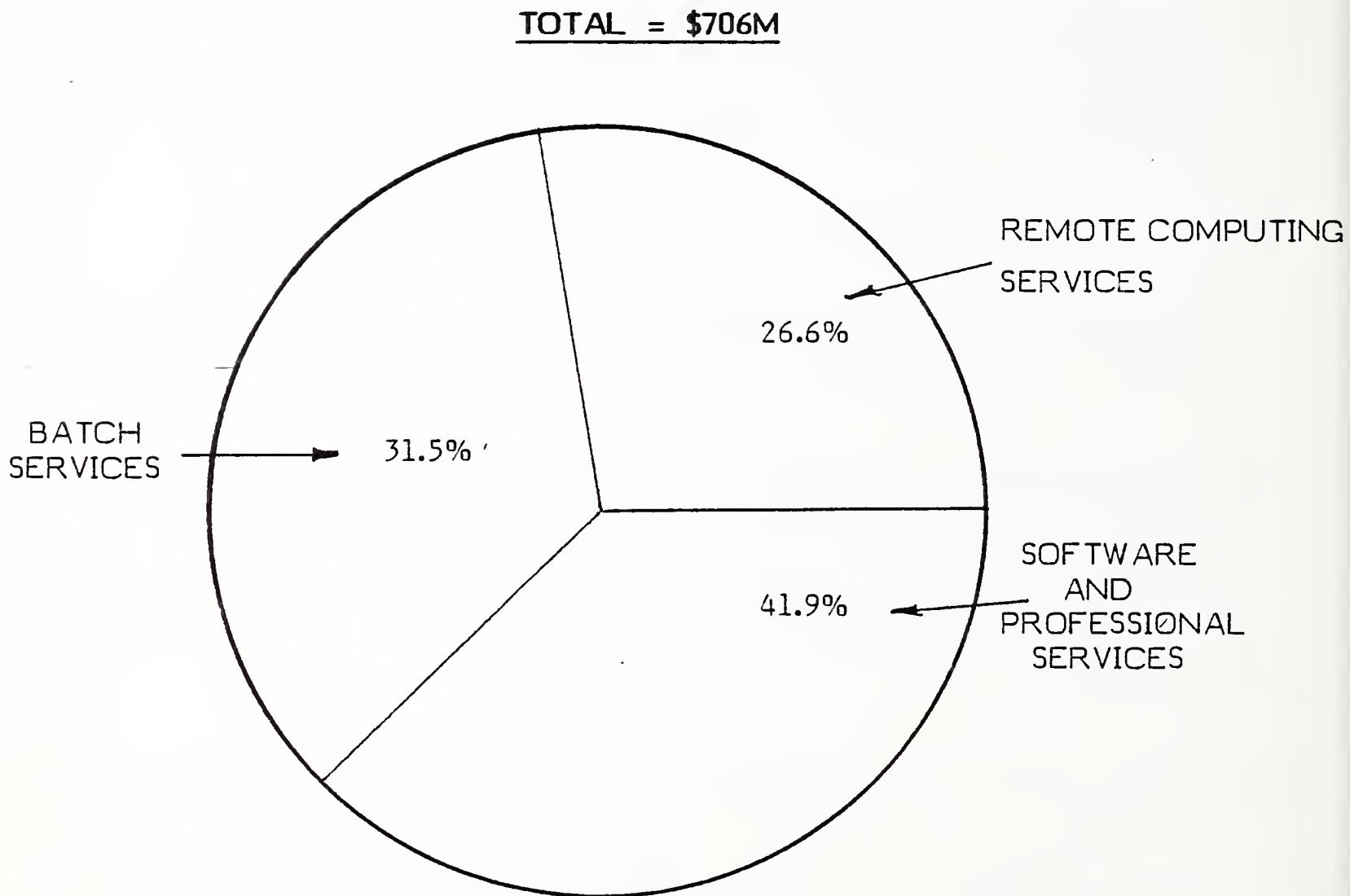


EXHIBIT IV-C.1

- The industry in Eire supports only 38 firms.
- The vast majority of computer services vendors (69%) are privately owned. None are quoted on the stock exchange. A similar majority of vendors are concentrated in London and the South East (see Exhibit IV-C.2).
- In the last five years, the number of spin offs (or organizations who set up their EDP departments as separate entities offering computer services) has increased. As partial reflection of this trend in 1978 75% of the U.K. computer services revenue comes from the private sector, whereas only 17% comes from the public sector (5% from Central Government) and 8% from clients based outside the U.K.

## 1. ECONOMIC BACKGROUND

- Exhibit IV-C.3 gives the recent values of the basic economic indicators for the UK.
- Exhibit IV-C.4 shows the breakdown of organisations in the U.K. by industry and size of turnover.

## 2. USER CHARACTERISTICS AND REQUIREMENTS

- All computer services categories in the United Kingdom market show a clear growth trend overall, although the rate of growth varies substantially between categories and organisation size groups. Non-users of services remain the majority of the total "Times 1000" population, which lends credence to the "large company-only" strategy adopted by many computer services vendors.
- Substantial business growth can therefore be sustained by accurately targeting this large company group.



UNITED KINGDOM VENDOR GEOGRAPHICAL DISTRIBUTION

LOCATION	SERVICE CATEGORY (%)	
	PROCESSING	CONSULTANCY AND SOFTWARE
<u>ENGLAND</u>		
- NORTH	8%	17%
- EAST	1	2
- MIDLANDS	11	17
- SOUTHWEST	2	5
S.E. AND LONDON	67	54
<u>SCOTLAND</u>	7	3
<u>IRELAND</u>	3	1
<u>WALES</u>	1	1
TOTAL	100%	100%

SOURCE: COMPUTER USER'S YEARBOOK 1979

EXHIBIT IV-C.2

BASIC ECONOMIC STATISTICSUNITED KINGDOM

<u>INDICATOR</u>		<u>YEAR</u>	
		<u>1977</u>	<u>1978</u>
GDP +	£B	113	127
	\$B**	198	249
Population (millions)			
	- Total	56.05	56.09
	- Total Working	25.03	25.08
	Agriculture, etc.	0.68	0.66
	Manufacturing	9.56	9.34
	Service Industries	14.80	15.08
No. of organisations *		-	844,800
(thousands)			
No. of establishments *		-	1,400,000
(thousands)			

+ At market prices

\*\* At current exchange rates

\* These figures include the numbers engaged in agriculture, forestry and fishing, but exclude businesses run from home premises.

SOURCES: COI and INPUT estimates

EXHIBIT IV-C.3

DISTRIBUTION OF ENTERPRISES BY SIZE AND INDUSTRYUNITED KINGDOM

ISIC Code	Industry	Enterprise by Size of Annual Turnover (£)			
		< 5.0M	5.0 - 50M	> 50M	Total
11 - 13	Agriculture/Forestry/ Fishing,	34,950	14,750	300	50,000
21 - 29	Mining/Quarrying	1,500	440	60	2,000
31 - 39	Manufacturing	71,000	7,500	1,500	80,000
41	Electricity/Gas etc.	1,700	250	50	2,000
50	Construction	25,900	2,000	100	28,000
61 - 63	Wholesale/Retail	494,455	5,500	45	500,000
71 - 72	Transport/Communications	137,620	2,500	80	140,200
81	Financial	940	340	120	1,400
82	Insurance	290	360	50	700
83	Business Services/ Professions	34,600	2,890	10	37,500
91	Government	1,500	1,450	50	3,000
	TOTAL	804,455	37,980	2,365	844,800

EXHIBIT IV-C.4

- An overall view of the U.K. bureau market is one which encompasses high frequency of usage of external services (43% of the top 1500 companies) and a lower tendency to find an in-house solution (73% of the top 1500 companies have in-house installations). RCS growth potential is as good as any in Western Europe and is aided by a progressive PTT which provides cheap and good quality data transmission services.

## 2.2 COMPETITION FOR THE USER'S BUDGET

- The U.K. is among the higher frequency users of external services in Western Europe - excepting, that is, the extreme usage figures found in Sweden and Norway. The U.K. is on a par with France and Holland; the figures are as follows:

France	41%
U.K.	43%
Holland	44%
Sweden/Norway	72%

- In all Western European countries surveyed, a counterbalancing relationship between in-house and external services usage was observed. In-house usage in the U.K. is 73% of all organisations in the sample. The relative figures are:

	IN HOUSE	EXTERNAL
Sweden Norway	70%	72%
U.K.	73%	43%
Holland	76%	44%
France	79%	41%
Belgium/Lux	82%	33%
Germany	90%	25%

- 16% of organisations surveyed use both in-house and external computer services. This compares with overlap figures of 20% in Holland and 42% in Sweden/Norway. Users in the U.K. are less ambivalent than their counterparts elsewhere in Europe.

LARGE ORGANISATIONS' PROCESSING SERVICES USAGE BY INDUSTRY

UNITED KINGDOM

ISIC	INDUSTRY	RESP %GE	EXTERNAL SERVICES USAGE				IN HOUSE USAGE
			ALL	B	RB	I	
11 - 13	Agriculture/Fishing	100	50	50	0	50	100
21 - 29	Mining/Quarrying	-	-	-	-	-	-
31	Food/Drink/Tobacco	45	41	22	11	22	93
32	Textiles/Clothing	42	63	63	0	13	75
33	Wood Products	20	100	100	0	0	0
34	Paper/Print/Publ.	32	0	0	0	0	89
35	Chem./Petrol/Coal	30	42	42	8	17	75
36	Non-Metallic Prod.	10	0	0	0	0	100
37	Basic Metal	70	57	14	14	29	71
38 - 39	Fabricated Metal Prod.	37	38	14	14	38	81
41	Electricity/Gas	24	83	50	33	33	67
50	Construction	64	61	33	22	33	39
61 - 63	Wholesale/Retail	45	38	31	0	23	85
71 - 72	Transport/Comm.	40	25	25	0	0	100
81	Financial/Banks	46	50	42	0	17	92
82	Insurance	35	20	20	0	10	100
83	Business Services	70	43	43	14	29	29
91	Government	20	80	40	60	10	40
	OVERALL WEIGHTED AVERAGE	40	44	28	10	20	76

EXHIBIT IV-C.5



- Usage of each category of computing service varies considerably as follows:

Batch	20%
Remote Batch	8%
Interactive	16%

### 2.3 IN-HOUSE COMPUTING

- IBM has a clear overall market lead and in all company size groups except three (two of which are tied market shares with ICL).
- ICL's market coverage is patchy in some areas (Unit Trusts/Property Companies/Investment Trusts, British Banks, Overseas/Foreign Banks, Accounting/Management Consultants).
- HIS has the third largest market share by number of machines, with an irregular penetration of some key markets (Times Top 500 etc).
- DEC, in the space of four years has become a significant supplier of commercial systems and manages to lead the market in the Accepting Houses, Mining and Other Finance group, and Accounting/Management Consultants.
- Burroughs is close to challenging HIS (in system numbers though not in value) as is NCR.
- UNIVAC, whose small number of large systems are not easily found, is not in contention for market share on the basis of number of systems.

### 2.4 EXTERNAL COMPUTING SERVICES - EXPENDITURE

#### Batch Services

- Batch Services continue to be a popular service in the Industrial group of companies examined (Times Top 1000). This is however not true of the Financial companies included in the survey.

USER ESTIMATES OF GROWTH - EXTERNAL SERVICES

UNITED KINGDOM

SERVICE	EXPENDITURE RANGE (£ Sterling)					OVERALL
	< 1K	1K-5K	5K-12K	12K-25K	> 25K	
Batch	+ 12%	+ 3%	- 10%	- 16%	+ 2%	- 4.0%
Rem. Batch	+ 2%	+ 33%	+ 7%	+ 3%	+ 1%	+ 4.0%
Interactive	+ 15%	+ 21%	+ 4%	+ 10%	6%	+ 12.3%
On Site	N/A	N/A	N/A	N/A	N/A	

Note:

The percentages under specific expenditure ranges are simple averages of respondent estimates; the "Overall" figures are weighted averages according to expenditure range.

EXHIBIT IV-C.6

- The stability of the user base is questionable in some key sectors of the market (British Banks Overseas, Foreign Banks, Insurance companies, Clearing Banks, Building Societies, Finance Houses, Discount Houses) but also in the lower half of the Times Top 1000. In this last category the percentage of respondents expecting a decline in expenditure is high (14%). In terms of a quantified rate of decline users in large organisations anticipate a - 4% decline (See Exhibit IV-C.6).
- Batch companies will realise the market growth potential forecast (See Exhibit IV-C.7) by concentrating on small and medium sized organisations. In this market arena there is however a strong conflict between in-house minis and traditional Batch Services.
- The Batch Services market is gradually losing its clients to in-house computers (frequently turnkey minicomputers) but has not lost a great deal to Remote Batch Services as yet.
- A total of 113 responses out of 611 concern Batch Vendors who are not part of the 10 major vendors listed. The Batch Services market is fragmented into many small territories. Without an external source of investment these vendors cannot grow substantially. Their territories are limited, as are their abilities to fund new product development and marketing force expansion.

#### Remote Batch Services

- In the markets examined by recent surveys, the penetration of Remote Batch Services was small indeed. Only 86 single-and multiple-source users were found.
- The massive support of Centre-file by the Building Society group distorts the picture from a vendor market share standpoint, and it would be erroneous to extrapolate this data to other, wider markets.

EXTERNAL PROCESSING SERVICES GROWTH BY COMPANY SIZE: OVERALL MARKET

UNITED KINGDOM

SIZE	BATCH	REM. BATCH	INTERACTIVE	ON SITE
Large	-4%	+4%	+12%	N/A
Medium*	+10%	+13%	+25%	N/A
Small*	+20%	+7%	+15%	N/A
OVERALL	+17%	+9%	+25%	N/A

Note: \* These figures are INPUT estimates.

EXHIBIT IV-C.7



- Users of Remote Batch Services have less of a tendency towards a decline of usage than Interactive and Batch users and a higher percentage of stable users. Large organisations will show a + 4% increase in demand for Remote Batch Services over the next 2 years. (See Exhibit IV-C.6). Better growth will be found in medium-sized companies which have large enough data volumes to justify a Remote Batch Service but insufficient justification for heavy internal computer processing capability; this will apply to a lower extent to demand in the small companies sector. (See Exhibit IV-C.7).
  
- Individual expenditure trends show a remarkably heterogeneous picture:
  - the Accepting Houses, Mining and other Finance group evidences a lack of interest in Remote Batch services.
  
  - similarly, the Insurance sector is an RB market in a state of flux with an equal number of users with a tendency towards growth as there is with a tendency towards a decline in usage.
  
  - all other sectors are growth markets, the best of which is the Times Top 50. The Times 51-200 is also a good growth market.
  
- The significance of the last point lies in the fact that the Remote Batch services growth sectors are, (with the exception of the Clearing Bank/Building Society/Finance and Discount Houses - very much the province of Centre-file at present), located in those markets where Interactive Services are strong and Batch Services vendors are weak.
  
- Thus, it more likely that the Remote Batch market will be serviced by Interactive vendors than by Batch vendors extending their coverage to a larger client base than at present.
  
- None of the major services vendors (IBM, UCC, GEISCO, COMSHARE) have established themselves strongly in the company groups examined. The market is therefore very much open to a determined thrust by vendors convinced of



the inevitability of distributed processing and who can successfully package local hardware with remote processing applications know-how provided through a network.

### Interactive Timesharing Services

- The contrast in usage of Interactive Services with usage of Batch and RB services is striking; it is the most heavily used external service. The distribution of the expenditure is also clearly established between the major vendors.
- The market for Interactive (Timesharing) services in the company groups examined shows strong growth in the Times Top 500. Growth is also good in the Times 501-1000, British Banks Overseas and Foreign Banks. In all markets, with the exception of the Times Top 500, the user base is in a state of flux with a substantial proportion planning to decrease their usage of Interactive Services.
- This "de-emphasis" on Interactive Services is most apparent in the Insurances and Accounting/Management Consultancy sectors where planned declines reached 31% and 38% respectively of respondents.
- The Interactive Services growth in the U.K. reached 29% per annum in 1977, a rate, which cannot be sustained by the increased usage of Interactive Services by current users, (who along account for nearly half of this growth). Thus, new users must be sought by the major vendors to keep pace with (or exceed) the rate of market growth so as to sustain or increase current market shares.
- The large user organisation sampled expect a + 12% growth in their future requirements for Interactive Services. (See Exhibit IV-C.6). (Note that growth from new users is not included in this figure).
- Highest growth will continue to be found in large organisations with growth at the overall market level; only modest growth is likely to be achieved with the small organisations. (See Exhibit IV-C.7).

### 3. MARKET DEVELOPMENT 1978

- The total Computer Services market for the United Kingdom/Eire in 1978 amounted to \$706M at 1978 dollar exchange rates.
- During the year the market continued to grow, showing an overall growth over 1977 revenues of 31%.
- This annual growth rate of 38% is accounted for by:
  - 2% - average fall in the dollar,
  - 10% - average domestic price rises for equivalent products,
  - 17% - true growth in terms of new business or additional business from existing accounts.
- Exhibit IV-C.8 shows the growth between 1977 and 1978 in terms of the different types of services sold.

#### 3.1 PROCESSING SERVICES

- Work completed in Batch mode, defined to include off-line Data Preparation and Encoding, lost the precarious hold it had in 1977 as the largest revenue earning sector and fell back to a close second place with 32% of total market.
- Off-line Data Preparation undertaken by specialist non-processing bureaux typically accounts for 3-5% of the market in the U.K.
- Work completed in RCS (Remote Computing Services) mode, including Interactive and Remote Batch, is a considerable sector taking almost 27% market share.

THE U.K./EIRE COMPUTER SERVICES MARKET SIZES,  
1977 AND 1978

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TYPE OF SERVICE	1977		1978		AVERAGE ANNUAL GROWTH RATE %
	\$M *	%	\$M *	%	
RCS PROCESSING	136	25.3	188	27	38%
BATCH SERVICES	185	34.4	223	32	21%
SOFTWARE PRODUCTS	33	6.1	56	8	70%
PROFESSIONAL SERVICES	184	34.2	239	33	31%
TOTAL	538	100	706	100	31%

SOURCE: CAMP/EUROPE AND INPUT ESTIMATES

\* AT CURRENT EXCHANGE RATES

EXHIBIT IV-C.8

- Batch Services grew at a below market average rate, while Professional Services grew at the market average and RCS above it. This relative decline of Batch is expected to continue and the rate of decrease is gentle enough to fit in with industry forecasts of a prolonged period of falling market share, rather than a sudden demise.
- The growth of RCS in UK/Eire was 38%, but this was exceeded by Software Products with 70% growth.
- User Site Hardware Services are not included in the service type breakdown used in this section, because the volume of business done under this heading is still small in European markets.

### 3.2 SOFTWARE PRODUCTS

- In European markets as a whole the revenues earned by the separate sale or licence of software products are small - of the order of 5%. Where income is earned, it is usually from one of:
  - system software products, (operating systems or language compilers),
  - utility programs and routines, including DBMS.
- The growth of software product sales is strong in UK/Eire at 70% between 1977 and 1978. Such a high growth rate is not expected to continue at this level, but because of its relative lack of development the sector will lead the growth rate chart for the next few years. A new contributing factor to this growth was the start-up of sales of software packages for personal computers at the very low end of the market.

UNITED KINGDOM COMPUTER SERVICES MARKET GROWTH

YEAR	MARKET SIZE (£M)	
	REPORTED TOTAL	CONSTANT 25%
1968	35	35
69	45	44
70	55	55
71	65	68
72	78	85
73	102	107
74	120	133
75	160	167
76	202	208
77	285	261
78	347	326

EXHIBIT IV-C.9



### 3.3 PROFESSIONAL SERVICES

- This category is defined to include:
  - Consultancy, training and education,
  - Tailored systems and programming,
  - Contract programming,
  - Turnkey systems.
  
- At \$239 million in 1978, this sector represents 33% of the overall 'country' market, moving into first place as a revenue earner. The UK contains a good number of well developed system and software houses, with a good exporting capability.
  
- Growth in absolute terms between 1977 and 1978 was up from \$184 million, a 40% increase. Professional Services are expected to continue at this level of growth; any decrease in tailored systems market share being taken up by increases in:
  - consultancy, education and turnkey systems.

### 4. COMPETITION AND VENDOR MARKET SHARES

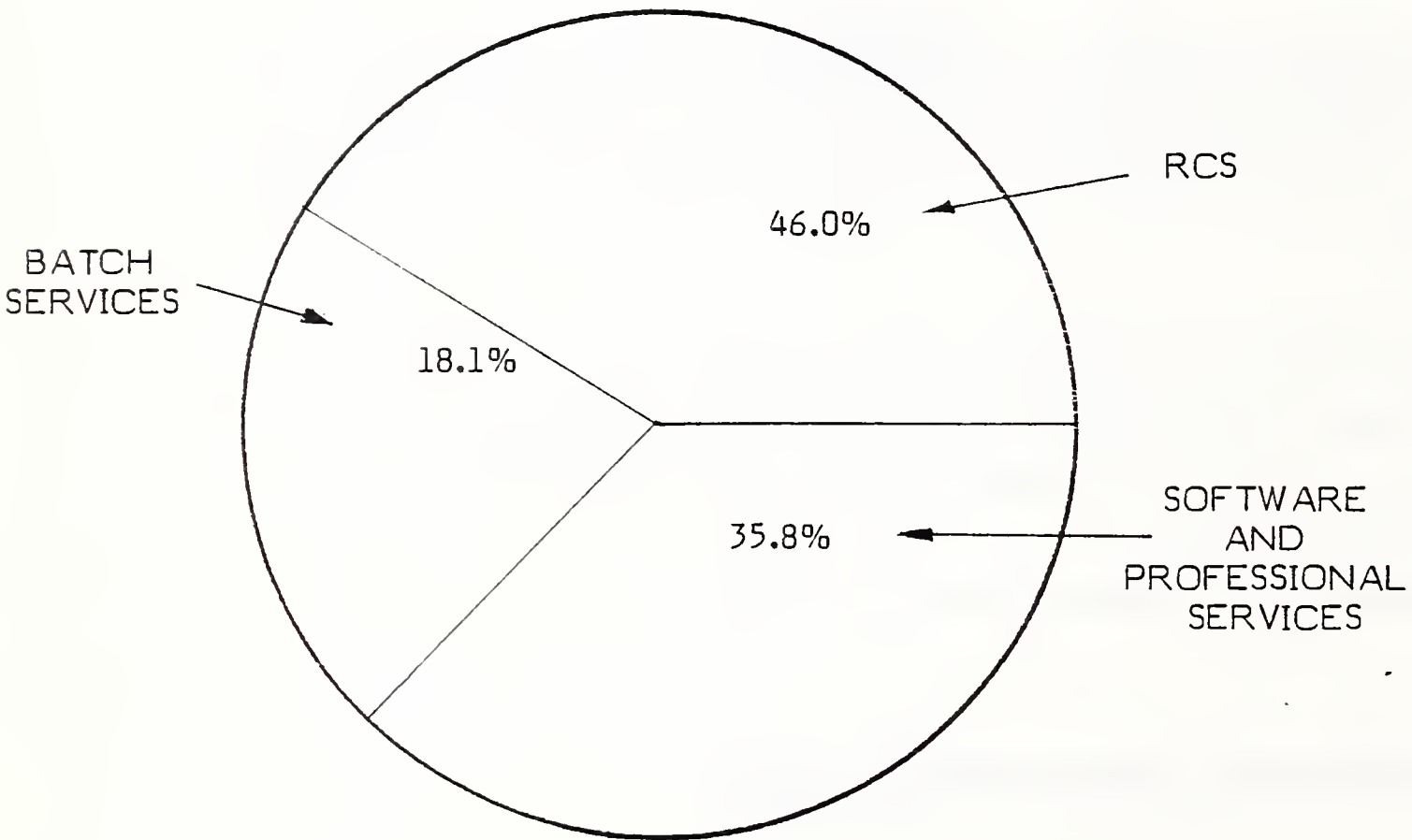
- A factor that is unique to the U.K. market is the degree to which ICL equipment is used for computer services. In terms of hardware share, based on the number of machines installed, ICL has a 40% penetration. In terms of revenue, however the picture is drastically different.

1977 U.K. AND ICL-BASED MARKET SIZES (\$M)

MARKET	BATCH	REMOTE BATCH	INTER-ACTIVE	OTHER	TOTAL
UK TOTAL	185	81.6	54.4	217.0	538.0
ICL-BASED	57.0	11.8	7.8	35.0	111.6
ICL SHARE	31%	14%	14%	16%	21%

THE UNITED KINGDOM COMPUTER SERVICES MARKET 1978

THE TOP TWENTY (£186M = 53.6% of Market)



THE TOP TEN (£131M = 37.7%)

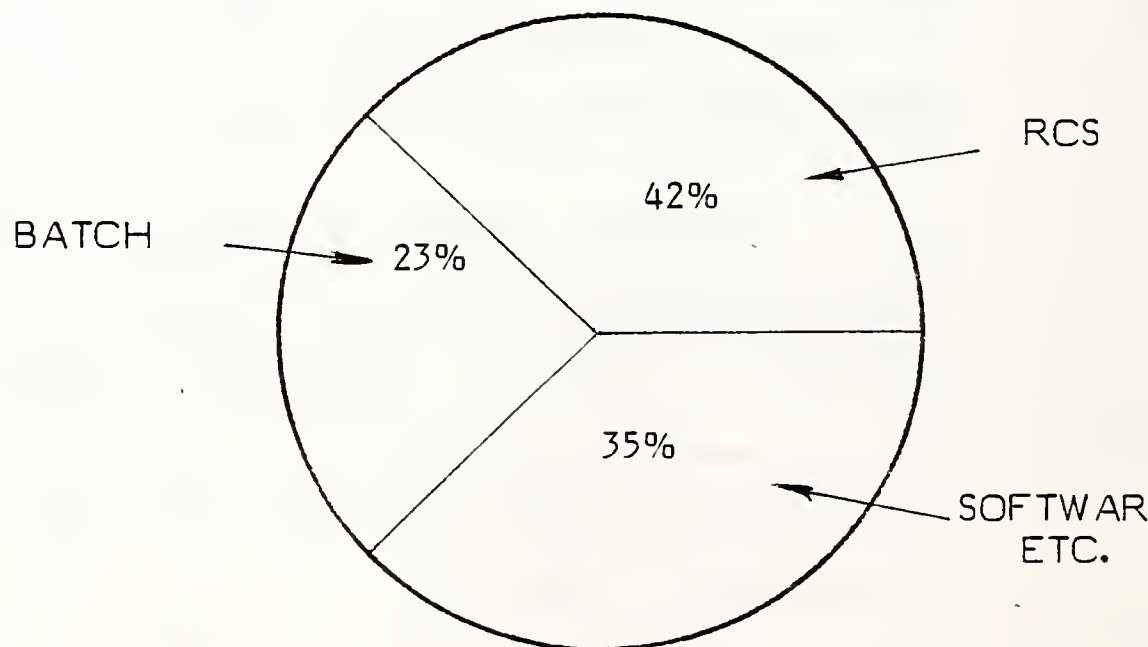


EXHIBIT IV-C.10

- Due to ICL weakness in telecommunications, the RCS share is far below the Batch business. This situation is being improved, notably with the introduction of the 2900 series into the major bureaux (eight at this time). COMPUTEL has begun to generate one-third of its revenue from RCS on its ICL 2960. The largest ICL bureau, Baric, is 85% batch, however.
- IBM has completed the restructuring of its Data Centre Services and Remote Computing Services (both previously part of IBM DP Division), into one RCS Division.
  - An aggressive growth plan is in the early stages of implementation with the super-centre at Warwick, which can house as many as six IBM System/370 Model 168s tied to a network of 80 high speed lines and 10 concentrators serving the U.K. market.
  - To date, only one 370/168 has gone live with the concentrators switching customers to either Warwick or the existing 370/155s in London, used for the Terminal Business Systems and Call Services. IBM has now discontinued its batch bureaux in Croydon, Manchester, and Birmingham.
- GEISCO is one of the few suppliers to cover the entire country and whose presence is felt everywhere. GEISCO is more concerned with growth than with competition, an indication of the buoyant state of the U.K. RCS market.
- CDC provides mainly Remote Batch services. In the words of some competitors, CDC is "rarely seen" in competitive situations. The drastic pruning of the Brussels-based European headquarters has unsettled the data services group. The Call 370 service acquired from IBM has been partially merged with the Cybernet service with limited success.
- COMSHARE Ltd. is the prime supplier of Interactive Services (though not the largest). Growth over 40% in 1978, came mainly from banking, government and other specialized markets where the value-added can be maximized. This specialization insulated the company from competition to a great extent.

DISTRIBUTION OF SAMPLE COMPUTER SERVICES COMPANIES IN  
UNITED KINGDOM BY 1978 TURNOVER AND PRINCIPAL ACTIVITY

TURNOVER US \$ MAIN CODE ACTIVITY	> 10M		10M - 1M		1M - .1M		< 0.1M		ALL WITH T/O	SAMPLES as % of EST. TOTAL POPN.
	A	B	B	C	C	D	D			
RCS BUREAU	9	36	12	1	58	81% of 72				
BATCH BUREAU	1	34	77	7	119	80%	149			
SOFTWARE AND PROFESSIONAL SERVICES	7	47	134	28	216	80%	271			
OTHER (EG COM, DATA PREP.)	-	7	54	11	72	80%	90			
ALL WITH T/O.	17	124	277	47	465	80%	582			



- Centre-file is a major RCS vendor, mainly for interactive services. The company's main strength is its link with National Westminster Bank and the latter's 3,500 branches that serve as a collection/distribution and semi-marketing force for Centre-file's services. Referrals of significant new business come from this network.
  - Centre-file has the Motor Registration (SMMT) monopoly, which is bought by all car manufacturers.
  - It also has the Law Society's time recording service license and a near-monopoly of the building society business.
- ADP's main RCS strength in Europe lies currently in the U.K. and Holland through the former Time Sharing Ltd. and Cyphernetics operations, respectively. The combination is currently trading as ADP Network Services International.
- Atkins On-Line has become a significant supplier of Interactive Services, largely based on OLIVER, a problem-solving language, which produced over \$1 million in 1977. APL, Financial Planning and Engineering services provided the remainder of the \$4.1 million of Interactive Services. The Atkins group, formerly the parent before the On-Line acquisition, provided \$780,000 in revenues. The mid-79 acquisition of On-Line by UCS in the USA is resulting in significant structural changes, as yet incomplete.
- The estimated market shares for 1977 revenue for each of the major competitors in the U.K. RCS market are shown in Exhibit IV-C.14.
- The main competition in the U.K. RCS field is between IBM, BOC, GEISCO and COMSHARE. The latter two companies have, in some cases, identical software (e.g. SDRC) such that any improvements in running efficiency result in lower costs to the client base (which can easily change from one supplier to the other).



THE TOP TEN COMPUTING SERVICES VENDORS  
- UNITED KINGDOM 1978

SOURCE: CAMP/EUROPE

RANK	VENDOR	REVENUE IN MILLIONS OF POUNDS STERLING (£ M)				ALL SERVICES TOTAL
		BATCH	RCS	SOFTWARE & PROFESSIONAL		
1	IBM	14.0	20.0	1.0	35.0	
2	ICL Dataskil	-	-	16.0	16.0	
3	BOC Datasolve	6.0	3.0	4.0	13.0	
4	SCICON	0.1	3.6	9.0	12.7	
5	H-IS (GEISCO)	-	10.2	-	10.2	
6	Logica	-	-	10.0	10.0	
7	Systime	-	-	9.1	9.1	
8	UCSL	-	8.0	1.0	9.0	
9	CMG	1.0	4.0	3.0	8.0	
10=	CAP-CPP	-	-	7.0	7.0	
10=	ICL Baric	6.5	0.5	-	7.0	

- The large number of RCS suppliers already established in the market should not be considered as a deterrent to the creation of a new supplier. The rapid development of the market has more than coped with the expansion of the main vendors, so that the U.K. market is not a harshly competitive environment.

#### 4.1 PRICING

- In the U.K. RCS market, pricing tends to be set by GEISCO who prices its services at a premium to the other suppliers in the market.
- Until recently, market price changes have followed a pattern. GEISCO modifies its prices, followed one month later by COMSHARE, and by ADP Network Services six months later. IBM has not had appreciable influence to date.
- In 1977 this pattern was broken. GEISCO (then Honeywell) raised its prices, but its closest rival, COMSHARE, did not. ADP also kept prices unchanged.
- Competitor's evaluation of each other's pricing is usually carried out by buying time on each other's systems and running company benchmarks.
- The market is very price sensitive and, as a result, the vendors tend to move in parallel.

TOP SUPPLIER RANKING BY SERVICE TYPE

UNITED KINGDOM - 1978

BATCH SERVICES	REMOTE COMPUTING SERVICES	SOFTWARE & PROFESSIONAL SERVICES
IBM ICL Baric BOC Datasolve Centrefile Data Sciences Extel LUCS UCC CMG Hoskyns ADP-MD Lowndes-Ajax	IBM GEISCO UCSL COMSHARE UCC CDC ADP-NIS Scicon CMG Atkins On-line SIA GSI (CRC) BOC Datasolve Computel Tymshare Centrefile	ICL Dataskil Logica Systime Scicon CAP-CPP ABS F International Hoskyns ACS BOC Software Sciences BIS SPL CMG VLI Marcol PACTEL Datalogic SDL

SOURCE: CAMP/EUROPE

EXHIBIT IV-C.13

## 5. MARKET TRENDS

### Remote Batch Services

- Users of Remote Batch Services have less of a tendency towards a decline of usage than Interactive and Batch users and a higher percentage of stable users. Large organisations will show an increase in demand for Remote Batch Services over the next 2 years. Better growth will be found in medium-sized companies.
- It is more likely that the Remote Batch market will be serviced by Interactive vendors than by Batch vendors extending their coverage to a larger client base than at present.

### Interactive (Timesharing) Services

- The Interactive Services growth in the U.K. has reached 25% per annum. This cannot be sustained by the increased usage of Interactive Services by current users, (who along account for nearly half of this growth). Thus, new users must be sought by the major vendors to keep pace with (or exceed) the rate of market growth so as to sustain or increase current market shares.
- Highest growth will continue to be found in large organisations with growth at the overall market level; only modest growth is likely to be achieved with small organisations.

### Batch Services

- A reasonable growth of 14% is anticipated during the forecast period.

### Professional Services

- Led by mini-based Turnkey Systems this sector will continue to be a major strength of the U.K. market.

RCS MARKET SHARES OF MAIN UNITED KINGDOM FIRMS

COMPANY	SHARE OF RCS MARKET (%)	
	INTERACTIVE	REMOTE BATCH
GEISCO	26.0	0.4
IBM	7.4	10.8
BOC/DATASOLVE	-	17.1
COMSHARE	16.0	3.2
UCSL	3.3	8.3
CENTREFILE	9.9	2.0
ADP	10.8	+
SIA	10.3	-
ATKINS ON-LINE	5.1	2.4
SCICON	1.6	3.7

+ SMALL VALUE

EXHIBIT IV-C.14



### Applications Trends

- In the Industrial sector there is a heavy but stagnating market for general accounting and payroll services, with only two thirds of present users planning to make greater use of applications in this area.
- Users of Marketing/Sales Analysis and Production/Inventory applications show sustained interest in expanding their usage.
- Personnel Management and Financial Analysis/Planning applications are expected to be used more widely in the future.
- Engineering and Scientific applications have the smallest user base of all, but one whose planned usage is expected to grow. This area of the market has yet to be fully exploited in the U.K., where the consulting engineering profession has a large involvement with North Sea oil exploration.
- In the Financial sector the future planned applications demand is weak in all areas.

### 6. MARKET FORECASTS BY SERVICES CATEGORY

- Exhibit IV-C.15 shows the sector forecasts for the five-year forward period.
- Professional Services will remain the largest sector at 34%. RCS will oust Batch services from second place by increasing its market share 1%, from 27% to 28%.
- Largest proportional growth will be had by Software Products, up in share from 8% to 14%.

THE UK/EIRE COMPUTER SERVICES MARKET  
- FORECASTS BY TYPE OF SERVICE, 1979 - 1983

TYPE OF SERVICE	MARKET FORECASTS IN \$ MILLIONS									
	1977 **	1978 **	GROWTH 77 - 78 (%)	1979 *	1980 *	1981 *	1982 *	1983 *	AAGR (%)	
RCS PROCESSING	136	188	38	233	275	333	413	516	22	
BATCH SERVICES	185	223	21	260	300	347	395	435	14	
SOFTWARE PRODUCTS	33	56	70	76	102	139	189	257	36	
PROFESSIONAL SERVICES	184	239	30	296	356	427	521	635	21	
ALL	538	706	31	865	1033	1246	1518	1843	21	

\* = CONSTANT 1979 DOLLARS; \*\* = CURRENT EXCHANGE RATES

D. ITALY



#### IV-D ITALY

- In 1978, the Italian market was \$550M, the fourth largest market in Europe. This value does not include captive revenues. (See Exhibit IV-D.1.).
- Exhibit IV-D.2 gives the basic indicators for the Italian economy.
- Exhibit IV-D.3. shows the sector growth pattern between 1977 and 1978.
- Around 650 computer services companies were identified in INPUT's CAMP/Italy research, half of which have less than ten employees. Exhibit IV-D.5. shows the breakdown of these companies by size and principal activity.
- The Top Ten companies (see Exhibit IV-D.4.) gather 26.5% of their revenues from RCS, a considerably larger proportion than the 10.7% of the total market.
- The largest computer services companies offering RCS services are (in order of overall revenue):
  - Datamont (\$22.3M)
  - IBM (\$21.2M)
  - Data Management (\$17.0M)
  - GE-DA (\$10.0M)
- The companies which have the largest RCS revenues are IBM, Datamont, GEIS and CDC (see Exhibit IV-D.6.)
- The Italian RCS sector at only 11% of the total 1978 market, was nearly two and one half times smaller than the proportion found in other countries.
- IBM has made an important effort towards improving the RCS service and has narrowed the gap with GEIS in interactive services.



THE ITALIAN COMPUTER SERVICES MARKET 1978

TOTAL = \$550M

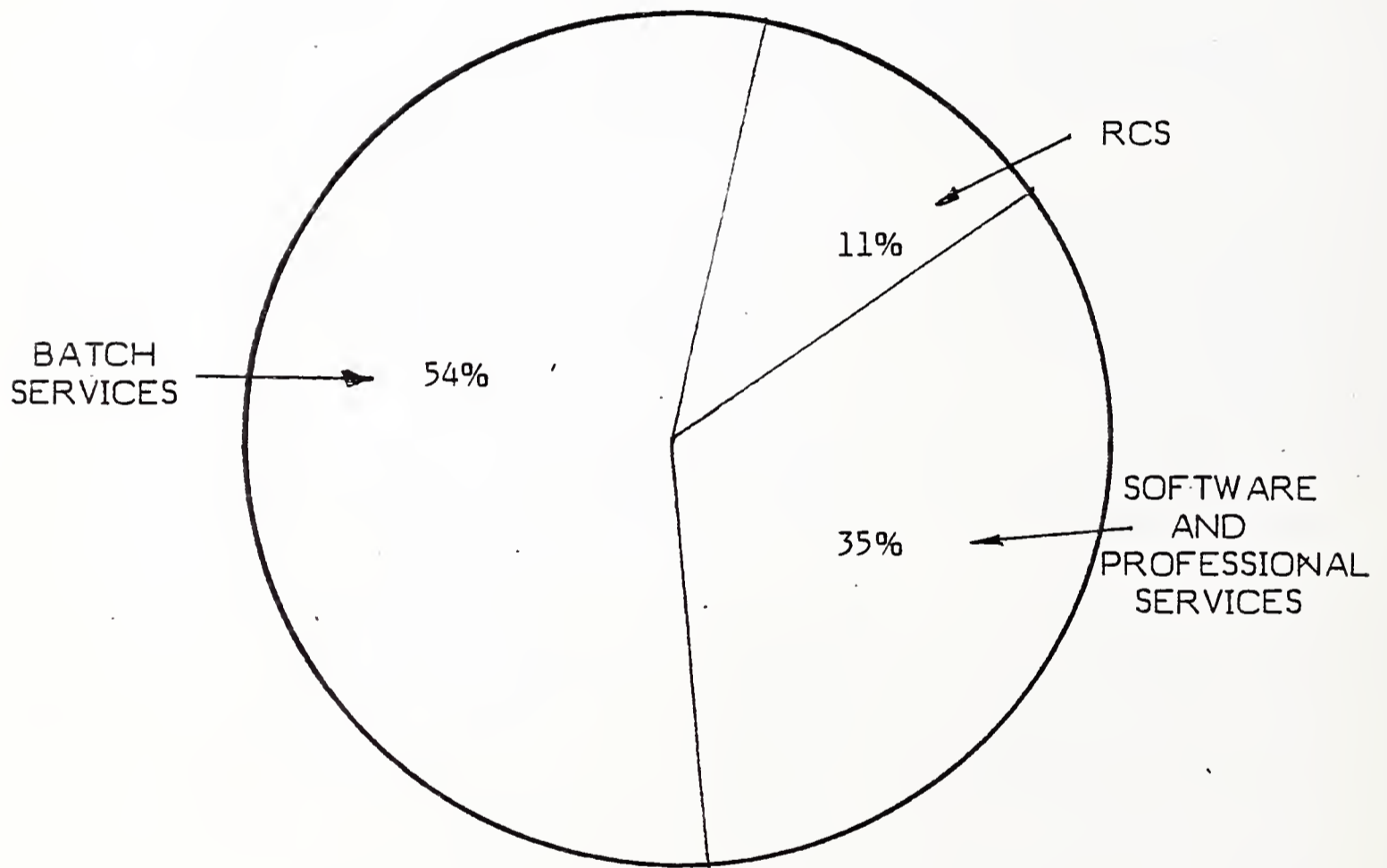


EXHIBIT IV-D.1

BASIC ECONOMIC STATISTICSITALY

<u>INDICATOR</u>		<u>YEAR</u>	
		<u>1977</u>	<u>1978</u>
GDP +	Lire B	150,380	169,550
	\$B**	170.5	198.8
Population (millions)			
	- Total	55.75	55.97
	- Total Working	16.11	16.15
	Agriculture, etc.	3.52	3.48
	Manufacturing	7.23	7.14
	Service Industries	5.36	5.53
No. of organisations *		-	2.55
(millions)			
No. of establishments *		-	2.10
(millions)			

+ At market prices

\*\* At current exchange rates

\* These figures include the numbers engaged in agriculture, forestry and fishing, but exclude businesses run from home premises.

SOURCES: National Statistical Institute and INPUT estimates

EXHIBIT IV-D.2

THE ITALIAN COMPUTER SERVICES MARKET SIZES,  
1977 AND 1978

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TYPE OF SERVICE	1977		1978		AVERAGE ANNUAL GROWTH RATE %
	\$M *	%	\$M *	%	
RCS PROCESSING	46	10.7	59	10.7	28.3%
BATCH SERVICES	254	58.9	297	54.0	16.9%
SOFTWARE PRODUCTS	35	8.1	51	9.3	44.9%
PROFESSIONAL SERVICES	96	22.3	143	26.0	49%
TOTAL	431	100	550	100	27.6%

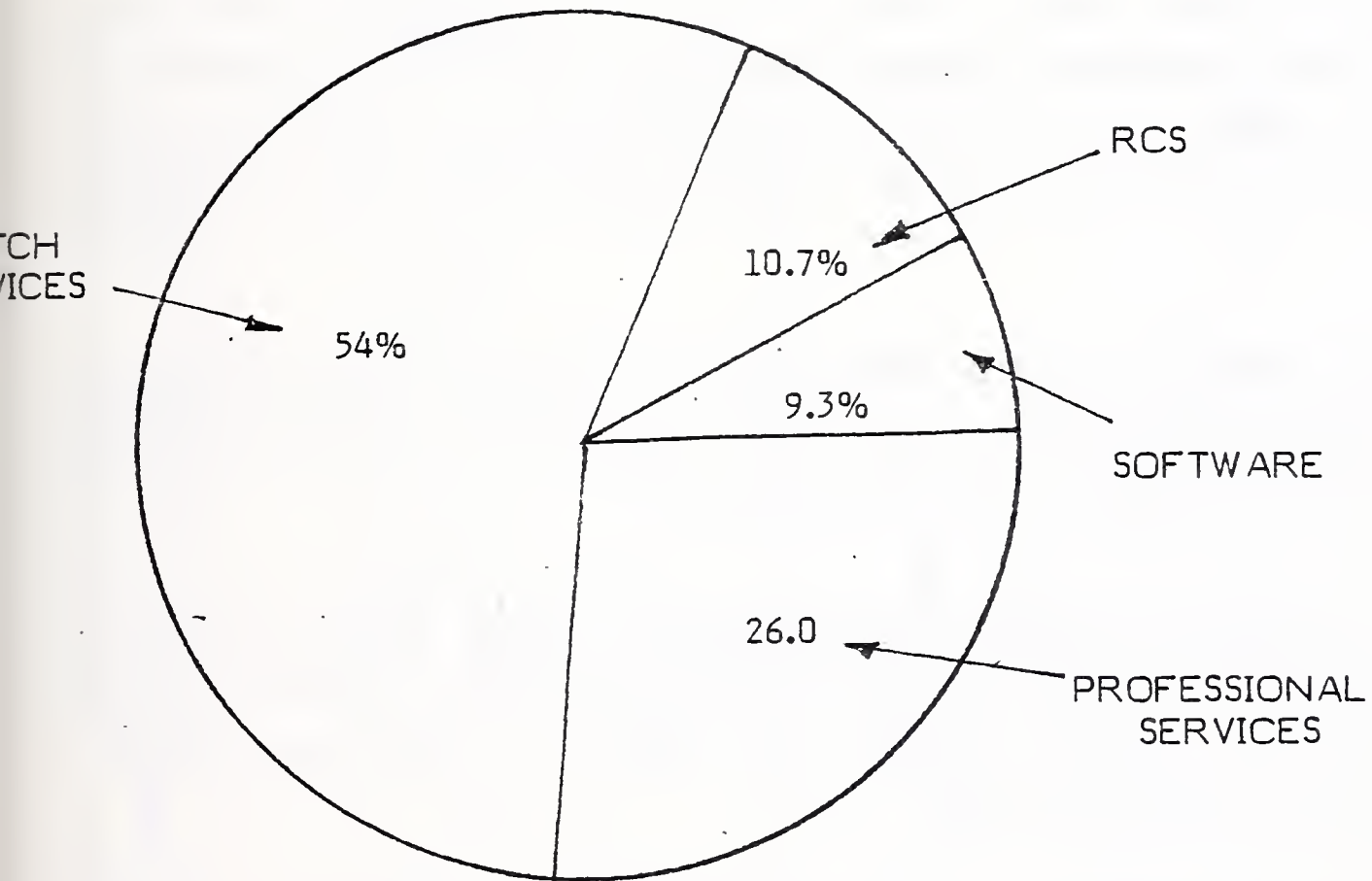
SOURCE: CAMP/EUROPE AND INPUT ESTIMATES

\* AT CURRENT EXCHANGE RATES

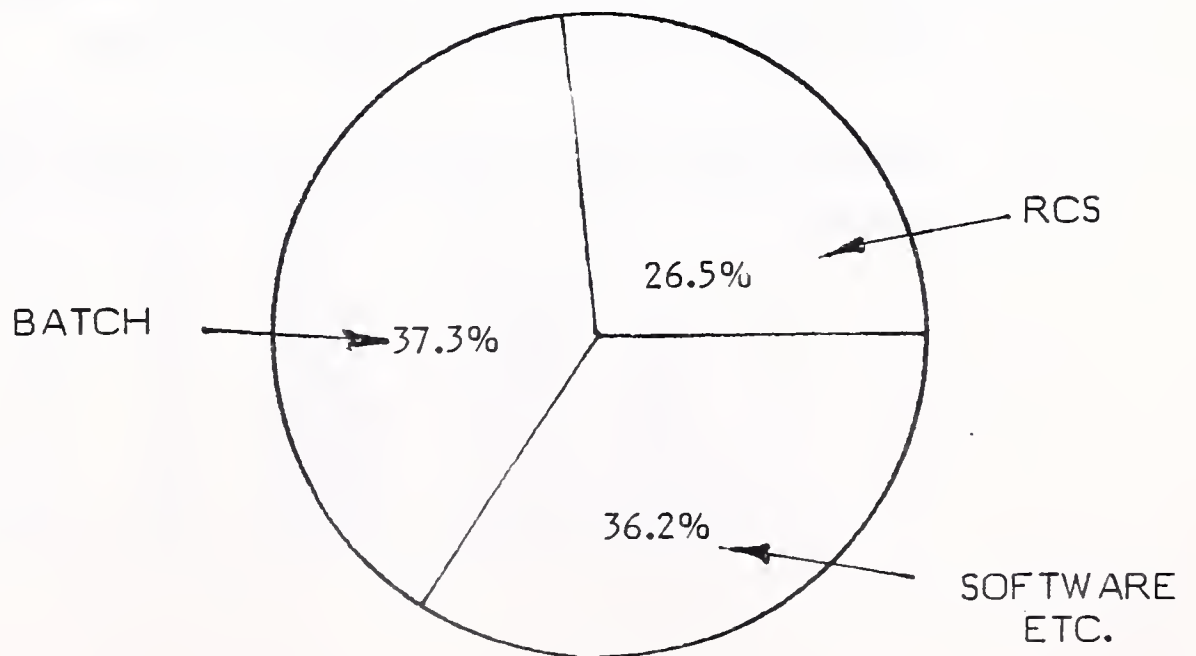
EXHIBIT IV-D.3

THE ITALIAN COMPUTER SERVICES MARKET 1978

ALL VENDORS (\$550M)



THE TOP TEN (\$147 = 27%)



- ADP-Cyphernetics is now one of the main interactive services vendors active in Italy, with offices in Milan and Rome.
- Other interactive vendors include INFONET (owned by GEDA), SIPE OPTIMATION, DATA AUTOMATION, and SICIT. Other remote batch vendors include AUSELDA and ITALSPED in addition to the above.
- Italian banks have a dual role in Italy's services industry: a) they own several large services vendors and, through them control 15% of the available Italian market; b) bank computer centres or consortia (mainly small and medium size banks) provide an important part of the computer services for the banking sector.
- Services companies are mainly (70%) located in the North of Italy, particularly in Lombardy (36%), Piedmont (12%) and Veneto (10%). Only 10% of the services vendor population is in or around Rome.
- Despite repeated difficulties of establishing a viable network of public switched lines, Italy has nevertheless developed an underlying demand for RCS services which is spread among very few vendors. As a result, each vendor sees its market expanding rapidly.
- With the high concentration of business north of the Genoa/Bologna line, serving the larger part of the market is not too costly from any one of a dozen cities. The added attraction of the north is that the congestion of Rome (the administrative and political centre) is avoided.
- Exhibit IV-D.7 gives the five-year forward projections for each services sector.



**DISTRIBUTION OF SAMPLE COMPUTER SERVICES COMPANIES IN  
ITALY BY 1978 TURNOVER AND PRINCIPAL ACTIVITY**

TURNOVER US \$	MAIN CODE				1M - .1M		<0.1M		ALL WITH T/O	SAMPLES as % of EST. TOTAL POPN.
	A	B	C	D	A	B	C	D		
RCS BUREAU	5 1.11	9 2.0%	6 1.33%	- -	20 4.44%	83.33% of 24				
BATCH BUREAU	- -	53 11.78%	257 57.11%	34 7.56%	344 76.44%	68.7%				
SOFTWARE AND PROFESSIONAL SERVICES	2 0.44%	14 3.11%	58 12.89	7 1.56%	81 18.0%	71.1%				
OTHER (EG COM, DATA PREP.)	- -	2 0.44%	3 0.67%	- -	5 1.11%	71.4%				
ALL WITH T/O.	7 1.56%	78 17.33%	324 72.00%	41 9.11%	450 100%	646 69.7%				

EXHIBIT IV-D.5

THE TOP TEN COMPUTING SERVICES VENDORS

IN ITALY 1978

RANK	VENDOR	REVENUE IN MILLIONS OF DOLLARS (\$M)*				ALL SERVICES TOTAL
		BATCH	RCS	SOFTWARE & PROFESSIONAL		
1	DATAMONT	13.0	6.5	6.9	26.4	
2	IBM	4.0	15.2	2.0	21.2	
3	SOCIETA GENERALE	1.9	-	16.0	17.9	
4	DATA MANAGEMENT	6.9	5.7	4.7	17.3	
5	SIPE OPTIMATION	11.8	1.4	3.1	16.3	
6	ITALSIEL	-	-	12.0	12.0	
7=	GE-DA	8.2	2.2	0.5	10.9	
7=	SE-DA	8.8	1.8	0.3	10.9	
9	SYNTAX	0.2	-	7.7	7.9	
10	GEISCO	-	6.1	-	6.1	

SOURCE : CAMP/EUROPE

\* AT 1978 EXCHANGE RATES

TOP SUPPLIER RANKING BY SERVICE TYPE  
ITALY 1978

BATCH SERVICES	REMOTE COMPUTING SERVICES	SOFTWARE & PROFESSIONAL SERVICES
DATAMONT SIPE AUTOMATION SE-DA GE-DA DATA MANAGEMENT CER IBM	IBM DATAMONT GEIS DATA MANAGEMENT CDC GE-DA SE-DA ADP CDS ITALIA SPI	SOCIETA GENERALE ITALSIEL SYNTAX DATAMONT DATA MANAGEMENT SIPE AUTOMATION SPI

SOURCE: CAMP/EUROPE

EXHIBIT IV-D.7

THE ITALIAN COMPUTER SERVICES MARKET  
- FORECASTS BY TYPE OF SERVICE, 1979 - 1983

TYPE OF SERVICE	MARKET FORECASTS IN \$ MILLIONS									
	1977 **	1978 **	GROWTH 77 - 78 (%)	1979 *	1980 *	1981 *	1982 *	1983 *	AAGR (%)	
RCS PROCESSING	46	59	28	77	91	110	134	166	21	
BATCH SERVICES	254	297	17	350	396	444	492	542	12	
SOFTWARE PRODUCTS	35	51	45	61	74	91	114	142	24	
PROFESSIONAL SERVICES	96	143	49	186	227	281	354	443	24	
ALL	431	550	28	674	788	926	1094	1293	18	

\* = CONSTANT 1979 DOLLARS; \*\* = CURRENT EXCHANGE RATES

E. THE NETHERLANDS





#### IV-E. THE NETHERLANDS

- The Dutch computer services market is ranked sixth in size among Western European countries, - behind only the four major industrial countries (France, West Germany, the UK and Italy) and Sweden. It is for its size one of the most sophisticated, - particularly in the matter of systems development. In some application areas, Dutch systems are the most advanced in the world.
- The Dutch market for all computer services was in 1978 at \$319 Million (see Exhibit IV-E.1) approximately 45% of the UK market and 25% of the French market. Due to the open minded and free trading nature of the Dutch business community, it has become well developed by means of strong competition between Dutch national, other European and US vendors; between them they have created a market which is as well, or better, covered than any other comparable European country.
- Besides the strongly competitive element in the services marketplace, other factors contributing to this high state of development are:
  - geographically, the Netherlands is well placed to accept the inflow and outflow of new technologies into and out of the European mainland,
  - historically, the Dutch as a trading nation have an eclectic tradition, - selecting the best components and ideas from all sources and welding them into excellent products and services, to which they put their own name,
  - the presence of a strong financial and banking sector has fostered the services industry and aided investment in it,
  - with some of the largest worldwide corporations (e.g. Shell and Philips) having a home base in Holland, the Dutch as a people are used to being near the top of the league.

THE NETHERLANDS COMPUTER SERVICES MARKET 1978

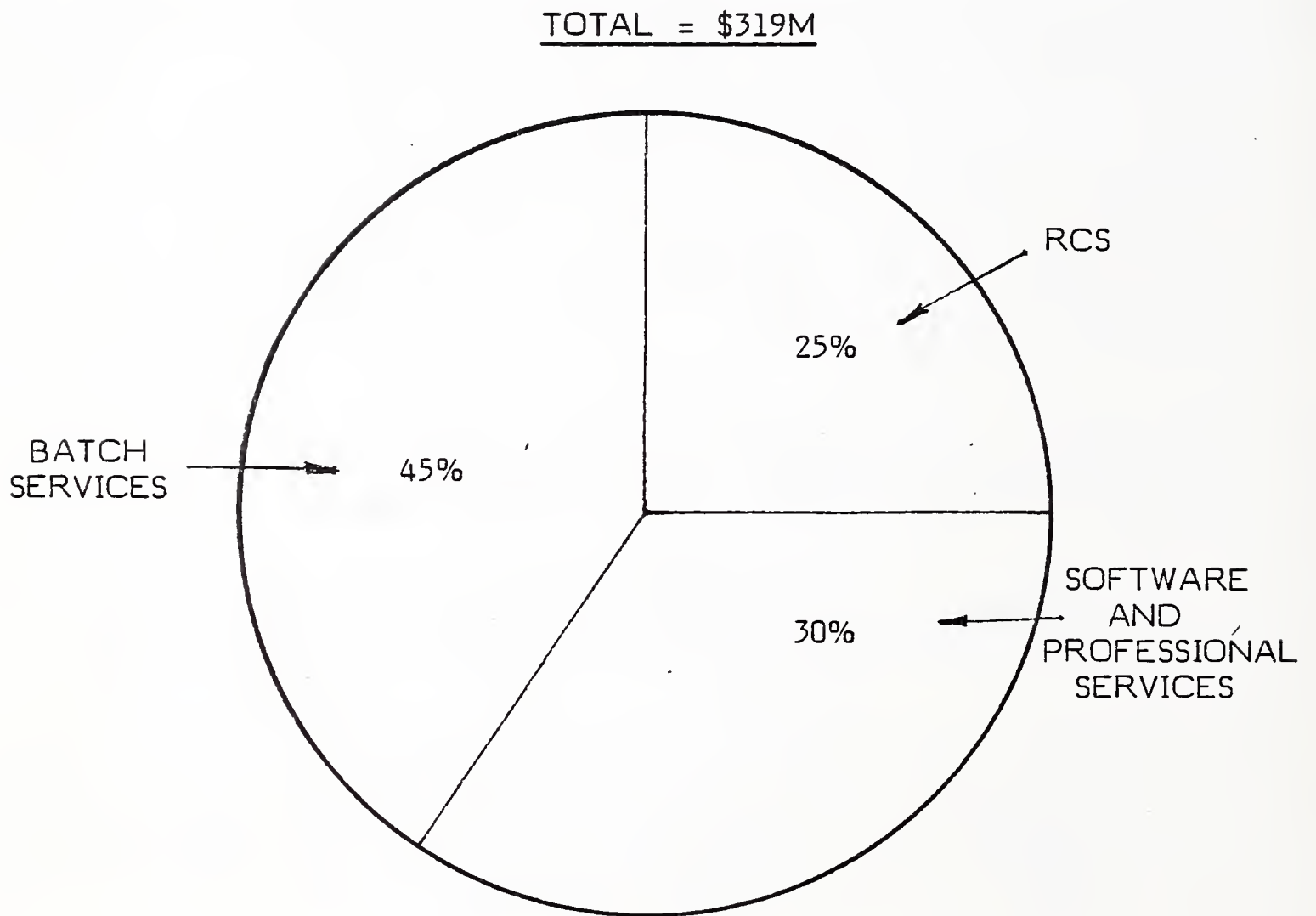


EXHIBIT IV-E.1

- This section of the report describes:
  - the development of the Dutch market in 1978,
  - the structure of the customer base,
  - overall market and sector trends,
  - the structure of the vendor organisations already in the marketplace,
  - the forecasts through to 1983.

## 1. ECONOMIC BACKGROUND

- Until the last year or two the Dutch economy has grown steadily since the 1960s, underpinned by the North Sea natural gas revenues and the boost which they gave to the country's confidence in its future. As well as steady growth, the government was also reporting a controlled inflation rate. Recent analyses of the economy, however, have identified long term structural problems. During the 1970s the manufacturing base has not grown fast enough to provide a platform for the increased social services costs. A deficit has occurred which has been filled by taxing away profitability causing further loss of investment capability.
- These problems are being addressed by the government and plans are being laid down to take the Dutch economy through into the "post-natural gas" period. A first objective is to achieve a balance of payments surplus; (Dutch imports for 1977 and 1978 exceeded exports by 1% and 3% respectively).
- The economy's dependence on foreign trade is very heavy, only a minimum of raw materials being available from within the country. In fact, exports per capita are the second highest in the world, after Belgium's.
- Exhibit IV-E.2 shows an administrative map of the Netherlands and marks the eleven provinces. Its source is INPUT's CAMP/HOLLAND database, which uses geographical areas based on these provinces to classify service companies by district. These areas are described below in relation to the country's industrial areas.

ADMINISTRATIVE MAP OF THE NETHERLANDS



EXHIBIT IV-E.2



BASIC ECONOMIC STATISTICSNETHERLANDS

INDICATOR		YEAR	
		1977	1978
GDP	fl. B	232.1	250.4
	\$B**	94.35	110.31
Population (millions)			
- Total		13.90	14.00
- Total Working		5.39	5.38
Agriculture, etc.		0.34	0.33
Manufacturing		1.75	1.72
Service Industries		3.30	3.34
No. of organisations *		-	169
(thousands)			
No. of establishments *		-	310
(thousands)			

+ At market prices

\*\* At current exchange rates

\* These figures include the numbers engaged in agriculture, forestry and fishing, but exclude businesses run from home premises.

SOURCES: Amro Bank and INPUT estimates

EXHIBIT IV-E.3

- Exhibit IV-E.3 shows some basic economic indicators relating to the country's performance in the immediate past.
- Gross National Product has increased by an average 11.5% per annum since 1965, when taken at market prices. In real terms growth has been lower at 4% over the same period, and at the even slower rate of 3% per annum since 1975.
- The increase in population since 1965 has been at the annual rate of 0.9%, and has again been even slower since 1975 with a rate of 0.7%. At the same time, the two sections of the population aged (a) between 20 and 64, and (b) 65 and over have increased at above average rates of 1.5% and 2.2% per annum for the twelve years from 1965 to 1977. This indicates a marked trend towards fewer people supporting an increasingly aged and leisured community.
- Holland contains 169 thousand enterprises operating from approximately 310 thousand establishments.

## 2. USER CHARACTERISTICS AND REQUIREMENTS

- As is the case with all industrialised nations, the majority of computer users in the Netherlands are in either the manufacturing or the services sector of private industry. However, Holland is advanced in its usage of computers to such an extent that one can find them being applied in the agricultural and fishing industries also, and among small as well as large users.
- Dutch agriculture is one of the most productive in the world. With over 60,000 enterprises operating in the sector, it offers a long-term market for very small business machines, and their associated software, implementation services and maintenance.

DISTRIBUTION OF ENTERPRISES BY SIZE AND INDUSTRYNETHERLANDS

ISIC Code	Industry	Enterprise by Size of Annual Turnover (fl.)			
		<1.0M	1.0 - 100M	>100M	Total
11 - 13	Agriculture/Forestry/ Fishing,	65,000	1,450	50	66,500
21 - 29	Mining/Quarrying	600	300	25	925
31 - 39	Manufacturing	12,500	3,150	260	15,910
41	Electricity/Gas etc.	-	100	20	120
50	Construction	10,000	500	50	10,500
61 - 63	Wholesale/Retail	50,050	3,100	150	53,300
71 - 72	Transport/Comm	11,050	1,245	30	12,325
81	Financial	150	200	40	390
82	Insurance	50	135	25	210
83	Business Services/ Professions	8,000	400	100	8,500
91	Government	-	250	50	300
	TOTAL	157,400	10,830	800	169,030

EXHIBIT IV-E.4

- The Dutch market has absorbed large numbers of mini-computers and small business systems into small and medium-sized companies. The competitiveness of Dutch industry and the productivity of the Dutch worker have both contributed to the willingness of management to invest in in-house small systems. A high degree of expertise in implementation of small business machines and minis has now developed within the Dutch software industry, as a result.

## 2.1 INDUSTRY LOCATION

- The Netherlands has an area of 15,900 square miles, and much of the land is devoted to agriculture in its various branches. About 40% of the country is below sea level and protected by dykes. Land reclamation is still in progress, i.e., the Delta Works in Zeeland and the reclamation of the former Zuider Zee, now known as IJsselmeer.

The population of the Netherlands is fractionally below 14 million, and of those, 50% live in the region known as the 'Randstad' which is broadly the area formed by Amsterdam, Utrecht, Rotterdam and The Hague.

- The sales of all goods by region in 1978 were as follows:

-	Den Haag (The Hague)	30%
-	Amsterdam	30%
-	Rotterdam	25%
-	all other	15%

The investment policy of the Dutch Government is encouraging faster growth in the "other" areas, but the above distribution will not change dramatically in the next five years.



## 2.2 INDUSTRIES AND THEIR USAGE OF EDP

- The leading industries in the Netherlands are:
  - Agriculture/Horticulture
  - Food Products
  - Electrical and Electronic Engineering
  - Chemicals
  - Oil and Gas
  - Shipping and the port of Rotterdam.
  
- In 1978, there were 169,000 organisations of all sizes operating in the Netherlands, excluding home-based businesses. An estimated 310,000 establishments were involved. An analysis of these enterprises by industry and size grading (small, medium, large) by annual turnover is shown at Exhibit IV-E.4.
  
- The industry sectors with the largest number of enterprises (in order of ranking) are:
  - Agriculture/Forestry/Fishing,
  - Wholesale/Retail,
  - Manufacturing,
  - Transport/Communications.
  
- INPUT's "Europe 5000 EDP Usage" survey in 1978 contained data collected in the Netherlands from 163 responses (41%) to a questionnaire mailed to 401 companies on the subject of 1978 usage and future trends.
  
- 67% of the organisations contained in the survey sample (109 out of 163) are users of in-house computers. This is a lower middle level of in-house computer usage of all countries in the surveyed series:



Germany	90%
Belgium/Luxembourg	82%
France	79%
<u>Holland</u>	<u>76%</u>
Sweden/Norway	70%

- Site occupancy by IBM, the dominant in-house equipment supplier is 47% for computers and 20% for terminals. These figures compare with 60% and 35% respectively in IBM's strongest European market, Germany. Honeywell and Burroughs are the next most successful suppliers, their combined site share being half of that achieved by IBM.
- Two thirds of all in-house installations have terminals connected; 27% of all in-house installations have more than 20 terminals connected.
- Nearly two thirds of IBM installations with terminals connected are supplied by IBM; the remainder are supplied (in order of site occupancy) by Datasaab, ITT, Data 100, Memorex and Harris. Honeywell and Burroughs installations exclusively use terminals from the mainframe supplier.
- Nearly half of all computer installations are occupied by mini-computers, often in addition to mainframes. The leading minicomputer suppliers are in order of site occupancy:

Datapoint	56%
IBM	28%
Philips	27%
ICL	20%
H-P	9%
DEC	9%

- Holland is the second highest user of external services overall particularly of Remote Computing Services.

- The frequency of external services usage in the sample at 44% is mid-way between the extremes found in other European countries and similar to the UK and French markets.

Sweden/Norway	72%
Holland	44%
-----	
UK	43%
France	41%
Belgium/Luxembourg	33%
Germany	25%

- Exhibit IV-E.5 gives an analysis of external services usage in the country as measured by that sample.
- In all countries there is a counter-balancing relationship between the frequency of external services usage and in-house installations. In Holland the second highest usage of external services is counter-balanced by the third lowest in-house usage. Sweden/Norway has the highest external services usage (72%) matched with the lowest in-house usage (70%); conversely Germany has the lowest external services usage (25%) matched with the highest in-house usage (90%).
- 20% of the organisations in the sample use both external and in-house services. This is a favourable market factor in that computer users are more likely to look for external and in-house sources of supply. Only in Sweden/Norway is this factor more encouraging where the overlap is 42%; elsewhere this factor is the same (France) or less (at 15% or 16%) in the UK, Germany and Belgium/Luxembourg.
- Some industries, notably Wood and Government, are wholly or nearly wholly dependant on external services for computer usage. Conversely other industries, particularly Paper/Printing/Publishing and Non Metallic Products are more dependant on in-house services.

LARGE ORGANISATIONS' PROCESSING SERVICES USAGE BY INDUSTRY

NETHERLANDS

ISIC	INDUSTRY	RESP %AGE	EXTERNAL SERVICES USAGE - %				IN HOUSE USAGE %
			ALL	B	RB	I	
11 - 13	Agriculture/Fishing	100	50	50	0	50	100
21 - 29	Mining/Quarrying	-	-	-	-	-	-
31	Food/Drink/Tobacco	45	41	22	11	22	93
32	Textiles/Clothing	42	63	63	0	13	75
33	Wood Products	20	100	100	0	0	0
34	Paper/Print/Publ.	32	0	0	0	0	89
35	Chem./Petrol/Coal	30	42	42	8	17	75
36	Non-Metallic Prod.	10	0	0	0	0	100
37	Basic Metal	70	57	14	14	29	71
38 - 39	Fabricated Metal Prod.	37	38	14	14	38	81
41	Electricity/Gas	24	83	50	33	33	67
50	Construction	64	61	33	22	33	39
61 - 63	Wholesale/Retail	45	38	31	0	23	85
71 - 72	Transport/Comm.	40	25	25	0	0	100
81	Financial/Banks	46	50	42	0	17	92
82	Insurance	35	20	20	0	10	100
83	Business Services	70	43	43	14	29	29
91	Government	20	80	40	60	10	40
OVERALL WEIGHTED AVERAGE		40	44	28	10	20	76

EXHIBIT IV-E.5

- The industries with above average usage of both external and internal services are Agriculture/Fishing, and Financial Institutions; these sectors may be approaching saturation point for existing products and services.
- Of the organisations which use external services in Holland, 28% use Batch Services (23% Belgium/Luxembourg and 53% Sweden/Norway), 10% use Remote Batch (3% Belgium/Luxembourg and 23% Sweden/Norway), and 20% use Interactive (14% Belgium/Lux and 33% Sweden/Norway).
- The most frequent users of Remote Batch services are to be found in Utilities, Construction and Government.
- The most frequent users of Interactive services are to be found in Agriculture/Fishing, Fabricated Metal Manufacturing, Utilities and Construction.
- The growth prospects for Batch and Remote Batch Services in the large organisations included in the survey are pessimistic; the future is however optimistic for Interactive Services.

### 2.3 APPLICATION AREAS AND SOURCES - INDUSTRIAL SECTOR

- The most computerised application areas overall regardless of source are:
  1. Bookkeeping/Payroll
  2. Production/Stock Control
  3. Marketing/Sales
  4. Personnel
  5. Financial Analysis/Planning

The pattern will be the same in two years time excepting that Financial Analysis will displace Personnel in fourth position.



- The most frequent use of external services currently occurs in:
  1. Bookkeeping/Payroll
  - 2= Personnel
  - 2= Technical/Scientific
  4. Marketing/Sales

In two years time Bookkeeping/Payroll and Technical/Scientific will still be the most popular followed by Financial Analysis/Planning and Personnel.

- Some significant source changes are anticipated by users over the next two years. The most notable of those is the migration to internal and User Site Hardware Services (USHS) or On-Site Computing, generally at the expense of conventional external services, particularly Batch and Remote Batch.

- The move towards internal services will be most pronounced in:
  1. Financial Analysis/Planning
  2. OR
  3. Technical/Scientific
  4. Numerical Control
  5. CAD

- The move towards User Site Hardware Services will be most pronounced in:
  - 1= Production/Stock Control
  - 1= Bookkeeping/Payroll
  - 3= Marketing/Sales
  - 3= Financial Analysis/Planning
  5. Numerical Control.



	MOST COMPUTERISED APPLICATIONS		BEST GROWTH APPLICATIONS
	OVERALL	EXTERNAL	
Agriculture/Fishing	Tech./Scientific Prod./Stock Control Commerce/Sales	Computer Aided Design Commerce/Sales Personnel	Tech./Scientific Prod./Stock Control Commerce/Sales
Food/Drink/Tobacco	Prod./Stock Control Commerce/Sales	Stat. Analysis	Prod./Stock Control Fin. Plan. & Analysis
Textiles/Clothing	Prod. Stock Control Commerce/Sales Bookkeeping/Payroll	Bookkeeping/Payroll Prod./Stock Control	Prod./Stock Control Commerce/Sales
Wood Products	Stat. Analysis Commerce/Sales Bookkeeping/Payroll	Stat. Analysis Commerce/Sales Bookkeeping/Payroll	Stat. Analysis Commerce/Sales Bookkeeping/Payroll
Paper/printing	Prod./Stock Control Commerce/Sales	-	Prod./Stock Control Commerce Sales
Chem./Petroleum/Coal	Bookkeeping/Payroll Commerce/Sales	Bookkeeping/Payroll	Prod./Stock Control Commerce Sales
Non-Metallic	Commerce/Sales Bookkeeping/Payroll Fin. Plan. & Analysis	-	Commerce/Sales Bookkeeping/Payroll Fin. Plan. & Analysis
Basic Metal	Prod./Stock Control Bookkeeping/Payroll	Bookkeeping/Payroll	Prod./Stock Control
Fabric. Metal	Bookkeeping/Payroll Prod./Stock Control Commerce/Sales	Tech./Scientific Commerce/Sales	Prod./Stock Control Bookkeeping/Payroll

- Overall, the best growth in usage will occur in:
  - 1= Production/Stock Control
  - 1= Financial Analysis/Planning
  2. Marketing/Sales
  3. Bookkeeping/Payroll
  4. Personnel
  5. Statistical Analysis
- The top two growth prospects also have the best potential for distribution on standard products in many European countries since they are largely unaffected by differences in law, taxation and accounting conventions.
- Exhibit IV-E.6 summarises the application preferences in the industrial sector, and gives the present usage and trends in the individual industries.

#### 2.4 APPLICATION AREAS AND SOURCES - FINANCIAL SECTOR

- The most computerised application areas both now and in two years time are:
  1. Bookkeeping
  2. Financial Transactions
  3. Payroll
  4. Financial Consolidation.
- The application areas for which external service vendors are most frequently used are:
  1. Payroll
  2. Financial Analysis/Planning
- Exhibit IV-E.7 summarises the application preferences in the Financial/Commercial sector and gives details of the present usage and trends in the individual industries.

APPLICATION AREAS, USAGE AND TRENDS - FINANCIAL/COMMERCIAL

	MOST COMPUTERISED APPLICATIONS		BEST GROWTH APPLICATIONS
	OVERALL	EXTERNAL	
Electricity/Gas	Tech./Scientific Prod./Stock Control Commerce	Tech./Scientific Prod./Stock Control Commerce	Tech./Scientific Prod./Stock Control
Construction	Bookkeeping/Payroll Prod./Stock Control	Bookkeeping/Payroll Tech./Scientific	Fin. Plan. & Analysis Prod./Stock Control
Wholesale/Retail	Bookkeeping/Payroll Prod./Stock Control	Bookkeeping/Payroll	Stats. Analysis
Transport/Communication	Prod./Stock Control Personnel Bookkeeping/Payroll	Personnel Bookkeeping/Payroll	Commerce/Sales Fin. Plan. & Analysis
Banks	Bookkeeping Fin. Transactions	Payroll Fin. Plan. & Analysis	Fin. Transactions
Insurance	Bookkeeping Fin. Transactions	Payroll Fin. Plan. & Analysis	Fin. Transactions
Business Services	Payroll Bookkeeping	Payroll Consultancy	Bookkeeping
Government	Bookkeeping/Payroll Fin. Plan. & Analysis	Personnel	

EXHIBIT IV-E.7



### 3. MARKET DEVELOPMENT 1978

- The total Computer Services market for the Netherlands in 1978 amounted to \$319M at 1978 dollar exchange rates.
- During the year the market continued to grow, showing an overall growth over 1977 revenues of 38%. This very healthy looking figure should be regarded in the light of current European inflation rates and the recent steady fall in the international value of the dollar.
- The annual growth rate of 38% is accounted for by:
  - 8½% - average fall in the dollar,
  - 4½% - average domestic price rises for equivalent products,
  - 22 % - true growth in terms of new business or additional business from existing accounts.
- Exhibit IV-E.8 shows the growth between 1977 and 1978 in terms of the different types of services sold.

#### 3.1 PROCESSING SERVICES

- Work completed in Batch mode, defined to include off-line Data Preparation and Encoding, remained as the single largest revenue earning service at 45% of the total.
- Off-line Data Preparation undertaken by specialist non-processing bureaux typically accounts for 6-7% of the market, or between 14% and 16% of the Batch Services sector.

THE NETHERLANDS COMPUTER SERVICES MARKET SIZES,  
1977 AND 1978

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TYPE OF SERVICE	1977		1978		AVERAGE ANNUAL GROWTH RATE %
	\$M *	%	\$M *	%	
RCS PROCESSING	53	23	80	25	51
BATCH SERVICES	111	48	142	45	30
SOFTWARE PRODUCTS	10	4	17	5	70
PROFESSIONAL SERVICES	58	25	80	25	40
TOTAL	232	100	319	100	38

SOURCE: CAMP/EUROPE AND INPUT ESTIMATES  
\* AT CURRENT EXCHANGE RATES

EXHIBIT IV-E.8



- Work completed in RCS (Remote Computing Services) mode, including Interactive and Remote Batch, tied for second place at 25%.
- Batch Services grew at a below market average rate, while RCS grew likewise at an above average rate. This relative decline of Batch is expected to continue and the rate of decrease is gentle enough to fit in with industry forecasts of a prolonged period of falling market share, rather than a sudden demise.
- The growth of RCS in Holland was 51%.
- User Site Hardware Services are not included in the service type breakdown used in this section, because the volume of business done under this heading is still negligible in European markets.

### 3.2 SOFTWARE PRODUCTS

- In European markets as a whole the revenues earned by the separate sale or licence of software products are small - of the order of 5%. Where income is earned, it is usually from one of:
  - system software products, (operating systems or language compilers),
  - utility programs and routines, including DBMS.
- The growth of software product sales is strong in Holland at 70% between 1977 and 1978. Such a high growth rate is not expected to continue at this level, but because of its relative lack of development the sector will lead the growth rate chart for the next few years.

### 3.3 PROFESSIONAL SERVICES

- This category is defined to include:
  - Consultancy, training and education,
  - Tailored systems and programming,
  - Contract programming,
  - Turnkey systems.
  
- At \$80 million in 1978, this sector represents 25% of the overall Netherlands market. Like RCS and Software Products, it has a growing market; and this growth similarly is had at the expense of the Batch Services sector.
  
- Growth in absolute terms between 1977 and 1978 was up from \$58 million, a 40% increase. Professional Services are expected to continue at this level of growth; any decrease in tailored systems market share being taken up by increases in:
  - consultancy, education and turnkey systems.
  
- The Netherlands is starting to exhibit certain aspects of an established market:
  - large national vendor companies with substantial backing from local sources of finance,
  - deliberate acquisition strategies being adopted by both national and multi-national vendors,
  - acceptance of minicomputer-based solutions.
  
- Large users in Holland are extensive purchasers of external vendor services; there is a steady move of their systems from Batch to RCS.

EXTERNAL PROCESSING SERVICES GROWTH BY COMPANY SIZE: OVERALL MARKET

THE NETHERLANDS

SIZE	BATCH	REM. BATCH	INTERACTIVE	ON SITE
Large	-13%	-1%	-16%	+31%
Medium *	0%	+8%	+15%	N/A
Small *	+10%	+2%	+5%	N/A
OVERALL	+14%	+10%	+25%	N/A

Notes: \* These figures are INPUT estimates, cross-checked against market trends derived from the CAMP/HOLLAND database.

EXHIBIT IV-E.9

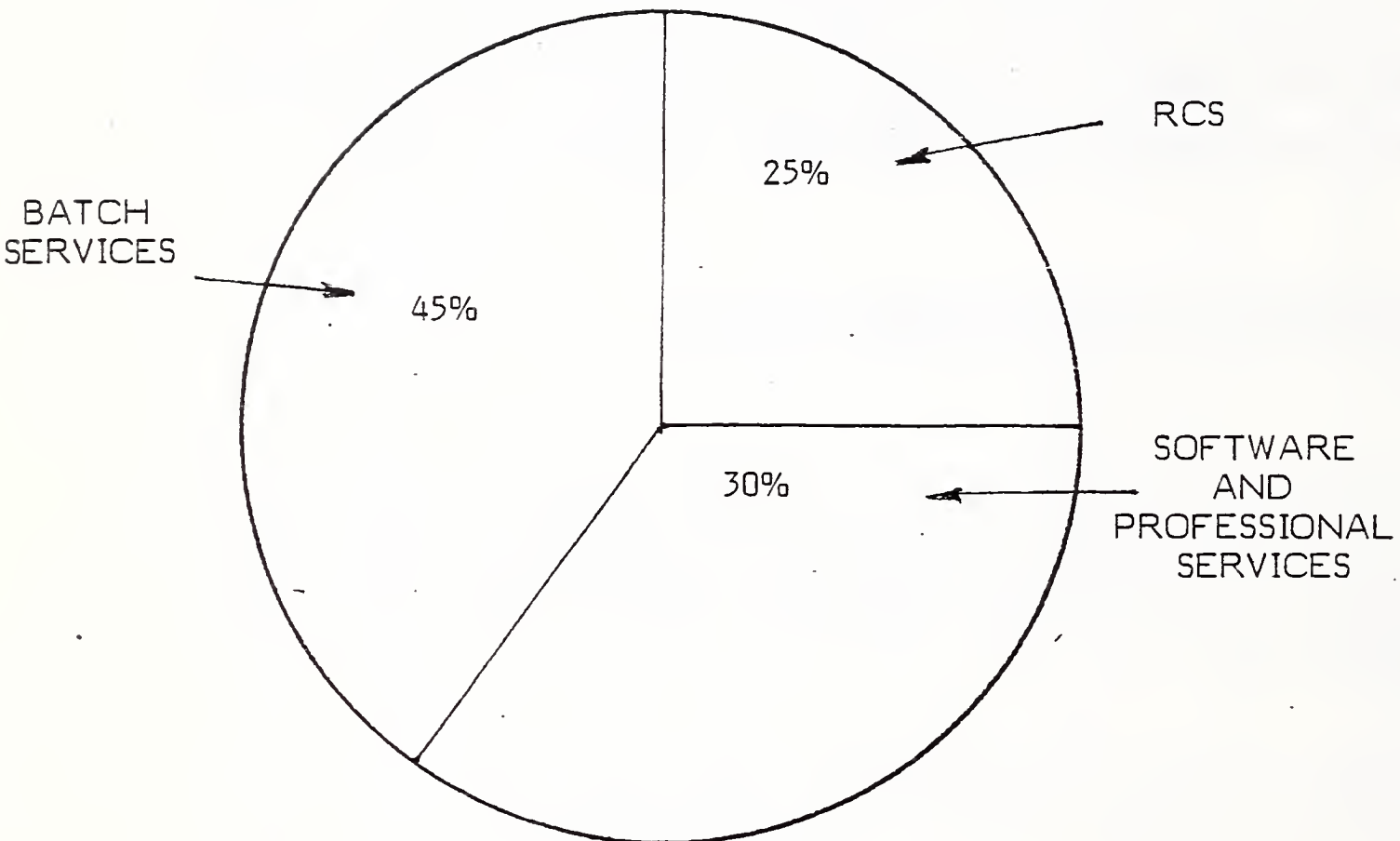
- Medium and small users in Holland are equally a target for:
  - on-line transaction processing systems supplied by an RCS vendor,
  - minicomputer-based in-house solutions provided by a systems house or software vendor.
- Both approaches have been observed in action during 1978 and 1979. The mini-computer solution is the one more often selected. This has produced a thriving market for systems and software houses, and some strong companies have developed. Dutch expertise in software is second in Europe only to that of the UK, and in some specialist areas e.g. publishing, is its equal or superior.

#### 4. COMPETITION AND VENDOR MARKET SHARES

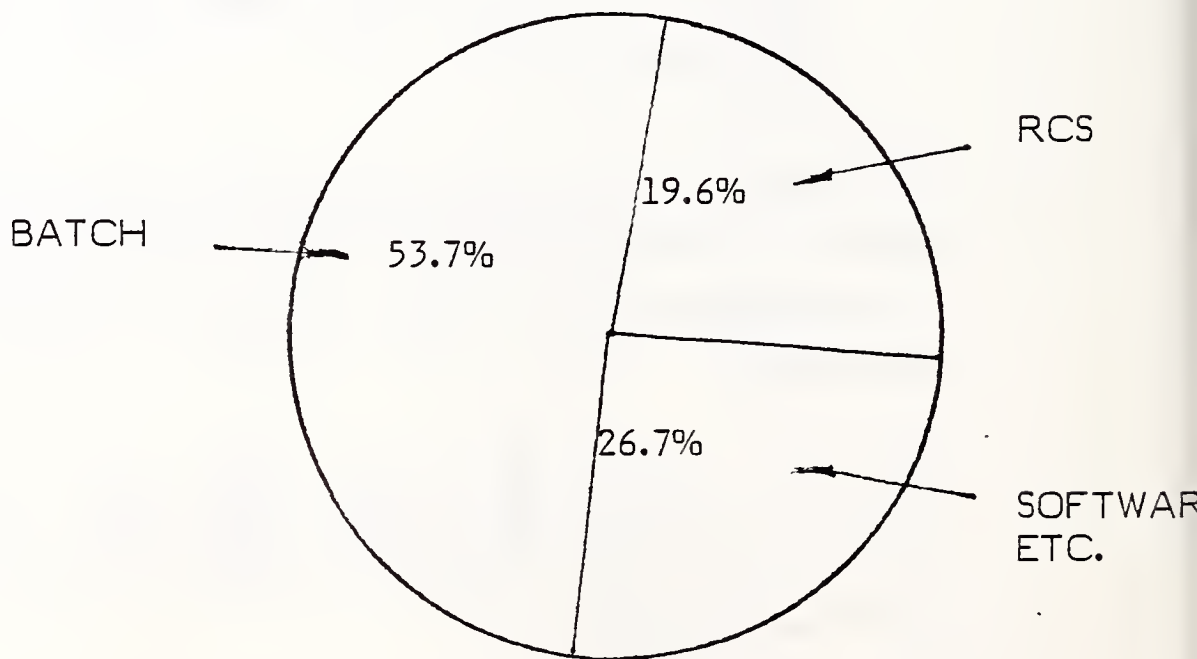
- Exhibit IV-E.10 gives a breakdown of the Dutch Computer Services Market between Batch, RCS and Software/Professional Services; and compares it with the equivalent break-down of the revenues of the Top Ten companies operating in the Netherlands.
- Batch Services tended to dominate the market share in both the cases illustrated. This is due to:
  - the strength of the large and medium-sized indigenous service bureaux and the time they have had to establish traditional batch-style commercial applications.
- The second largest sector in both cases is the Software/Professional Services; growth in this area is expected to be particularly good because of the interest in minicomputer-based Turnkey Systems as supplied by the Dutch software companies.
- Per head of population, the Dutch market is very prolific of computing services companies - 257 for a population of just on 14 million, or one for every 54,400 persons.

THE DUTCH COMPUTER SERVICES MARKET 1978

ALL VENDORS



THE TOP TEN





**DISTRIBUTION OF SAMPLE COMPUTER SERVICES COMPANIES IN THE  
NETHERLANDS BY 1978 TURNOVER AND PRINCIPAL ACTIVITY**

TURNOVER US \$	MAIN ACTIVITY	CODE	>10M		10M - 1M		1M - .1M		<0.1M		ALL WITH T/O	SAMPLES as % of TOTAL POP. N.	
			A	B	C	D							
	RCS BUREAU		7	8.2%	8	9.4%	1	1.2%	-	-	16	18.8%	73% of 22
	BATCH BUREAU		1	1.2	17	20.0	16	18.8	-	-	34	40.0	48% 71
	SOFTWARE AND PROFESSIONAL SERVICES		3	3.5	16	18.8	12	14.1	1	1.2	32	37.6	28% 114
	OTHER (EG COM, DATA PREP.)		-	-	1	1.2	2	2.4	-	-	3	3.5	6% 50
	ALL WITH T/O.		11	12.9	42	49.4	31	36.5	1	1.2	85	100	33% 257

EXHIBIT IV-E.11

- An indicator of the value of the services market in Holland is the vendor revenue per head of population, which comes out at \$22.8 for 1978. This figure is higher than that for any of the major European countries' markets, except France.
- Since costs and selling prices in Europe vary, the figures quoted need strictly to be compared on some indexed basis. Nevertheless, we can say that the Dutch market is as active as other European markets, taking approximately 6% of the total revenues in Western Europe.
- Of the 257 vendor companies, the systems and software houses and consultancies form 44% with 114 enterprises against 143 organisations whose main activity is a processing service of some kind, whether batch, RCS or data prep.
- An analysis of the vendor population derived from INPUT's CAMP/EUROPE database is shown in Exhibit IV-E.11. This table gives the distribution of vendor companies by size groups and principal activity. Four size groups are used:
  - Group Code A had annual turnovers (1978) greater than \$10M,
  - Group Code B had annual turnovers between \$10M and \$1M.
  - Group Code C had annual turnovers between \$1M and \$0.1M,
  - Group Code D had annual turnovers less than \$0.1M.

The total vendor population in the database exceeds the number with a stated or estimated turnover. Eighty-five companies could be attributed an annual turnover, and this was 33.1% of the total population.

- Exhibit IV-E.12 shows the revenue breakdown of the Top Ten vendors by the three major categories of service type. The table is now headed by Central Beheer a large national insurance group. In 1978 due to the acquisition by Central Beheer's CEA of the previously independent CSR, the group's turnover exceeded that of CVI. Third place was held by ARSYCOM the largest software house in the field, turning over considerable revenue in turnkey systems.

THE TOP TEN COMPUTING SERVICES VENDORS

- THE NETHERLANDS 1978

SOURCE: CAMP/EUROPE

RANK	VENDOR	REVENUE IN MILLIONS OF DUTCH GUILDERS (fl. M)			
		BATCH	RCS	SOFTWARE & PROFESSIONAL	ALL SERVICES TOTAL
1	CENTRAL BEHEER CEA (AND CSR)	38.0	4.0	5.0	47.0
2	CVI	34.0	6.8	4.6	45.4
3	ARSYCOM	8.0	3.0	19.0	30.0
4=	CCN	12.5	7.4	5.1	25.0
4=	RAET	13.8	4.8	6.4	25.0
6	CMG	3.8	1.1	18.4	23.3
7	SAMSOM	10.9	1.1	10.9	22.9
8	ARC	19.8	1.1	1.1	22.0
9=	ACD	10.0	6.2	5.4	21.6
9=	IBM	1.6	20.0	-	21.6

EXHIBIT IV-E.12

- Exhibit IV-E.13 gives the ranking of major suppliers in each of the three main service categories - Batch, RCS and Software/Professional Services.
- The Top Ten companies accounted for \$125 Million or just over 39% of the total market for 1978.

#### 4.1 REMOTE COMPUTING SERVICES

- Most of the international RCS companies are present. There are some notable exceptions however: CSS International (NCSS), and Rapidata. (See Exhibit IV-E.14).
- Others who are present, but with small interactive revenues are: Infotech, Logisterion, Computer Centrum Groningen, Datastream, I.P. Sharp, Atkins On-Line, CSC.
- Nine companies share 61% of the Dutch RCS market, as shown in Exhibit IV-E.14. The same group absorbed 42% of the remote batch market and 86% of the interactive market.
- IBM has a small share of the Remote Batch market (12%), closely followed by CDC, CCN (Computer Centrum Netherlands), ACD (Alpha Computer Diensten) and RAET. However, IBM is easily the largest RCS supplier in the Netherlands due to its combined strength in Interactive and Remote Batch services.
- GEIS is, as usual, the leading supplier of interactive services but with a higher market share than usual (33%). The nearest competitors are IBM with 26% and ADP/Cyphernetics with 14%.



TOP SUPPLIER RANKING BY SERVICE TYPE  
- THE NETHERLANDS 1978

BATCH SERVICES	REMOTE COMPUTING SERVICES	SOFTWARE & PROFESSIONAL SERVICES
CENTRAL BEHEER CEA (AND CSR)  CVI ARC ADP-BENELUX RAET CCN SAMSOM ACD HOLLAND DATA SMRA VELDEN	IBM GEIS CDC CCN CVI ACD ADP-NIS RAET COMSHARE DATA PROCESS UCC	ARSYCOM VOLMAC CMG FDO LOGICA SAMSOM NOVA PANDATA INFONET RAET ACD CCN CVI ARC

SOURCE: CAMP/EUROPE

EXHIBIT IV-E.13



## 5. MARKET TRENDS

- BATCH SERVICES - In a recent INPUT user survey, the voting was 12 to 7 for decline of the batch sector. There were 20 votes in favour of stability and this is the most likely trend in the middle expenditure categories where the growth and decline votes balanced. In percentage terms the overall demand forecast by large users is - 16.8%; this does not take account of present non-users of computing who may use Batch Services for the first time in the future. Overall, a 14% annual growth rate is expected, mostly with small organisations.
- REMOTE BATCH SERVICES - The overall trend is similar to, but less severe than, Batch Services. Both the voting and the quantified percentage estimates indicate a decline of - 0.7%. Modest growth however can still be expected from the big expenditure users (over 200K Guilders); otherwise the trend is towards slight decline by existing users in large organisations. Overall the annual growth rate is estimated to be 10%.
- INTERACTIVE SERVICES - Overall the trend is towards good growth (25%), particularly from the big expenditure users. The growth curve starts with positive values at an expenditure level of 50K Guilders and the growth rates increase markedly towards the over 200K Guilders expenditure category.
- USER SITE HARDWARE SERVICES, or On-Site Computing, is expected to grow at 31% per annum. This is probably representative of the overall market since users in all sizes of organisation will find a valid reason for this form of distributed processing. Only in Norway is there a higher forecast growth rate (39%). However growth in DISTRIBUTED (in-house) processing is at the lowest level. It appears from the corresponding figures for all countries in the survey that the trend is either more strongly disposed towards the external or the in-house approach:

RCS MARKET SHARES OF MAIN DUTCH FIRMS

COMPANY	SHARE OF RCS MARKET (%)	
	INTERACTIVE	REMOTE BATCH
IBM	20.0	9.1
GEIS	25.2	+
CDC	6.0	6.7
CCN	0.1	6.4
CVI	0.1	5.5
ACD	2.8	4.4
ADP	10.8	+
RAET	+	4.4
ARC	+	2.0

\* INPUT ESTIMATE

+ SMALL VALUE

EXHIBIT IV-E.14

	COMBINATION (External)	DISTRIBUTED (In House)
Norway	39	32
Holland	31	23
Sweden	23	30
France	18	51
Germany	10	22

### 5.1 GROWTH OPPORTUNITIES - USER PERCEIVED

- Distributed in-house processing is estimated by users to experience an annual growth rate of 23%.
- Holland is one of only two European countries (the other is Norway) in which higher growth is anticipated by users for User Site Hardware Services than for in-house DDP.
- The best prospects for growth in the Dutch market for a bureau services company are Interactive and On-Site services. In terms of application areas this growth is most likely to be realised in:
  1. Production/Stock Control
  2. Financial Analysis/Planning
  3. Accounting/Payroll
  4. Statistical Analysis.

The first two are subject to less variation to meet the needs of different European countries and thus represent the best investment potential for a multi-national vendor.

- The industries which are likely to provide the best growth for the top two application areas are as follows:

Production/Stock Control

Financial Analysis/Planning

Food/Drink

Construction

Textiles/Clothing

Food/Drink

Paper/Printing

Transport/Communication

Chemicals/Petroleum

Basic Metal

Fabric. Metal Manufacturing

- The table in Exhibit IV-E.9 shows the growth of processing services by size of company and mode of delivery.

6. MARKET FORECASTS BY SERVICES CATEGORY

- Exhibit IV-E.15 shows the forecasted market values by major type of service for the period 1979 to 1983. These are expressed in terms of 1979 constant dollars. Therefore no estimates have been implied of:
  - fluctuations in the guilder-dollar exchange rate,
  - effects of inflation.
- Software Products have the highest growth rate at 28%,
- Professional Services and RCS both have good growth potential at 21% and 20% respectively.
- Batch Services will in the short term continue with good growth of approximately 18% for two years, but this rate will decline towards the end of the forecast period to 4%, indicating a difficulty in the finding of new batch business at this juncture.
- The overall market growth of 19% per annum means the continuation of a range of opportunities for both processing and software services vendors.



THE NETHERLANDS COMPUTER SERVICES MARKET  
 - FORECASTS BY TYPE OF SERVICE, 1979 - 1983

TYPE OF SERVICE	MARKET FORECASTS IN \$ MILLIONS									
	1977 **	1978 **	GROWTH 77 - 78 (%)	1979 *	1980 *	1981 *	1982 *	1983 *	AAGR (%)	
RCS PROCESSING	53	80	51	108	129	154	185	221	20	
BATCH SERVICES	111	142	30	192	228	270	320	332	15	
SOFTWARE PRODUCTS	10	17	70	26	34	44	55	71	28	
PROFESSIONAL SERVICES	58	80	40	116	142	173	211	253	21	
ALL	232	319	38	442	533	641	771	877	19	

\* = CONSTANT 1979 DOLLARS; \*\* = CURRENT EXCHANGE RATES



F. BELGIUM/LUXEMBOURG



F. BELGIUM/LUXEMBOURG



#### IV-F. BELGIUM/LUXEMBOURG

- Belgium presents overall a smaller market than Holland, and one which is less well developed. The smaller size of the market at \$201M (see Exhibit IV-F.1) can be mainly accounted for by the smaller population. Belgium has a population just under 10 million, while Holland's has now risen to over 14 million.
- Luxembourg at 3% of the combined total (\$6M in \$207M) does not have a significant impact on the market as a whole. The country, being linked in a monetary union with Belgium, tends to react in a similar way to that country; and for many planning purposes is best regarded as another "province" of the Belgian market.
- The Belgian and Luxembourg large organisations are unique in Europe for their extreme tendency to contain the maximum proportion of their activities in-house, this is reflected in their low usage of external services; only 33% of all large organisations use external services - other countries (except Germany) are above 40% and some are considerably higher (e.g. Norway 75%).
- The fact that the Belgian market is less developed than the Dutch results from:
  - the large number of small enterprises in Belgium,
  - the absence of any Belgian multi-national companies of the stature of Royal Dutch Shell, Unilever, or Philips.

The first factor has led to a slower transition from manual methods to traditional batch processing; the second factor has meant that Belgian organisations are not automatically in the forefront of computing technology and applications.



BELGIUM/LUXEMBOURG COMPUTER SERVICES MARKET 1978

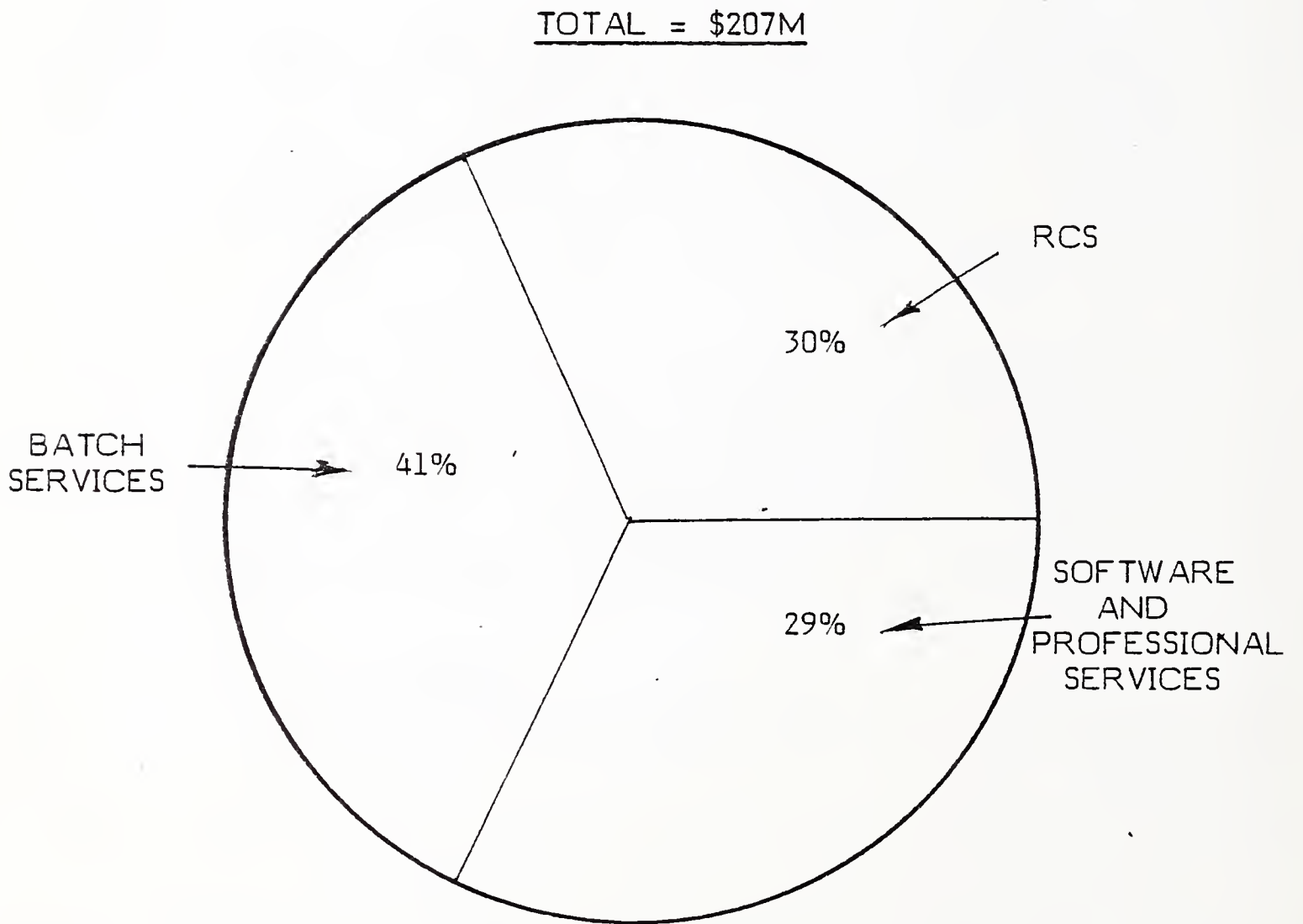


EXHIBIT IV-F.1

- The Belgian market, on the other hand, being relatively speaking less developed is now beginning to present a range of opportunities for computer services, and these opportunities stem from the specially Belgian characteristics of this country's business environment:
  - the number of small organisations,
  - the compact size of the country,
  - the presence of the European headquarters of many foreign multinationals.
  
- This section of the report describes:
  - the development of the market in 1978,
  - the appearance of a number of market opportunities, in 1979,
  - the structure of the customer and supplier organisations already in this market-place.

## 1. ECONOMIC BACKGROUND

- Located as it is at the cross-roads of Western Europe's main lines of communication, close to the Rhine-Meuse-Scheldt delta, Belgium owes its status as an important industrial position to:
  - its favourable geographical position,
  - coal and iron deposits,
  - skilled manpower.
  
- Belgium has since 1921 been in an economic union with Luxembourg - the Belgo-Luxembourg Economic Union (B.L.E.U.). Since the B.L.E.U. accounts for between 3% and 4% of world trade, Belgium, as a trading nation, is very heavily dependent on the state of the world economy. The oil crisis of 1974, therefore disturbed the internal economy of the country and initiated a period of unemployment, inflation and slow growth in real terms.

- Some 40% of Belgian exports are to West Germany; the slow growth policy exercised in recent years by that country's government has caused a correspondingly slow recovery in the Belgian economy. This has been a period when:
  - Belgian government and trade sponsoring bodies have been seeking new markets particularly in the developing countries,
  - the private sector has had the opportunity to reexamine and overhaul business systems and methods.
- Exhibit IV-F.2 gives an administrative map of Belgium, showing provincial boundaries and large urban areas. The source of the map is CAMP/Belgium/-Luxembourg. For the purposes of the CAMP programme, both countries have been grouped together and divided into eleven regions.
- Exhibits IV-F.3 and IV-F.4 shows certain basic economic indicators relating to the performance of the Belgian and Luxembourg economies over the last ten years.
- The Belgian Gross National Product (GNP) has increased by an average 13% per annum in actual terms. In real terms growth has been minimal (between 1% and 3%).
- Belgian population increase has been at an annual average rate of around 0.4%. However, the working population has increased at the rate of 0.8% per annum, indicating in a time of increased unemployment and with an ageing population that the stagnant economy has given impetus to an increase in the number of bread-winners per family unit.
- The standard of living and its cost are both high in Luxembourg. The per capita GDP is slightly higher than that of Belgium, - 280,000 Francs per head as against 265,000 in Belgium.

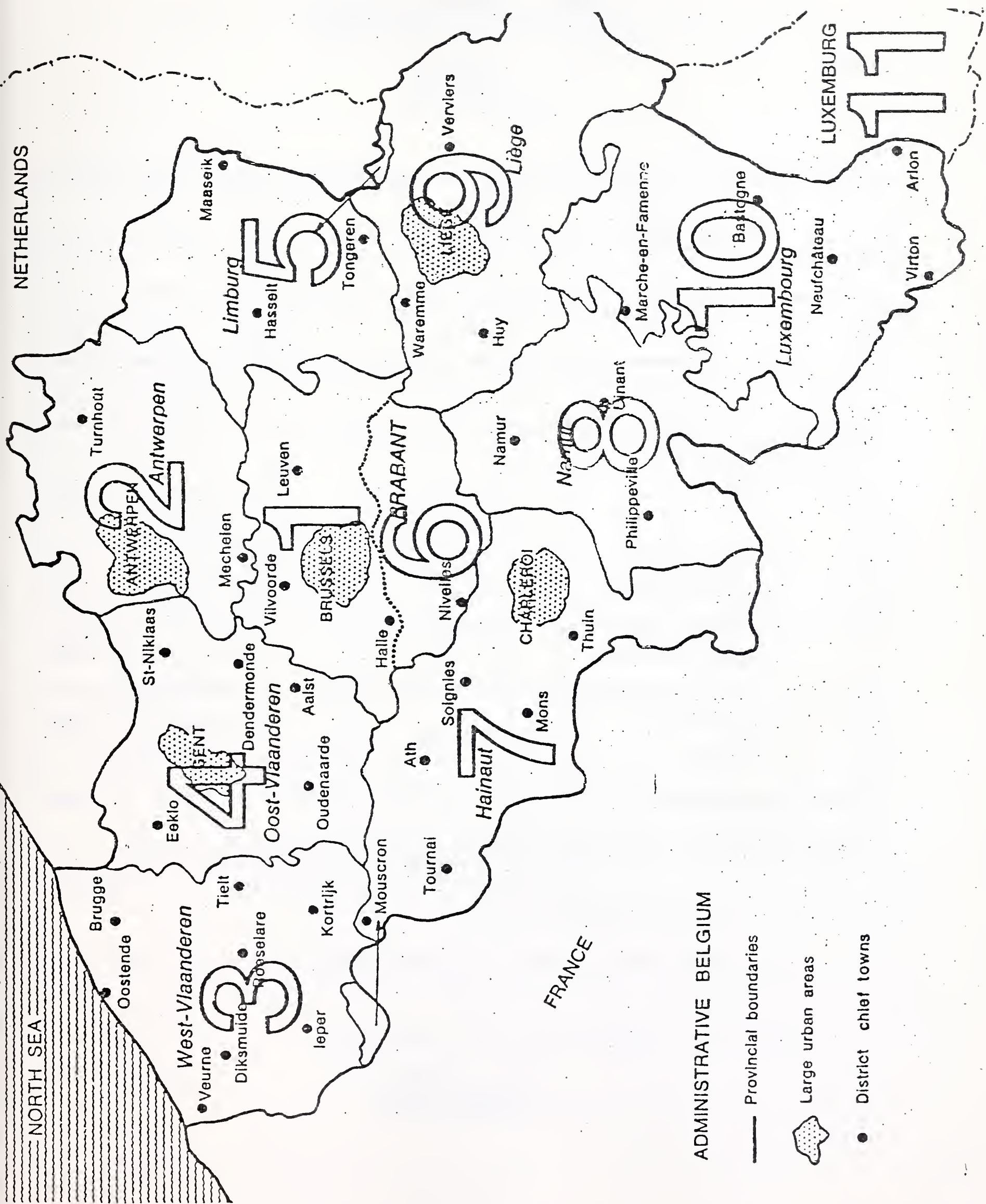


EXHIBIT IV-F.2



BASIC ECONOMIC STATISTICSBELGIUM

INDICATOR		YEAR		
		1970	1974	1978
GDP	BFB	1,132	1,866	2,564
	\$B**	29.75	49.0	78.40
Population (millions)				
	- Total	9.65	9.79	9.95
	- Total Working	3.83	3.99	4.08
	Agriculture, etc.	0.17	0.14	0.12
	Manufacturing	1.58	1.57	1.53
	Service Industries	2.07	2.28	2.43
No. of organisations *		-	-	148
(thousands)				
No. of establishments *		-	-	290
(thousands)				

\*\* At current exchange rates.

\* These figures include the numbers engaged in agriculture, forestry and fishing.

SOURCES: Belgian N.I.S. and INPUT estimates

EXHIBIT IV-F.3



BASIC ECONOMIC STATISTICSLUXEMBOURG

INDICATOR	YEAR		
	1970	1974	1978
GDP FB	53	94	98
Population (millions)			
- Total	0.34	0.35	0.36
- Total Working	0.14	0.15	0.15
Agriculture, etc.	0.01	0.01	0.01
Manufacturing	0.06	0.07	0.07
Service Industries	0.06	0.07	0.07
No. of organisations * (thousands)	-	-	5
No. of establishments * (thousands)	-	-	11

\* These figures include the numbers engaged in agriculture, forestry and fishing.

SOURCES: Luxembourg M.E.N. and INPUT estimates.

EXHIBIT IV-F.4

## 2. USER CHARACTERISTICS AND REQUIREMENTS

- Belgium's agricultural workers form 3.0% of the working population, compared with 6.5% for West Germany, 9.9% for France and 2.7% for the U.K. The agricultural sector is responsible for meeting approximately 80% of the nation's food requirements, by intensive farming methods. The average farm is between 2½ and 50 acres. The sector is responsible for approximately 3% of GNP.
- The vast majority of computer users are in the manufacturing and services sectors where are found most of the largest enterprises.

### 2.1 INDUSTRIAL ORGANISATIONS IN BELGIUM

- Leading industries in Belgium are:
  - Steel,
  - Non-ferrous metals,
  - Mechanical Engineering,
  - Chemicals,
  - Textiles,
  - Glass,
  - Leather goods and footwear,
  - Diamond industry,
  - the port of Antwerp.
- From the point of view of exporting the most important are:
  - Mechanical Engineering,
  - Chemicals,
  - Non-ferrous metals,
  - Steel.

DISTRIBUTION OF ENTERPRISES BY SIZE AND INDUSTRYBELGIUM

ISIC Code	INDUSTRY	Enterprise by Size of Annual Turnover (BF)			
		Small < 20M	Medium 20M to 2B	Large > 2B	Total
11-13	Agriculture/Forestry/Fishing	63,388	1,330	28	64,746
21-29	Mining/Quarrying	407	292	20	719
31	Food/Drink/Tobacco	2,350	125	14	2,489
32	Textiles/Clothing	1,373	180	8	1,561
33	Wood Products	400	32	5	437
34	Paper/Print/Publ.	465	200	5	670
35	Chem./Petroleum	112	273	40	425
36	Non-Metallic Prod.	3,307	170	17	3,494
37	Basic Metal	53	135	25	213
38-39	Fabricated Metal Prod.	3,037	250	71	3,358
41	Electricity/Gas	-	50	11	61
50	Construction	7,606	352	56	8,014
61-63	Wholesale/Retail	42,255	2,260	170	44,685
71-72	Transport/Comm.	9,508	955	55	10,518
81	Financial	-	150	33	183
82	Insurance	264	50	28	342
83	Business Services and Professions	5,810	226	24	6,060
91	Government	-	132	23	155
TOTAL		140,335	7,162	633	148,130

SOURCE: INPUT Estimates.

EXHIBIT IV-F.5

- In 1978, there were approximately 148,000 organisations of all sizes in Belgium. These enterprises operated from 290,000 establishments. A breakdown by industry and size grading (small, medium, large) is shown at Exhibit IV-F.5.
  
- The two industry sectors providing the largest number of organisations are:
  - Agriculture/Forestry/Fishing,
  - Wholesale and Retail Distribution.

The latter industry offers potential for concentration into larger units.

- In INPUT's 1978 survey of the computer usage of the top 5000 companies in Western Europe, a sample of these companies was from Belgium and Luxembourg. Five hundred and twenty-three (523) were contacted and 345 (66% of the sample) responded by telephone or post to a questionnaire on present and future trends in their EDP usage and buying patterns.
  
- Exhibit IV-F.6 indicated the usage of external vendors' processing services in the sample.
  
- All large organisations are computer users (in-house, external or both) and there are significant indications of a broad move in the direction of increasing user independence. After two decades of centralisation of in-house computing the market will experience an evolution towards decentralisation, not a revolution.
  
- Decentralisation of computing and increased user independence will be expressed in either of two ways:
  1. Distributed data processing (DDP) which is an in-house approach to the re-organisation of computing around the user,

LARGE ORGANISATIONS' PROCESSING SERVICES USAGE BY INDUSTRY

BELGIUM/LUXEMBOURG

ISIC	INDUSTRY	RESP %AGE	EXTERNAL SERVICES USAGE %				IN HOUSE USAGE %
			ALL	B	RB	I	
11-13	Agriculture/Fishing	-	-	-	-	-	-
21-29	Mining/Quarrying	-	-	-	-	-	-
31	Food/Drink/Tobacco	83	20	17	3	10	93
32	Textiles/Clothing	75	33	22	0	11	89
33	Wood Products	100	50	0	0	50	100
34	Paper/Print/Publ.	88	50	50	7	14	86
35	Chem./Petrol/Coal	67	54	30	7	31	85
36	Non-Metallic Prod.	53	50	25	0	25	75
37	Basic Metal	70	25	19	6	6	81
38-39	Fabricated Metal Prod.	68	38	31	3	8	66
41	Electricity/Gas	100	50	50	0	25	50
50	Construction	61	18	12	0	6	94
61-63	Wholesale/Retail	43	32	29	0	6	87
71-72	Transport/Comm.	80	0	0	0	0	25
81	Financial (Belgium)	64	19	8	2	13	92
81	Financial (Lux)	86	16	0	0	16	89
82	Insurance	63	30	30	0	10	100
83	Business Services	75	50	50	0	0	50
91	Government	-	-	-	-	-	-
OVERALL WEIGHTED AVERAGE		66	33	23	3	14	82

EXHIBIT IV-F.6



2. User Site Hardware Services (USHS), sometimes called On-Site Computing, which provides the same facility for the user as provided by DDP but with an external source of mainframe and telecommunications support.

- The natural tendency in this market in adopting de-centralisation is to go for the in-house (distributed system) approach. This is not thought an easy option however because 70% of in-house installations are small (up to 10M BF annual expenditure) and only one third have significant experience (i.e. more than 5 terminals) of telecommunications.
- The opportunity which exists for external services vendors is to offer an acceptable and alternative form of de-centralisation. To be acceptable in this market such a service must have all the important user attractions of an in-house system plus some in addition. The customers for such services will increasingly be the user departments whose loyalty to the in-house computer department may well be disturbed.

## 2.2 LUXEMBOURG USERS

- The main manufacturing industries in Luxembourg are:
  - Steel,
  - Chemical Products,
  - Agriculture etc.,
  - Building.
- Besides these, in the services sector, there is a healthy segment in Banking and Insurance.

- The main computer users are:
  - in manufacturing
    - steel mills
    - chemical firms,
  - in services
    - banking and financial institutions.
- Luxembourg's development in application terms takes on a standard profile for Western Europe, with no particular highlights in any one area.

### 3. MARKET DEVELOPMENT 1978

- The total Computer Services market for Belgium and Luxembourg in 1978 amounted to \$207M at 1978 dollar exchange rates.
- During the year the market continued to grow, showing an overall growth over 1977 revenues of 58%. This very healthy looking figure should be regarded in the light of current European inflation rates and the recent steady fall in the international value of the dollar.
- The annual growth rate of 58% is accounted for by:
  - 10% - average fall in the dollar,
  - 8% - average domestic price rises for equivalent products,
  - 33% - true growth in terms of new business or additional business from existing accounts.
- Exhibit IV-F.7 shows the growth between 1977 and 1978 in terms of the different types of services sold.

BELGIUM/LUXEMBOURG COMPUTER SERVICES  
MARKET SIZES, 1977 AND 1978

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TYPE OF SERVICE	1977		1978		AVERAGE ANNUAL GROWTH RATE %
	\$M*	%	\$M*	%	
RCS PROCESSING	37	28	62	30	67
BATCH SERVICES	61	47	84	41	38
SOFTWARE PRODUCTS	5	4	8	4	60
PROFESSIONAL SERVICES	28	21	53	25	89
TOTAL	131	100	207	100	58

SOURCE: CAMP/EUROPE AND INPUT ESTIMATES

\* AT CURRENT EXCHANGE RATES.

EXHIBIT IV-F.7

### 3.1 PROCESSING SERVICES

- Work completed in Batch mode, defined to include off-line Data Preparation and Encoding, remained as the single largest revenue earning service at 41% of the total.
- Off-line Data Preparation undertaken by specialist non-processing bureaux typically accounts for 6-7% of the market, or between 14% and 16% of the Batch Services sector.
- Work completed in RCS (Remote Computing Services) mode, including Interactive and Remote Batch, was the second largest sector at 30%.
- Batch Services grew at a below market average rate, while RCS grew likewise at an above average rate. This relative decline of Batch is expected to continue and the rate of decrease is gentle enough to fit in with industry forecasts of a prolonged period of falling market share, rather than a sudden demise.
- The growth of RCS was 67% over the 1977 figures.
- User Site Hardware Services are not included in the service type breakdown used in this section, because the volume of business done under this heading is still negligible in European markets. Useful indications have, however, been detected in 1979 in the Belgian market, where there is evidence of vendors, especially the largest, offering this approach to decentralisation.

### 3.2 SOFTWARE PRODUCTS

- In European markets as a whole the revenues earned by the separate sale or licence of software products are small - of the order of 5%.

- However, the growth of software product sales is strong in the Benelux countries, and reaches 60%, between 1977 and 1978 in the combined Belgium and Luxembourg markets. Such a high growth rate is not expected to continue at this level, but because of its relative lack of development the sector will lead the growth rate chart for the next two years.

### 3.3 PROFESSIONAL SERVICES

- At \$53 million in 1978, this sector represents 25% of the overall Belgium/-Luxembourg market, up 4% from the 21% recorded in 1977. Like RCS and Software Products, it has a growing market; and this growth similarly is had at the expense of the Batch Services sector.
- Growth in absolute terms between 1977 and 1978 was up from \$28 million. Professional Services are not expected to continue at quite this level of growth in future, but any decrease in tailored systems market share is likely to be taken up by increases in:
  - consultancy, education and turnkey systems.
- Belgium is starting to break out of its traditional mould and beginning to experiment with:
  - distributed processing (DDP),
  - microprocessor-based User Site Hardware Services (USHS).
- Large users in Belgium are infrequent users of external services; the tendency to in-house distributed solutions is an observed preference.
- Medium, small and first-time users in Belgium have tended to bypass the mini-computer solution in favour of a batch bureau because of:



USER ESTIMATES OF GROWTH - INTERNAL SERVICES

BELGIUM/LUXEMBOURG

MODE	EXPENDITURE RANGE (Belgian Francs)					OVERALL	
	<1M	1M - 4M	4M - 10M	10M - 20M	20M - 40M		>40M
Centralised	+ 3	+ 22	+ 30	- 4	+ 13	+ 11	+ 10.0
Distributed	0	+ 1	+ 3	+ 20	+ 103	+ 24	+ 39.6

EXHIBIT IV-F.8

USER ESTIMATES OF GROWTH - EXTERNAL SERVICES

BELGIUM/LUXEMBOURG

SERVICE	EXPENDITURE RANGE (Belgian Francs)						OVERALL
	<100K	100K - 500K	500K - 2M	2M - 5M	5M - 10M	>10M	
Batch	+ 30%	- 19%	- 18%	- 23%	+ 9%	+ 5%	+ 1.3%
Rem. Batch	+ 10%	0%	- 5%	+ 7%	+ 2%	+ 24%	+ 13.9%
Interactive	0%	- 1%	- 13%	- 3%	+ 58%	- 48%	- 11.1%
On Site	0%	0%	0%	0%	0%	+ 3%	+ 1.4%

Note: The percentages under specific expenditure ranges are simple averages of respondent estimates; the "Overall" figures are weighted averages according to expenditure range.

EXHIBIT IV-F.9

EXTERNAL SERVICES GROWTH BY COMPANY SIZE : OVERALL MARKET

BELGIUM/LUXEMBOURG

SIZE	BATCH	REM. BATCH	INTERACTIVE	ON SITE
Large	+ 1%	+ 14%	- 11%	+ 1%
Medium*	+ 15%	+ 20%	+ 5%	N/A
Small*	+ 25%	+ 5%	+ 5%	N/A
OVERALL	+ 11%	+ 10%	+ 24%	N/A

\* Notes: These figures are INPUT estimates, cross-checked against data derived from the CAMP/Belgium/Luxembourg database.

o Entirely new user growths not quantified by organisation size are included in the overall figures.

EXHIBIT IV-F.10

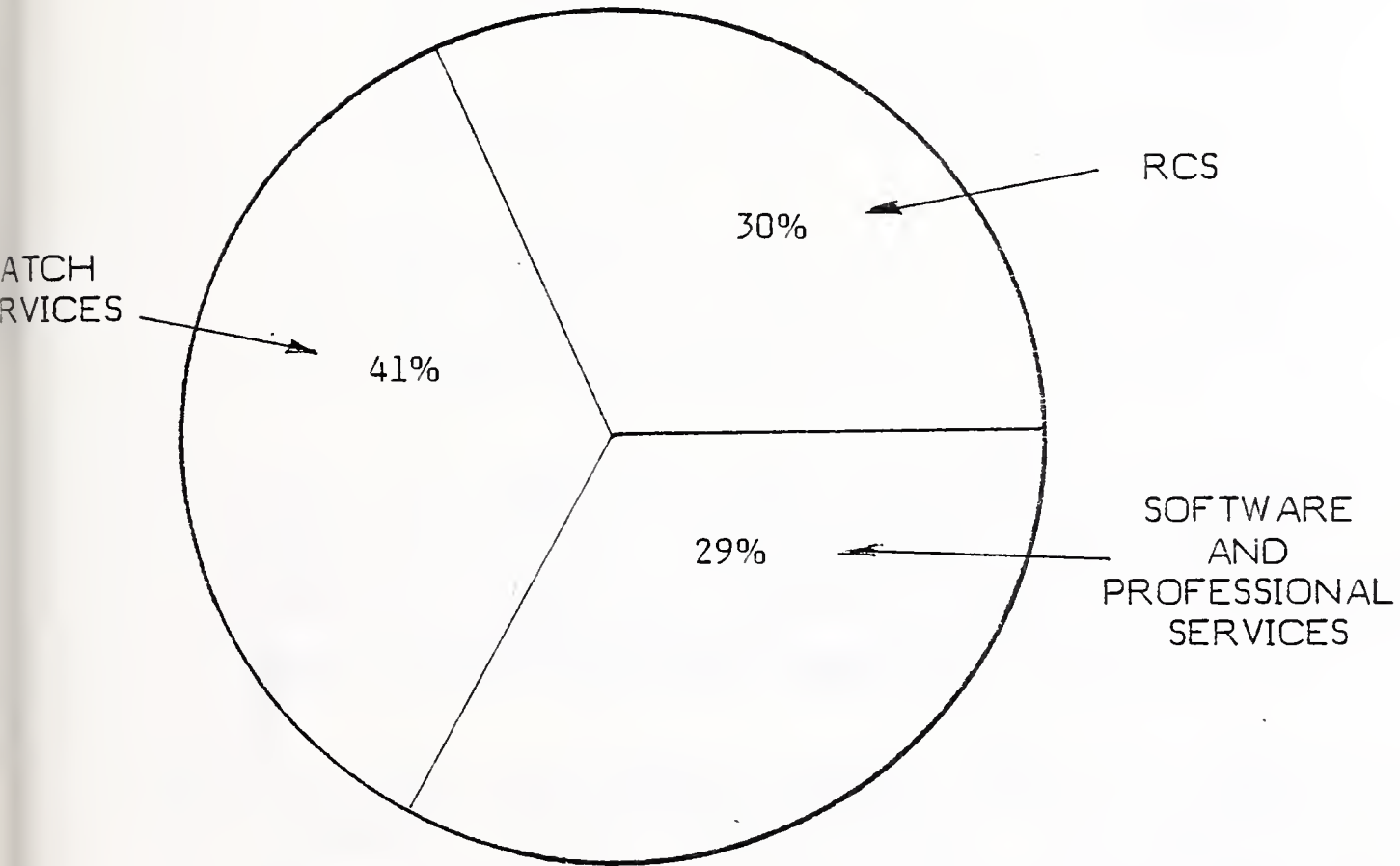
- the high cost of implementation relative to the size of their undertaking,
  - the low level of minicomputer expertise.
- These users are now an excellent target for the cheaper microprocessor-based solutions appearing on the market. Both processing services vendors and systems houses are currently attacking this sector with inexpensive hardware offerings.

#### 4. COMPETITION AND VENDOR MARKET SHARES

- Exhibit IV-F.11 shows the breakdown of the total Belgium/Luxembourg Computer Services revenue between Batch Services, Remote Computing Services (RCS) and Software Products/Professional Services; and compares it with the revenue breakdown of the Top Ten service companies.
- Whereas Batch Services at 41% is the largest component for the universe of services vendors, among the Top Ten, as a group, Software Products/Professional Services is the most significant with 42% of their revenue. This illustrates two ways in which the large vendors' customers differ from those of the smaller vendors:
  - there is a marked tendency for the larger users to keep their processing in-house,
  - software services and attendant expertise is more credible when purchased from a large, well-established vendor.
- By contrast the small and medium-sized organisations in Belgium prefer to purchase their processing services from the local batch bureau.
- Per head of population the Belgian market is very well served with computing services vendors - 203 for a population of just under ten (10) million.

THE BELGIUM/LUXEMBOURG COMPUTER SERVICES MARKET 1978

ALL VENDORS



THE TOP TEN

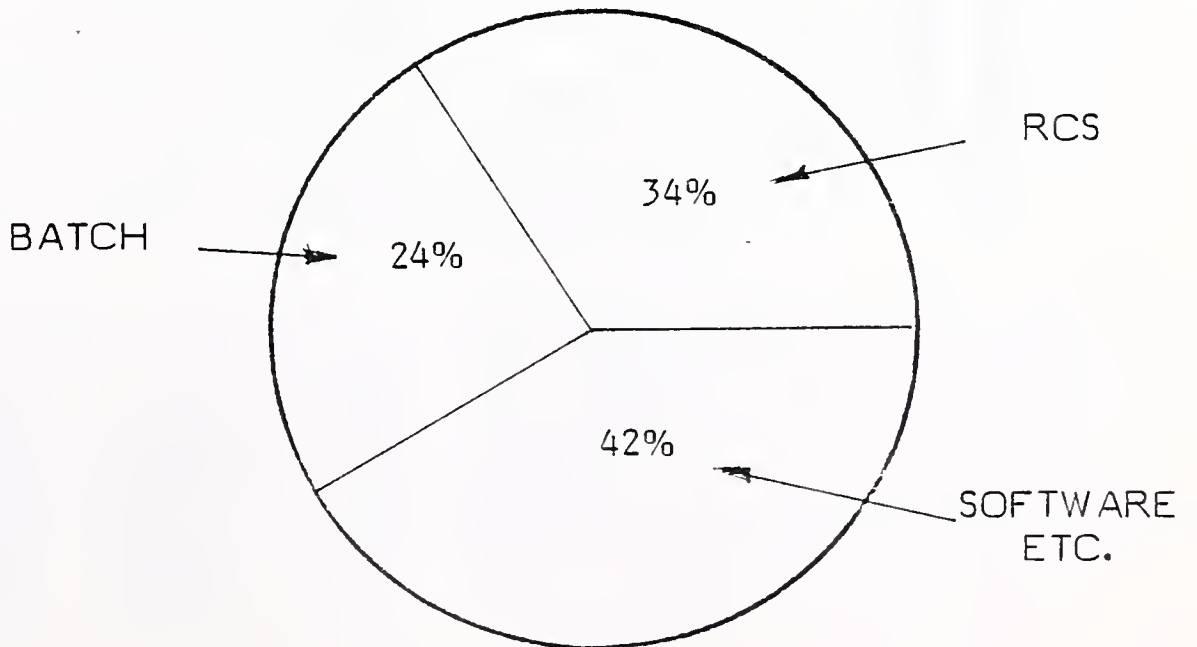


EXHIBIT IV-F.11



DISTRIBUTION OF SAMPLE COMPUTER SERVICES COMPANIES IN  
BELGIUM BY 1978 TURNOVER AND PRINCIPAL ACTIVITY

TURNOVER US \$	MAIN ACTIVITY CODE	> 10M		10M - 1M		1M - .1M		< 0.1M		ALL WITH T/O	SAMPLES as % of TOTAL POP. N.	
		A	B	C	D	A	B	C	D			
RCS BUREAU		1	0.6%	7	4.3%	7	4.3%	-	-	15	9.3%	71% of 21
BATCH BUREAU		1	0.6	11	6.8	22	13.7	6	3.7	40	24.8	77% 52
SOFTWARE AND PROFESSIONAL SERVICES		-	-	9	5.6	45	27.9	38	23.6	92	57.1	84% 109
OTHER (EG COM, DATA PREP.)		-	-	1	0.6	4	2.5	9	5.6	14	8.7	67% 21
ALL WITH T/O.		2	1.2	28	17.4	78	48.4	53	32.9	161	100	79% 203

EXHIBIT IV-F.12

- Another indicator of the teeming nature of the services market here is the vendor revenue per head of population, which comes out at \$20.2 for 1978. This figure is higher than that for any of the major European countries' markets, except France and the Netherlands.

-	France	-	\$23.72
-	Holland	-	\$22.80
-	West Germany	-	\$15.34
-	UK	-	\$12.61
-	Italy	-	\$10.58.

Of course one must remember that costs and selling prices in Belgium are among the highest in Europe, and the figures quoted need strictly speaking to be compared on some indexed basis.

- Of the 206 vendor companies (including 3 in Luxembourg), the systems and software houses and consultancies form just over 50% with 109 enterprises against 97 organisations whose main activity is a processing service of some kind, whether batch, RCS or data prep.
- An analysis of the vendor population derived from INPUT's CAMP/EUROPE database is shown in Exhibit IV-F.12. This table gives the distribution of Belgian vendor companies by size groups and principal activity. Four size groups are used:
  - Group Code A had annual turnovers (77-78) greater than \$10M,
  - Group Code B had annual turnovers between \$10M and \$1M,
  - Group Code C had annual turnovers between \$1M and \$0.1M,
  - Group Code D had annual turnovers less than \$0.1M.

The total vendor population in the database exceeds the number with a stated or estimated turnover. A hundred and sixty-one companies could be attributed an annual turnover, and this was 79.3% of the total population. (As a sample it proved large enough to extrapolate revenue figures for all company groups).

THE TOP TEN COMPUTING SERVICES VENDORS

BELGIUM/LUXEMBOURG 1978/79

SOURCE: CAMP/EUROPE

RANK	VENDOR	REVENUE IN MILLIONS OF BELGIAN FRANCS (MBF)			
		BATCH	RCS	SOFTWARE & PROFESSIONAL	ALL SERVICES TOTAL
1	CIG	273	200	287	760
2	IBM	153	261	41	455
3	SLIGOS	109	61	140	310
4	ORDA-B	52	82	66	200
5=	SOBEMAP	-	-	180	180
5=	GTS	-	180	-	180
7	CDC	34	119	17	170
8	STERIABEL	-	-	168	168
9	SGAB	87	49	24	160
10	EFFICIENT SA	-	-	150	150

- Exhibit IV-F.13 shows the revenue breakdown of the Top Ten vendors by the three major categories of service type. The table is headed by CIG a large national group. Second and third are two multi-national companies, one US, one French - IBM and SLIGOS respectively. Fourth position is occupied by ORDA-B. Except for GTS, CDC and Steriabel the rest of the table is dominated by national software houses.
- If one analyses the suppliers' ranking according to major class of service, IBM is top of the league in RCS and second in Batch Services. This type of ranking is shown in Exhibit IV-F.14.
- There are twenty-one (21) different companies included among the top ten of each of the three service types. The world-wide multi-nationals dominate the RCS ranking, but national companies with a sprinkling of European multi-nationals are mostly in evidence in the other two classes.
- The Top Ten companies accounted for \$88.4 Million or just under 43% of the total market for 1978.

#### 4.1 REMOTE COMPUTING SERVICES

- All major competitors are concentrated in Brussels, where 72% (53 out of the 74 vendors) have located their main offices. This is the only local market worthy of consideration (although national suppliers do have far wider coverage, of course); ORDA-B, for example, has offices in Bierbeek, Kortrijk, Antwerpen, and Maasmechelen in addition to its two offices in Brussels.
- The main competition for the interactive market is between IBM (whose presence is strongly felt in the small Belgium market for interactive and remote batch services) and GE's marketing representative, CIG/GTS. A challenge is slowly being mounted by COMSHARE based on highly price/competitive on-line services, but its revenues are, as yet, very small.

TOP SUPPLIER RANKING BY SERVICE TYPE

BELGIUM/LUXEMBOURG 1978/79

BATCH SERVICES	REMOTE COMPUTING SERVICES	SOFTWARE & PROFESSIONAL SERVICES
CIG	IBM	CIG
IBM	CIG	SOBEMAP
SLIGOS	GTS	STERIABEL
SGAB	CDC	EFFICIENT SA
AIM	ORDA-B	SLIGOS
CIM	SLIGOS	CEDEC
ORDA-B	SGAB	CAP-GEMINI
REK. SECUREX	UCC	ORDA-B
ANPROPER	CEVI	CINCOM
GERAC	ADP	UCC
CEVI	COMSHARE	IBM
COMECAN SA	CIM	SGAB
	SIA	REK. SECUREX
	CEGOS-TYMSHARE	FIDUCIERE
		CEVI

SOURCE: CAMP/EUROPE

EXHIBIT IV-F.14



- The top ten RCS vendors shown in Exhibit IV-F.15 cover 75% of the interactive market in Belgium. Others not shown include I.P. Sharp, Continental Computing, CEPOC, Sobemap, Mandata, and the University of Louvain.
- In the remote batch market, CIG and IBM lead from ORDA-B. Along with UCC, these four absorb 30% of the remote batch revenues in Belgium.
- A recent survey indicated that most of the batch and remote batch vendors were concerned with the rate of success of the in-house, minicomputer-based small business system, which has grown in popularity. Many vendors are looking to forestall the impact these systems could have on their revenues by entering into OEM agreements with manufacturers.
- Two thirds of the Belgium RCS market is divided between six vendors, as shown in Exhibit IV-F.15.
- Three companies have been identified as sharing the bulk of the Luxembourg market:
  - IBM Belgium,
  - Centre de Gestion,
  - Sterialux.
- The second of these is a national service bureau, while the third is part of the French Steria group and has an associate in West Germany.

## 5. MARKET TRENDS

- In general up to 1979, the Belgium/Luxembourg market was one of the least rewarding in Europe for external services vendors. The market size being small for conventional (Batch, Remote Batch, Interactive) processing services, requires good growth prospects in other and new types of service and signs of such development are now beginning to be manifested.

RCS MARKET SHARES OF MAIN BELGIAN FIRMS

COMPANY	SHARE OF RCS MARKET (%)	
	INTERACTIVE	REMOTE BATCH
CIG/GTS	30.4	13.8
IBM	11.2	8.1
GEIS	14.0	+
CDC	6.8	1.6
ORDA-B	+	7.3
SLIGOS	2.8	3.5
UCC	+	4.9
ADP	3.6	-
COMSHARE	3.4	+
TYMSHARE	2.8	-

\* INPUT ESTIMATE

+ SMALL VALUE

EXHIBIT IV-F.15

- BATCH SERVICES will stagnate generally, although some growth will be found in large organisations (+ 1%). This mode of service is more a small/medium organisation market and it is in that sector that the overall market growth forecast of 11% will be achieved.
- REMOTE BATCH SERVICES have the best growth prospects of any type of external computing service. The forecast 16% suggests that:
  - in this do-it-yourself market Remote Batch is considered to be user controlled.
  - the spread of data communications is causing a straight transfer of traditional Batch work onto Remote Batch.
- INTERACTIVE SERVICES appear to have a bleak future. Within large organisations existing users estimate a decline of - 11%. Entirely new users and the medium/small size organisation will make up the difference between this figure and the overall market forecast of 24%.
- ON SITE SERVICES have not yet made any measurable impact in this market although there are now modest growth plans in some industries.
- Growth prospects which exist for Interactive services in their present form will be found in the following industries:
  1. Fabricated metal products
  2. Financial services
  3. Insurance
  4. Wood Products
  5. Paper/printing/publishing
- The small trend towards On Site Services is most likely to occur in:
  - Engineering/Scientific
  - Production/Inventory control \*
  - Personnel
  - Financial Analysis/Planning \*

- There is some correspondance \* between the above trends and the application areas which are expected to experience the best overall growth in usage. These are:

1. General Accounting/Payroll
2. Financial Analysis/Planning \*
3. Production/Inventory control \*

- In the financial sector there is no evidence of any shift towards On-Site Services; the growth in usage of Portfolio Management and General Banking applications will be completely covered by internal services.

- The best prospects for each of the previously mentioned best growth applications will be found in specific industries:

- General Accounting/Payroll - Basic metal \*  
Fabricated metal \*  
Electricity/Gas \*  
Construction \*  
Insurance
- Financial Planning/Analysis - Food/Drink/Tobacco  
Textiles/Clothing \*  
Chemicals/Petroleum
- Production/Inventory control - Paper/Printing \*  
Non Metallic \*

- The industry markets with an asterisk (\*) against them in the previous paragraph offer good growth for two of the three application areas. Those industries will therefore be the most productive targets for future sales campaigns.

## 5.1 GROWTH PROSPECTS - USER PERCEIVED

- Users' own estimates for the growth of internal services are shown in Exhibit IV-F.8.
- The growth trend anticipated by users is greatest in distributed systems. This is true even when a single extreme estimate in the sample (causing a peak figure of 103%) is excluded from the calculation.
- The user estimated growth figure for centralised internal services at 10% is close to the European average (11%). This growth rate is larger in the lower middle expenditure categories.
- When we turn to the user generated growth estimates for these external services (shown in Exhibit IV-F.9), the prospects within the large organisations encompassed by our sample are poor. Only in Remote Batch processing services is growth at all reasonable.
- In order to offset the dominance of the large user mentality in any conclusions drawn from this particular sample, we have reworked the estimates for all types of processing services to include all sizes of organisation. The results are shown in Exhibit IV-F.10.
- There is seen to be a distinct trend towards the use of microcomputers both in User Site systems, and in Turnkey small business systems.
- This trend is due to:
  - the large number of small businesses in the country, who can be most effectively approached with this type of solution.



- The preponderance of small organisations had depressed the market for minicomputer-based medium sized business systems. Now with the advent of the microcomputer as the basis for small business systems, there is the potential for data processing to reach down to the smaller user.
- The Belgian traditionalism has led to a slow growth of on-line business and real-time minicomputer usage. Small business systems have been implemented on Olivetti, Nixdorf and Philips equipment, but these have tended to be single-station machines and have not yet brought the computer closer to the user.

## 6. MARKET FORECASTS BY SERVICES CATEGORY

- Exhibit IV-F.16 gives the five-year forecast for the combined Belgium/Luxembourg market.

THE BELGIUM/LUXEMBOURG COMPUTER SERVICES MARKET  
 - FORECASTS BY TYPE OF SERVICE, 1979 - 1983

TYPE OF SERVICE	MARKET FORECASTS IN \$ MILLIONS										AAGR (%)
	** 1977	** 1978	GROWTH 77 - 78 (%)	* 1979	* 1980	* 1981	* 1982	* 1983			
RCS PROCESSING	37	62	67	84	107	134	161	190		23	
BATCH SERVICES	61	84	38	101	116	130	144	156		11	
SOFTWARE PRODUCTS	5	8	60	11	14	18	21	25		23	
PROFESSIONAL SERVICES	28	53	89	77	100	125	150	177		23	
ALL	131	207	58	273	337	407	476	548		19	

\* = CONSTANT 1979 DOLLARS; \*\* = CURRENT EXCHANGE RATES

EXHIBIT IV-F.16



G. THE SCANDINAVIAN COUNTRIES





#### IV-G SWEDEN/NORWAY/DENMARK/FINLAND

- The Swedish computer services market is ranked fifth in size among Western European countries, - behind only the four major industrial countries (France, West Germany, the UK and Italy). It is the most developed country market in terms of commercial exploitation and sector coverage. Together with the other three Scandinavian countries, it forms a market bloc which is roughly the same size as the West German market, but of course suffers from geographic and other internal barriers.
- The total Scandinavian market for all computer services was in 1978 \$885 Million (see Exhibit IV-G.1). Due to the weaker penetration of hardware manufacturers, external services usage in Scandinavia has become a well recognised alternative to in-house equipment.
- The Swedish market is characterized by high-end user prices and high staff and accommodation costs. On average, Swedish companies have a high percentage of staff dedicated to administration and a low percentage of staff in sales and marketing. Turnover per employee tends to be lower in Sweden than in the other European countries.
- The Norwegian market is similarly competitive but with a predominance of local national suppliers such as Teamco, Fjerndata, Computas and Tronderdata.
- The Danish market is dominated by a few large-scale bureau companies. One of the largest is under public ownership and obtains a high proportion of its revenue from government sources.
- This section of the report describes:
  - the development of the Scandinavian market in 1978,

SCANDINAVIAN COMPUTER SERVICES MARKET 1978

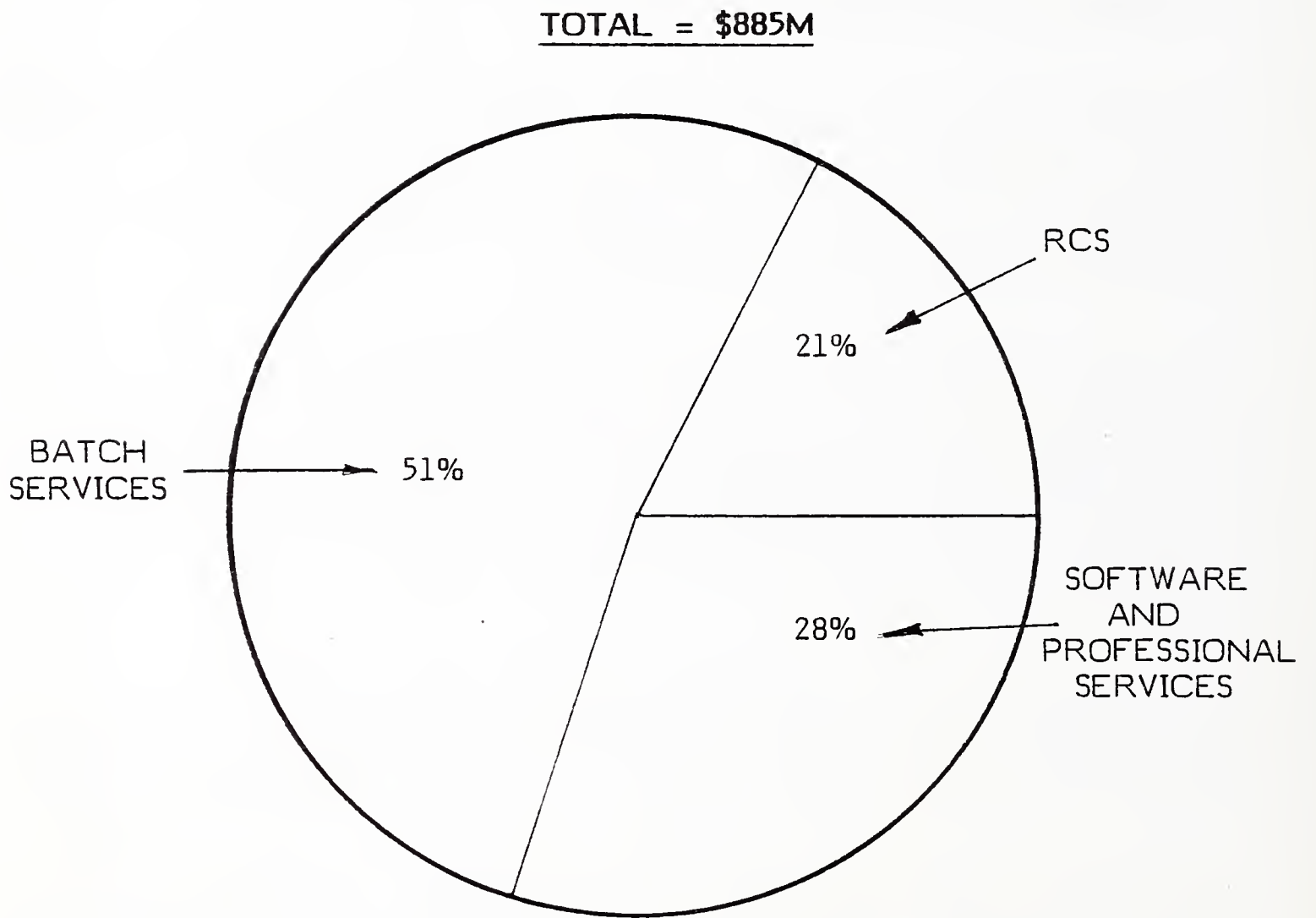


EXHIBIT IV-G.1

- the structure of the customer base,
- overall market and sector trends
- the forecasts through to 1983

## 1. ECONOMIC STRUCTURE

- In the last six years the Swedish economy has grown at an average rate of 2.2% (at constant prices); this is a slower rate than the 3.6% of the 1960's. However productivity has kept pace with inflation and working hours have undergone a steady decline.
- Norway has started to become one of the richest countries in the world on a per capita basis. For some years, it has enjoyed a stable but finely balanced economy which has been gradually moving from its traditional role as a supplier of primary products (fish, timber, metal ores) over to a diversified economy in which manufacturing and processing industries feature. The country has massive oil reserves, which will ensure that further growth continues.
- Denmark's economy has been in trouble of recent years, due to its high rate of inflation fuelled by overlarge social costs reducing its competitiveness in international markets. Expansion in real GDP has been around the 2% mark for the immediate past. Austerity measures have been introduced to combat the worsening balance of payments.
- Finland has had a virtually static economy in recent years, but this has improved rather than harmed the prospects for computer services.
- Exhibit IV-G.2 shows some basic economic indicators relating to the country's performance in the immediate past.
- The increase in population since 1967 has been at the annual rate of 0.48%. Unemployment varies in the different countries. Finland and Denmark have high rates of unemployment while Norway has one of the lowest in Europe.

BASIC ECONOMIC STATISTICSSCANDINAVIA

INDICATOR		YEAR	
		1977	1978
GDP + (\$B)	Denmark	52.51	56.34
	Finland	25.35	25.82
	Norway	40.00	42.20
	Sweden	78.77	84.84
	Scandinavia	196.63	209.20
Population (millions) - Total	Denmark	5.08	5.10
	Finland	4.81	4.83
	Norway	4.15	4.19
	Sweden	8.27	8.29
	Scandinavia	22.31	22.41
- Total Working Agriculture, etc. Manufacturing Service Industries		10.04	10.12
		0.70	0.67
		3.63	3.61
		5.71	5.84
No. of organisations * (thousands)		-	669,500
No. of establishments * (thousands)		-	808,000

+ At market prices and current exchange rates

\* These figures include the numbers engaged in agriculture, forestry and fishing, but exclude businesses run from home premises.

SOURCES: National Statistical Institutes and INPUT estimates

EXHIBIT IV-G.2

DISTRIBUTION OF ENTERPRISES BY SIZE AND INDUSTRYSCANDINAVIA

ISIC Code	Industry	Enterprise by Size of Annual Turnover (\$)			
		<1.0M	1.0 - 10M	>10M	Total
11 - 13	Agriculture/Forestry/ Fishing,	152,815	13,350	85	166,250
21 - 29	Mining/Quarrying	390	800	10	1,200
31 - 39	Manufacturing	48,200	24,100	800	73,100
41	Electricity/Gas etc.	2,990	910	40	3,940
50	Construction	72,885	10,290	255	83,430
61 - 63	Wholesale/Retail	103,750	22,300	350	126,400
71 - 72	Transport/Communications	68,900	20,300	150	89,350
81	Financial	75	1,045	60	1,180
82	Insurance	-	620	65	685
83	Business Services/ Professions	52,455	12,615	45	65,115
91	Government	39,180	19,590	100	58,870
	TOTAL	541,640	125,920	1,960	669,520

EXHIBIT IV-G.3



- Scandinavia contains 669 thousand enterprises operating from over 800 thousand establishments. A breakdown of enterprises by size and industry category (ISIC) is shown at Exhibit IV-G.3.

## 2. USER CHARACTERISTICS AND REQUIREMENTS

- As is the case with all industrialised nations, the majority of Scandinavian computer users are in either the manufacturing or the services sector of private industry. However, the Nordic countries are advanced in their usage of computers to the extent that one can find them being applied in the primary industries like agriculture and fishing, and as much among small as large users.
- The primary industries associated with forestry and fishing are important to the economies of Sweden, Finland and Norway, while Denmark's agriculture is intensive and a rich source of foreign currency.
- The Nordic countries have started to absorb large numbers of mini-computers and small business systems into small and medium-sized companies. The acceptance of the mini-computer with communications capability has been speeded by the development of service bureaux networks serving the dispersed geography of the region.
- In large organisations in Sweden and Norway the frequency of external computing services usage is the highest in Western Europe : 75% of large organisations in Norway use these services and 71% in Sweden.

### 2.1 COMPETITION FOR THE USER'S BUDGET

- All large organisations are computer users (in-house, external or both) and there are some very significant indications of a broad move in the direction of increasing user independence. After two decades of centralisation of in-house computing the market will experience an evolution towards decentralisation not a revolution.

LARGE ORGANISATIONS' PROCESSING SERVICES USAGE BY INDUSTRY

SWEDEN/NORWAY (combined)

ISIC	INDUSTRY	RESP %AGE	EXTERNAL SERVICES USAGE				IN HOUSE USAGE %
			ALL	B	RB	I	
11 - 13	Agriculture/Fishing	100%	80%	60%	60%	0%	80%
21 - 29	Mining/Quarrying	100%	86%	43%	29%	86%	71%
31	Food/Drink/Tobacco	73%	75%	63%	21%	25%	79%
32	Textiles/Clothing	100%	40%	40%	0%	20%	100%
33	Wood Products	25%	75%	50%	25%	25%	25%
34	Paper/Print/Publ.	72%	67%	44%	33%	39%	83%
35	Chem./Petrol/Coal	86%	63%	41%	13%	41%	88%
36	Non-Metallic Prod.	60%	50%	33%	17%	17%	100%
37	Basic Metal	69%	44%	11%	11%	33%	100%
38 - 39	Fabricated Metal Prod.	52%	86%	60%	38%	36%	60%
41	Electricity/Gas	67%	100%	100%	0%	100%	100%
50	Construction	84%	88%	69%	13%	19%	44%
61 - 63	Wholesale/Retail	35%	60%	51%	16%	11%	63%
71 - 72	Transport/Comm.	40%	60%	40%	20%	30%	60%
81	Financial/Banks	-	-	-	-	-	-
82	Insurance	58%	80%	68%	26%	53%	62%
83	Business Services	-	-	-	-	-	-
91	Government	-	-	-	-	-	-
OVERALL WEIGHTED AVERAGE		55%	72%	53%	23%	33%	70%

EXHIBIT IV-G.4

- The trend towards DDP is already mobilised, one indication being the ratio of centralised to distributed hardware installed. Although in-house computer services are generally centralised, currently some industries show a significantly noticeable tendency towards distributed processing (ration of 1/1 or better); these are Paper/Printing, Chemicals/Petrochemicals, Basic Metal, Gas/Electricity and Wholesale/Retail.
- In almost all industry groups a large external service usage is complemented by a correspondingly low in-house computer usage, and vice-versa. (See Exhibit IV-G.4). An indication of the degree of computerisation (by either means) can be gained from adding the two percentages : it is interesting to note that the compound figures show relatively little variation.
  1. Mining/Quarrying (157%)
  2. Non Metallic Products (150%)
  3. Metal Manufacturing (146%)
  4. Basic Metal (144%)
  5. Financial Inst./Services (142%)
- Only one industry group contains any non-users of either an in-house or an external service. This is the accountants and managing consultants section of the financial institutions group : 6% of companies in this group are too small to justify computer usage. Otherwise, all companies in the sample are computer users and can be treated as knowledgeable sales prospects.
- Overall the level of external services usage is high and is currently running at 72% ; the Norwegian companies in the sample are more active, 75% of them are using external services compared with 71% in Sweden. (See Exhibit IV-G.5.).
- The largest users of external services are :
  1. Construction (88%)
  2. Mining/Quarrying (86%)

LARGE ORGANISATIONS

USAGE OF EXTERNAL SERVICES - NORWAY AND SWEDEN COMPARED

INDUSTRY	NORWAY				SWEDEN			
	B	RB	I	ALL	B	RB	I	ALL
Agriculture	0%	0%	0%	0%	75%	75%	0%	100%
Mining/Quarrying	0%	0%	100%	100%	60%	40%	80%	80%
Food/Drink	67%	17%	0%	67%	61%	22%	33%	78%
Textile/Clothing	33%	0%	0%	33%	50%	0%	50%	50%
Wood	0%	50%	50%	50%	100%	0%	0%	100%
Paper/Print	33%	33%	67%	67%	47%	27%	33%	50%
Chem/Petroch.	20%	40%	40%	40%	47%	5%	42%	79%
Non Metal	100%	100%	0%	100%	20%	0%	20%	40%
Basic Metal	0%	0%	0%	0%	13%	13%	38%	50%
Metal Mfg.	40%	60%	40%	100%	70%	26%	33%	78%
Gas/Electricity	0%	0%	0%	0%	100%	0%	100%	100%
Construction	100%	0%	0%	100%	64%	14%	21%	86%
Wholesale/Ret.	64%	18%	9%	73%	47%	16%	13%	56%
Transp/Storage	67%	0%	0%	67%	29%	29%	43%	57%
Finance/Real Est.	90%	40%	50%	90%	58%	21%	54%	75%
AVERAGES	52%	32%	29%	75%	54%	20%	34%	71%

EXHIBIT IV-G.5



3. Metal Manufacturing (86%)
4. Financial Institutions/Services (80%)

- The smallest users of external services are :
  1. Textile/Clothing/Leather (40%)
  2. Basic Metal (44%)
  3. Non-Metallic Products (50%)
- More companies use Batch services than either Remote Batch or Interactive. In fact, overall 53% of companies sampled used Batch services ; there is little variation between Sweden and Norway, the figures being 54% and 52% respectively.
- Remote Batch services are the least used. This factor varies quite significantly between Sweden (20%) and Norway (32%)
- Overall Interactive services were being used by 33% of companies, with again noticeable variation between Sweden (34%) and Norway (29%).
- The most noticeable difference between the external services markets in Sweden and Norway is in the area of Remote Computing Services. Whilst Norway is the bigger user of Remote Batch Services (50% more than Sweden), Sweden is the bigger user of Interactive Services (20% more than Norway).

## 2.2. IN-HOUSE COMPUTING - EXPENDITURE AND TRENDS

- Site occupancy by IBM equipment is 50% of all companies with in-house installations. Saab-Univac are the second supplier with 16%, followed by ICL with 10%. Note that these figures apply to equipment installed as the principal or centralised facility ; distributed or dedicated equipment is supplied by mini-computer companies as well and these are becoming as significant as the traditional mainframe suppliers in this corner of the market. Although IBM is still the leader, its share is lower at 23% occupancy of



USER ESTIMATES OF GROWTH - INTERNAL SERVICES

SWEDEN AND NORWAY COMPARED

MODE	EXPENDITURE RANGE (Kroner/annum)						OVERALL
	< 100K	100K - 400K	400K - 1M	1M - 2M	2M - 4M	> 4M	
SWEDEN	Centralised	+ 10%	+ 30%	+ 15%	+ 15%	+ 9%	+ 10.4%
	Distributed	0%	+ 53%	+ 40%	+ 18%	+ 37%	+ 29.7%
NORWAY	Centralised	0%	+ 77%	+ 9%	+ 11%	+ 13%	+ 13.7%
	Distributed	0%	+ 300%	+ 20%	+ 70%	+ 10%	+ 31.7%

EXHIBIT IV-G.6

distributed and dedicated sites ; IBM is followed by DEC (13%), Data General (11%), Saab-Univac (9%), Datapoint (5%), Honeywell (6%) and Kongsberg (6%).

- IBM terminals, which are connected exclusively to IBM hardware, account for, by far, the largest share of the terminal market with a site occupancy of 29%. Saab-Univac has a 17% occupancy followed by ICL and Alfaskop, each with a 10% occupancy.
- Expenditure on in-house computing in Sweden and Norway is bi-nodal and is concentrated around the 400K-1M Kroner/annum range and around the 2M to 4M+ Kr range. This occurs generally because organisations tend either to base their in-house computing on low price minis or to go for the more traditional general purpose mainframe approach which is more expensive.
- Growth in in-house expenditure will favour distributed systems. (The trend (see Exhibit IV-G.6) is marginally stronger in Norway.
- Centralised growth is highest in the low expenditure category where in-house minicomputer applications are being found to be increasingly cost effective compared with existing manual methods and in many cases externally supplied batch services. Distributed processing growth will benefit also for this reason ; additionally growth will be higher in the big budget installations in which DDP becomes a part of the corporate computer approach.

### 2.3 EXTERNAL COMPUTING SERVICES - EXPENDITURE AND TRENDS

- Not only are Swedish and Norwegian large organisations frequent users of external services, they are also big spenders. Around one third of current users spend more than 1M Kroner annually ; a further quarter spend between  $\frac{1}{2}$ M and 1M Kroner annually.
- The growth (or decline) of this expenditure favours Norway as the more exciting market, albeit on a smaller market size. (See Exhibit IV-G.7).

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USER ESTIMATES OF GROWTH - EXTERNAL SERVICES

SWEDEN AND NORWAY COMPARED

SERVICE	EXPENDITURE RANGE (Kroner/annum)							OVERALL
	10K	10K-50K	50K-200K	200K-500K	500K-1M	1M		
SWEDEN								
Batch	+ 17%	- 5%	- 5%	- 17%	- 15%	- 6%	- 15.2%	
Rem. Batch	- 10%	0%	- 8%	+ 10%	- 16%	+ 9%	+ 1.4%	
Interactive	0%	- 32%	- 3%	+ 3%	- 6%	+ 17%	+ 7.5%	
On Site	0%	0%	+ 50%	+ 11%	+ 30%	+ 21%	+ 23.2%	
NORWAY								
Batch	-	0%	- 63%	+ 34%	- 33%	+ 2%	- 5.6%	
Rem Batch	-	+ 70%	-	+ 70%	+ 17%	+ 24%	+ 28.8%	
Interactive	-	+ 67%	-	0%	+ 54%	+ 27%	+ 31.5%	
On Site	-	+ 35%	+ 25%	+ 15%	+ 20%	+ 55%	+ 38.8%	

EXHIBIT IV-G.7

- In both countries the prospects for BATCH SERVICES are pessimistic; more so in Sweden than in Norway.
- REMOTE BATCH SERVICES show good potential in Norway where a 29% growth rate is estimated in a market where Remote Batch usage is much higher than in Sweden.
- INTERACTIVE SERVICES usage in Sweden is already larger than in Norway and this may explain the smaller growth rate. The bigger growth rate in Norway is also inflated by the high estimated growth in the lower expenditure categories ; this characteristic is in complete contrast with the pattern in Sweden.
- USER SITE HARDWARE SERVICES (USHS), or ON SITE COMPUTING SERVICES are likely to grow at the highest annual rate for any external computing service. Apart from the increasing desire by users for some independence from their traditional computer service suppliers they are also finding an externally supported local mini an operationally and managerially attractive system.
- Growth variations between different expenditure categories give a broad clue on the direction of migration. Small budget Batch is probably being transferred to a distributed mini or to a Remote Batch service, particularly in Norway. This probably applies also in the case of the large budget category excepting that the computer load will also be absorbed by the central mainframe computer. Similarly On Site Services will benefit from the creation of new computer loads with big spenders and inheritance of existing small computer loads from the existing supplier.

### 3. MARKET DEVELOPMENT 1978

- The total Computer Services market for Scandinavia in 1978 amounted to \$885M at 1978 dollar exchange rates.



THE SCANDINAVIAN COMPUTER SERVICES MARKET SIZES,  
1977 AND 1978

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TYPE OF SERVICE	1977		1978		AVERAGE ANNUAL GROWTH RATE %
	\$M *	%	\$M *	%	
RCS PROCESSING	154	21	185	21	20%
BATCH SERVICES	404	54	450	51	11%
SOFTWARE PRODUCTS	18	2	25	3	39%
PROFESSIONAL SERVICES	169	23	225	25	33%
TOTAL	745	100	885	100	19%

SOURCE: EDP 5000 USER RESEARCH AND INPUT ESTIMATES  
\* AT CURRENT EXCHANGE RATES

EXHIBIT IV-G.8



- During the year the market continued to grow, showing an overall growth over 1977 revenues of 19%. This figure is considerably lower than the growth rates experienced in the major European country markets. While reflecting the deeper penetration of the Nordic Services industry into the respective national economies, it should be noted that it is higher than the rates of 11% and 12% being quoted by observers in 1977. This acceleration of the growth pattern has been due to the upsurge in the mini-computer based turnkey and professional services sector, and is expected to hold during the forecast period.
- Growth rates in the Nordic countries have not been inflated by dollar depreciation during 1978. Only in Denmark has an appreciable change in the exchange rate taken place.
- Exhibit IV-E.6 shows the growth between 1977 and 1978 in terms of the different types of services sold.

### 3.1 PROCESSING SERVICES

- Work completed in Batch mode, defined to include off-line Data Preparation and Encoding, remained as the single largest revenue earning service at 51% of the total, or \$450M, down in percentage terms since 1977 when it stood at 54%.
- Remote Computing, including Interactive and Remote Batch, accounted for 21% of revenues, approximately the same percentage as in 1977.

### 3.2 SOFTWARE PRODUCTS

- The growth of software product sales is strong in Scandinavia at 39% between 1977 and 1978. Such a high growth rate is not expected to continue at this level, but because of its relative lack of development the sector will lead the growth rate chart for the forecast period.

SWEDEN AND NORWAY COMPARED

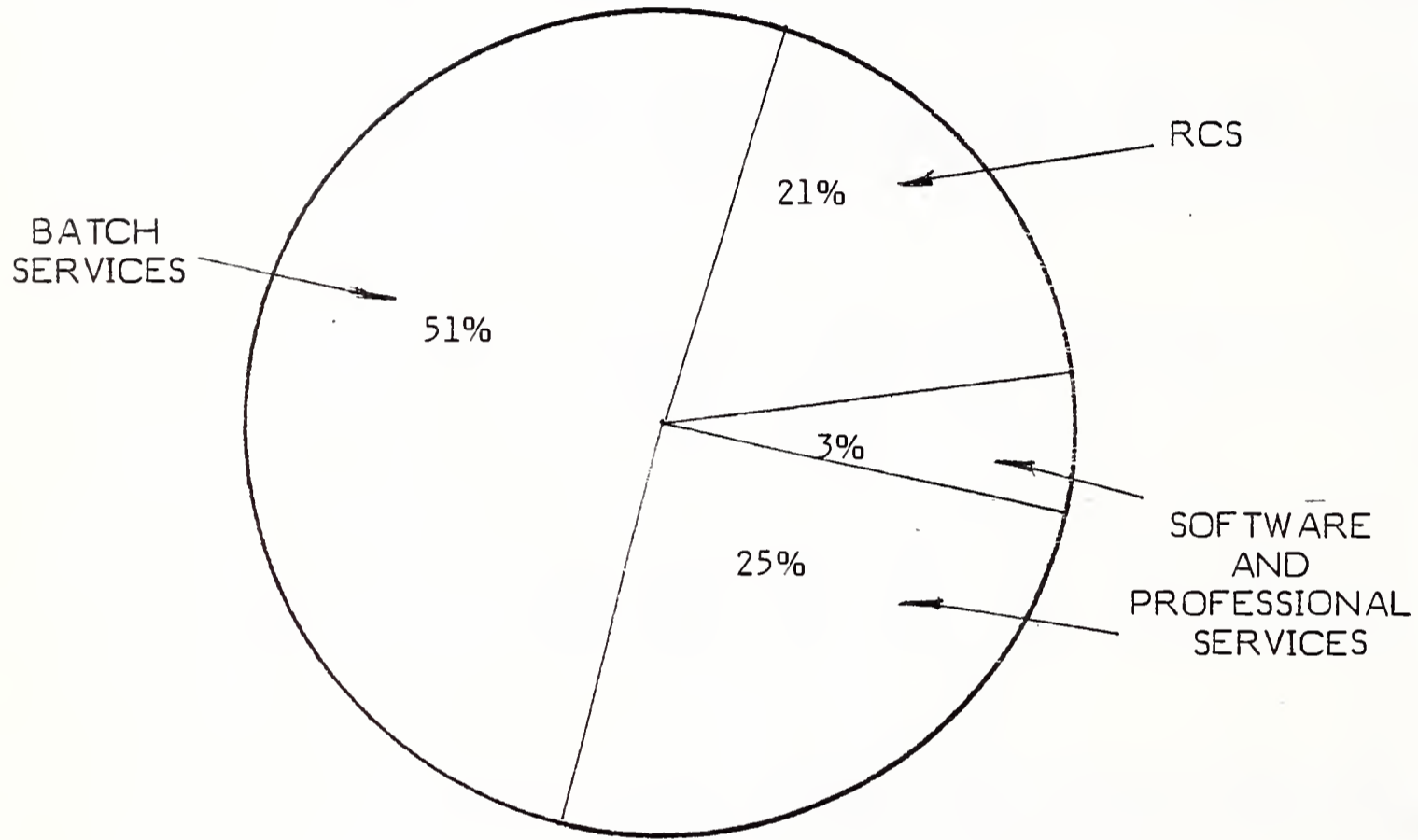
	SIZE OF ORGANISATION	BATCH	REM. BATCH	INTERACTIVE	ON SITE
SWEDEN	Large	-15%	+1%	+8%	+23%
	Medium	+5%	+15%	+15%	N/A
	Small	+20%	+7%	+10%	N/A
	OVERALL	+15%	+10%	+25%	N/A
NORWAY	Large	-6%	+29%	+32%	+39%
	Medium	+5%	+20%	+20%	N/A
	Small	+20%	+15%	+10%	N/A

Note: N/A = Not available.

EXHIBIT IV-G.9

THE SCANDINAVIAN COMPUTER SERVICES MARKET 1978

ALL VENDORS (\$885M)



THE TOP TEN (\$334M=38%)

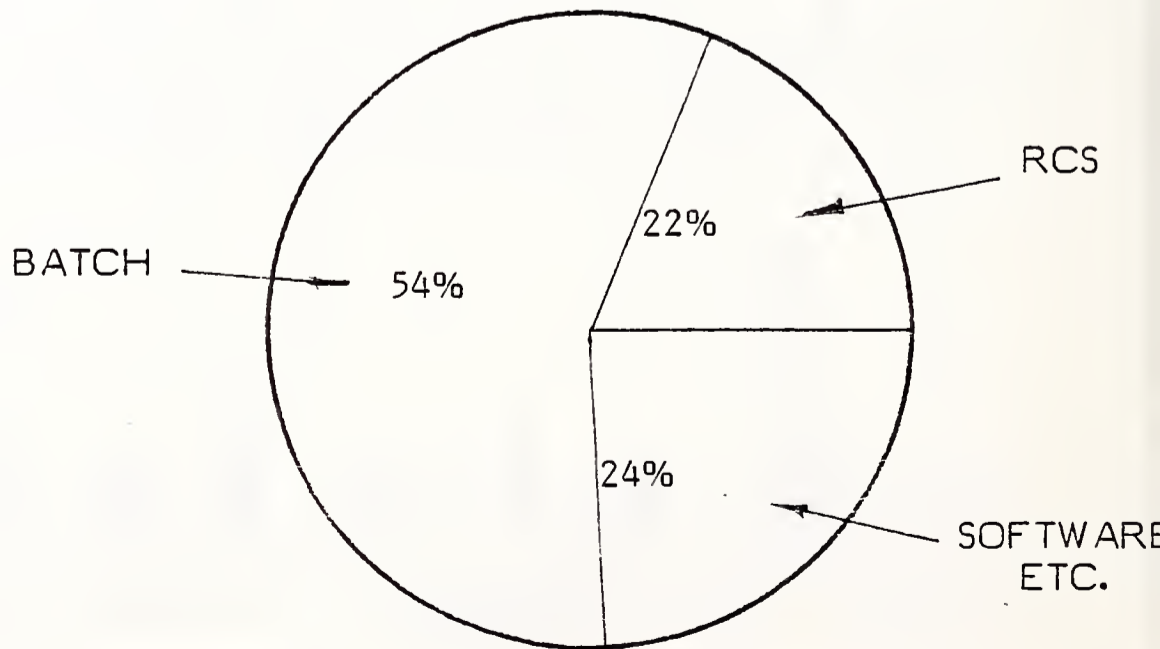


EXHIBIT IV-G.10

THE TOP TEN COMPUTING SERVICES VENDORS

IN SWEDEN AND DENMARK 1978

RANK	VENDOR	REVENUE IN MILLIONS OF DOLLARS (\$M)*				ALL SERVICES TOTAL
		BATCH	RCS	SOFTWARE & PROFESSIONAL		
1	KOMMUNEDATA	30.0	12.0	18.0	60.0	
2	DATEMA	32.0	7.1	20.1	59.2	
3	DATACENTRALEN	22.8	8.9	13.0	44.7	
4	SPADAB	20.5	9.1	9.0	38.6	
5	KOMMUN DATA	20.0	6.4	5.4	31.8	
6	DAFA	14.0	10.4	1.6	26.0	
7	IBM	9.9	10.6	3.5	24.0	
8=	JDC DATA	10.0	2.0	8.0	20.0	
8=	RC DATA	16.0	2.0	2.0	20.0	
10	CDC	4.0	5.0	1.0	10.0	

SOURCE : MAS/EUROPE

\* AT 1978 EXCHANGE RATES

### 3.3 PROFESSIONAL SERVICES

- Growth in absolute terms between 1977 and 1978 was up from \$169 million to \$225 million, a 33% increase. Professional Services are expected to continue at this level of growth; any decrease in tailored systems market share being taken up by increases in:
  - consultancy, education and turnkey systems.

### 4. COMPETITION AND VENDOR MARKET SHARES

- In SWEDEN Spadab and Datema are the leaders for Batch, and Remote Computing services ; through in the Interactive services market they expect to be increasingly threatened by GEIS and IBM (See Exhibit IV-G.12).
- Datema is in the strongest position in Sweden for Batch services in the Food/Drink, Metal Manufacturing, Construction, Wholesale/Retail and Financial Insitutions/Business Services sectors.
- In Remote Computing Services (Remote Batch and Interactive), Datema and the others are accompanied in the top ten by Bonnier Data, Kommun Data, CDC and QZ Stockholms.
- Datema is the strongest supplier of Remote Batch services in Food/Drink, Metal Manufacturing, Construction and Wholesale/Retail - a nearly complete subset of their activities in Batch services. CDC are strongest in Chemicals/Petrochemicals, Transport/Storage and Financial/Business services.
- GEIS and Datema alternate in their dominance of industrial sectors, in particular :

GEIS -	Chemicals/Petrochem	Datema -	Paper/Printing
	Wholesale/Retail		Metal Manufacturing



TOP REMOTE COMPUTING SERVICES VENDORS

IN SWEDEN 1978

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES TOTAL (\$M)
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	DAFA	7.8	2.6	10.4	26.0
2	SPADAB	2.0	7.1	9.1	38.6
3	DATEMA	0.7*	6.4*	7.1*	59.2*
4	KOMMUN DATA	6.36	-	6.36	31.8
5	BONNIER DATA	1.9	3.8	5.7	7.3
6	QZ STOCKHOLMS	1.8	2.7	4.55	6.36
7	IBM	3.7*	0.4*	4.1*	16.0*
8	GEIS	-	2.3*	2.3*	2.3*
9	CDC	1.9*	0.2*	2.1*	2.4*

\* INPUT ESTIMATE

EXHIBIT IV-G.12

- GEIS is prominent in Mining/Quarrying, Food/Drink and Basic Metal, each of these sectors showing no significant activity by Datema. In turn, Datema is active in Metal Manufacturing and Transport/Storage where GEIS has no significant presence.
  
- IBM's dominance is limited to the Food/Drink, Basic Metal and Financial/Business Service sectors.
  
- Other suppliers are prominent in one sector, for example:
  - SSAB - Mining/Quarrying
  - Multidata - Textile/Clothing
  - Kraftdata - Gas/Electricity
  
- The largest computer services vendors in DENMARK are listed in Exhibit IV-G.13.
  
- In NORWAY (see Exhibit IV-G.14), there is no overall market leader providing all services as in Sweden ; indeed, Datema although second to GEIS in Interactive services has little reported activity in both Batch and Remote Batch services. Only four companies in the top ten, in addition to Datema, supply two services. They are EDB (Batch and Remote Batch), Fjerndata (Remote Batch and Interactive), Computas and Teamco.
  
- There is a fairly close correlation of predominant suppliers of Batch and Remote Batch, and industry sectors among the top ten, the most noticeable being :
  - Landbruket - Food/Drink (agricultural aspects)
  - EDB - Paper/Printing
  - Datajenste - Non Metallic

For Interactive and Remote Batch, Fjerndata are the strongest suppliers to the Metal Manufacturing sector.

THE TOP REMOTE COMPUTING SERVICES VENDORS

IN DENMARK 1978

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES TOTAL (\$M)
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	KOMMUNE DATA	8.0*	4.0*	12.0*	60.0*
2	DATA CENTRALEN	1.8	7.1	8.9	44.65
3	IBM	2.9*	1.2*	4.1*	6.0*
4	GEIS	+	4.8*	4.8*	4.8*
5	DATA INFORM	1.5	0.76	2.26	7.62
6	JDC DATA	-	2.0	2.0	20.0
7	RC DATA SERVICES	-	2.0	2.0	20.0
8	CDC	1.45*	0.25*	1.7*	2.13*
9	REGNECENTRALEN	0.06	0.02	0.08	18.3

\* INPUT ESTIMATE

+ SMALL VALUE

EXHIBIT IV-G.13

- GEIS is the dominant supplier of Interactive Services to the Mining/Quarrying, Paper/Printing and Financial/Business Services sectors. Fjerndata are ahead of GEIS in Metal Manufacturing.
- Datema supplies Interactive Services mainly (and in order of number of accounts) to the Basic Metal, Chemical/Petroleum, Paper/Printing and Financial/Business Services industries.
- Apart from GEIS, Datema and IBM, the only other suppliers of significance in supplying Interactive Service are Fjerndata (Metal Manufacturing), Tronderdata (Wholesale/Retail) and Data Drift.

## 5. MARKET TRENDS

- The growth (or decline) of external services expenditure favours Norway as the more exciting market, albeit on a smaller market size. By contrast the Finnish and Danish economies preclude especially fast growth in any but the software sectors.
- In both Sweden and Norway the prospects for BATCH SERVICES in large organisations are pessimistic, - more so in Sweden than in Norway.
- REMOTE BATCH SERVICES show good potential in Norway where an 18% growth rate is estimated in a market where Remote Batch usage is much higher than in Sweden. Large organisations will be the best hunting ground in which users expect a 29% growth/yr. in their requirements.
- INTERACTIVE SERVICES usage in Sweden is already larger than in Norway and this explains the smaller growth rate of 20%.
- TURNKEY and USER SITE HARDWARE SERVICES are likely to grow at the highest annual rate for any external computing service except SOFTWARE PRODUCTS.

SUPPLIER RANKING BY TYPE OF SERVICE

NORWAY

BATCH	REMOTE BATCH	INTERACTIVE
LANDBRUKETS	TEAMCO	GEIS
EDB	FJERNDATA	DATEMA
=MERCANTILDATA	EDB	IBM
=IDA	=STATENSDRIFCENTRAL	=FJERNDATA
VESDATA	=DATAJENSTE	=TRONDERDATA
TEAMCO	=VESDATA	=DATA DRIFT
COMPUTAS	=GM DANK	TEAMCO
=DATAJENSTE	CDC	COMPUTAS
=DATA AUTOMATION	COMPUTAS	COMSHARE
=SCANIPS	=DATEMA =SHELL HANG =IDA	

EXHIBIT IV-G.14



- The best growth prospects for USHS will be found in the following industry sectors and application areas:

INDUSTRY	APPLICATION
Metal Manufacturing	General Accounting/Payroll
Mining/Quarrying	Production/Inventory
Wood Products	Marketing/Sales
Basic Metal	

### 5.1 APPLICATION AREAS - TRENDS

- Present users of external services do so more in :
  1. General accounting/payroll
  2. Financial analysis/planning
  3. Personnel
  4. Production/inventory
  5. Marketing/Sales
- A comparison of the overall computer usage and the external usage shows a switch in the proportion of Personnel and Marketing/Sales. Surprisingly perhaps, Personnel is more often computerised with an external service.
- A surprisingly high proportion of user respondents claim to be using an On-Site or combination service ; engineering/scientific, financial analysis/planning, marketing/sales and general accounting/payroll are the most popular applications.
- In two years, the order of applications popularity for processing by a combination service is estimated to be :
  1. General accounting/payroll
  2. Marketing/Sales
  3. Financial analysis/planning
  4. Production/inventory

- The most promising application areas for future growth are :
  1. Financial analysis/planning
  2. Production/inventory
  3. Marketing/Sales
  4. General accounting/payroll

## 6. MARKET FORECASTS BY SERVICES CATEGORY

- Exhibit IV-G.15 gives INPUT's five-year forward forecast to 1983.
- Batch Services are expected to go into decline towards the end of the forecast period, while at the same time RCS will plateau out.
- Software Products and Professional Services (including Turnkey and Hardware Maintenance Services) provide steady growth throughout the period reflecting the increasing hardware preoccupation of the leading services vendors.

THE SCANDINAVIAN COMPUTER SERVICES MARKET  
 - FORECASTS BY TYPE OF SERVICE, 1979 - 1983

TYPE OF SERVICE	MARKET FORECASTS IN \$ MILLIONS									
	1977**	1978**	GROWTH 77 - 78 (%)	1979*	1980*	1981*	1982*	1983*	AAGR (%)	
RCS PROCESSING	154	185	20	226	278	342	424	521	23	
BATCH SERVICES	404	450	11	494	538	582	622	653	7	
SOFTWARE PRODUCTS	18	25	39	35	49	68	91	118	36	
PROFESSIONAL SERVICES	169	225	33	293	381	495	649	843	30	
ALL	745	885	19	1048	1246	1487	1786	2135	19	

\* = CONSTANT 1979 DOLLARS; \*\* = CURRENT EXCHANGE RATES

H. AUSTRIA/SWITZERLAND





## IV-H. AUSTRIA/SWITZERLAND

### 1. AUSTRIAN MARKET CHARACTERISTICS AND COMPETITION

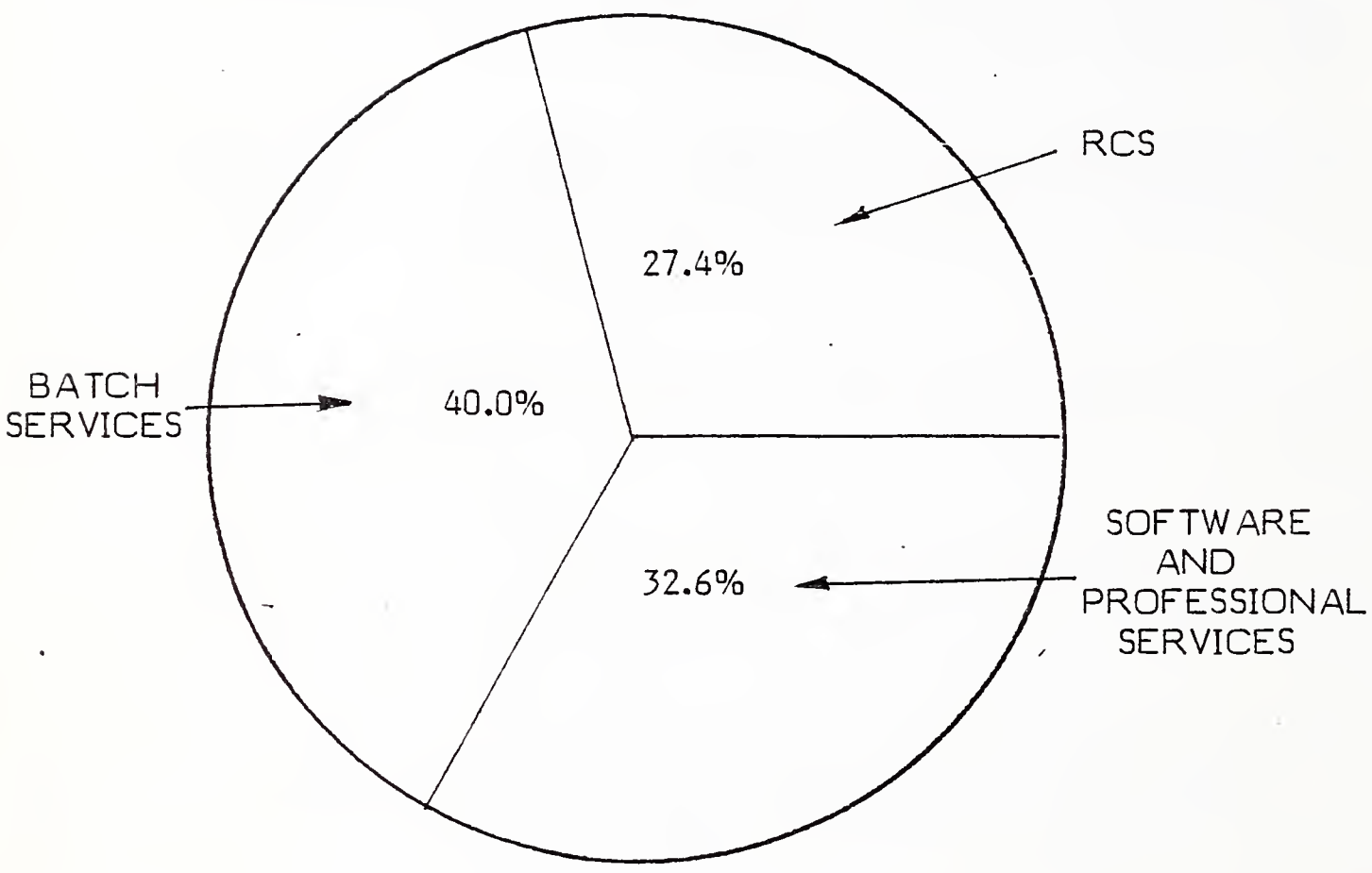
- Austria is a relatively small market in both geographic and value size. The market is valued at \$77M in 1978. (See Exhibit IV-H.1)
- Approximately 70 companies are known to INPUT's CAMP database. A table giving their distribution by size and principal activity is shown in Exhibit IV-H.2.
- The main participants in the Austrian market offering RCS services are listed in Exhibit IV-H.3.
- Three of the largest RCS companies are American owned, namely CDC, GEIS and AC Service (UCC).
- The Austrian market has not been an encouraging one for RCS vendors since the PTT has not until recently offered equipment and services tailored for data transmission.

### 1.2 SWISS MARKET CHARACTERISTICS AND COMPETITION

- The Swiss market is valued at \$180M for 1978 (See Exhibit IV-H). For its geographical size it is a well-developed, slow growing market.
- The market is dominated by a strongly entrenched batch sector. Over 80 companies are registered as active in INPUT's CAMP database. Their distribution by size and principal activity is shown in Exhibit IV-H.4
- The main RCS competitors are listed in Exhibit IV-H.5.

AUSTRIA/SWITZERLAND COMPUTER SERVICES MARKET 1978

SWITZERLAND (\$180M)



AUSTRIA (\$77M)

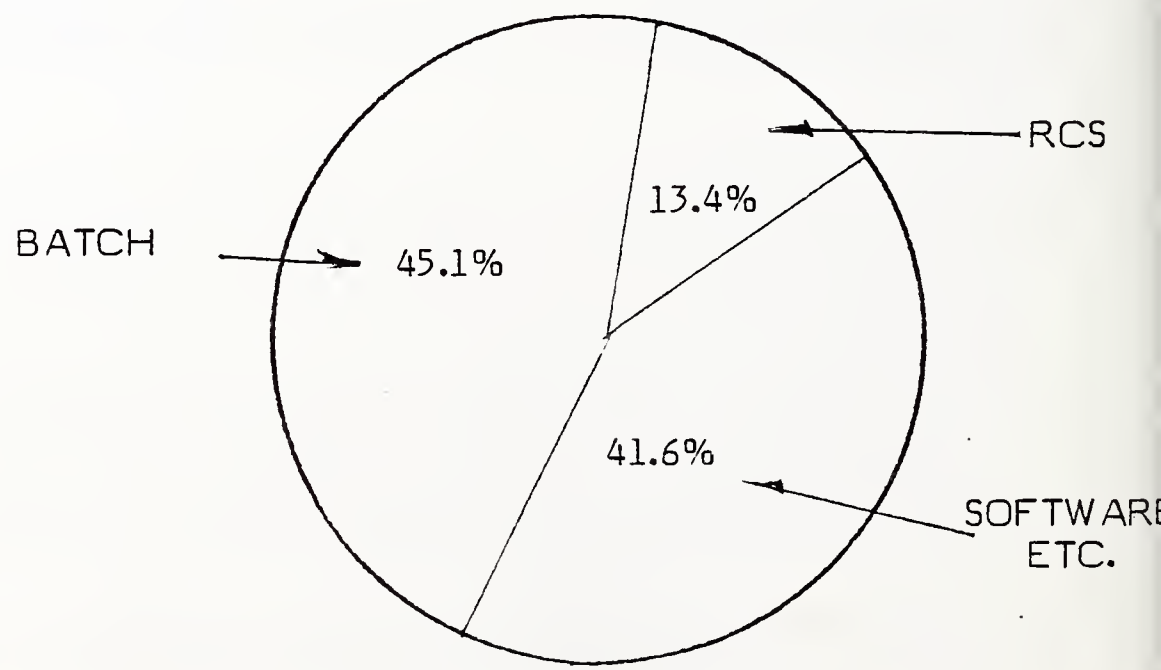


EXHIBIT IV-H.1

DISTRIBUTION OF SAMPLE COMPUTER SERVICES COMPANIES IN  
AUSTRIA BY 1978 TURNOVER AND PRINCIPAL ACTIVITY

TURNOVER US \$	MAIN CODE	ACTIVITY	>10M		10M - 1M		1M - .1M		<0.1M		ALL WITH T/O	SAMPLES as % of EST. TOTAL POP.N.
			A	B	C	D						
		RCS BUREAU	-	3	10 %	1	3.3%	-	-	4	13.3%	50% of 8
		BATCH BUREAU	-	2	6.7	8	26.7	-	-	10	33.3	50% 20
		SOFTWARE AND PROFESSIONAL SERVICES	2	2	6.7	11	36.7	1	3.3	16	53.3	47% 34
		OTHER (EG COM, DATA PREP.)	-	-	-	-	-	-	-	-	-	0% 8
		ALL WITH T/O.	2	7	23.3	20	66.7	1	3.3	30	100	43% 70

SOURCE : CAMP/EUROPE

EXHIBIT IV-H.2

THE TOP REMOTE COMPUTING SERVICES VENDORS

IN AUSTRIA 1978

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES TOTAL (\$M)
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	CDC	0.8	0.4*	1.2	1.4*
2	GEIS	+	0.7*	0.7*	0.7*
3	GREGOR	-	0.4	0.4	2.1
4	VORARLBERGER R.Z.	0.03	0.1	0.12	3.15
5	AC SERVICE	1.7*	+	1.7*	4.3

SOURCE : INPUT CAMP/EUROPE 1979

NOTE:

\* INPUT ESTIMATE

+ SMALL VALUE

CAPTIVE REVENUES WHERE KNOWN ARE OMITTED

DISTRIBUTION OF SAMPLE COMPUTER SERVICES COMPANIES IN SWITZERLAND BY 1978 TURNOVER AND PRINCIPAL ACTIVITY

TURNOVER US \$	MAIN CODE	ACTIVITY	>10M		10M - 1M		1M - .1M		<0.1M		ALL WITH T/O	SAMPLES as % of EST. TOTAL POPN.	
			A	B	C	D	A	B	C	D			
		RCS BUREAU	6	9.0%	4	6.0%	1	1.5%	-	-	11	16.4%	73% of 15
		BATCH BUREAU	-	-	9	13.4	5	7.5	-	-	14	20.9	88% 16
		SOFTWARE AND PROFESSIONAL SERVICES	1	1.5	15	22.4	23	34.3	2	3.0	41	61.2	95% 43
		OTHER (EG COM, DATA PREP.)	-	-	-	-	1	1.5	-	-	1	1.5	14% 7
		ALL WITH T/O.	7	10.5	28	41.8	30	44.8	2	3.0	67	100	83% 81

SOURCE : CAMP/EUROPE



THE TOP REMOTE COMPUTING SERVICES VENDORS

IN SWITZERLAND AND 1978

RCS RANK	COMPANY	RCS SERVICES (\$MILLION)			ALL SERVICES TOTAL (\$M)
		REMOTE BATCH	INTERACTIVE	TOTAL	
1	CDC	0.9	0.5	1.4	1.6*
2	IHA	1.4	-	1.4	7.0
3	INTERDATA	0.6	0.4	1.0	12.4
4	GEIS	-	1.0*	1.0*	1.0*
5	DATRON A.G.	0.8	0.17	0.97	4.2
6	PROGNOS A.G.	-	0.5	0.5	5.9
7	TELECOMCENTRE	-	0.36	0.36	1.8
8	ELDATOR A.G.	-	0.28	0.28	0.7
9	HOWEG DATA A.G.	0.02	0.11	0.13	1.0

SOURCE : INPUT CAMP/EUROPE 1979

NOTE:

\* INPUT ESTIMATE

CAPTIVE REVENUES WHERE KNOWN ARE OMITTED

COMPUTER SERVICES MARKETS IN AUSTRIA AND SWITZERLAND  
 - FORECASTS BY TYPE OF SERVICE, 1979 - 1983

TYPE OF SERVICE	MARKET FORECASTS IN \$ MILLIONS									
	1977 **	1978 **	GROWTH 77 - 78 (%)	1979 *	1980 *	1981 *	1982 *	1983 *	AAGR (%)	
RCS PROCESSING	48	59	23	74	91	111	132	154	20	
BATCH SERVICES	100	108	8	119	129	140	150	159	7	
SOFTWARE PRODUCTS	19	25	32	33	42	53	67	85	27	
PROFESSIONAL SERVICES	48	65	35	86	112	144	181	221	26	
ALL	215	257	20	312	374	448	530	619	19	

\* = CONSTANT 1979 DOLLARS; \*\* = CURRENT EXCHANGE RATES

EXHIBIT IV-H.6



I. SPAIN/PORTUGAL





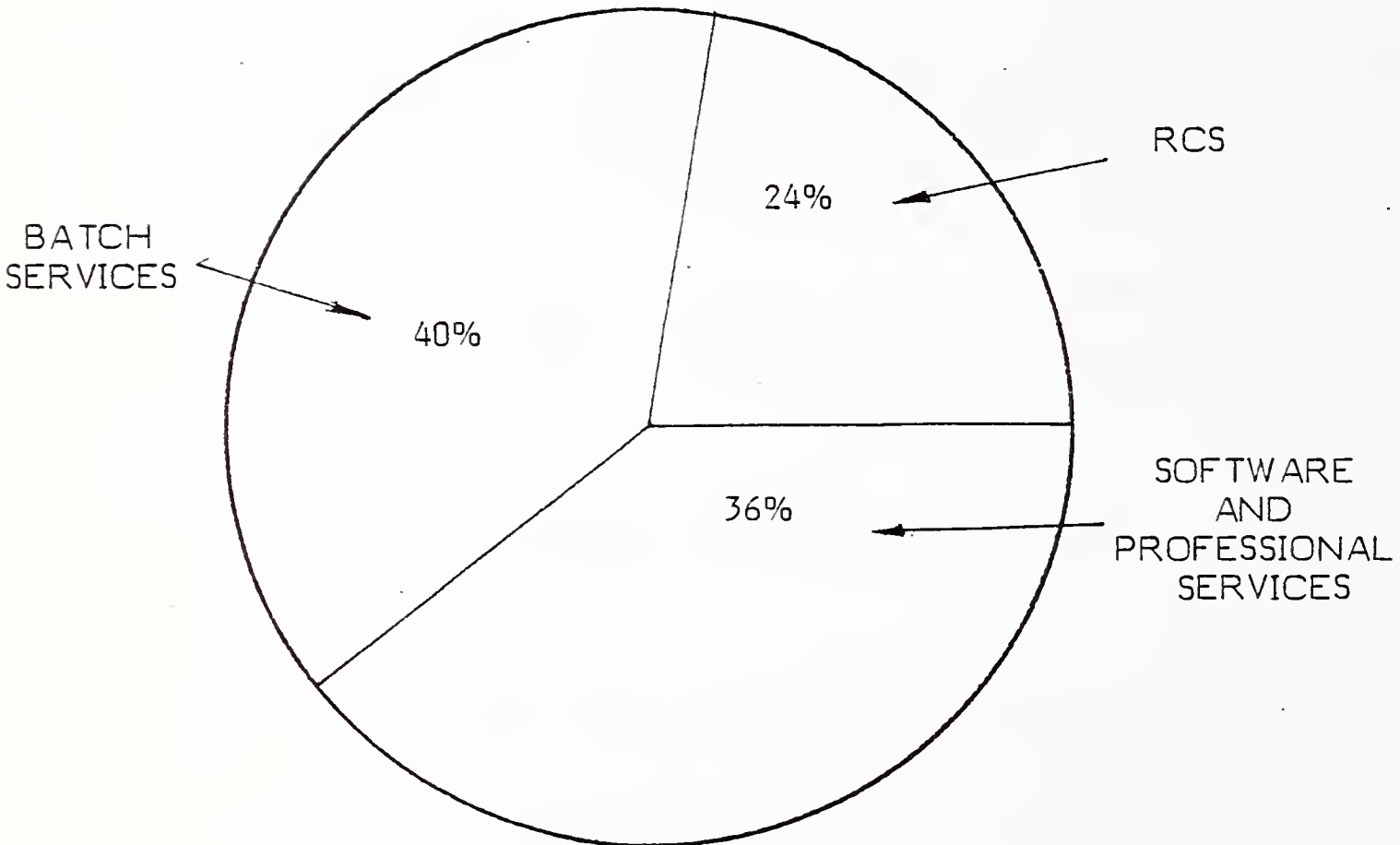
## IV-I. SPAIN/PORTUGAL

### 1. MARKET CHARACTERISTICS AND COMPETITION

- The market for services in the Iberian Peninsula - Spain and Portugal - is as yet not at all well developed. Together the two countries accounted in 1978 for some \$163M at the current exchange rates. See Exhibit IV-I.1.
- Like that other underdeveloped country market - in Italy -, there are signs that the market wishes to grow at a considerable pace. But there are constraints:
  - the lack of trained d.p. professional staff being of most impact in this context.
- In Spain's case, however, a good communications network has now been set up. With GSI's recent acquisition of Spain's largest bureau Seresco, the scene is, therefore, laid for the introduction of French-developed Remote Computing services.
- The second major area of expansion will take place in the software sector. Spain's intake of mini-computers is presently one of the growth points in European hardware markets. With the lack of trained personnel for software development, users are ready for the software product alternative to tailored systems. However, turnkey services will also grow firmly as part of the Professional Services sector.
- See Exhibit IV-I.2 for forecasts of the combined country market's growth through 1983.

THE IBERIAN COMPUTER SERVICES MARKET 1978

SPAIN (\$143M)



PORTUGAL (\$20M)

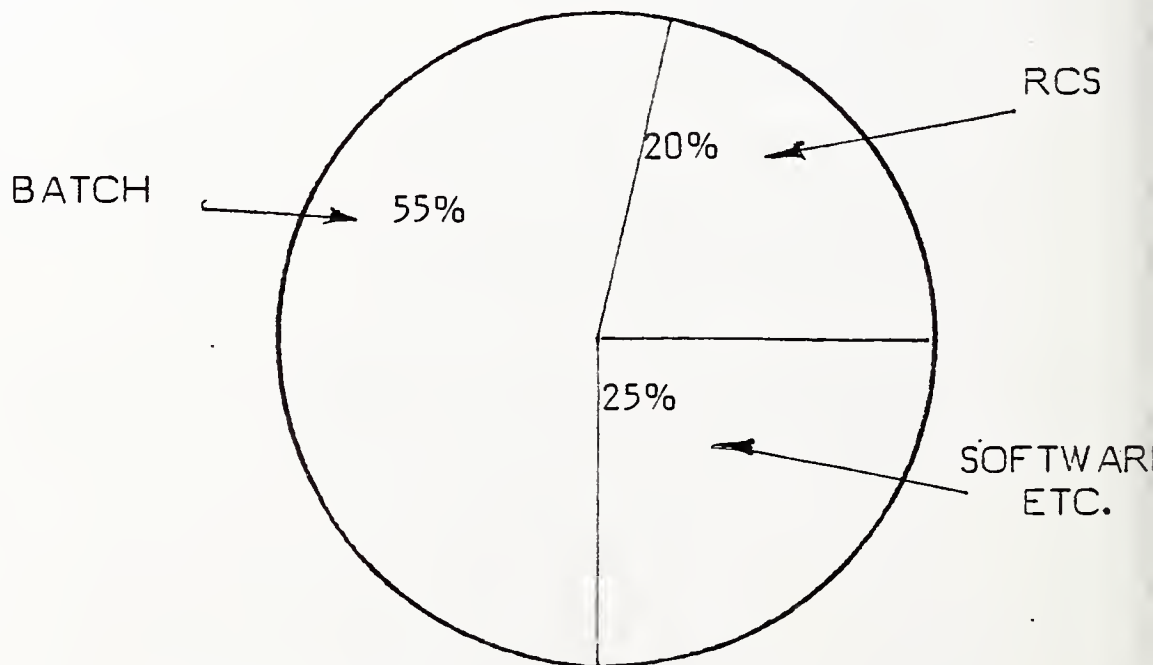


EXHIBIT IV-1.1

COMPUTER SERVICES MARKETS IN SPAIN AND PORTUGAL

- FORECASTS BY TYPE OF SERVICE, 1979 - 1983

TYPE OF SERVICE	MARKET FORECASTS IN \$ MILLIONS									
	1977 **	1978 **	GROWTH 77 - 78 (%)	1979 *	1980 *	1981 *	1982 *	1983 *	AAGR (%)	
RCS PROCESSING	33	39	18	46	54	65	78	94	19	
BATCH SERVICES	59	68	15	78	90	103	119	137	15	
SOFTWARE PRODUCTS	12	15	25	19	24	29	37	49	27	
PROFESSIONAL SERVICES	32	41	28	52	67	84	104	127	25	
ALL	136	163	19	195	235	281	338	407	20	

\* = CONSTANT 1979 DOLLARS; \*\* = CURRENT EXCHANGE RATES

EXHIBIT IV-1.2



V. APPENDICES

- A. DOLLAR EXCHANGE RATES
- B. DATA COMMUNICATIONS
- C. DEFINITIONS





APPENDIX A. DOLLAR EXCHANGE RATES



## APPENDIX A: 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	SCHILLING 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 B. DATA COMMUNICATIONS



## APPENDIX B: DATA COMMUNICATIONS

### A. FRANCE

#### A.1 Services Provided

- Conventional circuit switched data transmission is provided entirely on the publicly available lines; no leased lines for exclusive use are available.
  - For speeds up to 2400 bits/Sec the Public Switched Telephone Network is used; the quality cannot be consistently guaranteed due to the variety of equipment which services that network and the variety of routes which may be selected. All subscriber installations consist of a telephone to establish communication.
  - For speeds between 2400 bits/sec and 9600 bits/sec the Caducee service is available; this is a specially engineered network offering a higher quality service and is provided specifically for data transmission.
  - Telex circuits are an alternative to the PSTN for very low speeds; the cost of transmission at 300 bits/sec for distances over 200 km, and between 100 and 200 km for long datastreams favour the Telex service.
- For more intensive users and those with multi-point data transmission requirements two network based services are available. The networks consist of multiplexors connected by special high grade links. Users are connected to the nearest node of the network by the PSTN, leased line or the network can be extended to place a multiplexor on the user's site; the type of connection depends on the service selected:

- The Transplex service is provided for speeds up to 1200 bits/sec and operates in asynchronous duplex mode. Connections on the terminal side can be made through PSTN or a leased line; on the computer side, the connection can be made by leased line to the nearest network node, or, the network can be extended to place a nodal multiplexor in the computer installation.
- The Transmic service is a high speed service reserved for data transmission. Speeds ranging between 2400 bits/sec and 2M bits/sec are available operating in duplex synchronous mode. Connections with the network are made through special very high speed links or on-site multiplexors.
- The French have been at the forefront of European development of packet switching networks, particularly with the prototype RCP and CIGALE networks. These are the forerunners from which the present TRANSPAC public network is derived. The service is yet to be fully implemented to provide access from all parts of the country. Transmission speeds range from 50 to 4800 bits/sec. Connections with the nearest access node can be made through Telex, PSTN or leased circuits; the virtual circuits in the network can be automatically switched according to network load or on a permanently fixed path between two points.
- International data transmission connections are available through three types of service:
  - The Datel services, provided in partnership with the British Post Office, are available to connect with most European countries and the USA and Canada. The speeds available range from 50 bits/sec to 2400 bits/sec.
  - An access service, called DBS, is available to US subscribers to Tymnet and Telenet. Currently a transmission speed of 300 bits/sec is allowed.
  - The Sesame service provides the option to users of building up a private message switching network. The system offers speeds ranging from 50 to 1200 bits/sec.

EXHIBIT BA.1

PSTN CHARGES IN FRANCE

a) CONNECTION CHARGES

o ANNUAL RENTAL FOR CONNECTION TO PSTN - 378 FF to 504 FF

b) TRAFFIC CHARGES

DISTANCE (km)	CHARGE (FF)
10	0.42/CALL
10-25	21.0
25-50	33.6
50-100	63.0
100-200	100.8
200	126.0

NOTE: i) A REDUCTION OF 50% IS APPLIED  
OUTSIDE PEAK HOURS



EXHIBIT BA.2

LEASED LINE CHARGES IN FRANCE

DISTANCE (km)	ANNUAL RENTAL ('000 FF)		
	2 WIRE	4 WIRE QN	4 WIRE QS
1	2.06	4.07	6.68
5	3.73	7.46	8.21
10	5.85	11.69	12.86
20	10.08	18.75	20.62
30	12.90	25.80	28.39
50	19.96	32.86	36.85
250	85.68	98.58	115.72

## A.2 Tariffs

- French PSTN line costs as shown in Exhibit BA.1 are expensive compared with the European average. The quality of the lines does not compare well, however, nor does the average delay in obtaining lines (although this has vastly improved, halving in the last two years to today's average of ten weeks).
- PSTN connection costs are very high at short distance and also entail a monthly rental. As the distance grows to 150km or more, the charge becomes more comparable to other major European countries.
- Leased lines are the second most expensive in Europe (see Exhibit BA.2).
- When the same company uses both ends of the leased line (i.e. when the leased line is used for intercompany or intra-subsidiary communications) a 20% reduction is applied. The formulae used is directly dependent on straight line distance, such that there is a continuous variation of tariff between the tariff zones (kilometres 1, 2, 10, 20, 30, 50, 100, 200, 250, 300 and 311)
- At the top end (311km) the French tariff is more expensive than even the German tariff. Fortunately, most RCS business is done in and around Paris; where communications are necessary between Paris and Marseille there are alternatives, the most important of which is Transplex.
- Transplex (from Telesystemes) is practically a value added network (VAN) which offers a data highway between Paris and Marseille with network collection points in all of the major cities in the North, West, Southwest, and South. The tariff is some 25-30% cheaper for equivalent or better services than those of the PTT. Telesystemes is owned by France Cables, which is owned by the PTT.

## B. WEST GERMANY

### B.1 Services Provided

- Two alternatives utilising the public networks of the Deutsche Bundespost are available as discrete data transmission services:
  - The telephone (PSTN) and telex networks are used to provide a speed range of 20 bits/sec up to 4800 bits/sec. Since these networks were set up originally for transmission of voice-grade and teletype messages they are subject to some constraints on quality.
  - The Datex network was established especially for the transmission of data and provides high grade lines for operating speeds ranging from 200 bits/sec to 48,000 bits/sec. All but the 300 bits/sec service operate in full duplex mode. The Datex network employs for the higher speeds, electronic circuit switching and a 9600 bits/sec speed will soon be available.
- To satisfy user needs for dedicated circuits connections are allowed using PSTN or leased lines. Telephone type circuits are used, although, inter-connection with the standard PSTN network is not allowed if the circuit is leased. In the latter case connections are only allowed between persons of the same legal entity. By introducing electronic circuit switching the Deutsche Bundespost is establishing an integrated telex and data network; the routing of fixed and leased circuits will gradually be absorbed by this new network.
- The Datex network for packet switching will be available in 1980.
- For international connection German users have:
  - Access to a similar range of countries to those offered by France and the UK with Datex; PSTN lines are used for this purpose also.

- Datex is available only to Belgium and France (at 20 and 300 bits/sec).
- Leased lines are not normally offered but can be obtained under certain conditions.

## B.2 Tariffs

- The quality of the German PTT network services is the best in Western Europe and is continually being improved. Quality is expressed as measuring the reliability of the lines provided, speed of support for installation modification, line capacity available for expansion and short delay in obtaining it.
- It is estimated that the German PSTN is, on average, never loaded beyond 80% capacity. The result is that dialled connections always get through (unless the number dialled is busy).
- The importance, to a businessman, of this feeling of "communicability" cannot be overstressed. One only has to try to do business in Italy (where the lines between major cities are always saturated during normal working hours) to fully understand the value of good communications. The frustration caused by faulty communication is bad enough, but not being able to "get through" at all has disastrous effect on business morale.
- Unfortunately, this very high quality and availability of German communications has a stiff price. PSTN line costs are almost twice as expensive as the next most expensive peak rates in France and Norway.
- The cheaper PSTN connections are those that use lines that are greater than 100 km long (the longer the line, the better the relative cheapness). (See Exhibit BB.1).

- The leased lines tariff is graduated similarly, but changes reduce more steeply with increasing distance (see Exhibit BB.2). Overall the leased line rates in Germany are the most expensive in Europe, and by a large margin.
- Connection charges are composed of two elements: Cost of the first installation and its rental thereafter. This can be quite expensive for a multipoint connection and very expensive for complex networks.



EXHIBIT BB.1  
PSTN CHARGES IN GERMANY

a) CONNECTION CHARGES

- INSTALLATION OF ONE LINE - 200 DM (TWO WIRE)  
- 400 DM (FOUR WIRE)
- RENTAL FOR ONE LINE/YEAR - 324 DM

b) TRAFFIC CHARGES

DISTANCE (km)	CHARGE/HR (DM)					
	PEAK		STANDARD		CHEAP	
	TEL	DATEX	TEL	DATEX	TEL	DATEX
LOCAL	0.23	-	0.23	-	0.23	-
DISTRICT	1.73	-	1.73	-	1.73	-
WITHIN ZONE	9.20	-	9.20	-	9.20	-
OUTSIZE ZONE ≤ 25	18.40	16.25	12.27	10.85	12.27	10.85
25 - 50	27.60	27.05	18.60	16.25	12.27	10.85
51 - 100	55.20	48.65	27.60	24.17	12.27	10.85
> 100	69.00	66.85	36.80	34.61	12.27	10.85

NOTE:

- (i) PEAK RATE - 0600 TO 1800 hrs, MON-FRI; 0600 TO 1600, SAT
- (ii) STANDARD RATE - 1800 TO 2200, MON-FRI
- (iii) CHECK RATE - 2200 TO 0600 MON-SUN; 1400 TO 2200 SAT;  
0600 TO 2200 SUN
- (iv) DATEX CHARGES ARE FOR 2400 BITS/SEC.

EXHIBIT BB.2  
LEASED LINE CHARGES IN GERMANY

a) INSTALLATION CHARGES

- WITHIN SAME LOCAL TELEPHONE AREA: 2 WIRE-200DM; 4 WIRE-400 DM
- BETWEEN DIFFERENT TELEPHONE AREAS: 2 WIRE-400 DM; 4 WIRE-800 DM

b) RENTAL

DISTANCE (km)	CHARGE/YR ('000 DM)
	WIDEBAND CIRCUITS UP TO 48K Hz
5	12
10	24
50	72
250	105

DISTANCE (km)	CHARGE/YR ('000 DM)
	TELEPHONE CIRCUITS UP TO 3400 Hz
5	2.4
10	4.8
50	24.0
100	31.2
250	36.0

C. UNITED KINGDOM

C.1 Services Provided

- The main data transmission service offered by the Post Office is Datel. The service is offered over the public switched telephone network (PSTN) and private circuits (leased lines); maintenance of any necessary modems and ancillary control equipment is also available to interface customers' data terminal equipment to Post Office circuits. Transmission rates vary from 200 bits/sec to 50K bits/sec; the latter speed is provided over specially engineered circuits giving a full duplex facility.
- For computer bureaux and other organisations which need to link a larger number of customers via a common line to a facility, the Post Office provides Dataplex 3. This service comprises two multiplexers interconnected via modems to a private common circuit; customers access the remote multiplexer using private circuits or PSTN. Lower costs are thereby achieved since the common line is being shared and the local multiplexer is being accessed at local call charges.
- The Post Office has been experimenting with packet switching and has been operating an Experimental Packet Switched Service (EPSS) since April 1977. The service has been available between 0845 hours and 1645 hours on weekdays; a network availability of 99% has been achieved during these hours. It is planned to introduce a public Packet Switching Service (PSS) during the latter part of 1979; this will meet international standards CCITT X25, X3, X28 and X29. EPSS will be maintained for a reasonable overlap period.
- International data transmission is provided through the following services:
  - Datel for use on PSTN providing speeds ranging from 50 bits/sec to 2400 bits/sec. Connection with most European countries and the USA and Canada is available.

- Leased circuits using telephone or telegraph type circuits are available providing speeds up to 1200 bits/sec. For higher speeds telephone circuits can be grouped and can provide up to 50K bits/sec; between the UK and the USA up to 50K bits/sec can be provided using single channel per carrier facilities. The transmission is digital in the space link but it is necessary to change to analogue techniques for the terrestrial links.
  
- For connection with Canada a point to point facility is available between the UK and the Montreal International Gateway: Speeds ranging from 50 bits/sec to 2400 bits/sec are available on full duplex operation.
  
- An International Packet Switched Service (IPSS) is planned, initially between the UK and the USA. The first host-to-host link has been set up between the London and Boston IPSS gateway nodes. The link operates at 2400 bits/sec and is accessed in the UK from the Post Office R & D centre at Bedford.
  
- Euronet is due to be available to UK users in late 1979; access will be gained to this information network through a packet switching exchange in London. Speeds up to 96K bits/sec are available.

EXHIBIT BC.1

PSTN CHARGES IN THE UNITED KINGDOM

a) CONNECTION CHARGES

- INSTALLATION OF A NEW LINE WITHIN 5 km OF AN EXCHANGE WHERE EXTERNAL WIRING REQUIRED -£45
- ANNUAL LINE RENTAL -£36 to £39

b) TRAFFIC CHARGES

DISTANCE (km)	CHARGE/HR (£)		
	PEAK	STANDARD	CHEAP
LOCAL	0.90	0.60	0.15
<56km	3.60	2.40	0.60
>56km	10.80	7.20	1.80

- NOTES:
- i) PEAK RATE - MON TO FRI, 0900-1300
  - ii) STANDARD RATE - MON TO FRI, 0800-0900, 1300-1800
  - iii) LOCAL CALLS VARY IN RADIUS



EXHIBIT BC.2

UNITED KINGDOM LEASED LINE CHARGES

DISTANCE (km)	CONNECTION CHARGE (£)		ANNUAL RENTAL (£)	
	S1/S2/S3	T	S3	T
< 0.8	15	20	32-74	34-85
0.8-16	25	40	85-405	103-445
16-80	35	60	600-1185	610-1295
80-160	55	90	1280-1815	1440-2055
> 160	75	120	2210-3620	2410-3890

- NOTE:
- i) S1, S2, S3 AND T ARE LINE QUALITY INDICATORS
  - ii) S3 IS USUALLY 4 WIRE; T IS ALWAYS 4 WIRE
  - iii) S3 CAN CARRY UP TO 1200 BITS/SEC
  - iv) T IS REQUIRED FOR MORE THAN 2400 BITS/SEC

## C.2 Tariffs

- While Public Switched Telephone Network (PSTN) lines are relatively costly, leased lines are very cheap and of good quality.
- U.K. networks using PSTN lines have a critical cost breakpoint at 56 kilometres above which line costs are tripled (See Exhibit BC.1)
- Leased T quality circuit connection charges are from 33% (short distance) to 60% (long distance) more expensive than S3 charges. The circuits themselves are from 2% to 20% more expensive than S3 circuits. (See Exhibit BC.2).
- Average delay for obtaining leased line installation is three to four months.
- The post office announced in 1978 a ten year plan to increase telephone penetration from today's 45% (telephone per person) to 80%. Neither Sweden nor the U.S. who have the highest penetration rates (70-75%), attain that rate today.
- The U.K. Post Office telecommunications group has the largest budget among the Western European telecommunications authorities, spending nearly \$2 billion a year (or \$5.6 million a day) on improvements and network extensions. Its electronic exchange (System X) now under development will nevertheless arrive later than the Swedish, German, and French equivalents.

D. ITALY

D.1 Data Communications Facilities

- Transmission speeds are available ranging from 200 bits/sec up to 240K bits/sec. These are provided as follows:
  - Public telephone network                      200 bits/sec to 2400 bits/sec
  - Leased telephone circuits                      200 bits/sec to 7200 bits/sec
  - Baseband    2400 bits/sec to 96K bits/sec
  - Wideband    48K bits/sec to 240K bits/sec.
  
- A packet switching service is planned for introduction in 1981; this will operate at 2400 bits/sec up to 48K bits/sec.
  
- For international connections the PSTN is interfaced with the International Datel network; private lines can be arranged to most locations in the world whether an international system is available or not.

## E. THE NETHERLANDS

### E.1 Communications Facilities

- The Dutch PTT is situated in The Hague. The present telephone standard data communications service offers the cheapest line costs in Europe with excellent quality:
  - Leased line costs are about one tenth of those of France and public switched network lines are also far cheaper.
  - Connection costs are equivalent to those of the U.K.
- On the other hand, plans for a circuit switched digital facility are still at the feasibility stage. Nothing is expected to be provided until at least 1982, and developments in neighbouring countries are being studied with interest.
- The current data transmission services available in Holland are based on telegraph and telephone grade services:
  - Dabas, a slow speed service covering up to 300 bits/sec and 1200 bits/sec; operating mode is asynchronous with half or full duplex options. The service is available on the PSTN or leased lines.
  - Datel provides for a range of speeds up to 4800 bits/sec; operating mode is asynchronous or synchronous and half or full duplex. The service is available only on PSTN circuits.
- For higher speed and quality, special arrangements must be made with the PTT; the options available are:
  - High quality up to the CCITT recommendation M1020
  - Wideband circuits to allow speeds up to 64k bits/sec.

- Medium speed services will be available as a standard service in mid 1979 through the Idee service. This service will provide for speeds between 2400 bits/sec and 9600 bits/sec; operating mode will be synchronous and full duplex. Idee is being specially introduced for users who do not generate sufficient traffic to justify a leased line or need a back up facility for existing leased lines.
  
- A packet switching network is planned for the end of 1980. The service, called Datanet 1, will comprise:
  - 3 packet switching' exchanges located in Amsterdam, The Hague and Arnhem
  
  - 57 remote concentrators
  
  - 1 network control centre.

Customers will be connected to the network by 4 wire leased lines. Network speeds available will be 2400, 4800, 9600 and 48k bits/second

- DN-1 is planned to be available to seven major data communication users before the end of 1979. The PTT is working with the manufacturer on the functional specification of the network and on the definition of the interface between the network and the users. The seven initial users of DN-1 and the PTT itself form the 'Userclub DN-1' which is responsible for approval of the specification.
  
- The interface between the network and the user will be as far as possible in accordance with CCITT Recommendation X.25. At level 2, only LAP-B will be implemented. Other interfaces will not be offered initially.
  
- The initial users of DN-1 are expected to connect 15 host computers and about 1400 terminal interface processors to the network. An average of 5 terminals per interface processor are anticipated.



EXHIBIT BE.2

PSTN CHARGES IN HOLLAND

a) CONNECTION CHARGES

- INSTALLATION OF ONE LINE - 210 Dfl
- ANNUAL LINE RENTAL - 276 Dfl

b) TRAFFIC CHARGES

DISTANCE	CHARGE/HR (Dfl)
LOCAL	0.16 (PER CALL)
TRUNK (PEAK RATE)	13.2
TRUNK (OFF PEAK)	6.6

EXHIBIT BE.3

LEASED LINE CHARGES IN HOLLAND

a) INSTALLATION

- 2 WIRE - 165 Dfl
- 4 WIRE - 330 Dfl

b) RENTAL

DISTANCE (km)	CHARGE/YR (Dfl)		
	2 WIRE	4 WIRE	QUALITY 4 WIRE
LOCAL	210-450	420-900	840-1800
≤ 10	2100	2520	3960
11-25	3000	3600	5040
26-50	4800	5760	7200
51-100	6000	7200	8640
> 100	6600	7920	9360

- NOTE:
- i) ABOVE CHARGES APPLY TO THE DABAS SERVICE
  - ii) WIDEBAND CHARGES ARE: INSTALLATION, 2,660 Dfl  
ANNUAL RENTAL, 5,000-50,000 Dfl
  - iii) NORMAL QUALITY LINES ARE TO CCITT SPECIFICATION M1040; "QUALITY 4 WIRE" LINES ARE TO M1020

- The Dabas and Datel services are internationally available and connect with all other contributing countries to the International Datel service. Idee will not be available internationally, excepting to the USA.
- Datanet 1 will not be internationally available in its first phase; at a later stage however this network will become the link with Euronet and other packet switching systems elsewhere.

## E.2 Tariffs

- PSTN charges (see Exhibit BE.2) are among the cheapest in Europe and are of excellent quality.
- Leased line charges (see Exhibit BE.3) are also at the lower end of the European range for both installation and annual rental.
- A typical line charge between London and Holland is 120K Guilders/year.

## F. BELGIUM/LUXEMBOURG

### F.1 Data Communications

- Although the markets of Belgium and Luxembourg are often considered together, the data transmission services offered are supplied by independent PTT's.
- PSTN and leased lines are available in both countries for speeds up to 2400 bits/sec; for higher speeds each country provides different services:
  - Speeds up to 9600 bits/sec are provided in Belgium on baseband for physical lines of short distance (up to 20km)
  - Speeds up to 9600 bits/sec are provided in Luxembourg with conventional telephone circuits. Speeds in excess of 9600 bits/sec are provided either by baseband or wideband; the latter have to be specially engineered and can provide speeds of 48K bits/sec and 72K bits/sec.
- Conventional telegraph and telephone circuits are available to connect internationally with countries offering compatible data transmission facilities (i.e. those which participate in International Datel). Connections are available through PSTN or leased circuits for speeds up to 2400 bits/sec. Connection with the Tymnet and Telenet networks are also available through a connecting node in Brussels.

EXHIBIT BF. 1

PSTN CHARGES IN BELGIUM/LUXEMBOURG

a) CONNECTION CHARGES

	<u>BELGIUM</u>	<u>LUXEMBOURG</u>
● LINE INSTALLATION	4,700 B Fr	2,500 L Fr
● LINE ANNUAL RENTAL	9,720-16,560 B Fr	5,400-9,600 L Fr

b) TRAFFIC CHARGES

DISTANCE	CHARGE/HR (B Fr OR L Fr)	
	BELGIUM	LUXEMBOURG
LOCAL	5.00	3
SHORT TRUNK	93.73	
MEDIUM TRUNK	187.50	60
LONG TRUNK	375.00	



EXHIBIT BF. 2

LEASED LINE CHARGES IN BELGIUM

a) INSTALLATION

- MINIMUM CHARGE FOR 4 WIRE - 5000 BF

b) RENTAL

DISTANCE	CHARGE/YR ('000BF)	
	NORMAL QUALITY	HIGH QUALITY
LOCAL ( SAY 5km)	26.28-52.00	61.78-115.50
ADJACENT ZONES	97.50	150.00
NON-ADJ. ZONES	195.00	249.00

LEASED LINE CHARGES IN LUXEMBOURG

a) INSTALLATION

- STANDARD CHARGE FOR 4 WIRE CIRCUIT - 10,000 LF

b) RENTAL

DISTANCE	CHARGE/YR ('000 LF)
LOCAL	12.3
SAME SECTOR	49.8
DIFFERENT SECTOR	94.8

- A packet switching service is planned for introduction in Belgium at the end of 1980. This will conform to internationally agreed standards. In particular the X25 protocol. The system will be based on the 'virtual circuit' principle whereby all packets relating to one call follow the same route thus preserving the transmission sequence. Permanent virtual circuits will also be available to preserve the same route for all calls between two points. Access will be by PSTN or leased lines to the networks; network operating speeds will range from 2400 bits/sec to 9600 bits/sec.
- In Luxembourg public switched data communications facilities are available via:
  - telephone network, and telex
  - Leased lines are also available.
- The PTT Administration does not supply modems, teleprinters nor data transmission equipment. These have to be purchased from approved proprietary sources.
- The Administration is considering the introduction of a public packet switching network. At the present time access to Euronet and other database networks may be made through the public switched telephone network.

## F.2 Tariffs

- Although PSTN line rental is the highest in Europe in these two countries, the peak rate charges are also the lowest. Conversely, leased line charges are relatively cheap. (See Exhibits III-E.3 and III-E.4)

## G. SWEDEN/NORWAY/DENMARK

### G.1 Data Communications Facilities

- Data transmission services presently offered in Sweden and Norway are similar in scope and both use PSTN or private leased circuits.
  - Using the PSTN, speeds ranging from 200 bits/sec to 2400 bits/sec are available, full duplex mode is provided for all speeds, half duplexing being available in all mid range speeds.
  - Private leased lines are available to cover all the services provided in the PSTN system.
  - Higher speed ranges, typically 2400 to 9600 bits/sec are provided using baseband modems which must operate on a short distance (up to 20km) physical line. In Norway the service is referred to as DCB 9600 and includes a lower speed of 1200 bits/sec. In Sweden the Baseband service can provide a higher speed of 19,200 bits/sec also.
- Meanwhile a separate network intended specifically for data transmission is being established by the PTT's of Sweden, Norway, Finland and Denmark. The Nordic Public Data Network (NPDN) when available will provide full duplex four wire operating mode at speeds ranging from 600 bits/sec to 9600 bits/sec. The basic purpose will be to provide synchronous transmission although it will be possible to connect asynchronous data terminal equipment for lower transmission rates. Line quality standards will be higher than for the current PSTN circuits.
- A packet switching service is to be offered (probably at the end of 1981) by the introduction of the X25 interface in NPDN. Additional network components will be necessary to handle the interleaved multiplexing of packets from different subscribers. Such additional components will include

packet switching exchanges and separate packet multiplexors. Eventually the Nordic packet switching network will be able to communicate with the packet switching networks elsewhere, for example TRANSPAC, PSS and EURONET.

- o The standard range of PSTN and leased line services for data transmission (up to 9600 bits/sec) are available for international connections where compatible services exist at the other end. Access to the Telenet and Tymnet US networks is available through a node in The Netherlands.
- o In Denmark, transmission speeds available range from 50 bits/sec up to 48K bits/sec. These are provided as follows:
  - Telex network/leased circuits - 50 bits/sec
  - Public Telephone Network - 200 bits/sec to 2400 bits/sec
  - Leased circuits only - up to 48K bits/sec
- o A packet switching services is planned for availability in 1981.
- o International connections are possible using the telephone and telex circuits. Access to U.S. certain databases is available via a concentrator in Amsterdam.

EXHIBIT BG.1

PSTN CHARGES IN SWEDEN/NORWAY

a) CONNECTION CHARGES

	<u>SWEDEN</u>	<u>NORWAY</u>
● LINE INSTALLATION	340 SKr	1,000 NKr
● ANNUAL RENTAL	200-272 SKr	300-636 NKr

b) TRAFFIC CHARGES

SWEDEN		NORWAY	
DISTANCE (km)	CHANGE/HR (SKr)	DISTANCE (km)	CHARGE/HR (NKr)
LOCAL	0.17	LOCAL	13.4
≤ 45	13.60	ZONE	27.0
45 - 90	25.50	50	67.0
90 - 180	40.80	50	121.0
180 - 270	51.00		
> 270	61.29		

- NOTE:
- (i) PSTN TARIFFS ARE STANDARD FOR ALL TIMES AND DAYS IN SWEDEN.
  - (ii) CHARGES FOR NORWAY APPLY TO ALL TIMES AND DAYS EXCEPT LOCAL AND WITHIN ZONE CALLS WHICH ARE CHEAPER OUTSIDE PEAK HOURS.



EXHIBIT BG. 2

LEASED LINE CHARGES IN SWEDEN/NORWAY

a) INSTALLATION

- IN SWEDEN FOR DISTANCES UP TO 6 km - 500 to 700 SKr; OVER 6 km - 900 SKr
- IN NORWAY - 880 NKr

b) RENTAL

DISTANCE (km)	CHARGE/YR ('000 SKr or NKr)		
	SWEDEN		NORWAY
	2 WIRE	4 WIRE	
≤ 6	UP TO 0.5	UP TO 1.0	1.80
6-10	1.0	2.0	3.60
11-20	1.8	2.8	5.58
21-30	3.0	4.0	7.62
31-40	4.8	5.8	9.60
41-60	7.2	8.2	12.60
61-80	9.6	10.6	15.60
81-100	9.6	10.6	18.60
101-120	12.0	13.0	21.60
121-150	15.6	16.6	25.02
151-200	19.2	20.2	30.00
201-250	26.4	27.4	35.04
251-300	30.0	31.0	40.02
301-400	42.0	43.0	67.04
401-600	50.0	51.0	55.02
> 600	50.0	51.0	66.00

NOTE: (i) TWO AND FOUR WIRE TARIFFS ARE THE SAME FOR LONG DISTANCE LINES IN NORWAY

(ii) IN NORWAY SURCHARGES ARE APPLIED FOR SPECIAL QUALITY (NKr 6000) AND DATA TRANSMISSION (NKr 4200)

## G.2 Tariffs

- Sweden is unique in Europe in that there is an independent supplier of communications lines and modems (Televerket), which has not only helped to keep the line costs down, but has also accelerated the speed of market penetration. As a result, the penetration rate (numbers of telephones per head of population) is comparable to that of the U.S. (70%).
- Data transmission costs in Sweden are among the cheapest in Europe. PSTN chates are cheaper even than those in the U.K. (See Exhibit BG.1)
- Although leased line rental is the second cheapest in Europe (after Luxembourg) the connect charges are the highest. (See Exhibit BG.2)
- In neighbouring Norway charges are in the middle of the European range.
- Danish communications are expensive and good.

## H. Swiss Data Communications

- Transmission speeds ranging from 300 bits/sec up to 2400 bits/sec are available on PSTN or leased lines. The PTT supplies modems for all operating speeds and modes. In the public network, only 2-wire, and simplex or half duplex operation are available.
- Higher speeds are available with baseband facilities which extend the range to 9600 bits/sec.
- International calls are either dialled over the PSTN or booked with the operator for connection with the International Datel network. Connections with the Telenet and Tymnet networks in the U.S. are available through transatlantic lines supplied by Radio-Suisse Ltd.

- There are no plans for packet or message switching services; a link with EURONET is planned however.

#### I. Austrian Data Communications

- Until recently the Austrian PTT did not offer services or equipment for data transmission. Consequently users procured their own equipment and after the necessary approvals had been obtained they were able to proceed. However a Siemens EDS exchange located in Vienna forms a starting point for modern data services; this exchange is due to be offering data transmission up to 300 bits/sec after mid-1979. The second exchange will be installed in Salzburg in 1980. The new EDS network will be connected to similar networks in Germany and Switzerland.
- Meanwhile transmission facilities are available over the telex, PSTN or private leased circuits. Speeds ranging from 50 bits/sec up to 240K bits/sec, as follows:
  - Public Telex, up to 50 bits/sec, half duplex
  - Telegraph, up to 200 bits/sec, half or full duplex
  - PSTN, up to 2400 bits/sec, half duplex
  - Leased telephone circuits, up to 9600 bits/sec, half or full duplex.
  - Wideband, 48K or 240K bits/sec.
- International connections are available through the telex, PSTN or private leased telephone circuits.
- The Austrian PTT does not, and does not plan to, supply or maintain terminal equipment; provision of equipment and getting the necessary approvals is the responsibility of the user.
- There are no plans for packet or message switching systems.



APPENDIX C. DEFINITIONS





## APPENDIX C: DEFINITIONS

- A 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 of utilizing 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 stand-alone 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 that 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:
  - o INTERACTIVE (Time-sharing) 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.
  - o 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.
  - o DATA BASE is characterized by the retrieval of information from a vendor-maintained data base - this 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 or COM processing, are also included.
- Processing Services encompass FM, RCS and Batch Services: They are categorized 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 customizing 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 Hardwar 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.



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