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Definitions and Economic Assumptions

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I Definition of Terms

A
Overall Customer Services Definition

Customer Services are defined as those services provided to computer users to ensure the serviceability, availability and operation of a systems platform on which to run user applications. The customer services market as defined by INPUT specifically excludes services related to user applications.

B
Customer Services Market Structure

1. Market Definition

INPUT's definition of the customer services market is illustrated in schematic form in Exhibit I-1. This exhibit also illustrates the structure of the hardware products market and the relationship between customer services and the hardware products market.

Included within INPUT's definition of customer services are four service sectors:

- Hardware maintenance
- Systems software support
- Professional services
- Education and training

Excluded from INPUT's definition of the customer services market are:

- Hardware products sales
- Media and supply sales
- Sales of spare parts

Exhibit I-1 indicates the principal activities undertaken within each of the four service sectors. In each service sector, INPUT's definition of user expenditure includes only those services provided to users by an external organization on a chargeable basis and paid for as a seperate item.

Items generally excluded from INPUT market forecasts of user expenditure are:

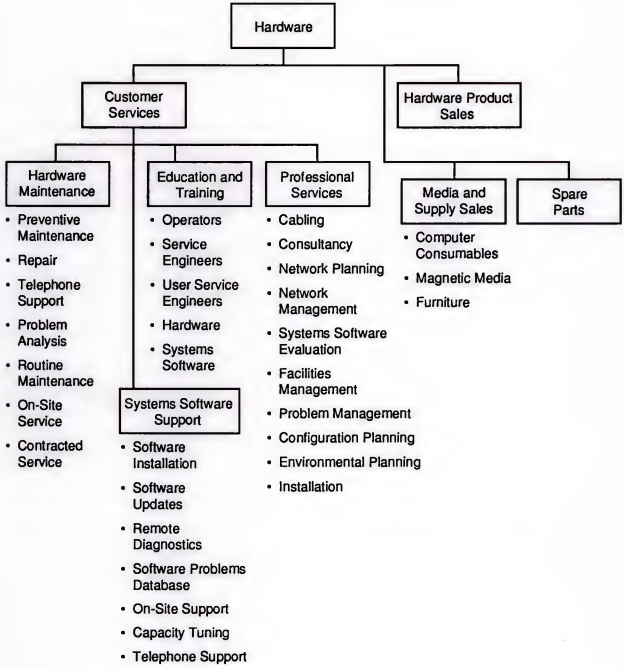
- Services that are funded by price bundling, for example systems software support costs that are bundled with the software license fee,

- Services provided by subsidaries or internal user resources are considered as captive revenues, not generally available for open tender.

However, where possible, an estimate for these excluded items is provied to enable clients to guage the total size of the market.

Exhibit I-1

Hardware Products Market Structure



2. Service Sectors

Definition of the four service sectors is as follows:

- Hardware maintenance: the repair or routine preventive maintenance of computer systems hardware or hardware components. Included are associated support activities such as telephone support, problem analysis and remote diagnostics.

- Systems software service/support: software maintenance activities that relate to systems software (not applications software). Included are associated support activities such as telephone support, problem analysis and software diagnostics. Exhibit I-2 provides a schematic illustration of INPUT's definition.

- Professional services: within the definition of customer services, this sector of the market refers to those elements of professional services that are delivered and revenued as a customer services activity. Examples of customer services professional services are:

  - Cabling
  - Consultancy
  - Network planning
  - Network management
  - System software evaluation
  - Systems operations (Facilities management)
  - Problem management
  - Configuration planning
  - Environmental planning
  - Installation

- Education and training: within the definition of customer services, this sector of the market refers to those elements of education and training that are delivered and taken as revenue by a customer services organisation. Education and training activities are defined as those related to computer hardware or operating systems software (not applications). These aspects of customer service would normally include:

  - User hardware maintenance training, housekeeping and support training

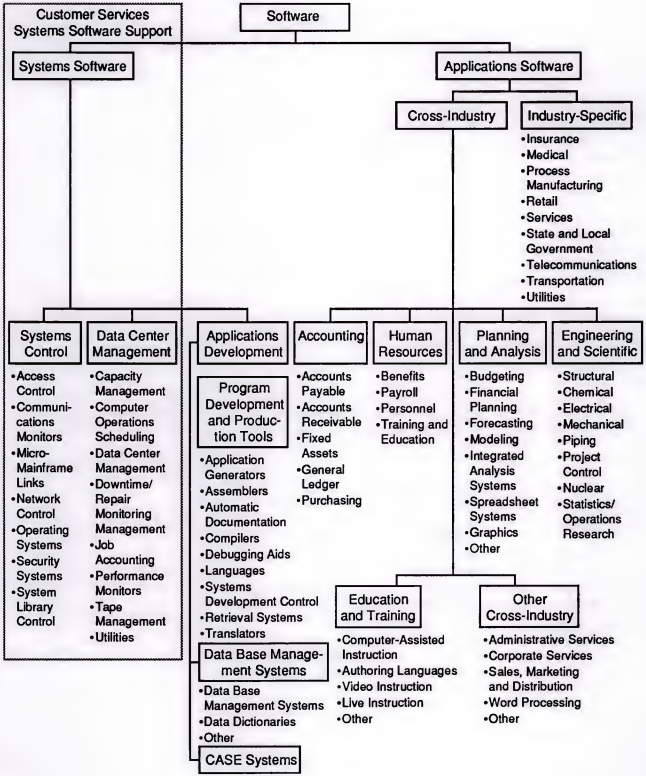
  - User operating systems software maintenance training, housekeeping and support training

  - Operator training related to the use of hardware or operating systems software

Software support activities included in the customer services market are those activities related to support of the systems software. Exhibit I-2 gives INPUT's definition of the software products market. Aspects of software support included in the customer services market are restricted to those areas highlighted in exhibit I-2 relating to system control and data centre management.

Exhibit I-2

Software Products Market Structure



The areas of professional services and education and training are both parts of more widely defined computer services markets. Only those professional services or education and training services directly associated with the support of hardware operations and operating systems software are included as part of the customer services market. The principal activities related to those areas are listed in Exhibit I-1.

Distribution of user expenditure for customer services can be categorized in a number of ways. INPUT defines revenue sources under two headings: the first defines three market segments dependent on the type of vendor providing the service; the second is based on four service sectors dependent on the type of activity that generates the revenue.

3. Service Vendor Definition

- Equipment vendors are defined as companies that manufacture computer hardware equipment and may service equipment manufactured by themselves or other equipment manufacturers.
- Third-party maintenance vendors are defined as companies that service computer equipment independent of the manufacturer or agent who sold the equipment.
- Dealers and distributors are defined as vendors that service equipment that is sold by them, either as an agent of the equipment vendor or as a value-added reseller (VAR).

C
Information Services Industry Structure

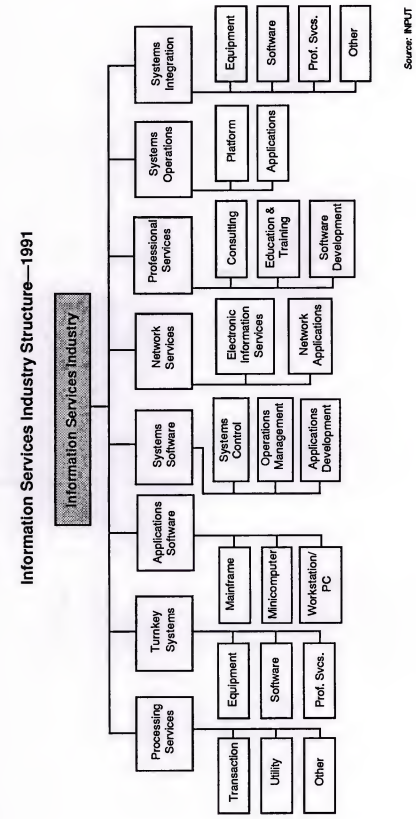
1. Service Categories

The customer services market is an embedded part of the overall information services industry. As service markets continue to blur customer services market studies will occasionally refer to the software and services market. Therefore this section has been included to define the structure of the information services industry and the delivery modes for those services.

The following Exhibit I-3 presents the structure of the information services industry catagorised by delivery mode. Several of the delivery modes can be grouped into higher-level **Service Categories**, based on the kind of problem the user needs to solve. These categories are:

- **Business Application Solutions (BAS)** - prepackaged or standard solutions to common business applications. These applications can be either industry-specific (e.g., mortgage loan processing for a bank), cross-industry (e.g., payroll processing), or generic (e.g., utility timesharing). In general, BAS services involve minimal customization by the vendor, and allow the user to handle a specific business application without having to develop or acquire a custom system or system resources. The following delivery modes are included under BAS (research on these sections in published in the Market Analysis Programme):

Exhibit I-3



- *Processing Services*
- *Applications Software Products*
- *Turnkey Systems*

- **Systems Management Services (SMS)** - services which assist users in developing systems or operation/managing the information systems function. Two key elements of SMS are the customization of the service to each individual user and/or project, and the potential for the vendor to assume significant responsibility for management of at least a portion of the user's information systems function. The following delivery modes re included under SMS (research on these sectors is published in the Systems Management Programme):

  - *Systems Operations*
  - *Systems Integration*

Each of the remaining three delivery modes represents a separate service category:

- *Professional Services*
- *Network Services*
- *System Software Products*

2. Software Products

There are many similarities between the applications and systems software delivery modes. Both involve user purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Vendor-provided training or support in operation and use of the package, if bundled in the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

• Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. These products include:

- *Systems Control Products* - Software programs that function during application program execution to manage computer system resources and control the execution of the application program. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.

- *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.

- *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems and other development

productivity aids. Also included are system utilities (e.g., sorts) which are directly invoked by an applications program.

- **Application Software Products**

  - *Industry-Specific Application Software Products* - Software products that perform functions related to solving business or organizational needs unique to a specific vertical market and sold to that market only. Examples include demand deposit accounting, MRPII, medical recordkeeping, automobile dealer parts inventory, etc.

  - *Cross-Industry Application Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Applications include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

3. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom application software into a single system developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- *Value-Added Reseller (VAR):* A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually application software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems are divided into two categories.

- *Industry-Specific Systems* - systems that serve a specific function for a given industry sector, such as automobile dealer parts inventory, medical recordkeeping, or discrete manufacturing control systems.

- *Cross-Industry Systems* - systems that provide a specific function that is applicable to a wide range of industry sectors, such as financial planning systems, payroll systems, or personnel management systems.

4. Processing Services

This category includes transaction processing, utility processing, and other processing services.

- *Transaction Processing:* - Client uses vendor-provided information systems-including hardware, software and/or data networks-at vendor site or customer site, to process transactions and update client data bases. Transactions may be entered in one of four modes:

- *Interactive* - Characterized by the interaction of the user with the system for data entry, transaction processing, problem solving and report preparation: the user is on-line to the programs/files stored on the vendor's system.

- *Remote Batch* - Where the user transmits batches of transaction data to the vendor's system, allowing the vendor to schedule job execution according to overall client priorities and resource requirements.

- *Distributed Services* - Where users maintain portions of an application data base and enter or process some transaction data at their own site, while also being connected through communications networks to the vendor's central systems for processing other parts of the application.

- *Carry-in Batch* - Where users physically deliver work to a processing services vendor.

- *Utility Processing*: Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and or data bases, enabling clients to develop their own programs or process data on vendor's system.

- *Other Processing Services*: Vendor provides services-usually at vendor site-such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

5. Systems Operations

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes:

- *Professional Services:* The vendor provides personnel to operate client-supplied equipment. Prior to 1990, this was a submode of the Professional Services delivery mode.

- *Processing Services:* The vendor provides personnel, equipment and (optionally) facilities. Prior to 1990, this was a submode of the Processing Services delivery mode.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the user's information systems (equipment, networks, systems and/or application software), either at the client's site or the vendor's site. Systems operations can also be referred to as "resource management" or "facilities management."

There are two general levels of systems operations:

- *Platform/network operations* - where the vendor operates the computer system and/or network without taking responsibility for the applications

- *Application operations* - where the vendor takes responsibility for the complete system, including equipment, associated telecommunications networks, and applications software

Note: Systems Operations is a relatively new delivery mode introduced in the 1990 Systems Management Programme - Europe. It was created by taking the Systems Operations submode out of both Processing Services and Professional Services. No other change has been made to the delivery mode definitions, and the total forecast expenditures for these three delivery modes are identical to the total forecast expenditures of the two original modes before the breakout of Systems Operations.

6. Systems Integration (SI)

Systems Integration is a business offering that provides a complete solution to an information system, networking or automation requirement through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

To be included in the information services market, systems integration projects must involve some application processing component. In addition, the majority of cost must be associated with information systems products and/or services. The SI sector is fully analysed and reported in INPUT's Systems Management Programme.

The systems integrator will perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modification, integration and customization
- Custom software design and development
- Custom hardware design and development
- Systems implementation, including testing, conversion and post-implementation evaluation and tuning
- Life cycle support, including
  - System documentation and user training
  - Systems operations during development
  - Systems maintenance
- Financing

7. Professional Services

This category includes consulting, education and training, and software development.

- *Consulting:* Services include management consulting (related to information systems), information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of information systems, including equipment, software, networks and systems operations.

- *Education and Training:* Products and services related to information systems and services for the professional and end user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation.

- *Software Development:* Services include user requirements definition, systems design, contract programming, documentation and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

8. Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two major segments: *Electronic Information Services,* which involve selling information to the user, and *Network Applications,* which involve providing some form of enhanced transport service in support of a user's information processing needs.

- *Electronic Information Services*

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

The two kinds of electronic information services are:

- *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.

- *News Services* - Unstructured, primarily textual information on people, companies, events, etc.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

- *Network Applications*

- *Value-Added Network Services (VAN Services)* - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers.

- *Electronic Data Interchange (EDI)* - Application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly

performed using VAN services. Specialized translation software is typically employed to convert data from organizations' internal file formats to EDI interchange standards; this software may be provided as part of the VAN service, or may be resident on the organization's own computers.

- *Electronic Information Exchange (EIE)* - Also known as Electronic Mail (E-Mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.

- *Other Network Services* - This segment contains videotex and pure network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, and more.

Network management services included here must involve the vendor's network and network management systems as well as people. People-only services, or services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in Systems Operations.

Network Services research is fully reported in INPUT's Network Services Programme.

D
Industry Sector Definitions

INPUT has structured the information services market into 16 generic industry sectors, five of these sectors are the subject of specific INPUT research studies contained within the Market Analysis Programme. These five sectors are discrete and process manufacturing, distribution, banking and finance and insurance. The definitions of these sectors are based on the 1987 revision of the Standard Industrial Classification (SIC) Code system. The specific industries (and their SIC Codes) included under these generic industry sectors are detailed in the following tables.

Sector:	Discrete Manufacturing
SIC Code	Market sub-sector description
23XX	Apparel and other finished products
25XX	Furniture and fixtures
27XX	Printing, publishing and allied industries
31XX	Leather goods
34XX	Fabricated metal products except machines
35XX	Industrial and commercial machines and computer
36XX	Electronic and electrical equipment except computer
37XX	Transportation equipment
38XX	Instruments; photo/med/opt goods; watches/clocks
39XX	Miscellaneous

Sector:	Process Manufacturing
10XX	Metal mining
12XX	Coal mining
13XX	Oil and gas extraction
14XX	Mining non-metalic minerals
20XX	Food products
21XX	Tobacco products
22XX	Textile mill products
24XX	Lumber and wood products except furniture
26XX	Paper and allied products
28XX	Chemicals and allied products
29XX	Petroleum refined and related industries
30XX	Rubber and miscellaneous plastic products
32XX	Stone, clay, glass and concrete products
33XX	Primary metal industries

Sector:	Distribution
SIC Code	Market sub-sector description
50XX	Wholesale trade - durable goods
51XX	Wholesale trade - nondurable goods
52XX	Retail - building materials
53XX	Retail - general merchandise stores
54XX	Retail - food stores
55XX	Retail - automotive dealers, gas stations
56XX	Retail - apparel and accessory stores
57XX	Retail - home furniture, furnishings and accessories
58XX	Retail - eating and drinking places
59XX	Retail - miscellaneous

Sector:	Banking and Finance
60XX	Depository institutions
61XX	Nondepository institutions
62XX	Security and commodity brokers, dealers and exchanges
67XX	Holding and other investment offices

Sector:	Insurance
63XX	Insurance carriers
64XX	Insurance agents,brokers and services

SIC Code	Other Sectors
	Miscellaneous Industries:
01XX	Agricultural production - crops
02XX	Agricultural production - livestock
07XX	Agricultural services
08XX	Forestry
09XX	Fishing, hunting and trapping
15XX	Building construction - general contractors
16XX	Heavy construction - contractors
17XX	Construction - special trade contractors
	Transportation Services:
40XX	Rail transport
41XX	Public transit/transport
42XX	Motor freight transport/warehousing
43XX	Postal services
44XX	Water transportation
45XX	Air transportation except airline reservation
46XX	Pipelines except natural gas
47XX	Transportation services except travel agents
	Utilities:
49XX	Electric, gas and sanitary services
48XX	Telecommunications
80XX	Health services
82XX	Educational services
	Business and Technical Services:
65XX	Real estate
73XX	Business services
81XX	Legal services
87XX	Engineering, accounting, research, management services
89XX	Miscellaneous services

9XXX	Government
	Personal/Consumer Services:
4512X	Airline reservation services
472X	Travel agents
70XX	Hotels, rooming houses, camps and lodgings
72XX	Personal services
7389X	Hotel reservation services
75XX	Automotive repair services and parking
76XX	Miscellaneous repair services
78XX	Motion pictures
79XX	Amusement and recreation services
83XX	Social services
84XX	Museums, art galleries and botanical gardens
86XX	Membership organisations
88XX	Private households

II Economic Assumptions

There follow some notes on the methodology INPUT use in making forecasts and judging of how reasonable they are.

INPUT reports are based principally on three strands of research activity conducted throughout the year:

- A vendor research programme with more than 100 interviews with prominent customer services vendors across Europe. This research assesses their attributable revenues in each country by service sector. INPUT consultants use their own judgement in many cases to categorise revenues into sub-sectors. In particular INPUT excludes revenues considered captive, such as those from a vendor's parent company.

- Several hundred vendor and user interviews across all European market sectors to determine trends and opinions. These interviews are part of the research that INPUT carries out in specific sectors of the customer services market.

- Additionally INPUT maintains an extensive library and data-base of information relating to the information services industry. This covers for example INPUT's customer services programme data: results of INPUT's research into the hardware maintenance market which includes its diversification into the software and services market.

All the forecasts from these activities are produced in local currency for each country, then consolidated with common economic and exchange rate data to produce a top level forecast. This is done for customer services in each country and in Europe as a whole. At each stage it is examined for reasonableness and consistency and if necessary revisited.

The forecasts also benefit from assignments for and feedback from INPUT clients, who include over 50 of the leading customer services vendors around the world.

In order to consolidate INPUT's forecasts and vendor data into a consistent set of European analyses each year, it is essential to use a standard set of economic factors. The following pages show the inflation and exchange rates currently in use.

A
European Exchange Rates

The following table, Exhibit II-1, shows the standard exchange rates used throughout the 1991 programme to consolidate country market data for overall Western European forecasts and vendor market shares.

Exhibit II-1

US Dollar and ECU Exchange Rates
1991

Country	Currency	US Dollar Exchange Rate	ECU Exchange Rate
France	FF	5.65	7.74
Germany	DM	1.68	2.30
United Kingdom	£	0.515	0.704
Italy	Lira	1,233.0	1,689.0
Sweden	Sek	5.61	7.69
Denmark	DK	6.39	8.75
Norway	NK	6.49	8.89
Finland	FM	3.96	5.43
Netherlands	Dfl	1.69	2.32
Belgium	BF	34.60	47.40
Switzerland	SF	1.27	1.74
Austria	Sch	11.80	16.17
Spain	Ptas	95.0	130.12
	$	1	1.37

Source: Barclays Bank (Q4 1990)

Exhibit II-2 shows the standard exchange rates used throughout the 1990 programme to consolidate country market data for overall Western European forecasts and vendor market shares.

Exhibit II-2

US Dollar and ECU Exchange Rates
1990

Country	Currency	US Dollar Exchange Rate	ECU Exchange Rate
France	FF	6.17	6.87
Germany	DM	1.81	2.05
United Kingdom	£	0.631	0.74
Italy	Lira	1,336	1,502
Sweden	Sek	6.39	7.41
Denmark	DK	7.05	7.8
Norway	NK	6.85	7.94
Finland	FM	4.21	4.84
Netherlands	Dfl	2.05	2.3
Belgium	BF	38.06	42.29
Switzerland	SF	1.61	1.8
Austria	Sch	12.77	14.39
Spain	Ptas	115.8	129.7
	$	1	1.20

Sources: Exchange rates - Barclays Bank (1989)

B
European Inflation Rates

Exhibit II-3 shows the average five-year inflation assumptions for each reported country and the changes from those used in reports produced in the previous year. All **INPUT** forecasts include the effects of inflation as well as natural market growth rates. For consistency, the same inflation rates are used throughout all the different market sector research and analysis during a calendar year, unless specified otherwise.

Exhibit II-3

Inflation Assumptions 1990 and 1991

Country	Assumption 1990-1995	Assumption 1991-1996	Change
France	4.5	3.0	-1.5
Germany	4	2.7	-1.3
United Kingdom	7	4.8	-2.2
Italy	7	4.4	-2.6
Sweden	7	6.3	-0.7
Denmark	5	2.7	-2.3
Norway	5	4.9	-0.1
Finland	6	5.0	-1.0
Netherlands	3	2.4	-0.6
Belgium	4	3.3	-0.7
Switzerland	5	3.3	-1.7
Austria	4	2.6	-1.3
Spain	6.5	4.7	-1.8
Rest of Europe	10	7.7	-2.5
European Average	5.5	4.0	-1.5

Sources: OECD 1991 Forecast
IMF 1989

Exhibit II-4 shows the inflation assumptions for both the 1989 and 1990 research programmes.

Exhibit II-4

Inflation Assumptions 1989 and 1990

Country	Assumption 1989-1994	Assumption 1990-1995	Change
France	4	4.5	+0.5
Germany	2.5	4	+1.5
United Kingdom	5.5	7	+1.5
Italy	6	7	+1.0
Sweden	6	7	+1.0
Denmark	6	5	-1.0
Norway	4	5	+1.0
Finland	6	6	0.0
Netherlands	2	3	+1.0
Belgium	3.5	4	+0.5
Switzerland	2.5	5	+2.5
Austria	3	4	+1.0
Spain	5.5	6.5	+1.0
Rest of Europe	8	10	+2.0
European Average	4.5	5.5	+1.0

Source: IMF 1989