EUROPEAN PROFESSIONAL SERVICES MARKET TRENDS AND OPPORTUNITIES 1987 - 1992

INPUT

About INPUT

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

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years of experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international planning services firm. Clients include over 100 of the world's largest and most technially advanced companies.

Offices

NORTH AMERICA

Headquarters
1280 Villa Street
Mountain View, CA 94041
(415) 961-3300
Telex 171407

New York
Parsippany Place Corp. Center
Suite 201
959 Route 46 East
Parsippany, NJ 07054
(201) 299-6999
Telex 134630

Washington, D.C.
8298 C, Old Courthouse Rd.
Vienna, VA 22180
(703) 847-6870

EUROPE

United Kingdom
INPUT
41 Dover Street
London W1X 3RB
England
01-493-9335
Telex 27113

Sweden
Athena Konsult AB
Box 22232
S-104 22 Stockholm
Sweden
08-542025
Telex 17041

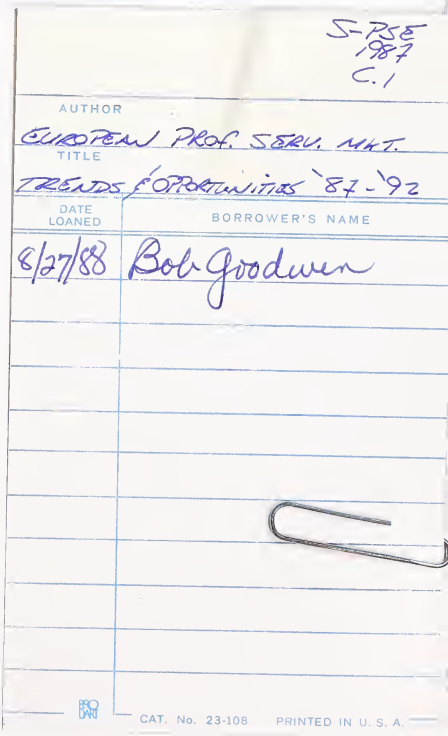
ASIA

Japan
FKI
Future Knowledge Institiute
Shanpia Bldg., 8-1,
Kanda Sakuma-cho 2-chome,
Chiyoda-ku,
Tokyo 101,
Japan
03-864-4026

INPUT®
Planning Services For Management

EUROPEAN PROFESSIONAL SERVICES MARKET TRENDS AND OPPORTUNITIES 1987-1992

AUGUST 1987



Research produced by
INPUT
41 Dover Street
London W1X 3RB
England
01-493-9335

Information Services Programme - Europe (ISP-E)

European Professional Services
Market Trends and Opportunities, 1987-1992

EUROPEAN PROFESSIONAL SERVICES MARKET
TRENDS AND OPPORTUNITIES, 1987-1992

ABSTRACT

Professional services are continuing to offer attractive opportunities for a wide cross-section of information services vendors and are essentially the carrying plasma of the services industry.

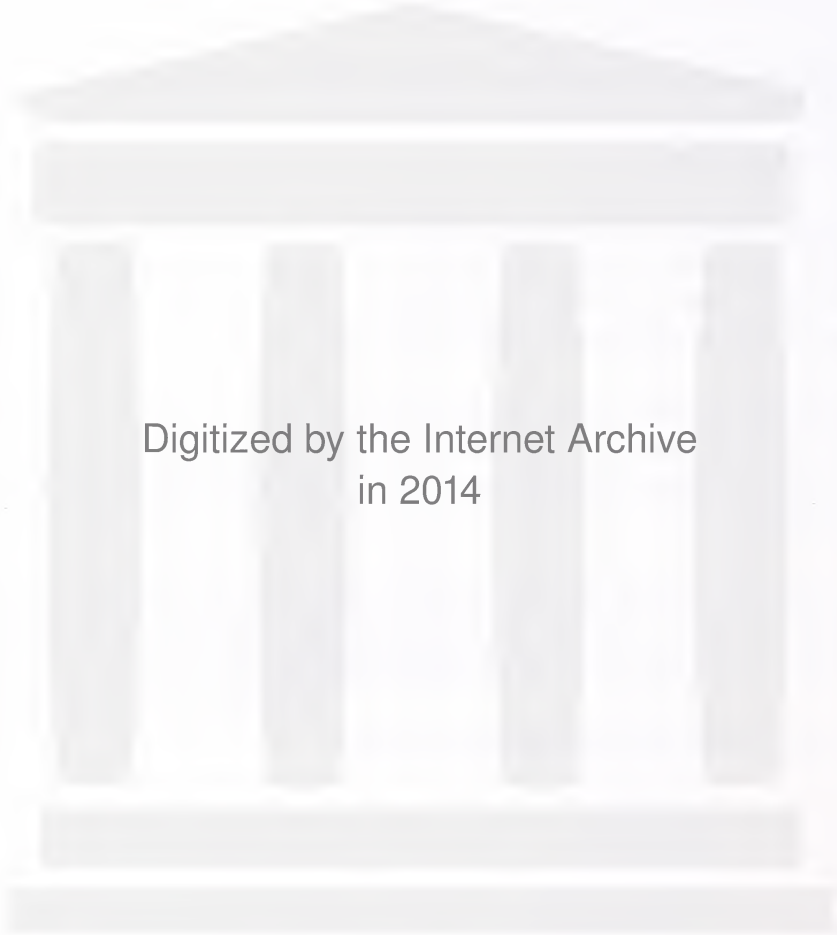
This report examines trends, opportunities, issues, and critical success factors for existing and potential vendor participants in the major market subsectors of IS Consultancy, Custom Software Development, Contract Staff, Education, and Training, Facilities Management, and Systems Integration.

Developments in major country markets and target industry sectors are reviewed together with an analysis of key issues impacting the development of the user environment. Forecasts of sector, country, and industry market size and growth are also included.

The report also identifies the opportunities and risks associated with the emerging Commercial Systems Integration market and examines the dynamics of competition to provide recommendations for existing and potential market players.

This report contains 241 pages, including 77 exhibits.

S-PSE-529



EUROPEAN PROFESSIONAL SERVICES
MARKET TRENDS AND OPPORTUNITIES, 1987-1992

CONTENTS

EUROPEAN PROFESSIONAL SERVICES
MARKET TRENDS AND OPPORTUNITIES, 1987-1992

EXHIBITS

CHAPTER I - INTRODUCTION

I INTRODUCTION

- This report has been written as part of INPUT's comprehensive Information Services Programme - Europe (ISPE). Other special interest topics covered during 1987 include Value-Added Network and Data Services, Software Pricing and Support, Systems Development Productivity, and the Annual Report which focuses on industry structure and key strategic directions.

A. SCOPE AND OBJECTIVES

- Professional services are continuing to offer attractive opportunities for a wide cross-section of information services vendors and are essentially the carrying plasma of the information services industry.

- The competitive need for real time information systems, increasing technicalcomplexity, and pressure on in-house resources to deliver on-time, within budget, multi-application systems solutions is driving the development of new opportunities in systems integration and the demand for prime contracting.

- In addition, INPUT believes that the rapidly changing structure of the computer and communications industries (and indeed the convergence between the two) will continue to offer above industry average growth potential in other key segments of the professional services market such as education and training and communiations facilities management.

- INPUT's particular objectives in conducting this research programme and preparing this report have been to:

  - Establish an overall view of the market for professional services in order to assist information services vendors in understanding the risk associated with exploiting potential market oportunities.

  - Analyse perceptions of the key trends and issues that are impacting on its development. This includes isolating trends in the competitive environment and key factors impacting on profitability.

- This report covers the country markets of France, Italy, the U.K., West Germany, Benelux, and Scandinavia. The term Western Europe is used throughout the report to imply these six individual markets as a group.

- Professional services can be delivered either directly or through hardware manufacturers and software suppliers. In some cases, professional services are offered by firms as an incremental and auxiliary service in support of other products. These services are included in the analyses and forecasts of the market.

- This report also considers professional services for the government sector (i.e., public) as well as the commercial sectors of the market.

- However, although the market forecast and analysis covers all the main segments of the professional services market, i.e., IT consultancy, custom software development, contract staff, IT-related training, facilities management, and systems integration, INPUT has been concerned to focus the report on areas of new opportunity and high growth. Consequently, systems integration and training have been given special attention.

- Facilities management is gaining increasing acceptance as changes in the business climate and technological environment lead organisations to favour

service solutions. Considerable interest in facilities management opportunities by Western European computer services companies was considered justification for a separate report published in 1986 entitled Facilities Management Opportunities in Western Europe.

- Systems integration has already significantly progressed from the federal government market into the commercial sector in the U.S. The U.S. commercial systems integration market (CSI) is expected to reach $1 billion in 1987 and has entered a phase of very significant growth and profit potential. In consequence, U.S. experience is highly relevant and of interest to participants in Western Europe. A number of INPUT's reports on subjects related to this area are therefore listed in Appendix E.

- Enquiries and comments are invited by INPUT regarding this report and any related topics of interest.

- INPUT expresses its gratitude to all those individuals and companies that participated in the research programme upon which this report is based.

B. METHODOLOGY

- Field research for this report was obtained from an interview programme that was conducted during the period of February through May 1987 which consisted of:

  - Corporate user interviews.

    - Structured interviews were conducted with 200 senior personnel in both the data processing and end-user commercial departments (Ratio 50:50) of a wide cross-section of organisations.

- The interviews were conducted as part of INPUT's biannual extensive user research survey and addressed the following issues:

  - Perceptions of the importance of IT to competitive advantage.

  - Perceptions of the importance of IT to operational efficiency/effectiveness.

  - Perceptions of key data processing problems, i.e., skill shortages, training, communications, developing real time systems, technological complexity, and applications development backlogs.

  - Priorities for applications development.

  - Usage and attitude towards external professional services.

  - Perception of the importance and attitude towards prime contracting or 'one stop shopping'.

  - Evaluation and selection of vendors of professional services.

  - Plans and budgets for professional services.

- Vendor interviews.

  - In-depth interviews (nearly all face-to-face discussions) were conducted with 40 senior personnel amongst hardware manufacturers, systems integrators, software houses, accountancy

firms, and specialist independent professional services vendors.

. The questionnaire used as an 'aide memoire' for these interviews is given as Appendix C.

. An analysis of the overall researh sample is included as Appendix B.

- Other studies.

. INPUT's continuing research programme on the information services markets has been used were appropriate to further understanding of the issues and markets discussed.

- Other public domain sources.

. Company press releases, press articles, and reports have been used where appropriate to obtain background data on market developments.

- Country market comparison.

. For convenince of comparison between markets, local currencies have been converted to U.S. dollars on the basis of average exchange rates for 1986 which are illustraed in Exhibit III-3. Owing to the volatility of international exchange rates anticipated for the forecast period 1987 - 1992 INPUT has not attempted to forecast future exchange rates. Currency conversion for the period 1987-1992 has been made at average 1986 rates.

. INPUT suggests that vendors exploiting export opportunities should carefully hedge their risk exposure to international

currency movements.

C. REPORT STRUCTURE

- The remaining chapters of this report are organised in the following way:

  - Chapter II is an Executive Overview providing a summary of the contents of the entire report.

  - Chapter III includes an overview and definition of the professional services markets, trends in the main market segments, and INPUT's assessments of market size and expected growth.

  - Chapter IV analyses user attitudes and needs in relation to professional services.

  - Chapter V reviews trends and potential areas of market opportunity in relation to systems integration.

  - Chapter VI provides an analysis of the competitive environment and strategies of leading players in systems integration.

  - Chapter VII provides INPUT's conclusions and recommendations for vendors participatng or planning to participate in professional services markets.

  - The Appendices contain a standard list of definitions of terms, an analysis of the research sample, the vendor and user survey questionnaires, and a list of related reports.

CHAPTER II - EXECUTIVE OVERVIEW

II EXECUTIVE OVERVIEW

- This Executive Overview is designed in a presentation format in order to:
  - Help the busy reader quickly review key research findings.
  - Provide a ready-to-go executive presentation, complete with a script, to facilitate group communication.
- The key points of the entire report are summarised in Exhibits II-1 through II-6. On the left-hand page facing each exhibit is a script explaining its contents.

A. INDUSTRY STRUCTURE

- Increasing new acceptance of the 'service solution' and complexity of problems and needs is providing professional service opportunities for a variety of company capabilities and in essence is the carrying plasma of the information services industry.

- As ground-level understanding of the nature of the customer's business has become a key success factor, coupled with increasing user preference for prime contracting, the market is becoming polarised between large international players who can achieve critical market position (either via acquisition or by combining specialist strengths via strategic partnerships) and smaller niche players.

- Hardware manufacturers are rapidly developing professional services capabilities and strategic partnerships in order to strengthen their position as prime contractors and exploit emerging systems integration opportunities.

- Software product vendors are increasing their proportion of revenues from implementation, consultancy, and training. The large U.S. companies are also taking an increasing share of the European market via acquisition and organic growth.

- The 'Big 8' accounting firms are increasingly capturing market share from not only the management consultants but also from traditional software houses as they seek to provide a 'total service' for corporate clients.

- Specialist opportunities have attracted niche players into the market; for example, in the field of telecommunications.

- Attractive growth and profit opportunities have also led to market entry from companies traditionally outside the services industry, for example, Blue Arrow and Saatchi and Saatchi, via acquisition.

INDUSTRY STRUCTURE

B. STEADY GROWTH AND INCREASING PROFIT POTENTIAL

- The increasing convergence of the information services industry towards professional services opportunities is being encouraged by steady rates of growth, and in many market sectors demand exceeds supply.

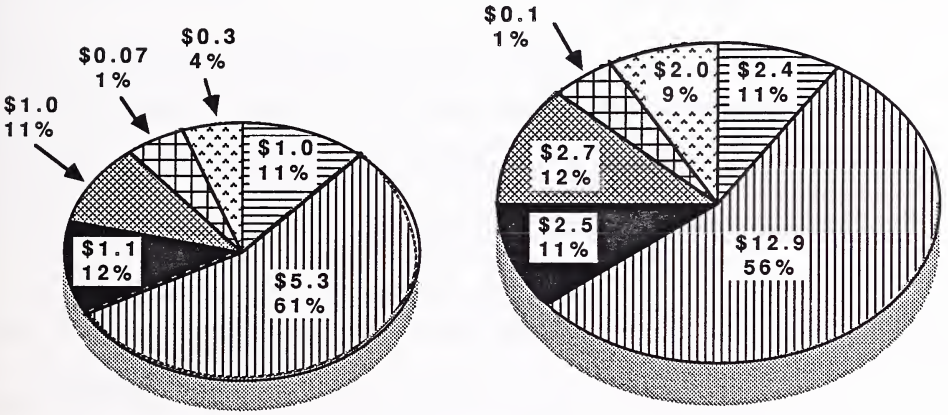
- Overall, INPUT estimates that the professional services market will grow from $8.7 billion in 1987 to $13.3 billion by 1989 at an annual average rate of 24%. The five-year forecast shows a market size of $22.6 billion by 1992 with an average annual growth rate of 19% for the period 1989-1992.

- Education and training is going through a phase of buoyant growth fostered by increased awareness of skilled human resources as a corporate asset, rapid technological change, increased usage of software productivity tools, and the growth of end-user computing.

- Systems integration is emerging as the major growth market, especially in the government, manufacturing, and finance and banking sectors. This is a reflection of a change in user preferences for doing business towards subcontracting complex, multidisciplinary systems to prime contractors.

- Increasing specialisation in terms of industry targets and technical strengths is contributing to the improved profit performance of vendor participants. Other contributing factors to profitability include improved understanding and management of risk, strategic partnering, sharpened marketing skills, and improved management professionalism.

STEADY GROWTH AND INCREASING PROFIT POTENTIAL



Total Market 1987
$8.7 Billion

Total Market 1992
$22.6 Billion

- IS Consultancy
- Contract Staff
- Facilities Management
- Custom Software Development
- Education and Training
- Systems Integration

C. MARKET PRESSURES INFLUENCING SIZE AND GROWTH

- Key overall market forces driving demand for professional services include:

  - The need to meet growing information systems demands in the face of a shortage of skilled in-house staff and a more complex, rapidly changing technical environment (for example, the conversion from batch to on-line systems).

  - The pervasiveness of information systems within user organisations and the criticality of these systems to corporate revenue generation, efficiency, and profitability, resulting from the demand, at the highest levels of the organisation, for a more productive utilisation of current corporate assets, including capital investments, human resources, and information assets.

- On the supply side, the principal overall constraints on market growth include:

  - The ability of service organisations to recruit, retain, and motivate adequate levels of skilled staff.

  - The ability of vendors to understand clients 'real' business needs, foster professionalism, and create feelings of trust and performance reliability amongst client organisations.

  - The ability of service organisations management to adequately position, structure, and refocus their businesses in a highly competitive and changing environment. Professional management is a key to success but in the computer services industry is often an inhibitor to growth.

- The speed with which opportunities created by the use of software engineering tools and techniques can be exploited is also a potential inhibitor.

MARKET PRESSURES INFLUENCING SIZE AND GROWTH

- Demand Side
  - Shortage of Skilled In-House Staff
  - Complex, Rapidly Changing Technical Environment
  - Increasing Confidence in Service Solutions
  - Pervasiveness and Criticality of Information Systems
  - Demands for Increased Productivity
- Supply Side
  - Human Resource Management
  - Management Professionalism
  - Software Engineering Tools

D. USER ENVIRONMENT

- INPUT's user research dispelled the myth perpetrated by business schools and consultancies that information technology is essential to competitive advantage - only 23% of respondents agreed with the concept.

- However, investments in IT are perceived as being critical to an organisation's effciency and productivity, and INPUT's research revealed that a key focus for future development is the spread of IT into production, distribution, and marketing in addition to general administrative systems.

- Communications is a major problem and opportunity as users seek to link up trading partners and operating units and install on-line systems. Departmental systems was the trend of the late 1970's and early 1980's. Integrated companywide information systems and information sharing is the challenge of the late 1980s.

- Users' attitudes on the 'make or buy' decision revealed a perceived failing on part of service vendors to understand the specialist business needs and problems of client organisations, despite a generally positive attitude towards subcontracting, especially amongst non-data processing department heads.

- Other key vendor selection criteria are:

  - On-time, within budget delivery.

  - Professionalism and creativity.

  - Performance guarantee.

  - Unique/specialist technical knowledge.

USER ENVIRONMENT

- Competitive Advantage - A Myth
- Key Problems
  - Communications
  - Personnel
  - Productivity
- Key Requirements
  - Unique Technical Skills
  - On-Time, Within Budget Delivery
  - Performance Guarantee
  - In-Depth Industry Knowledge

E. SYSTEMS INTEGRATION - A DEVELOPING OPPORTUNITY

- Although the concept of systems integration (SI) has been around the defence contracting community for almost 20 years, systems integration can be regarded as an emergent market oportunity (or approach towards doing business) in the commercial area as users are increasingly wanting to sign a single-source contract for a diverse development involving a number of subcontractors.

- INPUT estimates that the systems integration market (which includes contracts of $5 million and above but excludes NATO and Space) will grow from a base of $325 million in 1987 to $1,020 million by 1989 to reach $2 billion by 1992 at an annual average growth rate of 44%.

- The dynamics of the market are changing with the increased importance of software development in large projects and the enhanced market position of key players in the systems integration market such as Cap Gemini Sogeti, Logica, and Cap Group PLC. The hardware manufactuers are repositioning themselves to retain their position as a 'natural first choice' for implementing large non-standard turnkey systems. However, the specialist client knowledge and sophisticated software engineering skills of the software houses are enhancing their ability to act as prime contractors.

- INPUT's research reveals significant systems integration opportunities emerging in the banking and finance sector driven by deregulation, increased internationalism, and competitiveness. Manufacturing is also offering systems integration opportunities, especially in the areas of process control, materials handling and logistics management. Increasing pressure for efficiency, and accountability and acute in-house staff shortage are also fostering opportunities in the government sector.

SYSTEMS INTEGRATION
A DEVELOPING OPPORTUNITY

- A New Approach to Conducting Business in the Commercial Sector
- 44% AAGR 1987-1992
- Software Houses - An Increasing Role
- Target Industry Sectors
  - Finance and Banking
  - Manufacturing
  - Government

F. SYSTEMS INTEGRATION - STRATEGIES FOR SUCCESS

- To succeed in systems integration markets, it is necessary to form lasting strategic partnerships that are difficult to compete against or break (often due to cultural fit). It is therefore crucial for vendors to choose, at an early stage, partnerships that serve their best long-term strategic interests.

- Containing the risk element and consciously managng each project to reduce the possibility of failure is an essential part of participation in the market. Each project needs to be isolated in terms of financial control, organisational focus, management, and account control. Given the enormous impact that systems integration can have on the continued operation and viability of the client company, legal exposure is high.

- A systems integration vendor also needs to understand the processes that govern the fundamental business of the customer so as to be in a position to recommend work practice changes and guide the process of implementation of automation. This clearly means that expertise in systems design, productivity tools, project management, etc. is the second most important component of a systems integration vendor's make-up after a ground-level understanding of clients real needs and business problems.

- Systems integration is a big-stakes game for large international players. Typically, a vendor will spend up to 5% of the contract's value when bidding in preliminary systems evaluation, design, and bid support. Planning adequate funding and cultivating relationships with stakeholders is therefore an absolute necessity before entering the market.

SYSTEMS INTEGRATION STRATEGIES FOR SUCCESS

- Publicly Acknowledged Expertise in Industry and Application Area
- Quality, Long-Term Third-Party Relationships
- Ability to Assess, Contain, and Manage Risk
- Funded and Disciplined Bid Preparation
- Complex Project Management Skills

CHAPTER III -
MARKET ANALYSIS AND FORECAST

III MARKET ANALYSIS AND FORECAST

A. MARKET OVERVIEW AND STRUCTURE

1. INTRODUCTION

- The professional services market, because it includes a diverse set of 'people-supplied' services, affords entry and exploitation from a variety of company capabilities and is in essence the carrying plasma of the information services industry.

- Increasing user sophistication and complexity of problems, needs, and demands have driven vendors into refocussing their business around professional services.

- Hardware manufacturers have been rapidly developing professional service capabilities in order to position themselves as prime contractors and exploit emerging systems integration opportunities.

- Traditional software product vendors, for example, Computer Associates, Cullinet, and Software AG, now have significant professional services revenues from implementation, support, and training.

- The 'Big 8' accounting firms are increasingly capturing market share from not only the management consultants but also the traditional software houses by

acquisition and organic growth as they seek to provide a 'total service' for corporate clients.

- In addition, falling margins and profit opportunities in traditional areas are leading standard turnkey vendors to enter the market, for example, by offering public training courses.

- Processing and network services vendors are increasingly differentiating on the basis of support and service. An example is ISTEL's entry into the field of telecommunications consultancy to meet the user problems of skill shortage and technological complexity.

- The increasing convergence of the information services industry towards professional services opportunities also reflects the increasing credibility of vendors to understand customer needs, focus on real business problems, and provide cost-effective solutions in a timely manner. The 'can-do' rather than 'we can technically provide' attitude is a reflection of the increasing maturity of the industry.

2. MARKET STRUCTURE

- The structure of the professional services markets by types of activities is presented in Exhibit III-1.

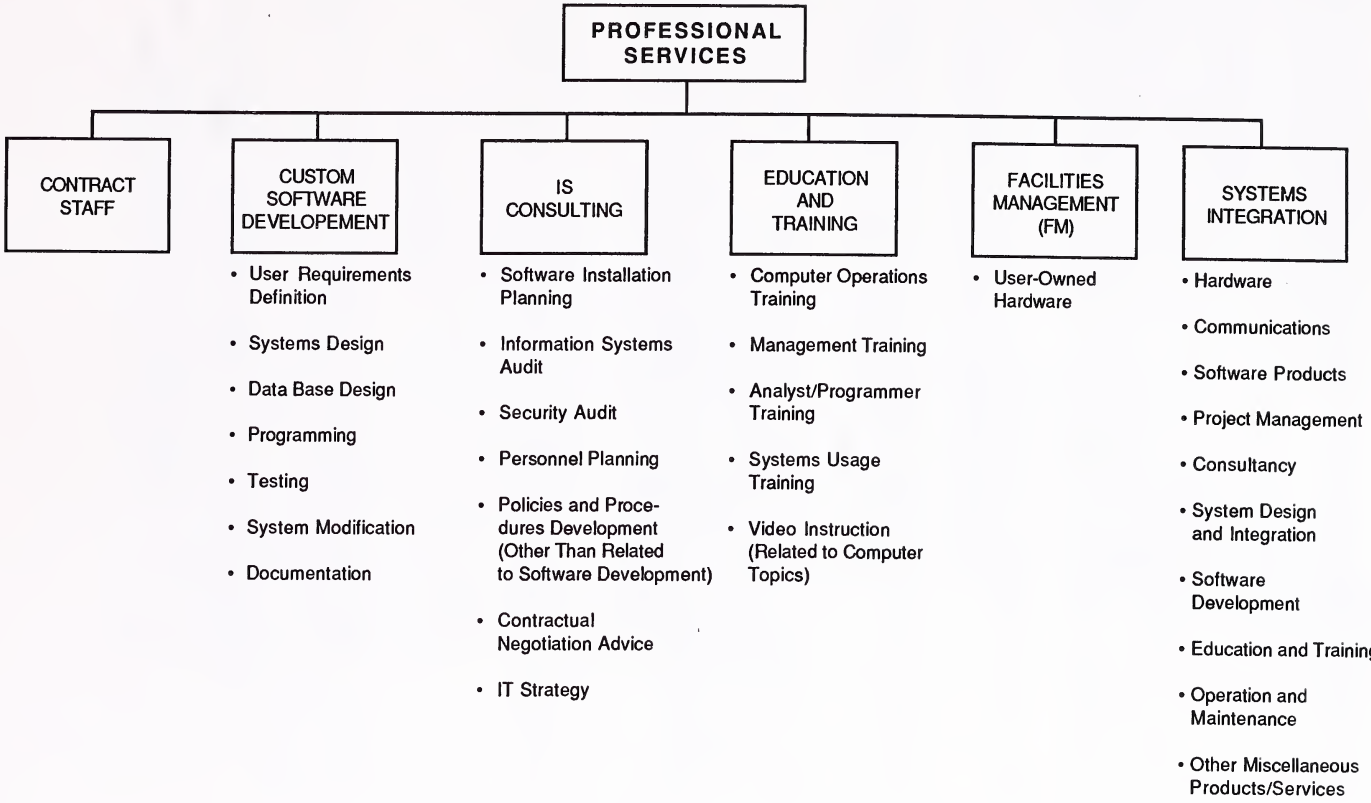
- Devotees of INPUT's reports and services will notice that we have included a new segment in the professional services market to reflect changing conditions and new approaches towards conducting business, specifically Systems Integration.

a. Custom Software Development

- Also called programming and analysis, this service involves the development of software systems on a custom basis and includes:

EXHIBIT III-1

PROFESSIONAL SERVICES MARKET STRUCTURE



- Hardware and/or software system design.

- Custom software development.

- Modification of commercial software packages.

- Software testing of both custom and commercial packages.

- Software conversion.

- Maintenance of operating and applications software.

- Independent verification and validation of software packages prepared by other vendors.

b. Information Systems Consultancy

- Information systems consultancy ranges from special studies to the preparation of specifications of information systems resources required to meet specific needs.

- The service provided is orientated towards the management processes attached to the exploitation of information systems technology. It includes strategic reviews and plans, contractual negotiation advice, feasibility studies, requirements analyses, and systems audits.

- Information systems consultancy is provided both as a discrete activity and as an integral element of the process of custom system development.

- INPUT's definition of the information systems consultancy market excludes mainstream general management consultancy which accounts for the majority of revenues of companies such as McKinsey and Bain. Nevertheless, INPUT is cognisant of the rising proportion of revenues generated by mainstream man-

agement consultancies in the information technolgoy sector and these have been included in our market definition.

c. Contract Staff

- The contract staff segment relates to end-user revenues generated from the provision of temporarily employed specialist EDP staff, for example, 4GL programmers or project managers, under contract to a service organisation.

  - Staff are directly supervised by the end-user organisations while under contract, and this is often termed 'bodyshopping'.

  - Staff are not necessarily employed to work on a clearly defined and prespecified development project.

- There are, however, clearly many grey areas between the two service modes. For example, vendors at the top end of the contract staff market are positioning themselves to provide a total solution for discrete application development projects, occasionally on a fixed-price basis. The user organisation then has the benefit of control in that it also supervises the staff.

- INPUT's definition of contract staff excludes revenues generated from low value-added services such as recruitment agency placement and headhunting fees.

d. Education and Training

- Education and training services are delivered to a wide range of individuals including non-data processing staff and help people acquire new skills, techniques, or knowledge related to computers. This mode of the professional services market does not include services to eductional institutions.

- The service can be delivered in a number of ways:

- Publicly available standard courses/training sessions covering specific topics, skill areas, or products.

- Customised training and personnel development courses and programmes designed for the specific needs of individuals and user organisations. There is clearly an increasing convergence between consultancy and training at this top end of the market.

- Traditional instructor-led training which can utilise a range of resources and techniques including manuals and live instruction (video-based and computer-based).

- Remote self-administered training which can utilise new technologies such as interactive video disk.

- Revenues generated from the provision of published information designed for self-teaching and training have not been included within INPUT's market definiton.

- In addition, INPUT's definition also excludes general management training covering topics, issues, and techniques that are not directly related to information technology.

- It should also be noted that education and training services can be delivered either as a stand-alone service or as part of a broader solution to users information technology requirements. Both these service types are included within INPUT's definition.

e. Facilities Management

- Facilities management involves the management of all or a major part of a user's data processing functions under a long-term contract.

- A facilities management vendor provides the staff to operate, maintain, and manage the facility and also to be involved in site preparation and installation tasks if the hardware is owned or leased by the user. This form of facilities management is defined as a professional service.

- Another form of facilities management is where the vendor owns the hardware which is often located off the user's site and a service is delivered via communications lines. This form of facilities management is defined as a processing and network service.

- Owing to the size, complexity, and duration of many facilities management contracts, some vendors, for example, EDS, make little or no distinction between facilities management and systems integration revenue streams. Indeed, there are some grey areas of a potential overlap between the two service modes, especially as facilities management is often a key element of systems integration contracts.

f. Systems Integration

- The term 'systems integration' is relativey new in the European market. It has been perceived as 'just another industry buzz-phrase' by many vendor participants, and there is a lack of clear definition and understanding of this sector which is not so much a new market but a change in approach towards subcontracting by users in the commercial sector.

- The term systems integration is best defined by describing the general market characteristics that are evident in this market sector. These can be described as follows:

  - Systems integration is an approach to the development of new, upgraded, or expanded information systems for client organisations. In this approach, a vendor or team of vendors assumes responsibility for providing the information services and products which result in a comprehensive solution to the client's information systems problem.

- This approach is most applicable to major project efforts that involve the development of complex, multidisciplinary systems. The typical size of these projects, the fact that large portions of the software must be custom developed, and/or the substantial network requirements usually mean that the total project effort is multi-year.

- It involves not only the actual integration or interfacing of the components of the solution, but also:

  . The analysis of the problem.

  . Design of the solution.

  . Selection, development, and implementation of the hardware and software.

  . Such post-implementation support as testing, client staff training, documentation, and, in some instances, operation and maintenance of the newly-developed system for a specified period of time.

- Generally, these projects are bounded at the start by the selection of the successful bidder and at the end by the acceptance of the new system by the client.

- Critical to the approach from both the client's and vendor's perspectives is the sharing or total transfer of responsibility (and risk) for the successful development of the system from the client organisation to the vendor(s). In exchange for assuming the risks of failure to deliver the desired solution on time and within budget, the integrator receives not only management fees from the client but also markups from subcontractors and the 'inside track' in providing any of the projects and services that comprise the total solution.

- Exhibit III-2 enumerates the component products and services that may be a part of a systems integration project and from which the vendor can expect to receive revenue. Since each project is unique in terms of specific requirements, not all of these components are applicable to all system integration projects. Further, the unique requirements dictate the proportion of the total project expenditures to be made for each component involved.

- When conducting research for this report, INPUT discovered that the term system integration was being used loosely within the industry, occasionally to describe relatively small, (i.e., less than $5 million in contract value) single vendor, time and materials based, custom systems development projects.

- INPUT has been careful to define this market and rapidly emerging business opportunity as comprising contracts valued at $5 million or more in total, including the information systems and communications hardware.

- INPUT's definition of the systems integration market for forecasting purposes includes defence as well as the commercial sector. It does, however, exclude specific projects related to NATO and the various space programmes.

B. MARKET FORECAST

1. FORECAST DEFINITION

- The market assessments and forecast growth that follow were developed from assessments of current and projected activities within the market definition described above.

- The forecasts cover the period 1987 to 1992 (including 1986 actuals) and assess end-user expenditures. Forecasts are made in local currency and converted into U.S. dollars for aggregation and comparative purposes.

EXHIBIT III-2

PRODUCTS/SERVICES IN SI PROJECTS

- Hardware
  - Information Systems
  - Communications
- Software Products
  - Systems Software
  - Applications Software
- Professional Services
  - Consulting
    - Feasibility and Tradeoff Studies
    - Selection of Hardware, Network, and Software
  - Project Management
  - Design/Integration
    - Systems Design
    - Installation of Hardware, Network, and Software
    - Demonstration and Testing
  - Software Development
    - Modification of Software Packages
    - Modification of Existing Software
    - Custom Development of Software
- Other Miscellaneous Products/Services
  - Data Processing Supplies
  - Processing/Network Services
  - Data/Voice Communications Services

- Owing to the volatility of international exchange rates anticipated for the forecast period, the U.S. dollar conversion rates used have been taken as the average rate for 1986.

- Exhibit III-3 sets out the average U.S. dollar exchange rates for 1986 for a range of Western European currencies.

- In addition, the forecasts have been expressed in actual monetary terms. For your interest, the latest inflation rates in Western European countries (i.e., percentage change in the consumer price index for the end of Q1 1986 to the end of Q1 1987 and the end of Q2 1986 to the end of Q2 1987) are as follows:

	Inflation Rates	
Country Market	Q1 1986 - Q1 1987	Q2 1986 - Q2 1987
U.S.	+1.4%	+3.8%
France	+3.0%	+3.5%
U.K.	+3.9%	+4.1%
Italy	+4.2%	+4.2%
Belgium	+1.0%	+1.7%
West Germany	-0.8%	+0.2%
Netherlands	-1.3%	-1.1%

- The statistics reveal an underlying trend for inflation rates to be rising in Western European economies owing to demand-pull factors which relate to high levels of money supply (M3) growth and levels of salary/wage settlements.

- Of more relevance to vendors of professional services is the realtionship between salary inflation (in excess of 50% of costs) and service/project price inflation.

EXHIBIT III-3

U.S. DOLLAR EXCHANGE RATE, 1986
(Average)

COUNTRY	CURRENCY	AVERAGE EXCHANGE RATE 1986
FRANCE	FF/$	6.86
WEST GERMANY	DM/$	2.14
UNITED KINGDOM	$/£	1.47
ITALY	It.L/$	1473.50
NETHERLANDS	DFL/$	2.43
BELGIUM	BF/$	44.59
SWEDEN	SK/$	7.08

- In the information services industry, salary inflation is at least several percentage points ahead of consumer price inflation due to skills shortages, especially for specialist experienced staff.

- In general terms, mark-ups on staff salaries and margins on projects tend to be least price sensitive if the vendor is able to offer unique skills, technical specialisation, and added value in terms of industry/application knowledge and experience.

- It is for this reason, i.e., the need to protect margins and profitability, that INPUT recommends a niche marketing strategy for vendor participants.

2. MARKET PRESSURES INFLUENCING SIZE AND GROWTH

- The key overall market forces that are impacting professional services (see Exhibit III-4) include:

  - The need to meet growing information systems demands in the face of a shortage of skilled in-house staff and a more complex technical environment.

  - The pervasiveness of information systems within client organisations and the criticality of these systems to corporate revenue generation, efficiency, and profitability.

  - The demand, at the highest levels of the organisation, for a more productive utilisation of current corporate assets, including capital investments, human resources, and information assets.

- On the supply side, the principal overall constraints to market growth include:

  - The ability of service organisations to recruit, retain, and motivate adequate levels of staff.

- The ability of service organisations to create a perception of professionalism, trust, and performance reliability amongst client organisations.

- The ability of service organisations' management to adequately position, structure, and refocus their organisations in an highly competitive and changing environment. Professional management is the key to success, but is potentially the major inhibitor to growth.

3. MARKET SIZE AND GROWTH BY COUNTRY AND DELIVERY MODE

- INPUT forecasts that the Western European professional services market will grow from a 1986 base of $6.9 billion to $8.7 billion in 1987, reaching $13.3 billion by 1989 at an annual average growth rate of 24%. The five-year projection shows a market size of $22.6 billion by 1992 (which represents an annual average growth rate of 19% for the period 1989 - 1992).

- The overall factors that are driving and inhibiting this growth are illustrated in Exhibit III-4, and INPUT's forecasts for the total Western European market shown by service mode and country market are illustrated in Exhibits III-5 and III-6, respectively.

- Forecasts for each country market split by service mode are given in Exhibits III-7 through III-12, and forecasts for each service mode split by country market are given in Exhibit III-13 through III-19.

EXHIBIT III-4

MARKET PRESSURES INFLUENCING GROWTH

- DEMAND
  - Reduced In-House Capability
  - Pervasiveness of Information Systems
  - Demands for Productivity
- SUPPLY
  - Personnel Management
  - Marketing - 'Customer Closeness'
  - Management Professionalism

EXHIBIT III-5

PROFESSIONAL SERVICES MARKET FORECAST, 1987-1992
TOTAL WESTERN EUROPE
(By Market Segment)

MARKET SEGMENT	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
IS CONSULTANCY	800	990	22	1,450	18	2,420
CUSTOM SOFTWARE DEVELOPMENT	4,265	5,275	22	7,750	18	12,860
CONTRACT STAFF	900	1,085	20	1,555	17	2,495
IS EDUCATION AND TRAINING	755	955	25	1,480	22	2,660
FACILITIES MANAGEMENT	60	70	17	90	17	150
SYSTEMS INTEGRATION	150	325	90	1,020	25	2,000
TOTAL	6,930	8,700	24	13,345	19	22,585

Note: Systems integration (SI) market forecasts include contracts of $5 million and above including computing and communications hardware components. A breakdown of SI project components is given in Exhibit V-2.

EXHIBIT III-6

PROFESSIONAL SERVICES MARKET FORECAST, 1987-1992
TOTAL WESTERN EUROPE
(By Country Market)

COUNTRY MARKET	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
FRANCE	2,335	2,870	21	4,220	17	6,875
UNITED KINGDOM	1,440	1,820	25	2,820	19	4,730
WEST GERMANY	1,235	1,565	24	2,365	19	4,000
ITALY	695	910	30	1,545	22	2,865
BENELUX	575	720	25	1,125	19	1,915
SCANDINAVIA	650	815	25	1,270	20	2,200
TOTAL	6,930	8,700	24	13,345	19	22,585

EXHIBIT III-7

PROFESSIONAL SERVICES MARKET FORECAST, 1987-1992
FRANCE
(By Market Segment)

MARKET SEGMENT	MARKET FORECAST (*ff* Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
IS CONSULTANCY	1,645	2,025	22	2,985	19	4,975
CUSTOM SOFTWARE DEVELOPMENT	10,975	13,375	20	18,965	17	30,355
CONTRACT STAFF	1,785	2,125	18	2,915	15	4,460
IS EDUCATION AND TRAINING	1,200	1,475	24	2,265	20	3,910
FACILITIES MANAGEMENT	150	170	14	220	16	345
SYSTEMS INTEGRATION	275	550	79	1,575	25	3,080
TOTAL	16,030	19,720	22%	28,925	18%	47,125

EXHIBIT III-8

PROFESSIONAL SERVICES MARKET FORECAST, 1987-1992
UNITED KINGDOM
(By Market Segment)

MARKET SEGMENT	MARKET FORECAST (£ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
IS CONSULTANCY	120	150	20	210	17	335
CUSTOM SOFTWARE DEVELOPMENT	560	685	22	1,015	19	1,700
CONTRACT STAFF	150	180	20	260	17	415
IS EDUCATION AND TRAINING	105	135	28	220	23	410
FACILITIES MANAGEMENT	5	7	22	10	22	18
SYSTEMS INTEGRATION	40	80	71	200	19	340
TOTAL	980	1,237	25	1,915	19	3,218

EXHIBIT III-9

PROFESSIONAL SERVICES MARKET FORECAST, 1987-1992
WEST GERMANY
(By Market Segment)

MARKET SEGMENT	MARKET FORECAST (DM Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
IS CONSULTANCY	300	365	21	535	17	855
CUSTOM SOFTWARE DEVELOPMENT	1,500	1,875	22	2,720	19	4,580
CONTRACT STAFF	300	365	20	515	17	825
IS EDUCATION AND TRAINING	450	555	21	790	18	1,305
FACILITIES MANAGEMENT	9	11	9	15	22	27
SYSTEMS INTEGRATION	85	180	79	490	25	960
TOTAL	2,644	3,351	24	5,065	19	8,552

EXHIBIT III-10

PROFESSIONAL SERVICES MARKET FORECAST, 1987-1992
ITALY
(By Market Segment)

MARKET SEGMENT	MARKET FORECAST (Lira Billions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
IS CONSULTANCY	135	170	24	260	21	465
CUSTOM SOFTWARE DEVELOPMENT	650	840	28	1,355	20	2,355
CONTRACT STAFF	120	150	25	235	22	425
IS EDUCATION AND TRAINING	90	125	35	220	30	485
FACILITIES MANAGEMENT	22	25	13	32	5	49
SYSTEMS INTEGRATION	5	30	>100	175	36	440
TOTAL	1,022	1,340	30	2,277	22	4,219

EXHIBIT III-11

PROFESSIONAL SERVICES MARKET FORECAST, 1987-1992
BENELUX (Holland, Belgium, and Luxembourg)
(By Market Segment)

MARKET SEGMENT	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
IS CONSULTANCY	70	90	23	130	20	225
CUSTOM SOFTWARE DEVELOPMENT	300	370	22	545	18	895
CONTRACT STAFF	120	145	20	205	16	320
IS EDUCATION AND TRAINING	75	95	25	145	21	260
FACILITIES MANAGEMENT	5	6	21	9	6	14
SYSTEMS INTEGRATION	<5	15	>100	90	30	200
TOTAL (Rounded)	575	720	25	1,125	19	1,915

EXHIBIT III-12

PROFESSIONAL SERVICES MARKET FORECAST, 1987-1992
SCANDINAVIA (Norway, Sweden, Denmark, and Finland)
(By Market Segment)

MARKET SEGMENT	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
IS CONSULTANCY	80	100	23	150	20	260
CUSTOM SOFTWARE DEVELOPMENT	400	505	24	760	19	1,300
CONTRACT STAFF	80	95	22	145	18	240
IS EDUCATION AND TRAINING	80	100	26	160	22	290
FACILITIES MANAGEMENT	<5	5	21	7	6	11
SYSTEMS INTEGRATION	<5	10	>100	50	26	100
TOTAL (Rounded)	50	815	25	1,270	20	2,200

EXHIBIT III-13

IS CONSULTANCY MARKET FORECAST, 1987-1992
WESTERN EUROPE
(By Country Market)

COUNTRY MARKET	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
FRANCE	240	295	22	435	19	725
UNITED KINGDOM	180	220	20	310	17	495
WEST GERMANY	140	170	21	250	17	400
ITALY	90	115	25	175	22	315
BENELUX	70	90	23	130	20	225
SCANDINAVIA	80	100	23	150	20	260
TOTAL	800	990	22	1,450	18	2,420

EXHIBIT III-14

CUSTOM SOFTWARE DEVELOPMENT MARKET FORECAST, 1987-1992
WESTERN EUROPE
(By Country Market)

COUNTRY MARKET	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
FRANCE	1,600	1,950	20	2,765	17	4,425
UNITED KINGDOM	825	1,005	22	1,490	19	2,500
WEST GERMANY	700	875	22	1,270	19	2,140
ITALY	440	570	28	920	20	1,600
BENELUX	300	370	22	545	18	895
SCANDINAVIA	400	505	24	760	19	1,300
TOTAL	4,265	5,275	22	7,750	18	12,860

Note: Forecast includes enabling products and kernels but not software products/packages.

EXHIBIT III-15

CONTRACT STAFF MARKET FORECAST, 1987-1992
WESTERN EUROPE
(By Country Market)

COUNTRY MARKET	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
FRANCE	260	310	18	425	15	650
UNITED KINGDOM	220	265	20	380	17	610
WEST GERMANY	140	170	20	240	17	385
ITALY	80	100	26	160	22	290
BENELUX	120	145	20	205	16	320
SCANDINAVIA	80	95	22	145	18	240
TOTAL	900	1,085	20	1,555	17	2,495

IN

EXHIBIT III-16

EDUCATION AND TRAINING MARKET FORECAST, 1987-1992
WESTERN EUROPE
(By Country Market)

COUNTRY MARKET	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
FRANCE	175	215	24	330	20	570
UNITED KINGDOM	155	200	28	325	23	600
WEST GERMANY	210	260	21	370	18	610
ITALY	60	85	36	150	30	330
BENELUX	75	95	25	145	21	260
SCANDINAVIA	80	100	26	160	22	290
TOTAL	755	955	25	1,480	22	2,660

EXHIBIT III-17

PROFESSIONAL SERVICES FACILITIES MANAGEMENT MARKET FORECAST, 1987-1992 WESTERN EUROPE (By Country Market)

COUNTRY MARKET	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
FRANCE	22	25	13	32	16	50
UNITED KINGDOM	8	10	3	15	22	27
WEST GERMANY	4	5	21	7	20	12
ITALY	15	17	14	22	14	33
BENELUX	5	6	21	9	16	14
SCANDINAVIA	4	5	20	7	16	11
TOTAL	58	68	17	92	104	147

Note: Forecast includes facilities management for user-owned hardware only, ie., where a vendor only provides "people-related" professinal services and does not accept the risk of owning/managing the computer equipment. The forecast includes data processing and communications facilities management.

EXHIBIT III-18

FACILITIES MANAGEMENT MARKET FORECAST, 1987-1992
TOTAL WESTERN EUROPEAN MARKET
(Including FM on Vendor- and User-Owned Equipment)

FACILITIES MANAGEMENT -DELIVERY MODES	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
DATA PROCESSING						
FACILITIES MANAGEMENT						
-USER-OWNED HARDWARE	53	61	12	75	11	102
-VENDOR-OWNED HARDWARE	267	329	18	435	14	643
SUBTOTAL	320	390	17	510	13	745
COMMUNICATIONS						
FACILITIES MANAGEMENT						
-USER-OWNED HARDWARE	5	8	50	17	38	45
-VENDOR-OWNED HARDWARE	35	45	32	80	23	150
SUBTOTAL	40	53	34	97	26	195
GRAND TOTAL	360	443	19	607	16	940

Note: Forecast for Communications Faci lities Management on Vendor-Owned Hardware includes INPUT's estimates of the market for Managed Data Network Services (MDNS).

EXHIBIT III-19

SYSTEMS INTEGRATION MARKET FORECAST, 1987-1992
WESTERN EUROPE
(By Country Market)

COUNTRY MARKET	MARKET FORECAST ($ Millions)					
	1986	1987	1986-1989 AAGR (Percent)	1989	1989-1992 AAGR (Percent)	1992
FRANCE	40	80	79	230	25	450
UNITED KINGDOM	60	115	71	300	19	500
WEST GERMANY	40	85	79	230	25	450
ITALY	5	20	>100	120	36	300
BENELUX	<5	15	>100	90	30	200
SCANDINAVIA	<5	10	>100	50	26	100
TOTAL (Rounded)	150	325	90	1,020	25	2,000

Note: Forecast includes SI contracts of $5 million and above but excludes NATO and Space. The forecast also includes communications and computing hardware.

C. TRENDS, ISSUES, AND OPPORTUNITIES IN KEY MARKET SEGMENTS

1. IS CONSULTANCY

- INPUT estimates that user expenditures in IS Consultancy will increase from $800 million in 1986 to $990 million in 1987, reaching $1,450 million in 1989 at an annual average growth rate of 22%. The five-year projection shows a market size of $2.4 billion by 1992.

- A key impetus to growth is the corporate level of visibility increasingly 'enjoyed' by information systems. The level of capital investment, the criticality of these systems to the business, and the productivity gains through connectivity and compatability all serve to focus management's attention on information systems.

- The size and complexity of information technology projects has expanded as companies seek to implement integrated companywide information technology strategies.

- Consultancy services are being utilised in areas where rapid technological change lends to a scarcity of in-house skills and knowledge. Telecommunications and expert systems are both good examples of this.

- These internal pressures, coupled with the availability of a wide variety of 'solutions', require that users seek external advice on current and long-term developments in the multitude of disciplines related to information systems.

- Levels of professionalism, enhanced via vertical market specialisation are rising and the use of consultants is becoming more sophisticated. An interesting trend and potential opportunity exists in the increasing use of consultants by small to medium sized organisations who have not developed a coherent information technology strategy and find problems when attempting to upgrade or change their initial computer systems.

- The continued convergence between management and information technology consultancy has not only led to the rapid expansion of the information technology consultancy divisions of the management consultancy firms, but also opened up new opportunities for companies to enter the market that can marry the disciplines of both branches of consultancy. One such example is Robb Wilmot's latest venture OASIS whose raison d'etre is based on the observation that the costs and difficulties involved in organisational change attached to implementing information technology is much greater than the investment in technology.

- The key issues impacting information systems consultancy are illustrated in Exhibit III-20.

- Although a large number of vendors perceive real growth and profit opportunities in the consultancy area, there is a trend towards market dominance by a small number of key players supplemented by niche players. Medium-sized consultancies who fail to achieve critical market position are gradually losing share of the market. In essence, there is a polarisation between the big players and the boutiques.

- The fee incomes of the top U.K. consultancies are given in Exhibit III-21.

- The information services consultancy market is becoming increasingly dominated by the large accountancy firms, causing more established players to review strategy, form strategic alliances, and apply political pressure in an attempt to stem the increasing flow of entries into the accountants' sales ledgers.

- Examples of consolidation include the purchase of the majority of INBUCON's businesses by P-E International from Reliance Group Holdings of the U.S.A. The combined fee income of PE INBUCON for 1986 has been imputted as approximately 35 million pounds, taking the venture into the U.K. top three.

EXHIBIT III-20

CONSULTING - KEY ISSUES

- Corporate Visibility of Data Processing
- Plethora of "Solutions"
- The Challenge of Implementation
- Management/Is Consultancy Convergence
- Market Polarisation
- International Expansion

SPSE

EXHIBIT III-21

THE TOP TEN U.K. CONSULTANCIES
FEE INCOME GROWTH, 1985-1986

	FEE INCOME 1986 (£ Millions)	FEE INCOME 1985 (£ Millions)	FEE GROWTH (Percent)
P A	60.0	45.0	33.0
Coopers & Lybrand	36.0	26.7	35.0
McKinsey	30.0	26.0	15.0
Arthur Andersen	26.1	16.3	60.0
P-E International*	24.1	19.5	26.0
Price Waterhouse	23.0	15.9	45.0
Inbucon*	21.7	17.0	28.0
Peat Marwick**	17.5	12.5	40.0
A.D. Little/ Cambridge Consultants	15.0	13.5	11.0
Bain	14.0	12.0	17.0

* Trading as P-E Inbucon since May 15, 1987
** Trading as Peat Marwick McClintock since April 1, 1987

- P-E has strong capability in information services and an excellent reputation for project management. INBUCON's businesses focus on human resources consultancy and industrial relations. International expansion is a key strategic thrust, and both have extensive manufacturing and public sector experience.

- Peat Marwick has merged with KMG Thomson McLintock to create the world's biggest accountancy group. It is interesting to note that although integration has been successful in the U.K., there have been cultural and organisational problems involved in the merger of operations in continental Europe.

- As one vendor suggested '...mergers and acquisitions are like the mating of porcupines...an activity that should be approached slowly and carefully...'.

- The strength of the accountants lies in their strategic consulting skills, comprehensive implementation services, and high-quality systems development methodologies. The 'Big 8' have undoubtedly increased the credibility and image of subcontractors by enhancing levels of professionalism. However, there is still a cloud over the ethical issue of impartiality in relation to their auditing activities.

- Critics in the debate over 'Chinese Walls' argue that because the manipulation of corporate numbers is handled by information systems, the certifiers of the rectitude of those manipulations should not be the people who designed the systems and the software that runs them.

- The mainstream software houses are continuing to lobby government bodies, arguing that the 'Big 8' abuse their position as auditors to win large contracts. However, the overlap between audit and consultancy clients is not as large as suggested. At Arthur Andersen it is only 10%, and Price Waterhoue 30%. In addition, there is an increasing market trend towards open bidding for audit contracts and rotation of auditors.

- The culture and style of the 'Big 8' makes them very suitable to undertake large systems development tasks that are not very complex (i.e., 'something they have done before'), ideally where they can utilise standard packages.

- In order to meet the competitive challenge, the traditional firms will need to refocus their services in order to provide systems solutions that are directly supportive of an organisation's business strategy. For example, the recent Regulation of Auditors survey in the U.K. noted that 70% of respondents mentioned 'familiarity with in-depth knowledge of the business' as a key advantage in using auditors' consultancy services.

- The development of unique technical skills and covering all phases of the software development life cycle with tools and methodologies are also key competitive appraoches.

2. CUSTOM SOFTWARE DEVELOPMENT

- INPUT estimates that the market for custom software development will remain relatively buoyant and grow from $4.3 billion in 1986 to $5.3 billion in 1987, reaching $7.7 billion by 1989, an overall annual average growth rate of 22%. The five-year forecast shows the market reaching $12.9 billion by 1992 at an AAGR of 18% for the period 1989-1992.

- France is the largest market for custom-built software, and the size of the industry is in part a consequence of the negative cultural attitude towards ready-made solutions. The government sector is also important and contributes approximately 18% of subcontractors revenues.

- The relatively limited size of the West German market is partially a consequence of the absence of large government procurement programmes designed to foster local subcontractors. The major factor is a cultural preference for in-house solutions and for packaged software. Nevertheless, IT plays a strong part within the West German economy and commercial thinking.

- INPUT's relatively buoyant projections for the U.K. are partially based on changes in government policy to increasingly utilise subcontractors' services.

- Industry structure for custom software development varies by country:

  - The French industry is dominated by a small number of key players and is concentrating, for example, SEMA-METRA's acquisition of CERCI and CAP GEMINI SOGETI's acquisition of SESA and 36% of CISI.

  - The U.K. industry is polarised between a small number of dominant players and a large number of small players.

  - The Dutch market is highly populated and dominated by large domestic operators, e.g., VOLMAC and ASSYST.

  - West Germany offers opportunities for market entry via acquisition or joint venture owing to the fragmented nature of the industry structure.

  - The Scandinavian market is currently dominated by local companies, a number of which are government owned.

  - The Italian market is fragmented and only has one significantly large systems house, FINSIEL, where revenues are nearly three times the size of the next largest competitor. Italy is expected to offer significant opportunities for growth and market exploitation via joint venture.

- The structure of the European Information Services Industry will be covered in more detail in INPUTs report entitled Western European Markets for Information Services, 1987-1992, which will be published later this year.

- The key issues impacting the user and vendor environment for custom software development are given as Exhibit III-22.

EXHIBIT III-22

CUSTOM SOFTWARE DEVELOPMENT - KEY ISSUES

- Lack of Skilled In-House Resources
- Project Management
- Embedded Software Tools and Kernels
- More Powerful and Flexible Software Packages
- "Buy and Tie" Approach
- Extensive Competition

- As discussed earlier, the user community has a lack of skilled in-house personnel to maintain existing systems and develop much needed new systems. In part, this lack of staff is due to financial controls that have forced major reductions in the size of the staff that is maintained on a full-time basis. In some instances, the staff may be present but unable to focus on new development because of demands on their time from an aging equipment inventory or from the lack of up-to-date technical skills required to implement new technologies. Regardless of the particular reason, vendors should find a large market for systems development work, increasingly through out-of-house developed systems rather than on a 'body shop' basis.

- In France, manpower shortages are most pronounced in the area of project management skills and for specialists in leading edge technology such as A.I. This phenomenon is generally true of Western Europe as a whole, and the challenge for vendors is to attach and retain staff with not only specialist skills but also industry knowledge. The dilemma, however, is that the most creative software developers tend to be relatively young and without client industry experience. The solution lies in team organisation and leadership from effective project managers who can marry commercial acumen with technical know-how and have the drive and enthusiasm to guarantee on-time, within budget delivery.

- Growth is being stimulated by new software tools, either incorporated within applications packages or on a standalone basis. These tools promise to increase productivity of programmers and enhance the attractiveness of professional services offerings. Vendors are implementing a 'tool box' concept of systems development that includes reusable code in the form of generalizable modules and kernels which provide leverage of intellectual inputs from one project to another.

- It is interesting to note that usage of software development tools and methodologies is probably more advanced in Western Europe than in the U.S. and can potentially provide a window of opportunity for international expan-

sion and commercial success. For example, BIS Applied Systems Fundmaster product, which the company wrote using its BIS proprietary ISPE (Integrated Project Support Environment) automated development tool, generated over $1 million in its first sales year in the U.K. alone.

- The whole area of systems development productivity will be covered in more detail in INPUT's report entitled Systems Development Productivity - Trends and Opportunities which will be published later in 1987.

- Maintenance and change control are also key issues with respect to kernels and embedded software. It is suggested that organisations establish international centres of excellence in order to maintain product purity and effective client support.

- This issue will be dealt with in more depth in INPUT's report entitled Software Product Pricing and Support - European Market Directions which will be published later in 1987.

- There are offsetting influences in this market that vendors must address. Chief among these is the growing list of alternatives available to the user in the form of more powerful and flexible software packages that, in many instances, now include embedded tools to ease the efforts of modification and maintenance.

- With the plethora of more powerful software available to a user community, the 'perceived' systems uniqueness that drove users to custom development may be shrinking. Users seem more willing to 'buy and tie' software packages than in the recent past.

- Not only are software vendors expanding their offerings horizontally in their respective vertical markets, but they are adding their own professional services to maintain control of software and capture the modification/ maintenance expenditures that have gone to professional services firms in the recent past.

3. CONTRACT STAFF

- INPUT estimates that the market for contract staff will grow from a base of $900 million in 1986 to $1,085 million in 1987 to reach $1,555 million by 1989 at an annual average growth rate (AAGR) of 20%. The five-year projection shows the market increasing to $2.5 billion by 1992 at an AAGR of 17% for the period 1989-1992.

- As mentioned earlier, contract staff are being utilised to meet peak loading requirements in applications development and to meet temporary requirements for specialist staff with both industry knowledge and scarce technical skills, for example, four GL programmers and project managers.

- Comparison of the cost of in-house staff and performance of contract staff has always been a focal point in the decision to acquire external services. In today's market this continues to be the case, but rising corporate overheads and the salary levels usually commanded by staff versed in newer technologies are indicating that contractors' fees are comparable to fully burdened in-house rates. The key, of course, is the notion of 'fully burdened'. Users must be made aware of the full costs of the in-house staff in any comparisons of internal versus external costs.

- Undoubtedly, users face a dilemma between selecting a contractor to undertake a systems development project or to use contract staff. The benefits of the contract staff solution are cost and control; systems houses have the advantage of independence, professionalism, proven experience for delivering total solutions, and specialist expertise which includes kernels and libraries of code for certain problems as well as tools and methodologies.

- The key issues impacting the development of the market for contract staff are illustrated in Exhibit III-23.

EXHIBIT III-23

CONTRACT STAFF - KEY ISSUES

- Skills GAP - The Need for Specialists
- Market Positioning - Project Approach versus Body Shop
- Lack of Professionalism
- Market Restructuring
- Key Opportunities
  - Financial Services
  - Public Sector

- Historically, in the 1970s the data processing manager was not subjected to the same financial constraints as his colleagues in commercial departments and many built empires of permanent staff. During that period relatively unspecialised personnel were hired under contract to meet peak loading requirements, e.g., Cobol programmers rather than banking experts.

- The 1980s have seen a shift in the contract labour market towards the provision of specialists and experts as D.P. requirements have increased in variety and complexity. Successful contract staff vendors now meet the skills gap for temporary specialist staff and meet clients' requirements for installing new applications packages, changing operating systems, transferring from batch to on-line processing, etc.

- Pioneering and profitable contract staff vendors have raised the professional image of freelancers by providing reliable people with specialist knowledge. In addition, they have aggressively pushed the promotional message that is a cost-effective strategy for organisations to only retain a restricted level of core staff on a permanent basis.

- The 'skills gap' is most strongly felt in the following areas:

  - Network controllers and communications specialists.

  - Senior project managers/team leaders with technical and commercial skills.

  - Specialists in application generator tools.

  - Specialists in fourth generation languages who also possess business problem solving skills and industry application knowledge.

  - Applications support specialists.

- Electronics engineers.

- Problems with the recruitment and recruitment of permanent computer staff have been felt most strongly in the public sector owing to inflexible grading structures, infrequent pay, and performance reviews, and lack of flexibility in offering staff nonmonetary rewards, for example, company cars.

- The public sector is a key business development opportunity for vendors, as is the financial services community which is undergoing rapid change in response to an almost revolutionised business environment.

- Other smaller niche opportunities also exist for new start-up companies or boutique players.

- A further major driving force in the market is the attractiveness of operating on a freelance or contract basis to individual IS personnel. The benefits are increased financial reward, variety, experience, and career progression as well as the psychological reward of independance and feeling of being in control of one's destiny.

- There is always a delimma for users in terms of whether to use contractors or hire trained staff. Consequently, vendors need to reduce risk by offering a total service in terms of availability of both permanent and contract staff.

- It should be noted that mark-ups and charge-out rates can be increased with the level of specialisation of staff in terms of both industry knowledge and technical skill -- a key to profitability.

- Market positioning and differentiation are key vendor issues and there are essentially two approaches:

  - The 'project' approach adopted by vendors with a DP background, e.g., Tangent in the U.K. and U.S. and Volmac in the Netherlands.

- The 'body shop' approach adopted by vendors with a personnel (i.e., recruitment agency) background, e.g., Blue Arrow.

- The 'solutions' or 'project' approach relieves clients of the need for management and professionalism is enhanced, partially by the requirement for the vendor to project manage service quality. However, this approach requires that the contract staff vendor increases the number of permanent staff on their payroll which increases risk through the increase in overheads.

  - There is clearly a convergence between contract staff and custom system development at the top end of the market.

  - Lack of professionalism is a key issue for the contract staff business, and there are a large number of small companies providing limited levels of service, i.e., 'C.V. shuffling'.

- These organisations who adopt a 'body shop' approach often use unprofessional marketing practices, e.g., publishing false advertisements in order to get contractors on their books. This lack of professionalism is partially due to an aggressive 'sales orientation' within the industry and the management of many companies by individuals who have limited horizons in terms of meeting monthly revenue targets rather than meeting and supporting client needs and business problems.

- The barriers to entry into the contract staff market are low and there are a large number of new entrants with a 'body shop' approach attempting to find profitable positions in the market with limited strategic focus.

- However, there are already signs that the contract staff market is restructuring and shaking-out via acquisition as vendors seek to gain critical market position in terms of financial strength, image, and resource in order to meet increasingly complex user demands and differentiate on service.

- The purchase of Tamor Ltd. and DP Support Services Ltd. by Blue Arrow, the U.K.'s largest employment agency is an example of this trend.

- In addition, there is evidence that the market is becoming increasingly dominated by the large players as users seek to establish relationships with credible, professional operators who can offer a comprehensive range of skills and services, e.g., Computer People, whose shares were heavily oversubscribed in a successful stock market floatation in May 1987.

4. EDUCATION AND TRAINING

- INPUT estimates that the market for IS related education and training services will grow from a base of $755 million in 1986 to $955 million in 1987 to reach almost $1.5 billion by 1989 at an AAGR of 25%. The five-year projection shows a market size of $2.7 billion in 1992 with an AAGR of 22% for the period 1989-1992.

- The U.K. shows the greatest opportunity for growth, and companies are becoming increasingly aware of the value of training as an investment in 'human capital' and are shaking off their traditional preference for 'sitting with nellie' as a valuable training method. As one respondent remarked '...we should include trained personnel as a balance sheet item...'.

- The size and growth of the French market is stimulated by law which obliges companies to spend 0.5% of their wage bill on 'formation initiale' and 1.1% on 'formation continue'. Any of this money not spent on training is forfeited to the treasury. French companies, in fact, do more than the law requires. On average they spend 2.14% on training.

- West German companies also place high emphasis on training. However, German graduates undertake a long preparatory education before embarking on their careers and an electronics or systems engineer will typically not be

expected to start work before the age of 27. Consequently, ongoing education and training tends to be company focused and role specific.

- The Scandinavian market for education and training is large (relative to the size of computer services industry) and expanding buoyantly. It is suggested that vendors exploit joint venture, international expansion opportunities in this market segment.

- Education and training is one of those markets which shows tremendous potential but which is difficult to capture on any large share basis. Barriers to entry are low and very few computer services vendors are not involved in education and training activity in some way. For the majority, training services are of an auxilliary, add-on, customer service nature.

- For software houses, network service operators, hardware manufacturers, and standard turnkey systems suppliers, education and training is not only synergistic with existing activities but is increasingly being organised and promoted as a standalone service and is a profit centre within large service companies, for example, Hoskyns, Datasolve and BIS (Nynex).

- There is also an increasing role for niche independant players who have the advantage of independance and professional status as training specialists. These organisations are well positioned to exploit growth opportunities in custom-designed training programmes for individual companies and also in consultancy as user organisations place increasing emphasis on career development, manpower planning, and professional personnel management, which is becoming increasingly expensive to staff and organise in-house.

- Low barriers to entry have seen a large number of players enter the market for microcomputer based training. However, the micro market and, indeed, the demand for end-user computing training is not growing as rapidly as expected. As one vendor has suggested, '. . . micro users tend to muddle through and rely on colleagues for help. . .'. Consequently, training for micro-

based products is price sensitive and unprofitable owing to high fixed staff overheads.

- Growth oportunities in computer based training (CBT) have also provided attractive opportunities for players in the industry, e.g., DELTAC and ASI.

- In addition, nontraditional computer services vendors have seen training opportunities as being synergistic with their existing operations, for example, Reed and Pitman computer training. The accountancy firms, such as Arthur Young, are beginning to actively promote their services in this area.

- Consequently, owing to the proliferation of players in the market and price sensitivity, high market growth rates do not necessarily indicate an easily addressable and profitable business opportunity.

- In summary, the education and training market is only for those vendors who can adequately differentiate and produce quality current educational courseware for their chosen specialist niche.

- For example, BOC, who are growth stars in the field of IBM mainframe instructor-led training (ILT), have concluded a joint marketing agreement with Deltac, specialists in self-teach training (STT), i.e., CBT and Interactive Videodisk, in order to enhance their range of service offerings and market penetration across Northern Europe.

- Exhibit III-24 illustrates the key issues that are impacting the development of education and training markets.

- The U.K. has pioneered the use of computer-based training and has been seen by many as the panacea (the 'Aspro') of the training world. However, not all training problems can be cured by automation. In practice, people concentrate more on the operation of the machine than what is designed to help in achieving. In addition, growing use of desktop publishing has meant that

EXHIBIT III-24

EDUCATION AND TRAINING - KEY ISSUES

- Micro Training Opportunities - Hyperware
- Computer-Based Training - Not an "Aspro Solution"
- Key Opportunities
  - Consultancy
  - Management and Personal Skills Training
  - Computer Literacy - Non-DP Staff
  - Exclusive Courses
- Rapid Technical Change
- Convergence Training and IT Strategy
- Marketing

technical literature and printed courseware can easily and relatively cheaply be updated.

- However, CBT does have its applications, for example, where an audience of users in very wide, both geographically and in ability level, as in a large conglomerate, needing centrally controlled training.

- CBT also needs to be supplemented by ILT particularly on more advanced courses.

- The most important current trend which has to be exploited is the use of artificial intelligence techniques. Current systems require a degree of expensive human instruction and are limited to relatively simple teaching tasks. The greater flexibility which could be built into systems which can themselves both learn and assess, objectively, the varied abilities of their audience, will extend the scope of CBT into more complex and intricate areas.

- A major factor driving the development of the training market is the increased emphasis on personal development and IT-related training placed by organisations as part of their longer term IT strategy. Companies are recognizing that training is necessary throughout an individual's career and does not necessarily only apply to the first couple of years of an employee's working life.

- Planned training programmes are a cornerstone in building staff loyalty and committment and are an essential investment to improve productivity and cut the expensive overhead attached to staff turnover.

- Companies are now placing more emphasis on management development and personnel skills training and no longer merely focusing on implementing technical training.

- Within the computer services industry, effective programmes for professional staff development are a critical success factor to removing supply side constraints and bridging the skills gap.

- A key opportunity for training vendors is to fill the gap in the market for end-user training as part of systems implementation. Training is too often picked up by systems analysts late in the development cycle, and as a consequence new and expensive systems are not utilised effectively and can be a root cause of end-user dissatisfaction with IT.

- In addition, vendors are having success with courses that provide basic systems analysis skills for end users. For example, the growth of micro-based 4GL packages in many companies has only resulted in users 'coding bad logic faster'.

- There is also a need for programmes designed to improve management understanding and awareness of IT and how the systems strategy interfaces with corporate, divisional, and departmental strategies.

- A further key opportunity is to effectively differentiate on quality by adopting a total service approach with consultancy linked to training, for example, developing personal, departmental, and corporate training programmes; career development planning; succession planning; and manpower planning.

- It is essential that vendors utilise advanced teaching techniques with effective support techniques, for example, follow-up reviews to ensure implementation.

- Other opportunities mentioned by vendors interviewed by INPUT included:

  - Project management skills.

  - Team leadership skills.

- Project planning workbenches.

- Micro-based software design tools.

- Business analysis training.

- Real time systems, e.g., DOS to MVS conversion and IBM CICS and Networking.

- Exclusive courses, i.e., specialist software packages or unique subject areas, e.g., BACS facilities and services.

- Interactive videodisk (IV) is both an opportunity and a market inhibitor in that it cuts the costs of training. There is no doubt that IV has increased the popularity and obiguity of training but must be approached cautiously as a business opportunity as it requires high up-front investment in equipment, courseware, and specialist production skills.

- Small independant training companies are faced with the challenge of seeking out and dominating niche market oportunities. For example, INSTRUCTION SET, is exploiting a profitable niche in leading edge operating systems software, i.e., UNIX (in cooperation with the X-OPEN group), ADA (an official defence language), C, PASCAL and OCAM (INMOS's proprietary language). A key management challenge for the small independents is to control growth in order to retain quality, culture, and independence.

- Consistency, quality, and professionalism are key challenges as indeed is the recruitment and retention of trainers with current technological skills. The ideal trainer comes from a technical rather than a training background, and it is suggested that vendors consider transferring technical staff into training for short periods as part of a planned personnel/career development programme which recognises the need to enhance an individual's interactive skills.

- Another key management challenge is effective project management and the need for a vendor to strike an adequate balance between people and commercial orientation, i.e., to resolve the conflict between the 'actors' and the 'accountants'. Teachers are renowned for their lack of awareness of budgets, costs, and financial discipline.

- Effective marketing is also a key issue, and clients need to be educated and reminded of the realisable cost, productivity, and morale benefits attached to training. This is especially true in the U.K. where there is a tendency for training to be regarded as a luxury item in a company's shopping basket and is the first to be cut when budgets are reduced.

- Effective account management, cutomer closeness, and after-sales support will also aid in the challenges of understanding clients' business problems and evolving a portfolio of courses and services.

- A key force driving the development of this market is the ubiquity of computing within companies and the spread of the decision making unit to individuals at a work unit level. In order to address pockets of potential, vendors need to target their missionary marketing (rather than sales) activities to a wide audience of people.

- To this end it is suggested that vendors undertake public relations activities and consider mounting seminars and awareness sessions. The production of a monthly/quarterly newsletter is an effective marketing tool and relatively inexpensive to produce using desktop publishing techniques. A professional looking course catalogue is an essential investment.

- The newsletter could include:

  - Additions or deletions to course calendar.

  - Short descriptions of new training products.

- A questionnaire of user requirements.
- Case studies of user experiences and pre- and post-implementation reviews.
- Testimonials of tutors.
- Technical publication abstracts.
- Company news and personnel changes.

- For vendors seeking to address the needs of large corporate organisations this activity will support a strategy to 'lock-in' the existing customer base.

- A key to vendor success is to meet the user challenge of technical complexity and constant change and to keep abreast of developments in leading edge technology.

- User organisations need external training to provide staff with new techniques and methodologies in order to maintain standards and technical leadership. Personnel skills and career development programmes are also increasing in priority. However, the marketing challenge is to identify a concentrated enough group of potential users to make a profitable standalone education and training offering. The unique needs of individuals and companies makes the identification of a critical mass very difficult.

- Consequently, the perceived value of training in generic applications and products is low. However, there is a trend for custom-built and on-site courses for which users are prepared to pay a premium and vendors must differentiate on service quality and client understanding in order to address these opportunities.

5. FACILITIES MANAGEMENT

- INPUT estimates modest growth for this delivery mode of the professional services market and forecasts that user expenditures will rise from $68 million in 1987 to reach $92 million by 1989 at an AAGR of 17%. The five-year forecast estimates the market size at $147 million by 1992 with an AAGR of 17% for the period 1989-1992.

- The major driving force in this market is the chronic shortage of skilled in-house staff available to run sophisticated online systems. This will be mitigated in part by increases in training of available staff that will allow this in-house group to operate and maintain these systems.

- A major inhibitor is user preference for control and risk resilience. There is a strong cultural preference in Western Europe to keep development and maintenance tasks in-house.

- Nevertheless, large vendors such as EDS and Hoskyns with extensive financial, technical, and management resources are able to effectively challenge the credibility and effectivenes of the 'D.P. Empire' and offer total service solutions on an international scale.

- Exhibit III-25 illustrates the issues that are impacting the development of the market for facilities management.

- This subject area has also been dealt with in depth in INPUT's 1986 report entitled Facilities Management Opportunities in Western Europe, 1986-1991.

- A major factor impacting the development of this market is the cultural attitude of a company's management towards subcontracting. Companies with open attitudes tend to be marketing oriented, are undergoing rapid organisational change (e.g., mergers and acquisitions), and regard investment in IT as beneficial to business efficiency and long-term competitive edge.

EXHIBIT III-25

FACILITIES MANAGEMENT - KEY ISSUES

- Chronic Shortage of In-House IS Personnel
- Management Attitude and Culture
- Vendor Management Skills
- Sophisticated Marketing - The Corporate Senior Management Target
- Understanding Clients' Real Business Needs and Problems

- Users with closed attitudes towards subcontracting are those where the provision of IT is dominated by the DP department which is preoccupied with in-house tools and methodologies (e,g., an IBM site), the management is conservative and risk averse, and the company is operating in a stable environment where the management focus is on cost reduction rather than business development in order to enhance profitability.

- As a consequence, it is not surprising that vendors cited financial services, retail and wholesale distribution, and consumer goods as key target market segments.

- The benefits of facilities management (FM) to user organisations are as follows:

  - Removal of distractions from main business purpose ('sticking to the knitting').

  - Potentially reduced capital expenditure.

  - Cost control.

  - No staff recruitment and retention problems.

  - DP stability during change.

  - Professional standards and high-quality service.

  - Objectivity of IT strategy.

- A key to vendor success in this area is the development of professional management skills at all levels of the organisation. As one vendor suggested '. . . you need to have people in your company who love to be managers . . .'.

- The key marketing challenge is to sell the FM concept at a corporate (board) management level as the decision to accept FM will very often be a very personal decision by the DP manager who often regard FM with fear and suspicion as a threat to their 'Empire'.

- It is essential that vendors are able to understand 'real' business needs and client problems. The first step is to help clients formulate their strategy. The next step is to assume total responsibility for the management and implementation of their systems strategy.

6. SYSTEMS INTEGRATION

- Systems integration, added to INPUT's professional services market as a separate delivery mode for the first time in 1987, represents one of the most exciting areas in information services and has been given a focus of attention in this report.

- Although the concept of systems integration has been around the defence contracting community for almost 20 years, systems integration can be regarded as an emergent market opportunity (or approach towards doing business) as users in the commercial area are increasingly wanting to sign a single-source contract for a diverse development involving a number of subcontractors.

- In addition, the dynamics of the market are changing with the increased importance of software development in large projects, and the increased financial stability, credibility, and international resources of software houses. In the past, the hardware manufacturers were a natural first choice when implementing large non-standard turnkey systems. Software and services companies are now a natural potential choice for providing total solutions and a 'one-stop shopping service' to corporate clients.

- INPUT estimates that the systems integration market (which includes contracts of $5 million and above but excludes NATO and space) will grow from a base of $150 million in 1986 to $325 million in 1987, to reach $1,020 million by 1989 at an AAGR of 90%. The five-year projection shows the market expanding to $2 billion by 1992 at an AAGR of 25% for the period 1989-1992.

- Exhibit III-26 illustrates the key forces that are driving and inhibiting the development of this market.

- Exhibit III-27 illustrates the key issues that are impacting the commercial systems integration (CSI) marketplace.

- There are a variety of pressures within the user environment which are driving demand for systems integration and can be highlighted as follows:

  - International competitive pressure on quality and cost has increased markedly in recent years in most, if not all, industry sectors. The competition is not only working harder, but working smarter, forcing European businesses to adopt new strategies for survival.

  - To track their progress in these areas, there is an ever-increasing need for real time information on a wide range of data, ranging from product sales analyses and consumer credit verification to cash flow requirements and manufacturing capacity. As a result, companies now find information systems at the very heart of the organisation and believe that new technologies will help them achieve the optimum systems solutions they require.

  - However, most of today's systems were conceived in response to single applications needs. The vast majority of installed systems address single requirements and are, therefore, often fragmented and incomplete. What is needed is a system solution that integrates the data, text, and image processing needs of the corporation, one that fosters a

EXHIBIT III-26

COMMERCIAL SYSTEMS INTEGRATION - MARKET PRESSURES

- MARKET DRIVERS
  - Competitive Need for Real Time Information Systems
  - Need for Integration of Single Application Systems
  - In-House Inability to Deal with Complex Systems While Maintaining Ongoing Systems
  - Need for On-Time, Within Budget, Successful Delivery
- MARKET INHIBITORS
  - Unaggressive Management Not Seeking to Employ Leading-Edge Technology
  - Closed Attitudes towards Subcontracting
  - Inability of Many Commercial Organizations to Be Able to Specify Administrative Systems
  - Limited 'Project Manager' Resources
  - Vendor Inexperience
  - Lack of Adversarial Mentality

S-PSE

EXHIBIT III-27

SYSTEMS INTEGRATION - KEY ISSUES

- Strategic Alliances, Consortia, and Acquisitions
- Account Control
- Political Factors
- "Can Do" Attitude
- Industry Knowledge, As Well As Project Management and Integration Skills, Critical
- Risk Management
- Disciplined Bid Preparation

SPSE

better use of existing systems.

- These envisaged systems (if they can be defined and specified) are complex, however, and frequently are incompatible with existing hardware, software, and network systems. Furthermore, the in-house staff frequently lack both the time and the technical skills required to implement such complex solutions on time and within budget.

- Systems integration promises rapid and successful development of these very complex systems by allowing vendors skilled in complex systems implementation and management to take responsibility for the entire project, occasionally including ongoing maintenance and facilities management.

- The major inhibitors to market development relate to cultural/managerial attitudes towards subcontracting and their ability to effectively define their requirements for information systems.

- The parameters of these attitudinal constraints have been discussed in the Facilities Management section of this report chapter.

- There are problems to be overcome before the full potential of systems integration will be realized by vendors.

  - Systems integration may require a company to turn over control of the entire information system to the integrator. Not only is this risky for the user on an operational basis, but also in the sense that the expertise for the system remains in the hands of the vendor, not the user.

  - There is also the concern that the commercial market does not have the adversarial mentality that may be required for systems integration. In the defence sector, where the bidding and implementation processes are highly regulated, procedures exist to protect government agencies

from the results of unsuccessful efforts. On the commercial side, however, these procedures do not exist, and even if they did, it is unlikely that a company would desire to suffer the bad press that might result from a lawsuit.

- A concern among some vendors is the lack of experience they have had in systems integration. Some efforts may call for a level of expertise in complex operating environments, for example, that few independent vendors have. While most vendors feel that it is a benefit to be independent of a particular brand of hardware for the sake of objectivity, these vendors realize that this independence requires additional learning that may, in fact, not be readily available. The solution is multiple relationships among independent vendors and hardware manufacturers.

- One of the key features of the European marketplace for systems integration and a central issue for participants is the need to form teaming agreements, joint ventures, and other consortia arrangements.

- Strategic alliances are necessary, not only to share heavy bidding costs (especially in defence contracts), but also to combine the unique strengths of several vendors in terms of technical capability, marketing skills, and geographical presence.

- Software houses need to carefully review their strategy on acquisitions in order to enhance their international market presence and capabilities vis-a-vis hardware manufacturers and other potentially significant market players.

- The complexities of some development projects simply demand a team of vendors with recognized expertise in a multitude of disciplines. No single vendor currently has all of the capabilities required in these types of projects and few vendors have the buying power that comes from the economies of scale that are also frequently required.

- Companies also face the political risks associated with the elimination of jobs that seem to be inevitable in such automation efforts. The tremendous cost of a large integration project can only be offset by the elimination of jobs. If these are union jobs, the problem only becomes compounded.

- System integration offers an opportunity to seize account control from established vendors. Because of the initial importance of these systems to the end user and because the direction of SI contracts is multi-year, its affords the opportunity to the vendor to develop a unique relationship with the customer that can transcend existing relationships.

- A key to vendor success in SI is a 'can do' attitude often most clearly projected by the large American multinationals. Users are essentially purchasing the contractor's ability to 'make it happen'. The overiding importance is to have the image of being able to accomplish to task. In this respect, the hardware manufacturers have a competitive edge in that users believe that IBM, DEC, Unisys, etc., 'must' know how to implement complex systems.

- Other critical success factors include:

  - The ability to assess, contain, and manage risk which includes sophisticated financial control procedures.

  - In-depth understanding of clients business operations, needs, problems, and development strategy.

  - Sophisticated and effective procedures for project management.

- Disciplined bid preparation procedures are also a key requirement. Systems integration is a big-stakes game, and planning adequate funding before entering the market is therefore an absolute necessity.

- Developments within the European systems integration marketplace and areas

of potential opportunity are discussed more fully in Chapter V of this report.

- The next chapter provides a summary of INPUT's user research and reviews trends and issues that are impacting the user environment.

CHAPTER IV - USER ENVIRONMENT

IV USER ENVIRONMENT

- This chapter provides a summary and analysis of INPUT's user research and highlights trends and issues impacting end-user organisations. It also highlights areas of business development opportunity for existing and potential vendors of IS related professional services.

- As part of INPUT's Information Services Program research, a sample of 100 senior data processing professionals and 100 middle/general managers (spread across marketing, production, finance, and distribution/logistics) were interviewed by telephone. An analysis of the research sample is given as Appendix B.

- The purpose of this biannual survey was to assess levels of awareness, usage, and attitude towards the development of information services and to highlight changes and trends across the population.

- With respect to IS related professional services (PFS) the major areas covered were:

  - User perceptions of competitive advantage benefits of information technology (IT).

  - User perceptions of importance of IT to organisational efficiency.

- User attitudes towards some key issues impacting the development of professional services markets.

- User plans for developing applications.

- Levels of penetration and planned utilisation of externally-sourced professional services.

- Perceptions of benefits and drawbacks associated with the use of external professional services.

- Perceptions of importance of key vendor selection criteria.

- User perceptions of competence of various types of information services vendors.

A. COMPETITIVE ADVANTAGE BENEFITS OF INFORMATION TECHNOLOGY?

- A wide cross-section of vendors interviewed by INPUT (normally marketing directors/managers) expressed the opinion that competitive advantage pressures were leading companies to make significant investments in information technology and/or utilise the services of external systems integrators, software houses, and consultancies.

- INPUT's research revealed that 29% of respondents strongly disagreed and 48% of respondents partially disagreed with the statement that it is important for the organisation to invest in information technology in order to sustain competitive advantage.

- Exhibits IV-1 and IV-2 illustrate INPUT's findings analysed by job function, country market, and industry sector. Our findings indicate that vendors

EXHIBIT IV-1

USER PERCEPTIONS OF COMPETITIVE ADVANTAGE BENEFITS OF I.T. (Analysed by Job Function and by Country)

CATEGORY OF ANALYSIS	Sample Size	PERCENTAGE SPLIT			
		Strongly Disagree	Partially Disagree	Agree	Strongly Agree
Analysis by Job Function					
MIS/DP Management	100	28	[52]	15	5
General Management	100	30	[45]	8	17
All Respondents	200	29	[48]	12	11
Analysis by Country					
France	50	0	[74]	6	20
Italy	25	24	[60]	12	4
United Kingdom	50	12	[58]	24	6
West Germany	50	[66]	22	10	2
Benelux	25	[50]	30	4	16
Western Europe	200	29	[48]	12	11

EXHIBIT IV-2

USER PERCEPTIONS OF COMPETITIVE ADVANTAGE BENEFITS OF I.T. (Analysed by Industry Sector)

INDUSTRY SECTOR	Sample Size	PERCENTAGE SPLIT			
		Strongly Disagree	Partially Disagree	Agree	Strongly Agree
Process Manufacturing	30	30	[50]	13	7
Discrete Manufacturing	31	22	[61]	10	7
Retail Distribution	20	25	[55]	10	10
Finance and Banking	45	30	36	18	16
Insurance	17	12	[76]	12	0
Health Care	13	15	[46]	15	24
Government	16	[50]	19	6	25
Transport	17	[47]	35	6	12
Utilities	11	18	[73]	9	0
All Sectors	200	29	[48]	12	11

claims for the competitive advantage benefits of IT were far from being a universal belief amongst user organisations.

- Our findings indicate that this is especially true amongst MIS/DP departmental heads. It is interesting to note that 17% of commercial departmental heads, mainly in larger organisations, were cognisant of the need for IT investments to sustain competitive advantage.

- The direct linkage between IT and competitive edge was felt most strongly in the U.K., as compared to West Germany where 66% of respondents felt that vendors claims are merely hyperware.

- Not surprisingly, INPUT's research revealed that industries such as finance and banking that are undergoing rapid change and intensification of international competitive pressures see IT as being relatively important to competitive edge. Conversely, respondents in manufacturing industry saw the linkage as being either indirect or nonexistent.

- To an extent, INPUT's findings reflect three phenomena:

  - Lack of awareness of potential benefits of IT.

  - Lack of integration between IT and Corporate Competitive Strategy (vision of development).

  - Long lead times between investments in IT and measurable improvements in profitability, market share, efficiency, productivity, etc. In general, investments in IT cannot be analysed using traditional cost/benefit techniques owing to long-term payback and unquantifiable intangible benefits.

B. EFFICIENCY BENEFITS OF IT

- Although only 25% of all commercial departmental heads interviewed perceived a direct linkage between investments in information technology and competitive advantage, INPUT's research revealed that end users perceive a direct linkage between investments in IT and improvements in business efficiency and productivity.

- Exhibit IV-3 illustrates that 75% of general managers felt that IT was either vital or very important to business efficiency in the short term and 92% in the medium term (two- to three-year timeframe).

- It is interesting to note that this disparity in part reflects a lack of marketing orientation among European industrialists. In addition, it almost certainly reflects a preoccupation with the need to control costs and improve productivity rather than to use IT to exploit business development opportunities.

- The research findings undoubtedly reflect the trend towards responsibility for IT development being shifted from data processing to end-user departments. This applies not only to the benefits of IT but also to the identification and specification of requirements and more significantly the design and development of specific solutions.

- Although tight control has been maintained on the budget of the central DP departments, spending on subcontractors' services and staff is continuing to grow outside the DP department and approximatley 30% of the total IT spend in large companies is taking place outside the DP/MIS managers budget. This proportion increases as the size of company diminishes.

- It is interesting to note that the continued use of subcontractors to develop new systems despite increasing financial discipline on IT spending is especially true of medium-sized (i.e., 1,000 to 10,000 employees) organisations, and

EXHIBIT IV-3

GENERAL MANAGER PERCEPTIONS OF IMPORTANCE OF I.T. TO EFFICIENCY OF DIVISION/COMPANY

PERCENTAGE OF IMPORTANCE	NUMBER OF MENTIONS	
	TIMEFRAME	
	Short-Term	Medium-Term
Vital	30	45
Very Important	35	47
Fairly Important	35	8
Unimportant	0	0

Total Sample = 100

INPUT recommends that software houses and consultancies refocus their marketing activity to de-emphasise their attention to gaining and retaining major 'blue chip' accounts.

C. KEY ISSUES/PROBLEMS FOR DATA PROCESSING IMPACTING THE DEVELOPMENT OF MARKETS FOR PROFESSIONAL SERVICES

- Exhibits IV-4 through IV-6 illustrate INPUT's research into key problems facing data processing departments analysed by industry sector and country market.

- Readers should be aware that the market research techniques of rating scales leads to a clustering of responses in the middle range of values as respondent bias arises owing to reticence in expressing extremes of opinion.

1. DEVELOPING INTERACTIVE SYSTEMS

- INPUT's research revealed that the development of interactive systems and the need to integrate computing with communications remain the most serious problem facing data processing departments.

- It is interesting to note that this problem is most marked in the public utilities, transportation, and finance sectors which revealed average ratings of 4.4, 4.2, and 4.3, respectively, against an average for the total sample of 4.1. Public utilities and financial services are the two key growth sectors in terms of predicted demand for the services of subcontractors and software houses.

- The move from batch to online systems, i.e., the upgrade of existing systems and the development of systems for transactions processing covering an organisation's production, logistics, and marketing functions, is a major driver of demand for the services of software houses, independent consultancies, and

EXHIBIT IV-4

USERS' RATINGS OF IMPORTANCE OF KEY DATA PROCESSING ISSUES

NUMBER	ISSUES	AVERAGE RATING*
1	Budget Restrictions	3.3
2	Developing Interactive Systems	[4.1]
3	Lack of Coherent IT Strategy	3.2
4	Developing Communications Networks	3.8
5	Lack of Telecommunications Expertise	2.9
6	Supporting Micro-Based Systems	3.3
7	Lack of Specialist Programmers	2.8
8	Lack of Systems/Business Analysts	3.0
9	Lack of Project Management Expertise	3.0
10	Training of DP Staff	3.8
11	Training End-User Staff	[4.0]
12	Meeting Deadlines for Applications Development	[3.9]
13	Keeping Pace with Technological Change	3.7

Total Sample = 102 - All MIS/DP Managers

Note: Ratings were expressed on a scale of 1 to 5, where 1 = unimportant and 5 = extrememly important.

* Average Standard Error = 0.13

EXHIBIT IV-5

USER RATINGS OF IMPORTANCE OF KEY DATA PROCESSING ISSUES (Analysed by Industry Sector)

INDUSTRY SECTOR	AVERAGE RATING BY ISSUE#*													AVG. SAMPLE SIZE
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Process Mfg.	3.2	[4.3]	2.8	[4.1]	3.4	3.4	2.7	2.9	2.8	3.8	3.6	3.7	3.6	20
Discrete Mfg.	3.5	[4.1]	3.5	3.4	2.5	3.3	3.3	3.6	3.7	[4.2]	[4.2]	3.6	3.6	16
Retail Distribution	3.6	[4.1]	3.5	3.6	2.5	3.5	2.6	2.6	2.7	3.5	[4.0]	[4.1]	3.7	11
Banking & Finance	2.7	[4.2]	3.4	[4.1]	3.2	3.0	2.7	3.2	3.2	3.8	3.8	3.9	3.9	20
Insurance	2.7	[4.3]	3.3	[4.2]	2.8	3.2	2.7	2.3	3.3	3.3	[4.3]	[4.2]	3.5	6
Health Care	2.9	3.3	3.4	2.7	1.9	2.9	3.0	2.7	2.6	3.4	3.7	3.4	3.3	7
Government	[4.2]	3.8	3.3	[4.7]	2.7	3.8	2.8	3.2	2.5	[4.0]	[4.0]	3.8	3.7	6
Transport	3.9	[4.2]	2.7	[4.4]	3.6	[4.1]	2.7	2.8	3.2	[4.1]	[4.1]	[4.1]	[4.3]	9
Utilities	3.4	[4.4]	3.0	2.9	2.4	2.7	2.6	2.9	2.9	3.9	[4.3]	[4.1]	3.1	7
All Sectors	3.3	[4.1]	3.2	3.8	2.9	3.3	2.8	3.0	3.0	3.8	[4.0]	3.9	3.7	102

Note: Ratings were expressed on a scle of 1 - 5, where 1 = unimportant and 5 = extremely important.

The thirteen issues are the same as those listed in Exhibit V-4

* Average Standard Error = 0.13

EXHIBIT IV-6

USER RATINGS OF IMPORTANCE OF KEY DATA PROCESSING ISSUES (Analysed by Country)

ISSUES	AVERAGE RATING BY COUNTRY*					
	U.K.	France	Italy	West Germany	Benelux	Total
Budget Restrictions	3.4	3.4	3.4	3.1	3.0	3.3
Developing Interactive Systems	3.4	[4.4]	[4.5]	[4.3]	[4.1]	[4.1]
Lack of Coherent IT Strategy	3.3	3.5	3.9	2.2	3.8	3.2
Developing Communications Networks	3.2	[4.0]	[4.3]	[4.3]	3.3	3.8
Lack of Telecommunications Expertise	2.8	2.8	3.9	2.6	2.6	2.9
Supporting Micro-Based Systems	2.8	3.2	3.5	3.9	2.9	3.3
Lack of Specialist Programmers	2.5	2.8	3.9	2.5	2.8	2.8
Lack of Systems/Business Analysts	3.2	3.0	3.7	2.3	3.3	3.0
Lack of Project Expertise	2.9	3.1	3.5	2.8	3.3	3.0
Training DP Staff	2.9	[4.1]	3.5	[4.7]	3.8	3.8
Training End User Staff	3.2	[4.2]	3.8	[4.4]	[4.3]	[4.0]
Meeting Applications Development Deadlines	3.6	3.6	[4.2]	3.9	[4.4]	3.9
Keeping Pace with Technological Change	3.4	3.7	[4.2]	[4.0]	3.5	3.7
Sample Size	25	25	13	25	12	100

Note: Ratings were expressed on a scale of 1 - 5, where 1 = unimportant and 5 = extremely important
* Average Standard Error = 0.13

systems integrators.

- The problem is most clearly marked in Italy which has traditionally lagged behind other European countries in the development of networking and telecommunications infrastructure.

2. MEETING DEADLINES FOR APPLICATIONS DEVELOPMENT

- INPUT's research revealed that the demands for on-time within budget delivery remain a key issue for data processing departments to resolve.

- It is interesting to note that this problem is most marked in the retail distribution, transportation, and public utilities sectors which revealed average ratings of 4.1 as against the average for the total sample of 3.9.

- This issue emerged as the highest concern amongst respondents in the U.K., Belgium, and Holland and remains as a seemingly unresolvable issue facing user organisations.

- The cycle runs like this: An initial poorly managed demand, supply, and project control situation leads to out-of-sight delivery dates. This leads to increased demand for systems development staff which leads to escalating staff costs, the use of external services, and budget overruns. In addition, experienced and specialist development staff are attracted into the employment of service organisations (for money and variety), which leads to further 'slippage' and greater opportunities for service organisations.

a. Failed Solutions

- Four solutions to this perennial problem have been tried by user organisations with varying degrees of success.

(i) Improved Project Management

- Gantt charts, network analyses, and other, often computer-based, planning and control tools have been introduced into systems development groups, and training on their use and benefits has been given a key priority.

- Although this is solving the problem, that in many computer systems development projects much of the activity is unplanned, conflicting objectives remain too long undiscovered, and there is a lack of measured feedback on progress; when these errors are corrected, deadlines are still not met. The main effect of improving project management is that systems developers are able to measure by how much deadlines have slipped, not the reduction of the slippage.

(ii) User Management/Involvement

- Another technique that was developed to try to meet deadlines was a strategy of 'User Management', i.e., freezing the original specification until project completion. Still deadlines were unobtainable, systems failed to meet the organisation's business requirements, and users' requests for applications were unmet.

- Organisations have attempted to solve this problem with the use of prototyping techniques, involving end users more closely in systems development and often forming joint project teams with end users for specific projects. Although these changes have meant that systems more closely meet requirements, the applications backlog remains all pervasive.

(iii) Standards

- Another solution to the problem of slippage has been the evolution of standards encompassing the detailed specification and programming conventions to be adopted and also the time expected for the various tasks to be performed. It would appear that this has not cured the problem.

(iv) Systems Development Tools

- The fourth solution being adopted is the use of tools and aids to improve system developer productivity. Specifically, larger organisations are adopting 4GLs and other aids such as system testbeds, on-line system development using desktop terminals, analyst workbenches using touch controlled screens for flowcharting and prototyping, packaged file systems, and integrated project support environment systems (IPSEs). Not only are existing developers producing faster with these aids, the work has been greatly de-skilled and many more people are producing.

- The shift towards end-user computing, however, is merely extending the demand for applications development and driving the need for training in the understanding of information technology, basic computer literary/system analysis skills, and the use of specific tools and packages.

- Undoubtedly, the rapid growth which is anticipated in the use of systems development productivity tools and methodologies will aid the quest to reduce applications backlogs.

- Readers should note that the whole area of systems development productivity will be covered in a separate INPUT report entitled Systems Development Productivity - Trends and Directions which will be published in 1987 as part of INPUT's Information Services Programme - Europe (ISPE).

b. Recommendations

- In relation to the whole problem of applications deadlines, INPUT's research revealed that the reason why some organisations are less concerned by the problem than others lies in their acceptance that the problem is insoluble and that it should be avoided rather than cured. Evidence suggests that by making systems developers more productive only serves to encourage demand for new applications and rising expectations for speed of development.

- Consequently, INPUT has developed some recommendations for systems developers (both external vendor and user organisations) to combat this problem.

  - Stop looking for solutions to meeting deadlines which seek to manage supply and concentrate on solutions which manage demand.

  - Divide system planning between core systems which provide an IT infrastructure for all companies as a whole and peripheral systems which use this infrastructure to deliver user benefits.

  - The demand for core systems can be sensibly controlled by the DP/MIS Department and the demand for peripheral systems to satisfy specific user needs can be sensibly controlled and developed by the end-user departments themselves since they can be built with 4GLs either by the users themselves or by 4GL specialists employed by external service companies under their supervision.

3. TRAINING

- INPUT's research revealed that requirements for training of both data processing and especially end-user staff is a key issue for user organisations and a major opportunity for service vendors.

- Demands from staff for new skills, variety, and personal and career development coupled with changes in employers attitudes towards viewing training as an important investment in the organisations future success, are leading this issue to be given key management priority.

- It is interesting to note that the degree of importance placed on training is particularly marked in manufacturing industry and also in the public sector, which revealed average ratings of 4.2 against an average for the total sample of 3.9.

- The need to keep pace with technological change, for example, the move from batch to online systems in the IBM environment, is a major factor leading to increasing importance being placed on this issue.

- Respondents in West Germany rated this issue as being the most serious problem they were facing and to an extent can be linked to serious problems in retaining the right levels of skilled personnel.

- French respondents also gave training a high priority and a difference in cultural attitude and management professionalism can be perceived in comparison with the U.K. where training is a relatively low priority.

- In general, there is an increasing trend towards developing staff skills in-house rather than recruiting already trained staff. In addition, it is also anticipated that the total number of in-house staff will gradually fall, with increasing reliance being placed on external contractors, systems houses, and consultancies. It is cost-effective for organisations to buy highly specialist expertise that is only required for short periods from external courses.

- The major shift in skills and skills training is expected to be in the increased proportion of end users involved in IT implementation.

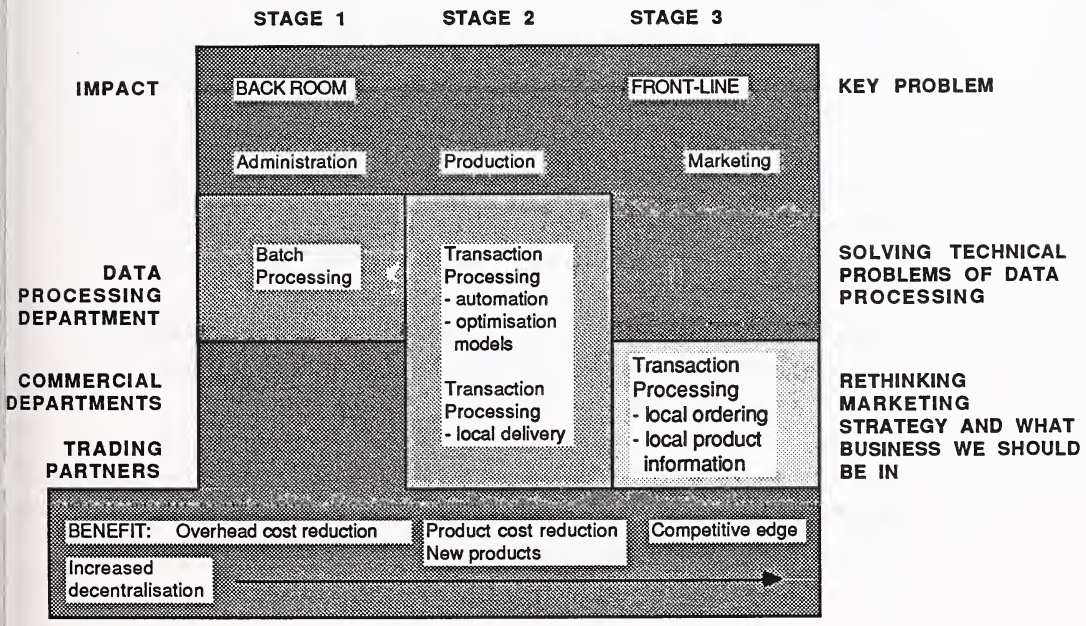
D. USERS' PLANS FOR APPLICATIONS DEVELOPMENT - MARKET OPPORTUNITIES

- Exhibit IV-7 illustrates a model that has been developed (largely based on the financial services sector) in an attempt to define the various stages in the development of applications and the progress of IT in user organisations.

- Current difficulties and dissatisfaction with the performance benefits of IT investments lie in moving information technology out of the data centre

EXHIBIT IV-7

THREE STAGES IN APPLYING INFORMATION TECHNOLOGY



S-PSE

handling batch processing based administrative applications into the transactions-based environment of production, logistics, and marketing.

- Exhibit IV-8 summarises users' responses in terms of applications that are planned for development. Our research indicates that the current focus of attention for the majority of users is on implementing general administrative, financial control, and accounting systems.

- A key focus for the future is the spread of IT into production, distribution, and marketing. Communications is also a key priority as users seek to link up operating divisions, subsidiaries, customers, and suppliers. Linking up departmental systems and the utilisation of central applications databases is also a key development priority.

- However, it is important to draw a distinction between the applications development needs of larger organisations and the development needs of small companies in terms of opportunities for software houses and consultancies.

- Large, and increasingly medium sized, companies have a strong need for communications owing to regional/geographical dispersion. In addition, they have a high need for an integrated coherent IT strategy.

- The main driving force leading larger organisations to adopt custom system rather than packaged solutions is the need for information sharing, i.e., a common interface to shared databases. This leads to the merging of general system, e.g., accounting and production control.

- The packaged software approach is more suitable for smaller organisations at earlier stages of computerisation, i.e., Stage I in our model. Packaged software is attractive because of price and is applicable to an investment approach. Packaged software is also increasingly attractive to specialist units using dedicated departmental computers.

EXHIBIT IV-8

USER PLANS FOR DEVELOPING APPLICATIONS

APPLICATION AREA	NUMBER OF MENTIONS	
	DEVELOPING	PLANNING TO DEVELOP
Financial Control/ Accounting Systems	27	6
Factory Automation	13	13
Office Automation	13	4
Communications Network	6	7
Distribution/ Materials Handling	9	5
Management of Information Systems	6	4
Other Administrative	16	10

Total Sample = 102 - All MIS/DP Managers

E. THE MAKE OR BUY DECISION

- The make or buy decision is largely dependant on the political environment of an organisation and the cultural attitude towards subcontracting.

- Companies with an open attitude towards subcontracting seek to utilise the leading edge of information technology, i.e., new techniques, tools, development environment, and methodologies. They also use external subcontractors to meet development peaks and find solutions to business problems more rapidly.

- Organisations with an open attitude towards subcontracting have a policy of how to subcontract and have a track record of experience. With reference to Exhibit IV-7, these organisations tend to be undergoing Stages 2 and 3 in the introduction of IT. In the past this has been large multinationals and industry dominant organisations. The trend is towards medium-sized companies.

- Organisations undergoing Stage 1 in the introduction of IT and/or where development is driven by the technologists and not the end users tend to have closed attitudes towards subcontracting.

- These organisations have difficulty in rapidly meeting business objectives and do not use advanced methodologies for application development.

- Exhibits IV-9 and IV-10 illustrate the most frequently mentioned comments relating to the decision to develop applications internally or to utilise the services of external subcontractors.

- Readers involved in marketing IT related professional services will notice a familiar pattern of response. Shortening technology/product life cycles, increasing product/market complexity, staff/skills shortages, and the need to rapidly meet commercial objectives are major driving forces for the whole range of IT-related professional services.

EXHIBIT IV-9

THE MAKE OR BUY DECISION - USERS' REASONS FOR DEVELOPING SYSTEMS IN-HOUSE

REASON	NUMBER OF MENTIONS
IN-HOUSE EXPERTISE AND RESOURCE	85
COST	25
CONTROL	22
SECURITY	17
LACK OF ADEQUATE ALTERNATIVE	8
COMPANY POLICY	4

Total Sample = 200

EXHIBIT IV-10

THE MAKE OR BUY DECISION - USERS' REASONS FOR DEVELOPING SYSTEMS EXTERNALLY

REASON	NUMBER OF MENTIONS
ACCESS TO NEW TECHNOLOGY	88
SHORTAGE OF STAFF	57
MEET OBJECTIVES RAPIDLY	55
COST BENEFITS	15
UTILIZE SPECIALISTS' KNOWLEDGE AND EXPERTISE	10
MEET SPECIFIC REQUIREMENTS	6

Total Sample = 200

- Staff shortages, however, have a double-edged effect and were frequently mentioned by vendors as a major inhibitor on their ability to effectively develop the business.

- The recruitment problem is a serious concern for user organisations in the U.K. and Italy. The skills gap is most pronounced in the areas of network/communications specialists, systems specialists, and effective project managers/team leaders with both IT and commercial skills.

- In smaller organisations there is a shortage of experienced applications development staff.

- They key point about cultural attitude and approaches towards subcontracting is probably best illustrated by West Germany where there is a cultural preference to develop applications internally. As a representative of a West German software house suggested '. . .the Germans tend to have the attitude of although it may be small, it is my own. . .'.

I. VIEWS OF CONTRACTORS

a. Drawbacks of Using Professional Services Vendors

- While failures in large, complex projects received 'front page' attention, overall, professional services vendors have satisfactorily developed sophisticated applications for leading clients and, in the process, established an image of credibility.

- Exhibits IV-11 and IV-12 illustrate the most frequently mentioned comments by our interview respondents relating to the drawbacks of externally sourced IT-related professional services from the standpoint of both DP management and commercial department heads.

EXHIBIT IV-11

GENERAL MANAGERS' PERCEPTIONS OF DRAWBACKS OF EXTERNAL PROFESSIONAL SERVICES
(Most Frequently Mentioned Comments)

COMMENT	NUMBER OF MENTIONS
NONE	20
COST	12
SOFTWARE MAINTENANCE	10
LACK OF UNDERSTANDING OF BUSINESS NEEDS AND PROBLEMS	9
FAIL TO MEET SPECIALISTS INDIVIDUAL NEEDS	8
DIFFICULTIES IN VENDOR SELECTION	6
DEPENDENCY/RISK	4
SECURITY/CONFIDENTIALITY	4
DIFFICULTIES WITH DEVELOPING PRECISE SPECIFICATIONS	4
LOSS OF CONTROL	3

Total Sample = 100

S-PSE

EXHIBIT IV-12

DP MANAGERS' PERCEPTIONS OF DRAWBACKS OF EXTERNAL PROFESSIONAL SERVICES (Most Frequently Mentioned Comments)

COMMENT	NUMBER OF MENTIONS
COST	27
NONE	25
SOFTWARE MAINTENANCE/CHANGE CONTROL	15
NOT SPECIFIC ENOUGH TO MEET NEEDS	12
VENDOR SELECTION	10
DEPENDENCY/RISK	5
LACK OF NEUTRALITY OF HARDWARE VENDOR	4
STAFF RESENTMENT	4
LOSS OF INTERNAL EXPERTISE	3
LACK OF SUCCESS CONTROL	3

Total Sample = 100

- Users' perceptions of high levels of professionalism, credibility, and expertise is reflected in the fact that a significant proportion of our respondents did not perceive any drawbacks connected with their use of vendors' services.

- It is interesting to note that the perception of data processing managers was remarkably similar to the perception of commercial department heads.

- Cost and problems with change control and software maintenance were the most frequently mentioned disadvantages of external contractors.

- A more serious concern for vendors, however, are comments concerning their lack of understanding of a company's specialist business needs and problems. This is most clearly marked in highly specialised segments of manufacturing industry.

- Vendor selection is also a major problem and timeconsuming drain on internal resources. This threat is also an opportunity, especially for vendors of IS-related consultancy services.

- The time it takes the vendor to understand the user organisation and its objectives and to come up to speed is longer than any in-house personnel would require. Users are reluctant to pay for this education and frequently offer repeat business to current vendors to avoid educating another vendor.

- Related to this 'learning curve', users are becoming more technologically sophisticated -- or at least think they are -- and are requiring a high level of competence on the part of vendor personnel. Unless vendors pass along the additional costs of these 'super staffers', they could be faced with shrinking margins in these situations.

- Sometimes users are not more sophisiticated but just think they are. The costs to the vendor in these cases come from the time it takes to re-educate the users without alienating them.

- When professional services vendors are employed, the company does not develop the expertise inherent in the project within its in-house personnel. The skills developed during the course of an engagement remain with the vendor, and the user remains dependent on the contractor. Some managers believe that this weakens the company's ability to do additional work. They reason that since in-house staff skill is not built during a project, when the contractor leaves, the expertise leaves.

- In addition, there is always the risk of nonperformance on the part of the contractor. The vendor may not deliver an acceptable product and/or may not deliver it on time and within budget.

b. Benefits of Using Professional Services Vendors

- User organisations with open attitudes towards subcontracting are experiencing a wide range of benefits from utilising professional services vendors.

- Exhibits IV-13 and IV-14 illustrate the most frequently mentioned comments by our interview respondents relating to the benefits of externally sourced IT related professional services from the standpoint of both DP management and commercial department heads.

- 'Access to new technology' and 'internal skills growth' were the most frequently mentioned comments. There is no doubt that larger companies are continuing to invest in leading edge technology, and their views can be summarised by the comments of two users as follows '. . .external suppliers provide state of the art techniques not available in-house. . .' and '. . .we always like to acquire specialist savoir faire. . .it gives us a kernel to work on'.

- Gaining knowledge of how other companies solve their problems, i.e., in terms of technologies and methodologies, was a further important factor that is leading companies to use external contractors. However, it should be noted that many organisations are reticent about transferring knowledge to external

EXHIBIT IV-13

GENERAL MANAGERS' PERCEPTIONS OF BENEFITS OF EXTERNAL PROFESSIONAL SERVICES (Most Frequently Mentioned Comments)

COMMENT	NUMBER OF MENTIONS
ACCESS TO NEW TECHNOLOGY	20
INTERNAL SKILLS GROWTH	18
SHORTER DEVELOPMENT LEAD TIMES	12
USE OF SPECIALIST KNOWLEDGE	10
REDUCED MANPOWER	8
ENHANCED EFFICIENCY	5
PROFESSIONAL EXPERIENCE/ CREATIVITY/INDEPENDENCE	5
SAVES COSTS	4
MEETS SPECIFIC REQUIREMENTS	4
FLEXIBILITY	3

Total Sample = 100

EXHIBIT IV-14

DP MANAGERS' PERCEPTIONS OF BENEFITS OF EXTERNAL PROFESSIONAL SERVICES

COMMENT	NUMBER OF MENTIONS
INTERNAL SKILLS GROWTH	17
ACCESS TO NEW TECHNOLOGY	10
SHORTER DEVELOPMENT LEAD TIMES	8
MEET PEAK LOADING REQUIREMENTS	8
ACCESS TO SPECIALIST KNOWLEDGE	8
COST EFFECTIVENESS	6
PROFESSIONAL STANDARDS/ CREATIVITY/INDEPENDENCE	5
FLEXIBILITY	3
AVOIDS DEVELOPMENT OF INTERNAL STRUCTURE	3
ACCESS TO/KNOWLEDGE OF OTHER COMPANIES', TECHNIQUES/SOLUTION TO PROBLEMS	3

Total Sample = 100

contractors concerning their most 'mission critical' systems, i.e., those that are critical to competitive advantage, for example, exploration in the oil industry.

- In addition, contracting some development or operational activites gives a company the ability to balance workloads without changing staff counts as requirements are changed. There are hidden organisational, financial, and managerial costs involved in retaining in-house personnel, and the sub-contracting approach is not only cost-effective in terms of meeting peak loading requirements but also to meet staff demands for variety and financial reward (i.e., by encouraging contracting).

- Expediancy, in terms of accelerated schedules and risk containment via the benefis of fixed-price contracts, is also a major force driving the increased use of external contractors.

- Contractors' objectivity and professional standards, which include the ability of a contractor to take an unbiased approach to a problem without being affected by internal client policies, are also significant considerations in employing professional services vendors. Political neutrality and objectivity are key success factors for systems integrators.

2. EXPENDITURE PLANS FOR EXTERNAL SOFTWARE AND SERVICES

- INPUT's research reveals a very encouraging user environment for vendors of IS-related professional services.

- As the data processing environment moves from a period in the early 1980's which focused upon distributed data processing towards integrated information systems and sophisticated networking, INPUT anticipates that there will be steady growth in the proportion of data processing (DP) expenditure devoted to the use of external contractors.

- Our estimates of the percentage of DP expenditure devoted to external software and services for the period 1986 to 1992 are as follows:

	1986	1988	1992
U.K.	16%	20%	25%
West Germany	14%	17%	23%
France	21%	24%	28%
U.S.	15%	18%	21%

- The key market pressures that are driving the shift towards external contracting are as follows:

  - The need to meet growing information systems demands in the face of a shortage of skilled in-house staff and a more complex technical environment.

  - The pervasiveness of information systems within client organisations and the criticality of these systems to corporate revenue generation.

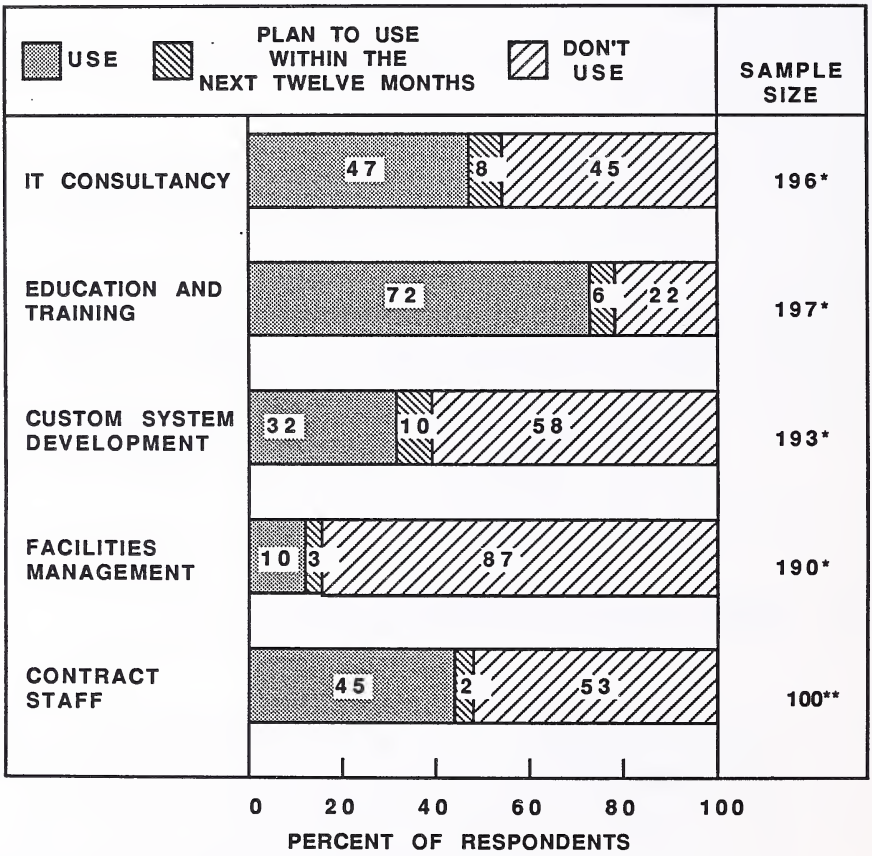
  - The demand, at the highest levels of the organisation, for a more productive utilisation of corporate assets, including capital investments, and human and information assets.

F. MARKET PENETRATION AND OPPORTUNITIES

- Exhibits IV-15 through IV-17 illustrate levels of existing and planned usage of IS related professional services, i.e., IS consultancy, education and training, custom system development, facilities mangement, and contract staff. The results of INPUT's research have been analysed by country market and industry sector in order to reveal trends and potential opportunities for vendors.

EXHIBIT IV-15

PROFESSIONAL SERVICES
MARKET PENETRATION AND OPPORTUNITIES
(Total Europe)



*MIS AND GENERAL MANAGEMENT
**MIS MANAGERS ONLY

S-PSE

EXHIBIT IV-16

PROFESSIONAL SERVICES
MARKET PENETRATION AND OPPORTUNITIES
(Analysed by Country)

COUNTRY MARKET	AVERAGE SAMPLE SIZE	PERCENTAGE SPLIT - USE, PLAN TO USE, DO NOT USE FOR EACH PROFESSIONAL SERVICES TYPE											
		IT Consultancy			Education & Training			Custom System Development			Facilities Management		
		U	P	D	U	P	D	U	P	D	U	P	D
Benelux	24	25	13	[62]	[71]	13	16	[63]	8	29	29	0	[71]
United Kingdom	50	27	8	[65]	44	12	44	33	15	[52]	8	2	[90]
France	45	[63]	7	30	[84]	16	0	7	2	91	2	5	[93]
West Germany	50	45	12	43	[76]	20	4	[50]	16	34	13	6	[81]
Italy	25	[88]	0	12	[96]	4	0	5	5	[90]	4	0	[96]
Western Europe	194	47	8	45	[72]	6	22	32	10	[58]	10	3	[87]

U = Currently Use

P = Plan to Use Within 12 Months

D = Do Not Use

EXHIBIT IV-17

PROFESSIONAL SERVICES
MARKET PENETRATION AND OPPORTUNITIES
(Analysed by Industry Sector)

INDUSTRY SECTOR	AVGE. SAMPLE SIZE	PERCENTAGE SPLIT - USE, PLAN TO USE, DO NOT USE FOR EACH PROFESSIONAL SERVICES TYPE											
		IT Consultancy			Education & Training			Custom System Development			Facilities Management		
		U	P	D	U	P	D	U	P	D	U	P	D
Process Mfg.	28	37	11	[52]	[79]	7	14	31	13	[56]	4	0	[96]
Discrete Mfg.	30	33	13	[54]	[64]	12	24	36	11	[53]	18	0	[82]
Retail Distribution	20	40	15	45	[63]	11	26	30	15	[55]	0	0	[100]
Banking & Finance	42	[51]	2	47	[73]	2	25	24	10	[66]	7	2	[91]
Insurance	19	[53]	11	36	[68]	5	27	39	11	[50]	0	6	[94]
Health Care	13	[86]	0	14	[69]	0	31	38	0	[62]	31	8	[61]
Government	15	27	13	[60]	[80]	0	20	29	7	[64]	6	0	[94]
Transport	16	[56]	6	38	[81]	0	19	33	13	[54]	33	13	[54]
Utilities	11	[55]	0	45	[64]	0	36	36	9	[55]	0	9	[91]
All Sectors	194	47	8	45	[72]	6	22	32	10	[58]	10	3	[87]

U = Currently Use

P = Plan to Use Within 12 Months

D = Do Not Use

- It should be noticed that levels of planned usage should not be taken as indicators of absolute levels of growth. Owing to the problem of vendor education and company knowledge, a great deal of professional services contracts tend to be 'repeat business' and users organisation prefer to remain with trusted 'preferred suppliers' with a track record of performance reliability and confidentiality.

I. I.S. CONSULTANCY

- INPUT's research revealed that the penetration of IS-related consultancy services was highest in France and Italy, where it is almost commonplace for companies to use consultancies for advice and support rather than for implementation and project management.

- In West Germany, the use of consultancy services is not only high but also is predicted to grow at a relatively high rate. Consultancy is also being increasingly linked to systems/methodology implementation and as a country market offers significant opportunities for vendors (not least, owing to the fragmented nature of the current industry structure).

- Belgium, Holland, and the U.K., although highly sceptical of the benefits of IS consultancy, offer significant growth opportunities as indicated by the levels of planned usage.

- INPUT's user research reveals that the financial services, transportation, and public utilities sectors have supported the development of IS consultancy sectors. However, of more interest are plans for the future, and our research reveals significant growth opportunities in discrete manufacturing, retail distribution, and central government.

- Vendors should be cognisant of the need to focus specialist expertise in these areas and deploy experienced staff with extensive industry/applications knowledge in order to handle the challenge of implementation at a senior level and enhance marketing presence through credibility.

2. EDUCATION AND TRAINING

- INPUT's research reveals that the U.K. is currently the least penetrated of the Western European markets for IS-related training services and reflects a cultural attitude that reveals a preference of 'sitting with nellie', an arrogant distrust of professional training, and a misunderstanding of its benefit as an investment in human capital by commercial and data processing managers.

- Nevertheless, this cultural attitude is changing and presents significant growth opportunities in the U.K. not only as an adjunct to other professional services, e.g., software development as part of a 'project solution' but especially as an independent standalone service.

- The convergence of training with consultancy is opening up significant growth opportunities in the field of 'in-house' and custom-built training programmes rather than standard topic- or product-related public courses.

- Successful and profitable vendors should be cognisant of the need to offer implementation support and focus expertise on key sectors of industry/ knowledge specialisation.

- The Scandinavian and West German markets offer significant growth opportunities for vendors of training services. This growth is fostered not only by increasing technological complexity and change, demands for productivity, and skills shortages, but also by a positive cultural attitude towards training.

- This attitudinal change is most noticeable amongst manufacturing organisations interviewed by INPUT and in part reflects the strategic realisation of the importance of staff quality to performance, productivity, and competitive edge.

3. CUSTOM SYSTEM DEVELOPMENT

- INPUT's research reveals that the U.K. offers the highest growth opportunities for custom system development, and trends towards the adoption of integrated information systems are driving users' preferences for custom rather than package solutions.

- Although there is a general trend towards a rising proportion of software 'products' or 'kernels' to be included as part of a custom solution, INPUT believes that the increasing pervasiveness of computer systems and their growing strategic importance will continue to foster demand for specialist company/application specific developments.

4. FACILITIES MANAGEMENT

- The change in business climate which is leading to increased use of external contractors and also preferences for one-stop shopping has revitalised interest in the concept of facilities management.

- There are increasing opportunities for vendors with extensive communications capability and large dispersed organisational infrastructures to compete with internal DP departments on an equal status and meet the challenges of security, loss of control, and the need to optimise companywide IT investments.

- INPUT's research reveals strong growth opportunities in the U.K., France, and, interestingly, in West Germany where users have been traditionally very hostile to the FM concept.

- Our research indicates that the strongest opportunities are among the larger organisations in the insurance, transportation, health care (pharmaceuticals/ private medical), and, interestingly, public utilities sectors.

G. VENDOR SELECTION CRITIERIA

- Exhibits IV-18 through IV-20 illustrate the relative importance of a range of selection critiera utilised by vendors, analysed by country market and industry sector.

- West German users were in general the most sceptical, cautious, and rigorous in their appraoch towards external vendor selection. The immaturity of the German computer services industry is reflected in high ratings of importance being placed upon staff qualifications and financial stability. In addition, demands for risk containment lead to their preference for performance guarantees.

- In general, all our respondents placed a higher emphasis on performance guarantee than on price, pointing to the growing significance of systems integration skills and opportunities for prime contractors who have a track record of on-time, within budget delivery for large, complex multi-vendor projects.

- French and Italian users placed a high degree of importance on applications knowledge and specialist technical skills, which points to the need for focused marketing and business development strategies.

- Users in the U.K., Belgium, and Holland placed relatively high importance not only on applications knowledge but also on meeting delivery deadlines. Bad in-house experiences, with rising applications backlogs, use of inadequate methodologies and productivity tools, and consistent failure to meet demands for user applications are obvious factors that may form these opinions.

- The specialist nature of the manufacturing and government sectors is reflected in respondents' high ratings of applications knowledge.

EXHIBIT IV-18

PROFESSIONAL SERVICES VENDOR SELECTION CRITERIA - RATINGS (Total Sample)

NUMBER	SELECTION CRITERIA	AVERAGE RATING*#
1	Track Record	4.2
2	Financial Stability	3.6
3	Industry Experience	4.1
4	Auditors Reference	3.0
5	Staff Qualifications	4.4
6	Applications Knowledge	4.6
7	Contract Terms - Price	3.7
8	- Performance Guarantee	4.4
9	- Delivery Deadline	4.1
10	Overall Technical Merit	4.5

Note: Ratings were expressed on a scale of 1 to 5, where 1 = unimportant and 5 = extremely important

Average Sample Size = 194

* Average Standard Error = 0.1

EXHIBIT IV-19

PROFESSIONAL SERVICES VENDOR SELECTION CRITERIA - RATINGS (Analysed by Country)

VENDOR SELECTION CRITERIA	AVERAGE RATING BY COUNTRY*					
	Benelux	U.K.	France	Italy	West Germany	Total Sample
Track Record	3.9	4.1	[4.3]	[4.2]	4.2	4.2
Financial Stability	3.9	4.0	3.0	2.6	4.5	3.6
Industry Experience	4.0	3.9	[4.2]	4.0	4.3	4.1
Auditors Reference	[3.9]	3.0	2.9	2.1	3.0	3.0
Staff Qualifications	3.7	3.8	4.3	4.2	[4.9]	[4.4]
Applications Knowledge	4.2	[4.5]	[4.8]	[4.6]	[4.8]	[4.6]
Price	3.3	3.6	3.7	3.9	3.8	3.7
Performance Guarantee	[4.3]	[4.3]	4.0	4.0	[4.8]	[4.4]
Delivery Deadline	[4.3]	[4.2]	3.5	3.9	4.3	4.1
Overall Technical Merit	4.1	4.1	[4.8]	[4.7]	4.6	[4.5]
Average Sample Size	24	50	45	25	50	194

*Average Standard Error = 0.1

Note: Ratings were expressed on a scale of 1 - 5 where 1 = unimportant and 5 = extremely important.

IN

EXHIBIT IV-20

PROFESSIONAL SERVICES VENDOR SELECTION CRITERIA - RATINGS (Analysed by Industry Sector)

INDUSTRY SECTOR	AVERAGE RATING BY SELECTION CRITERIA*#										AVERAGE SAMPLE SIZE
	1	2	3	4	5	6	7	8	9	10	
Process Manufacturing	4.2	3.7	3.9	2.8	4.2	[4.8]	3.6	4.5	4.0	4.4	28
Discrete Manufacturing	4.2	3.6	4.3	3.5	4.2	[4.9]	3.6	4.1	4.0	4.4	30
Retail Distribution	4.3	3.7	3.9	3.3	4.2	[4.5]	3.4	4.5	4.0	[4.6]	20
Banking and Finance	4.0	3.6	4.3	3.0	[4.6]	[4.4]	3.6	4.3	3.9	4.4	42
Insurance	4.5	3.7	3.7	2.6	4.4	4.5	4.0	[4.6]	4.2	4.5	19
Health Care	4.0	3.7	4.2	2.7	[4.6]	4.3	3.9	4.5	4.5	4.3	13
Government	4.1	3.9	4.1	3.6	4.3	[4.7]	3.8	[4.7]	4.2	4.5	15
Transportation	4.2	3.2	4.4	2.6	4.4	[4.5]	3.9	4.2	4.0	[4.7]	16
Utilities	4.2	3.5	4.0	2.7	4.1	4.0	3.6	4.3	3.9	[4.6]	11
All Sectors	4.2	3.6	4.1	3.0	[4.4]	[4.6]	3.7	[4.4]	4.1	[4.5]	194

* Average Standard Error = 0.1

The selection criteria are the same as those numbered in Exhibit V-18.

- Traditional buyer/supplier dynamic attitudes are most strongly reflected in the insurance sector which places relatively high importance on track record and price -- as do their customers.

- The government sector is the most heavily reliant on auditors for advice and reference in decision making and is a happy hunting ground for the 'Big 8'.

H. USERS' PERCEPTIONS OF VENDOR COMPETENCE

- Exhibits IV-21 and IV-22 illustrate our respondents ratings of the competence of various types of information services vendors analysed by country and industry sector.

- Readers should be cognisant of the fact that responses to rating scales tend to cluster around the middle of the range owing to attitudinal preference for not revealing extremes of opinion.

- In general, users feel most comfortable with the services provided by equipment manufacturers (average rating 3.9) and independent software/ systems houses (average rating 3.5). Users have established a track record of experience with these types of vendors and are comfortable about their expectations of performance, capabilities, contract negotiation procedures, etc.

- Newer entrants into the information services industry, i.e., accountancy firms and management consultants, were rated as the least competent by user organisations (i.e., average ratings of 2.9 and 2.8, respectively).

- These ratings only partly reflect lack of experience on the part of users. Consultancy firms have frequently been criticized for lack of implementation expertise, and undoubtedly some organisations believe that they have contracted for services for which there is little practical use or value.

EXHIBIT IV-21

USERS' RATINGS OF VARIOUS TYPES OF INFORMATION SERVICES VENDORS (Analysed by Country)

Number	VENDOR SELECTION CRITERIA	AVERAGE RATING BY COUNTRY*					
		Benelux	U.K.	France	Italy	West Germany	Total Sample
1	Network Services	[4.0]	3.0	3.3	3.2	3.5	3.3
2	Independent Software Houses	3.8	3.1	3.3	3.6	3.8	3.5
3	Accountancy Firms	3.7	3.0	2.8	2.5	2.3	2.9
4	Telecommunications Operators	3.4	3.1	3.3	2.7	3.4	3.2
5	Equipment Manufacturers	[4.3]	3.4	3.7	[4.1]	[4.3]	3.9
6	Systems Houses	3.8	3.2	3.2	3.0	3.9	3.5
7	Management Consultants	2.9	2.9	2.7	3.0	2.6	2.8
8	Packaged Software Vendors	3.0	3.0	3.5	2.9	3.7	3.3
9	Standard System/ Turnkey Vendors	3.5	2.7	3.4	3.1	3.7	3.2
	Average Sample Size	24	50	45	25	50	194

*Average Standard Error = 0.1

Note: Ratings were expressed on a scale of 1 - 5 where 1 = unimportant and 5 = extremely important.

EXHIBIT IV-22

USERS' RATINGS OF VARIOUS TYPES OF INFORMATION SERVICES VENDORS (Analysed by Industry Sector)

INDUSTRY SECTOR	AVERAGE RATING BY VENDOR TYPE*									AVERAGE SAMPLE SIZE
	1	2	3	4	5	6	7	8	9	
Process Manufacturing	3.6	3.6	2.8	3.0	3.8	3.5	3.0	3.3	3.2	28
Discrete Manufacturing	3.3	3.5	3.3	3.1	[4.0]	3.4	2.8	3.4	3.3	30
Retail Distribution	2.9	3.5	2.7	3.2	[4.0]	3.5	2.8	3.1	2.8	20
Banking and Finance	3.8	3.3	2.5	3.0	3.9	3.4	2.8	3.3	3.3	42
Insurance	3.2	3.7	3.2	2.5	[4.0]	3.3	2.6	3.1	3.1	19
Health Care	2.7	3.6	2.8	3.4	3.8	3.2	3.1	3.4	3.7	13
Government	2.9	3.0	3.0	3.9	3.4	3.1	2.7	2.9	3.2	15
Transportation	3.5	[4.2]	3.4	3.9	[4.3]	[4.3]	2.9	[4.0]	3.4	16
Utilities	3.0	3.6	2.3	3.3	[4.0]	3.0	2.5	3.2	3.2	11
All Sectors	3.3	3.5	2.9	3.2	3.9	3.5	2.8	3.3	3.2	194

* Average Standard Error = 0.1

The vendor types are the same as those numbered in Exhibit V-18.

- User organisations are now becoming increasingly sophisticated in their use and expectations from consultancy firms and the old approach of 'borrowing a client's watch in order to tell him the time' is clearly less than adequate.

- These general ratings of competence are somewhat misleading in that inevitably specialisation leads to vendors developing niches of expertise which are not revealed in these overall figures.

- It is interesting to note that respondents in government consistently gave ratings to vendors lower than the sample average. This clearly points to dissatisfaction with the offerings of service companies in meeting their specialist requirements.

I. CONCLUSIONS FOR THE FUTURE

- INPUT's user research programme reveals some interesting trends in the user environment and highlights some critical success factors fur future development.

- Specifically, it highlights the need for vendors to:

  - Strengthen expertise in key technologies, for example, telecommunications, artificial intelligence (AI), and UNIX.

  - Reconsider their methodologies and infrastructure for effective personnel management.

  - Undertake missionary marketing initiatives to convince senior management of the benefits of the 'service solution', providing evidence of professionalism, quality, performance reliability, and a 'can do' approach to business.

- Establish effective internal control systems (financial and project management) in order to guarantee on-time, within budget delivery and performance. Essentially, this means rapid, effective communications between staff and management, and client and contractor.

- Focus/specialise on key vertical market opportunities which will not only heighten marketing stance/presence but also aid the process of understanding and defining real client issues and business problems.

- The next chapter give a detailed review of the development of the market for systems integration in Europe and hghlights areas of key opportunity in this existing market.

CHAPTER V - SYSTEMS INTEGRATION — A MAJOR OPPORTUNITY

V SYSTEMS INTEGRATION - A MAJOR OPPORTUNITY

- The objective of this chapter is to provide existing and potential vendor participants with an overview of the development of SI in Western Europe and to provide details of projects and market forecasts for areas of opportunity, i.e., defence, manufacturing, finance, and banking.

- The definition of systems integration, factors that are driving and inhibiting market development, and key issues for vendor participants have been given in Chapter III of this report.

A. SI MARKET DEVELOPMENT IN EUROPE

1. MARKET

- The concept of a European SI market is relatively new and the overall market is immature. The number of significant SI contracts above the $5 million level is currently fairly limited.

- However, the market is rapidly developing almost as inexorably as information technology speeds through virtually every aspect of defence, business, and commerce. Data processing power can be delivered almost without restriction. The improvement in performance, size, power consumption, and overall capability is having a dramatic effect on civil and military systems.

- Exhibit V-1 illustrates one vendor's view of the evolution of systems integration and indeed the dynamics of the competitive environment.

- The priority has been to move to build up software expertise in keeping with the shift of the electronics industry away from hardware and towards software-based solutions.

- Software houses such as CAP, Logica, and Cap Gemini Sogeti are already positioned to play an increasing role in the market. Enormous expertise in providing software engineering solutions has allowed software houses to assume ascendancy, to some extent, over the traditional electronics manufacturers in the defence sector and hardware manufacturers in the commercial sector.

2. OVERALL GROWTH

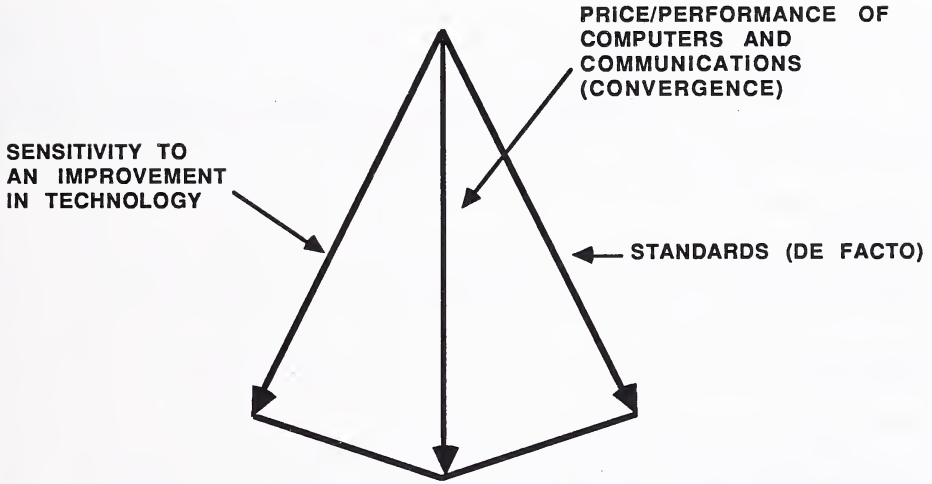
- As illustrated earlier, INPUT estimates that the Western European SI market (excluding NATO and space) will grow from a base of $325 million in 1987 to reach $1,020 million by 1989. The five-year forecast estimates a market size of $2 billion by 1992 and an AAGR of 25% for the period 1989-1992.

- The forecast has been developed from a consolidation of awarded and projected systems integration contracts and the revenues apportioned over the projected contract duration.

- Based largely on U.S. experience, INPUT has also developed a model for analyzing the revenue generated from SI contracts by project component over an average project life of four years. This model is illustrated in Exhibit V-2.

EXHIBIT V-1

THE EVOLUTION OF SYSTEMS INTEGRATION



1970s	Dominance of Hardware Suppliers - Large Project Component (but Software Problems)
1980s	Hardware - More a Commodity; Therefore Down in Importance. Software Up As a Component; More Important As Complexity Increases
Mid-1980s	Software Houses More Important but Financial Strength and Pressure to Become Systems Integrators

S-PSE

EXHIBIT V-2

SCHEDULE OF PROJECT COMPONENTS - A MODEL

PROJECT COMPONENT	Year 1 (Percent)	Year 2 (Percent)	Year 3 (Percent)	Year 4 (Percent)	Total Component Expenditures (Percent)
Computer Hardware		100			28
Communications Hardware			100		8
Systems Software Packages		100			2
Applications Software Packages			100		4
Consulting	60	20	20		6
Project Management Fees	40	20	20	20	6
Design/Integration	45	35	20		11
Software Development		50	50		30
Education/Training and Documentation			33	67	2
Operation and Maintenance			33	67	2
Other Expenditures				100	1
Total					100

Note: These averages are based on U.S. experience.

B. DEVELOPMENTS IN KEY SI MARKET SEGMENTS

1. UNITED KINGDOM

- The U.K. is currently the least immature of Western European markets with respect to acceptance of the systems integration approach towards subcontracting large systems development projects.

- As illustrated in Exhibit V-3, the market for contracts of $5 million and above (i.e., 3.5 million pounds) will grow from $60 million (40 million pounds) in 1986 to reach $300 million (205 million pounds) by 1989 at an AAGR of 70%. The five-year forecast estimates a market size of $500 million (340 million pounds) by 1992 at an AAGR of 19% for the period 1989-1992.

- In 1986, the U.K. accounted for 40% of the Western European SI market. This proportion is estimated to fall to 29% by 1989 and 25% by 1992.

a. Defence Sector

- As illustrated in Exhibit V-3, INPUT estimates that the U.K. SI defence contracting market will grow from a base of $5 million in 1986 to reach $60 million by 1989. The five-year forecast reveals a market size of $80 million by 1992 and an AAGR of 26% for the period 1987-1992.

- Defence contractors to the U.K. Ministry of Defence (MOD) have been facing a more stringent buying/contracting environment since the decision to phase out cost-plus contracting.

- Since 1985, all large development contracts have been let on a fixed- and maximum price basis, and responsibility for project management is given to a single prime contractor.

EXHIBIT V-3

UNITED KINGDOM
SI MARKET FORECAST
($ Millions)

SECTOR	1986	1987	1988	1989	1990	1991	1992
Defence	5	25	45	60	70	75	80
Civil Government	10	20	40	80	120	150	180
Manufacturing	15	25	35	40	45	50	60
Banking/ Finance	10	25	50	65	75	85	90
All Other	20	20	40	55	70	80	90
Total	60	115	210	300	380	440	500

- The IT systems content of defence procurement is steadily rising and becoming more critical. In particular, software development has been identified as a major problem in some current projects, e.g., Ferranti's surface ship command system.

- The increasng importance of software engineering skills has led to the emergence of software houses as prime contractors in this sector. Consequently, Logica, CAP, Scicon, Systems Designers, and Software Sciences have all emerged as significant players and are increasingly challenging the traditional electronics companies.

- The 1986 revenues of leading software houses in the defence sector are illustrated in Exhibit VI-5 in the next chapter which analyzes the competitve environment.

- Exhibit V-4 illustrates a league table of MOD expenditure placed with U.K.-based contractors for the period 1985/86, taken from the 1987 MOD statement on defence estimates.

- Examples of significant SI projects active in the U.K. defence sector include CHOTS (Computer HQ Office Technology Systems) - $30 million, UNITER Network - $40 million, and the FASTNET Army Communications Network - $40 million.

- Overall, there are significant opportunities for software houses in the defence sector, especially in the area of communications and upgrade of administrative systems by the military.

b. Government

- This sector represents a significant opportunity as a result of continuing difficulties in recruiting skilled and specialist staff and as a result of pressure to influence policy towards the support of U.K.-based service organisations.

EXHIBIT V-4

MOD EXPENDITURE WITH U.K.-BASED CONTRACTORS, 1985-1986

• Over £250m	GEC Plessey
• £100m - £250m	Ferranti Racal Thorn EMI
• £50m - £100m	STC (inc ICL)
• £25m - £50m	DEC Philips
• £10m - £25m	Control Data Hewlett-Packard Honeywell Systems Designers CAP Logica Scicon British Telecom IBM (U.K.)

Source: Statement on the Defence Estimates, 1987.

INF

- As illustrated in Exhibit V-3, INPUT estimates that this sector will grow from a base of $10 million in 1986 to reach $80 million by 1989, an AAGR of 100%. The five-year forecast shows the market expanding to $180 million (125 million pounds) by 1992 at an AAGR of 30% for the period 1989-1992.

- Government expenditure on computer systems is generally influenced (but it is not mandatory) by the Central Computer and Telecommunications Agency (CCTA). The group is currently part of HM Treasury; however, it would be more beneficial to the U.K. services industry if it were transferred to the DTI (Department of Trade and Industry) whose role is to support the development of U.K. industry both domestically and internationally.

- Vendors interviewed by INPUT revealed a variety of problems in contracting to central government and dealing with the CCTA. A key difficulty is lack of understanding of prime requirements by government departments, which is not helped by shortage of training in stating operational requirements and writing contracts. This has led to constantly changing requirements for custom software development contracts and the habit of abandoning contracts.

- Other serious difficulties include the problem of controlling projects remotely as the government retains overall control and the need to adapt to government procedures and culture.

- However, there is a trend towards placing significant SI contracts because of the chronic shortage of key staff resources, lack of trained project managers, the need to improve accountability, increasing technological complexity, and increasing vendor selection.

- An inhibitor on this sector is that, in moving further towards external contracting, resistance from the trades unions may occur and is a key consideration for vendors when proposing facilities management components of an SI solution.

- Exhibit V-5, shows an analysis produced by the CCTA of the U.K. governments pattern of expenditure on external computer services. The budget year runs to the 5th of April each year.

- The planned increase in expenditure on facilities management (FM) and systems integration (SI) is notable.

- In total, the government spends over $1.5 billion on computer systems, of which approximately 50% is spent on software development.

- Examples of some significant SI projects which are currently active include the Government Data Network (GDN) -- $300 million -- which is expected to be placed in Autumn 1987, the Home Office Passport Project (PIMIS) -- $30 million, the Foreign and Commonwealth Office Automation System (FOLIOS) -- $15 million, and the Local Office Project for the DHSS.

c. Manufacturing

- Outside the defence and aerospace industries there has, as yet, been limited major capital investments in Computer Integrated Manufactruing (CIM) or Advanced Manufacturing Technology (AMT), as some pundits prefer to call it.

- Despite the strong support of the U.K. Department of Trade and Industry and heavy research spending under the Alvey programme, the current status of adoption of CIM technology in the U.K. could be generalised as limited with the major internatonal players having implemented 'islands of automation' rather than total CIM solutions.

- A key objective for manufacturing companies has beome not simply quality or low cost but also flexibility as firms such to differentiate via customisation whilst retaining economies of scale.

EXHIBIT V-5

U.K. GOVERNMENT COMPUTER SERVICES PURCHASING PLANS

	£M		
	1985-1986	1986-1987	1987-1988
Consultancy	50	75	110
Software Development Contracts	40	60	90
Bureau	15	18	20
FM/SI	-	20	40
Total	105	173	260

- An international trend is the move towards flexible manufacturing systems (FMS) focussed towards low-volume/high-value as well as high-volume product lines.

- As illustrated in Exhibit V-6, the ultimate ambition is to develop flexible manufacturing processes that offer the best of both worlds: the customisation possible with CNC machines coupled with the unit costs that can be achieved on dedicated transfer lines.

- Key drivers of this trend are increasing international competitiveness caused by the need to capture significant international market shares with shortening product life cycles.

- It is estimated that by 1990 the number of FMS in use will be 35 in the U.K., 70 in West Germany, 45 in France, and 30 in Italy.

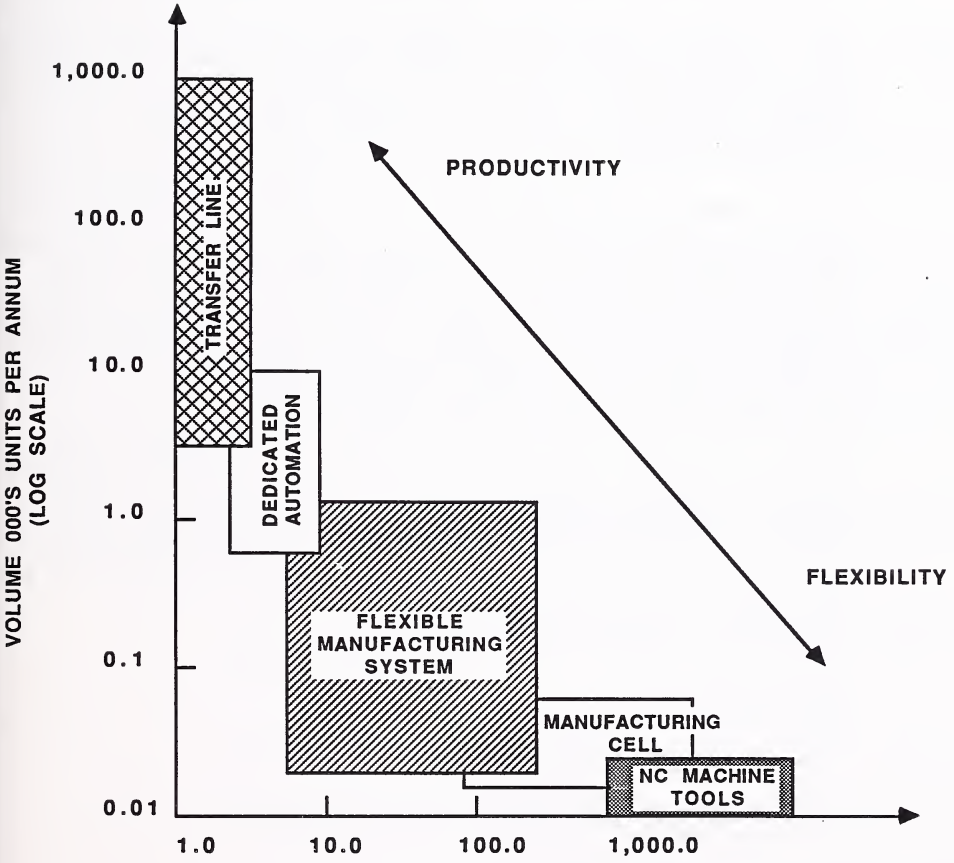
- There is no doubt about the benefits of this approach. For example, Rolls Royce's aero engine plant in Derby repaid a $6 million investment in 12 months, boosted productivity by 40%, cut work in progress by two-thirds, and reduced the time taken from receipt of an order and delivery from six months to six weeks.

- Another key objective for companies in this sector is to move towards Just-In-Time (JIT) inventory control. U.K. industry is estimated to have $25 billion tied up in inventories, and the potential savings could fund very significant investments in CIM technology. Companies have already prioritised the implementation of the BS5750 standards for good manufacturing practice, and there are increasing opportunities for vendors to support automation initiatives in ths area.

- However, levels of overall expenditure on computer systems development are currently relatively modest in manufacturing and rarely exceed 3% of company turnover (a fifth of the spend of some financial institutions).

EXHIBIT V-6

THE MANUFACTURING ENVIRONMENT CONVERGENCE ON FLEXIBLITY



S-PSE

- Nevertheless, INPUT's user research revealed high levels of priority being placed on process control, distribution/logistics systems, and communications networks in this sector.

- It is anticipated that there will be a steady flow of oportunities for integrators, and the U.K. software houses CAP and Systems Designers have already developed signficant process plant monitoring and materials handling systems.

- Some examples of significant SI projects in this sector include Rolls Royce (Engine Testing System) - $40 million, Jaguar (Diagnostics/fault location) - $13 million, and Heinz (Process Plant Monitoring) - $10 million.

- Growth, however, is not anticipated to be dramatic. In the U.K., it will require fundamental changes in management philosophy and culture before the market significantly develops. For implementing companies it requires an almost complete overhaul of an organisation's strategy and working practices in every functional area. Simple technical issues such as acceptance of communications standards (e.g., MAP) still remain unresolved.

- However, innovative, aggressively managed, internationally competitive organisations are increasingly seeking SI solutions, and with reference to Exhibit V-3, INPUT estimates that the U.K. SI manufacturing market will grow from a base of $15 million in 1986 to reach $40 million by 1989 and $60 million by 1992, at an AAGR of around 25%.

d. Banking and Finance

- Organisations that are included in this market sector are:

  - Banks/discount houses.

  - Credit institutions.

- Investment institutions.

- Auxiliary finance and banking services.

- Insurance companies.

- Building societies.

- Deregulation of the London markets which culminated in the Big-Bang of October 1986 led to a flurry of mergers and acquisitions, global trading, falling margins, increased competition, and significant investments in information technology in order to enhance administrative efficiency and maintain market position.

- A key trend in this market has been the move away from large batch or mainframe systems towards more flexible distributed data systems. Communications has significantly increased in importance, and there are substantial opportunities for converting batch processing systems to real time transactions processing systems capable of handling increasingly large volumes of business.

- Key areas of activity for computer system development in ths market sector are:

  - Dealing room systems (1987 expenditure estimated at around 600 million pounds).

  - Back office and front office systems (e.g., bank branches).

  - Banking systems and communications (e.g., ATM networks).

  - EFT-POS, home banking, electronic cash management, and messenger services (e.g., CHAPS).

- Dealing room systems, although involving a considerable degree of systems integration, are generally worth 2 million pounds or less for the computer system components.

- Further expansion in this subsector is emerging in the insurance sector.

- Another factor which is driving increased systems development expenditures is the replacement of systems hurriedly installed to meet the Big-Bang deadline that are now considered inadequate.

- In addition, concern with front office systems has led to a neglect of increasingly strained back office administrative systems. Growth in external contracting is being fueled by demands to integrate, update, and automate back office functions with front office customer interface activities.

- The four major retail banks are highly profitable (despite the setbacks of LDC risk exposure) and are committing large expenditures in order to retain market position following the enactment of the 1986 Financial Service Act which abolished many of the clearing banks' advantages over the building societies.

- The 1987 pre-tax profit forecast for the four major is Barclays 500 million pounds, Lloyds 200 million pounds, Midland 100 million pounds, and National Westminster 850 million pounds.

- Although banking and financial services offer strong growth opportunities for service vendors, in general there is little evidence of vendors seeking to adopt an SI approach. This is despite the importance of communications systems to banks and the inherent difficulties in attracting the necessary expertise. To date, the banks still feel that they can largely cope with this in-house.

- However, the Trustee Savings Bank (TSB) has committed over 60 million pounds with Unisys over a three-year period on hardware alone to automate its retail banking and back office settlement systems.

- Again, with reference to Exhibit V-3, INPUT estimates that the SI market in this sector will grow from $10 million in 1986 to $55 million by 1989, reaching $90 million by 1992 at an AAGR of 44%.

2. FRANCE

- The SI market in France is poised for growth, and significant vendors such as Sema-Metra and especially Cap Gemini Sogeti are well placed to take advantage of both commercial- and defence-related SI contracts that are available to software houses.

- Both organisations have strengthened their market position inboth domestic and international markets via acquisition and diversification, for example, Cap Gemini Sogeti's acquisition of 36% of CISI's interests and Sema-Metra's acquisition of CIM specialists, CERCI.

- With reference to Exhibit V-7, INPUT estimates that the French SI contract market will expand from a base of $40 million in 1986 to $230 million by 1989 reaching $450 million by 1992 at an AAGR of around 40% for the period 1987 to 1992.

- Significant SI contracts have included:

  - Annuaire Electronique $200 million

  - GSIT $30 million

- However, it must be noted that the French market does not necessarily present an easily addressable business oportunity for vendors not based in France because of the French chauvanistic culture.

- French law forbids overseas companies from buying a French services company unless they have existing established businesses in France. For example,

Logica fell foul of these regulations but EDS was able to acquire SIP through their parent GM.

- In terms of market sector opportunities, INPUT predicts that significant SI contracts will be placed by the French government as a central element in their 'dirigiste' strategy towards supporting domestic service companies. The central government sector accounted for approximately 18% of French services company revenues in 1986.

- Deregulation, restructuring , and increased competition will also open up SI opportunities in the finance and banking sector from 1988 onwards. There are also opportunities to be exploited in the public utilities sector. The planned upgrade of the French EFT-POS scheme also offers SI opportunities.

3. WEST GERMANY

- With reference to Exhibit V-7, INPUT estimates that the West German SI contract market will grow from $40 million in 1986 to $230 million in 1989, reaching $450 by 1992 at an AAGR of around 50%.

- The key to this growth in the early stages is the demand for increasingly sophisticated automation amongst the West German manufacturing base.

- Other opportunities are expected to arise as the federal government implements its current programme of support for the development of IT within German industry.

- Deregulation of the financial services community will lead to SI opportunities as new exciting players and new entrants seek to 'catch up' with the demands of an increasingly competitive international environment.

- Already, both the West German MOD and the Deutsche Bunderspost (DBP) are known to have placed large SI contracts, and a more innovative approach towards public purchasing is anticipated for the future.

EXHIBIT V-7

CONTINENTAL EUROPEAN SI MARKET FORECAST
($ Millions)
(Major Country Markets - Totals Only)

COUNTRY MARKET	1986	1987	1988	1989	1990	1991	1992
France	40	80	150	230	310	380	450
West Germany	40	85	155	230	315	400	450
Italy	5	20	80	120	180	240	300

- Currently, the West German information services market is dominated by the hardware manufacturers (i.e., Nixdorf, Siemens, and IBM), and the general attitude amongst West German companies has tended to favour an 'anti-service' approach for systems development.

- However, there is a future opportunity for integrators driven by the desire of user organistions not to contract directly with manufacturers because of their internal equipment prejudice.

- Software houses could also have a significant role to play as subcontractors to the hardware manufacturers for SI contracts.

- Non-German software houses could also have a significant role to play in the development of the West German SI market because of the fragmented nature of the West German software industry. There are a large number of small players (in European terms), and many are overseas owned. In additon, existing domestic vendors are not orientated around solutions and concentrate on technologies, e.g., tools and databases.

- Indeed, a U.K. based systems house commented that West Germany was '...a natural opportunity for systems integrators...'. A major driving force for development is the shortage of skilled staff.

4. ITALY

- With reference to Exhibit V-7, INPUT estimates (tentatively) that the Italian SI market will grow from a base of only $5 million in 1986 to $120 million by 1989, reaching $300 million by 1992 at an AAGR of 72% for the period 1987 to 1992.

- In the manufacturing sector, large firms such as Olivetti are making signficant investments in CIM (e.g., the Zincocelere plant) as part of a programme of restructuring and international expansion. In addition, the state-owned

telecommunications companies are anticipated to adopt an SI approach.

- As yet, however there is little evidence of SI contracts being placed in Italy. However, INPUT estimates that from 1988 onwards the market will develop rapidly from its base in defence into government and manufacturing.

- Government policy is a key factor impacting market development. The adoption of innovative purchasing strategies by the state holding company IRI would have a very significant impact on a wide cross-section of the Italian commercial community.

C. SYSTEMS INTEGRATION - MARKET DEVELOPMENT STRATEGIES

- INPUT's research reveals that the size, complexity, and strategic value of systems development projects is increasing as users seek to exploit the benefits of digital computer technology across all the areas of their business and link them via communications.

- From a user standpoint, this is leading towards requirements for new approaches towards doing business, especially in the commercial sector, and vendors who are not already positioned as commercial systems integrators (and, indeed, those who already think that they are) must decide what their strategy is towards CSI, whether they enter the market themselves, partner with 'prime' contractors, or operate a flexible arrangement of assuming 'prime' and 'subcontractor' roles.

- From a user standpoint, there are many attractive characteristics of the CSI approach, and INPUT's research indicates significant opportunities developing in the government, manufacturing, and financial services sectors. The attractions to users of the CSI approach are summarised in Exhibit V-8.

EXHIBIT V-8

ATTRACTIVE CHARACTERISTICS OF CSI APPROACH

- Meet Business Objectives Rapidly
- Reduce Risk of Systems Development
- 'Acquire' Project Management Skills
- Integrate Fragmented Systems
- Save Costs Over Internally-Developed Systems
- Use New Technology to Achieve Optimum Solution

- To properly prepare for the CSI competitive environment over the next five years and beyond, vendors now must choose the envelope of services, industry market, and skills that will be the focus of their CSI efforts. They can then isolate those capabilities, products, and services that are needed to complement their own catalogue and begin selection of the ideal partner or partners that not only provide the skills needed but enhance the vendor's public CSI image and therefore the likelihood of obtaining business.

- Successful vendors such as CAP are directing their envelope of services to carefully defined vertical markets, developing their market expertise as they go.

- To succeed in CSI markets, it is necessary to form lasting strategic partnerships that are difficult to compete against or break. It is, therefore, crucial for vendors to choose, early on, partnerships that serve their best long-term strategic interests.

- When selecting partners for CSI, vendors should review a partner's strategic fit in a matrix combination of industry knowledge, technical skills, financial strength, public reputation, managerial professionalism, application knowledge, geographical coverage, and cultural style. As partnerships need to be formed on a long-term basis, this last factor, cultural style, needs careful consideration and may well inhibit vendors with a unique and idiosyncratic cultures (e.g., IBM) from effectively exploiting CSI opportunities.

- Exhibit V-9 illustrates a list of factors that vendors have perceived as being critical to formulating a successful market development strategy with respect to commercial systems integration (CSI).

- There are several key strategic elements to be considered in entering the CSI market. Containing the risk element and consciously managing each project to reduce the possibility of failure is an essential part of continued participation in the market. Each project needs to be isolated in terms of financial

EXHIBIT V-9

SYSTEMS INTEGRATION - STRATEGIES FOR SUCCESS

- Quality, Long-Term, Third-Party Relationships - Cultural Fit
- Envelope of Services, Industry Targets, and Skills
- Publicly-Acknowledged Expertise in Industry and Application Area
- Ability to Assess, Contain, and Manage Risk
- Funded and Disciplined Bid Preparation
- Complex Project Management Skills

S-PSE

control, organisational focus, management, and account control. Given the erroneous impat that CSI can have on the continued operation and viability of the user's company, legal exposure will be very high.

- To be successful in the CSI market, the vendor must have an understanding of the processes that govern the fundamental business of the customer so as to be in a position to recommend workpractice changes as well as simple automation. This clearly means that systems design, development tools and methodologies, project management talent, etc., together comprise the second most important component of a CSI vendor's makeup, the first being a ground-level understanding of the nature of the customer's business both now and in the future.

- This is the reason why market specialisation is a must, not just a sensible marketing approach. It is also why the selection of relevant partners is so crucial to the success of the CSI vendor.

- Lastly, CSI is a big-stakes game for big international players. Typically, a vendor will spend up to 5% of the contract's value in bidding in preliminary systems evaluation, design and bid support. A $20 million CSI contract can cost up to $1 million just to bid with no assurance of success. Planning adequate funding before entering the market is therefore an absolute necessity.

- Readers wishing to obtain an insight in how to manage CSI bidding, risk containment, project control, and CSI marketing are recommended to consult INPUT's report entitled, U.S. Commercial Systems Integration Markets, 1986-1991.

- The next chapter provides INPUT's assessment of the evaluation of the competitive environment for SI, including reviews of some potential players in each major European country market.

CHAPTER VI - SYSTEMS INTEGRATION — THE COMPETITIVE ENVIRONMENT

VI SYSTEMS INTEGRATION - THE COMPETITIVE ENVIRONMENT

- Any market in its embryonic stages invites vendor activity in the form of product/service (re)definition, self-assessment vis-a-vis market requirements, and some form of risk-benefit analysis. This chapter identifies vendors who are (or could potentially) position themselves as systems integrators and have the range of skills, experience, and resources coupled with critical market position to address this emerging opportunity.

- In the medium/long term, a few large deep-pocket corporations will dominate the systems integration marketplace. These vendors have already made strong commitments to both establishing vendor-vendor relationships and developing or acquiring complex project management expertise. The major issue will be whether these large vendors can overcome limitations in applications and industry experience that may accrue as they expand their base of experience.

- A larger group of SI vendors will find opportunities in smaller SI applicatons (i.e., below $5 million in contract value). These vendors will focus on their areas of expertise and existing players are frequently involved in subcontracting to larger vendors on SI projects.

- Competition for SI business is emerging from a number of directions. Participation in the market could potentially come from the following groups:

  - Computer manufacturers.

- Communications companies.
- Professional services companies.
- Management consultants.
- Aerospace companies.
- Engineering and constructon firms.

- When examining the market for systems integration, INPUT sees the hardware manufacturers as key players. It is interesting to note their increasing revenues from software and services, as illustrated in Exhibit VI-1.

- This chapter provides background review of players in the European SI market analysed by:
  - U.S.-owned vendors.
  - U.K.-based vendors.
  - West German-based vendors.
  - Italian-based vendors.
  - French-based vendors.

- One of the key features of the European competitive environment is the presence of alliances, consortia, or other forms of joint venture. These teaming agreements are necessary not only to share the very heavy bidding costs but also to demonstrate the necessary breadth of expertise, financial strength, and managerial and technical skills. This phenomenon is especially marked in defence and multinational projects where it is necessary to provide representation for each country market.

EXHIBIT VI-1

MAJOR HARDWARE MANUFACTURES WESTERN EUROPEAN SOFTWARE AND SERVICES REVENUES, 1986

RANK	MANUFACTURER	EUROPEAN DF REVENUE $ BILLIONS	EUROPEAN REVENUE PERCENT OF WORLDWIDE REVENUE	SOFTWARE AND SERVICES PERCENT OF TOTAL REVENUE	EUROPEAN SOFTWARE AND SERVICES ESTIMATED REVENUE $ MILLIONS
1	IBM	15.7	32	11.7	1,839
2	SIEMENS	3.9	88	8.8	339
3	NIXDODRF	1.9	92	14.4	275
4	UNISYS	2.3	24	9.1	207
5	DIGITAL	2.8	33	6.7	185
6	OLIVETTI	2.7	70	5.8	158
7	BULL	2.4	94	6.4	155
8	STC (INC ICL)	1.4	81	9.7	139
9	NCR	1.2	28	10.8	133
10	HEWLETT-PACKARD	1.5	33	8.3	124

N.B. Software and Services Revenues Do Not Include Hardware Maintenance.

S-PSE

A. SIGNIFICANT U.S.-OWNED MULTINATIONAL PLAYERS

- Since the SI market has to date been largely a U.S. phenomenon, it is not surprising that a number of U.S. organisations are active in the European marketplace.

- Exhibit VI-2 lists U.S. vendors that are active in the European marketplace. However, it should be noted that not all vendors listed are necessarily acting in the prime contractor role.

1. IBM

- INPUT considers tht one of IBM's key problems in Europe is a lack of 'closeness' to the customer. This may seem a paradox in view of IBM's justified market reputation for customer service. The point is that IBM has always maintained a very clear demarcation line between what is its responsbility to service and what is the customer's. IBM's standard sales teams maintain this position.

- This philosophy is threatened by user demand for a fuller service commitment at every level of the computer industry. Recent announcements by IBM in the area of customer service underline this.

- In respect of SI, IBM has to make the general transition towards total commitment to delivering solutions and away from the 'box shifter' mentality, albeit backed up by superb service.

- It is believed IBM has assigned 1,000 people worldwide to SI project teams. They have created a central organisation to support:

  - Advice and management of bids.

EXHIBIT VI-2

US-OWNED VENDORS ACTIVE IN EUROPEAN SI MARKET

- IBM
- Digital
- EDS
- Hughes
- Gould
- CSC
- Raytheon
- Unisys
- Westinghouse
- RCA
- Rockwell

- Approval process.
- Project management.
- Resource allocation.

- The operating SI organisations in the field will provide the project management and the pools of specialist resources.

- Target markets for SI are believed to be:
  - CIM.
  - Government.
  - Service industries.
    - Banking.
    - Insurance.
    - Retailing.
  - Small companies.

- Whilst undoubtedly IBM has immense strengths in the European market for computer systems, it does have some significant weaknesses in relation to its capability to exploit emerging SI opportunities. These include:
  - Inability to fully commit to support of customer's complete problem because of its standard terms for doing business.

- No current internal mechanism for handling complex bids and, particularly, subcontracting relationships.

- Lack of ability to work effectively as a joint venture partner.

- OEM capability/relationships limited to the bottom end of the market.

- Limited relationships with major systems houses, professional services firms.

2. EDS

- The most active company in this arena from a marketing viewpoint has, of course, been EDS. It has, in fact, been largely responsible for publicising the term 'Systems Integration' in Europe outside of the defence sector.

- EDS has however found it somewhat more difficult to translate this marketing awareness into sales success.

- In Europe EDS presents itself as being involved in four key sectors of the industry:

  - Systems integration.

  - Facilities management.

  - Computer integrated manufacturing.

  - Value-added network services.

- EDS's strategy in Europe in its non-GM busines is to develop through acquisition; it took over UCSL in the U.K. three years ago and most recently (December 1986) took over the French services company SPI. SPI had approximately 500 staff.

- Interestingly, EDS failed to take over Logica when it became clear that Logica was adamant that it wished to retain its independence, hostile take-overs being disastrous in this sector.

- In Italy, EDS has set up a joint venture company with Olivetti called Integrated Systems Management. This company is targeted at exploiting factory automation contracts, initially within Italy.

3. COMPUTER SCIENCES CORPORATION (CSC)

- CSC's track record over recent years has established its reputation as a leading international professional services company, and it is a growth and profit star in the industry.

- CSC's marketing and management success lies in its focus on key areas of opportunity, i.e.:

  - Central governments.

  - Banking.

  - Defence.

- Within these areas, CSC has an excellent reputation specifically related to its relatively unique skills in project management and its track record in developing large online systems.

- CSC has both a strong management training programme and its Digital Systems Development Methodology (DSDM), originally developed for the U.S. government.

- CSC tends to present itself not as a prime contractor but in a project management role, particularly in the government sector where overall management responsibility is retained by the responsible department.

- In addition to consultancy and bespoke system development expertise, CSC also has a presence in network services and communicatons markets, but its INFONET service is positioned as a premium support activity and is not being actively marketed.

- Number of employees:

  - Worldwide - 17,000 as of 1/1/87.

  - Europe - 450 as of 1/1/87.

- Financials ($ millions):

	FY Ending 31/03/85	FY Ending 31/03/86	FY Ending 31/03/87
European revenue	14.7	24.5 (U.K. 10.0)	44.9
Non-European revenue	708.8	814.1	985.1
Total revenue	723.5	838.6	1,030.0
Profit before tax	41.1	42.8	59.0 (est.)

- Growth:

	1985-1986	1986-1987
Total organic growth	66%	83%
European actual growth (as opposed to nominal $ growth)	30%	39%

4. OTHER U.S.-OWNED VENDORS

- As indicated in Exhibit VI-2, there are many other U.S. companies who have established some role in the European SI market.

- Digital, for example, amongst other major computer equipment manufacturers is known to be placing considerable emphasis on developing and exploiting an SI capability in Europe.

  - In the U.K., Digital has formed a 'defence programmes group' to more closely track developments and be in a position to be involved in study contracts.

- Raytheon is a player in the European SI market, principally its their U.K. systems house subsidiary Datalogic and its electronics subsidiary Cossor.

  - Datalogic has classed itself as a systems integrator for a number of years. Through Cossor Electronics it can build custom hardware to meet a very wide range of possible needs.

  - Datalogic claims that about 30% of its business (1986 revenues were $40 million in total) came from SI, of which the vast majority was for 'dealing room' systems in financial institutions.

  - In the last couple of years, Datalogic has found it extremely difficult to grow its business significantly but is now benefitting from the high levels of investment in the finance sector. It expects to grow 20% compound over the next few years.

  - Cossor employs about 2,000 people in the U.K. and is very active in the defence area. It believes that it is well placed to achieve a high proportion of the currently delayed IFF (Identification Friend or Foe) contracts.

- It is interesting to note that Boeing Computer Services has not yet made any signficant moves in relation to developing SI business in Europe.

- Hoskyns (75% owned by Martin Marietta) remains on the fringes of SI as far as the market exists at the moment. Only recently has it obtained approval as a defence supplier, and it derives the majority of its business from two other service areas:

  - Facilities management (specialising in organisations making transition from one equipment vendor to another).

  - Software products, principally its MAS manufacturing control package.

- Arthur Andersen is known to be interested in commercial SI markets and has obtained at least one $1.5 million contract which internally is regarded as SI.

B. U.K.-BASED SYSTEMS INTEGRATION PLAYERS

- In the U.K. competition for SI business can be basically identified as consisting of four key domestic groups in addition to the U.S.-owned companies:

  - The traditional electronics companies.

  - The systems houses (professional services companies).

  - Computer equipment manufacturers.

  - Communications companies.

- Exhibit VI-3 lists the most significant companies that are considered to be active in some respect in the SI business in the U.K.

EXHIBIT VI-3

U.K.-BASED VENDORS POTENTIALLY ACTIVE IN SI MARKET

- Traditional Electronics Company
  - GEC (Marconi/EASAMS)
  - BAe
  - Plessey
  - Ferranti
  - Racal
  - Dowty
  - Lucas
  - Smiths Industries
  - Hunting Engineering
  - Vickers
- Systems Houses
  - Scicon
  - SD
  - CAP
  - Logica
  - SSL
  - Admiral Computing
  - WS Atkins
  - Hoskyns
- Communicaitons Companies
  - British Telecom
- Hardware Manufacturers
  - ICL

- Some other vendors are active within the definition of the market but are not necessarily pursuing SI as a generic theme; for example, Reuters, by virtue of having a very significnt share of the 'dealer room' market.

- In addition to the organisations mentioned above there exist some other companies that potentially have the capability and appear to be making some moves towards being SI players.

- One of these is Atkins Planning, an engineering consultancy that has a very high reputation for its project management capability.

  - Atkins employs about 100-150 staff in the U.K.

- Another organisation that appears to be targetting SI markets in manufacturing in particular is PA Computers and Telecommunications.

- PA offers what it describes as a Systems Integration Service with a professional staff of around 350-400 worldwide. It has been involved in a variety of projects ranging up to 20 man years in size and is an approved MOD contractor.

- ICL has made a series of aggressive statements intended to position itself as a major player in the European SI market; for example, the statement from Chariman Peter Bonfield that '...the vast majority of ICL's business will be in systems integration by the mid-1990s...'.

  - ICL is also strengthening its position in Continental European markets with plans for a non-U.K. manufacturing plant and a joint production venture with a European partner. ICL plans to boost overseas sales from 37% of revenues in 1986 to 50% by next year, based around a proven vertical marketing strategy. Revenues for European Community member states rose by 34% to 171 million pounds during 1986 with strong growth in France, the Netherlands, and Germany. The

company has established a Technical Applications Centre in Dusseldorf and a Network Systems Development Centre in Paris to support its systems integration role.

- Communications is a key strength for ICL and the company has already established an independent reputation for Network Facilities Management.

- British Telecom has already established its credentials not only in the field of communications facilities management, but also as a prime contractor in the government and defence sectors.

I. TRADITIONAL ELECTRONICS COMPANIES

a. British Aerospace (BAe)

- BAe is the biggest U.K. defence contractor and represents the merger (as a result of nationalisation) of the leading aerospace companies that developed in the post-war area in the U.K.

- BAe consists of a myriad of divisions and subsidiary companies with interests in aircraft, weapons systems, project and test services and space engineering.

- Not surprisingly, defence systems integration is a very key area for the company.

- BAe has, interestingly, taken a 25% stake in Systems Designers.

b. GEC

- Significant SI participation from GEC (no relationship with GE of America) is through its subsidiaries Marconi and Easams.

(i) Marconi

- Marconi has a diverse and comprehensive involvement in electronics; its principal areas of activity being:

  - Space.
  - Test/simulation.
  - Component technology.
  - Weapons guidance.
  - Radars.
  - Electronic Warfare.
  - Data transmisson.
  - Fire control.
  - Broadcasting.
  - Communications.
  - Merchant marine/offshore.
  - Underwater systems.

- Although Marconi is very defence oriented, it has significant interests in commercial systems integration, for example:

  - Air traffic control systems.

- Airfield services.

- Primary and secondary radar systems, including their associated command and control and ATC display systems.

- Providing private data networks, e.g., British Telecom's Kilostream service.

- Inner-city earthstations for community services and offshore communications systems.

- Computer-based command and control systems for the emergency and public services.

- TV and sound broadcasting systems including 'payloads' for direct broadcasting TV satellites.

- Marconi is involved in a number of joint venture company operations, notably with Hughes and Plessey for U.K. Air Defence Ground Environment (UKADGE).

(ii) Easams

- Easams describes itself as the orginal systems engineering company. It is a completely autonomous organisation within GEC and claims dedication to a policy of complete impartiality and objectivity in the specification and selection of systems and equipment in both the defence and civil fields.

- Easams has four divisions:

  - Studies and Consultancy.

  - Weapons Systems.

- Implementation and Support.

- Information Management Systems.

- The Information Management Systems Division specialises in C^3I systems.

c. Plessey

- Plessey has benefitted from the result of GEC's AWACS debacle through an agreement with Westinghouse Electric which is likely to bring in $1.5 billion worth of business over the next ten years.

- This business will largely be for high-technology design, engineering, and manufacturing in the defence field. All the early warning radar systems will be placed with Plessey Avionics.

d. Racal

- Racal is a highly diversified electronics company with significant interests in the defence area.

- It has have a Project Management Division specifically set up to handle large SI-type contracts.

- At this stage, it does not appear to be highly focussed, gaining business in a variety of areas such as:

  - Government.

  - Manufacturing.

  - Retailing.

- Finance.

- Racal has a diversified experience profile and has particular strengths in voice and data networking systems.

2. SOFTWARE HOUSES

- The shift in system development emphasis, content, and risk from hardware to software and project management components has allowed the top U.K. software houses to become prime contractors in major projects.

- The traditional electronics companies with their vast cash and personnel resources has been very late in realising the potential opportunity of commercial systems integration, is surely a reflection of their 'production mentality'.

- Software houses who base their marketing philosophies upon 'customer closeness' and providing solutions to business problems are the natural key players in the market despite the increasingly aggressive stance of IBM, ICL, and the other major hardware manufacturers.

- The success of the major players is reflected in their financial performance and valuation by the international securites industry. For example, CAP GROUP PLC has had a 34% annualised increase in its share price since flotation.

- Exhibit VI-4 illustrates the calendar 1986 P/E Multiples of leading software houses.

- Exhibit VI-5 illustrates the financial performance of leading U.K. software houses.

- Exhibit VI-6 illustrates the relative financial performance of leading U.K. software houses in key market sectors.

EXHIBIT VI-4

SOFTWARE HOUSES - CALENDAR 1986 P/E MULTIPLES

COMPANY	P/E MULTIPLE-1986
SYSTEMS DESIGNERS	37.1
LOGICA	25.9
HOSKYNS	23.0
CAP GROUP	21.5
REUTERS	33.8
BLUE ARROW	25.2
U.K. COMPUTER SERVICES AVERAGE	18.5
F.T. ALL SHARE	15.3
U.K. ELECTRONICS SECTOR AVERAGE	15.0
U.S. COMPUTER SERVICES AVERAGE	27.0

EXHIBIT VI-5

FINANCIAL PERFORMANCE - U.K.-BASED SOFTWARE HOUSES

COMPANY	1985 (£M)		1986 (£M)		1987 (£M) (Estimate)	
	Turnover	Pre-Tax Profit	Turnover	Pre-Tax Profit	Turnover	Pre-Tax Profit
CAP	36.5	2.12	50.6	2.71	80.0	6.0
Hoskyns	55.9	3.50	67.7	4.50	85.0	5.7
Logica	62.3	5.00	87.0	6.80	115.0	10.5
Systems Designers	54.9	7.30	60.0	4.50	75.0	7.5
BIS*	41.1	2.80	47.1	4.20	60.0	6.0

*BIS was acquired by NYNEX in March 1987.

EXHIBIT VI-6

U.K.-BASED SOFTWARE HOUSES - PERFORMANCE IN KEY MARKET SECTORS

COMPANY	1986 REVENUES IN KEY MARKET SECTORS (£M)				
	Defence	Financial Services	Communi-cations	Industry	Overseas
BIS		18			25
LOGICA	17	19	12	30	40
CAP	13	14	6	11 25	10
HOSKYNS		10			
CCF		9			
CMG		8		5	19
DATALOGIC		7			
SCICON INC.	27	4	12	50	120
SDL	20	3	5	8	30
SSL	13	3			6

a. SCICON International

- SCICON International Ltd. is one of the largest companies in the world in the field of information services and offers a comprehensive range of services to provide total solutions for client organisations.

- SCICON's services range from consultancy (12% of turnover) and the development of complex, one-off systems (44%) to standard products and kernel systems (32%) including the provision of processing facilities and network management (12%).

- SCICON has been a wholly owned subsidiary of British Petrleum since 1966 (8% captive revenue) and as a distinct business stream within the group is composed of Scicon Limited and SCS GmbH (Germany), GFI SA (France), SC Inc., SCT Inc., and Telecom General Corps. (U.S.), and SISCO.

- Scicon Ltd.

Revenue by Sector (million pounds)	1985	1986	Percent Change 1985-1986
Energy	6.7	8.9	33%
Defence and aerospace	12.4	13.9	12%
Banking and finance	2.6	3.7	43%
Processing services and other	3.2	2.3	
Industry	7.7	8.2	
Communications	5.9	7.3	24%
Total	38.5	44.3	15%
Percent captive	9%	8%	
Profit before tax	3.0	3.6	20%
Number of employees	1,060	1,130	7%

- SCS (Scientific Control Systems) GmbH

Revenue by sector (DM millions)	1985	1986	Percent Change 1985-1986
Industry	N/A	58.6	---
Financial services	N/A	20.0	---
Defence	N/A	17.2	---
State and federal government	N/A	17.2	---
Public utilities	N/A	12.9	---
Other commercial services	N/A	17.1	---
Total	128	143.0	12%
Number of employees	750	810	08%

- Scicon International.

	1984	1985	1986	Percent Change 1985-1986
Worldwide turnover (million pounds)	127	158	173	9%
Number of employees	N/A	N/A	3,800	

- Relatively slow growth but improved profit performance has been a result of consolidation and restructuring within the group to focus expertise on key market opportunities.

- In the U.K., they are market leaders in the field of energy and have some unique products and applications skills to service a range of oil company requirements.

- Other potential competitors in the SI field, e.g., Datalogic, have undergone a similar process of restructuring, reflecting the need to specialise around niche market opportunities.

- The company also has a proven reputation in the fields of defence and communications. SCICON is an approved defence contractor and is one of the few companies qualified to Defence Standard 05-21 for software, hardware, processing services, and project management and to the NATO Quality Control System Requirements for Industry AQAP1.

- The range of services provided by the company is supported by a research and development programme which includes projects in automation, robotics, data communications, human factors, expert systems, computer aided instruction, trainers, and simulators.

b. Software Sciences Limited (SSL)

- Software Sciences Limited (SSL) is part of the THORN-EMI Group, a major electronics company spanning a range of activities including white goods, brown goods, and entertainment.

- SSL has specialist experience in:

  - Command and control systems.
  - Communications.
  - Electronic warfare.
  - Sensor data processing.
  - Weapons systems.
  - Logistics.
  - Software technology.
  - Life-cycle support.

- SSL is also a significant player in the 'dealing room' system market with their Continuous On-Line Trading (COLT) system.

C. FRENCH-BASED SI PLAYERS

- The French market is in general terms the most significant computer service market in Europe and has as a result developed some large and powerful service companies. The most significant of these are:

- CGS.
- SLIGOS.
- GSI.
- STERIA.
- SEMA-METRA.

- In terms of systems integration, the position is not so clearly defined. As yet, INPUT considers that SI is a very weak concept in France and that consequently there is only limited awareness amongst both users and vendors.

- The emergence of EDS with its 'missionary' marketing approach on the French market following its purchase of the large SSII company SPI has, however, brought the term into the everyday systems vocabulary.

- France demonstrated the generally observed situation throughout Europe already described elsewhere, namely:

  - The gradual development of larger and more complex projects, primarily from a non-administrative DP origin and therefore from an environment used to subcontracting.

  - No obvious breakpoint in the market except that is SI being used to describe projects less than $5 million in contract value.

  - One or two very large projects like the electronic directory which was 200 million French francs--to date the exception that proves the rule.

- Exhibit VI-7 lists significant vendors who could be considered as potential SI vendors. Some of these vendors are commented upon in more detail below.

EXHIBIT VI-7

FRENCH-BASED VENDORS POTENTIALLY ACTIVE IN SI MARKET

- Thompson CSF
- CAP Gemini Sogeti
- Sema-metra
- Sterla
- Sesa (CGS)
- Syseca (Thompson)
- GFI
- Sligos
- Matra

- Exhibit VI-8 illustrates the P/E Multiples of leading French services companies.

I. CAP GEMINI SOGETI (CGS)

- CGS is Europe's largest service company and is renowned for its strategic move at the end of the 1970s out of processing services and into professional services.

- CGS has grown very rapidly both organically (22% 1986 to 1987) and as a result of an aggressive takeover policy. Most recently takeovers have included:

  - IBAT, a German company specialising in process control, robotics, CIM, and CAD in October 1986. IBAT's 1987 revenues are estimated at 50 million Deutsch marks, and this effectively doubles the size of CGS's German operations.

  - GE-DA, an Italian professional services company, in December 1986. GE-DA has a turnover of 125 million French francs and is CGS's first entry into the Italian market.

  - HELIAS, a French professional services company, with 1986 revenues of 40.6 million French francs, SESA; and 36% of CISI.

  - SYCOMM, a U.S. systems corporation, with service companies specialising in banking, insurance, and telecommunications. SYCOMM had 1986 revenues of $17 million.

- CGS has issued a one page document shown as Exhibit VI-9 which attempts to define its role as a systems integrator. It is believed that this was produced in response to a heavy publicity campaign re SI by EDS following its absorption of SPI.

EXHIBIT VI-8

FRENCH INFORMATION SERVICES COMPANIES
CALENDAR 1986 AND 1987 (Estimate)
P/E MULTIPLES

COMPANY	P/E MULTIPLE - 1986	*P/E MULTIPLE - 1987
CAP GIMINI SOGETI	43.8	35.6
SEMA METRA	28.2	21.1
CCMC	16.2	15.2
CEGID	35.7	26.2
FRENCH INFORMATION SERVICES SECTOR AVERAGE	28.0	22.0

* Forecast

CAP GEMINI SOGETI AND SYSTEMS INTEGRATION

Cap Gemini Sogeti is operating in all Western European countriew as well as in the USA. The 1986 revenue will be around $430M. Cap Gemini Sogeti is offering professional services and application development tools.

We are involved in governmental as well as commenrcial systems integration, offering our customers all the possible answers fitting to their needs.

We are very active in the telecommunication field. We realized the electronic directory in France (an over $20M contract), and are in the process to develop similar videotex systems for other European PTT (Norway, Switzerland . . .).
We conceived different networks for the French army, navy and airforce (Artimon, Antinea, Reseda, Retinat).
We developed control and command systems for various emergency services (British police forces, fire brigade . . .).
In the finance area, we built a total insurance system for Skandia in dematerialization of the stock market shares for a consortium of the French largest banks.
In the industry, we developed a flight testing system for Fokker, and we are starting implementing computer integrated manufacturing systems.

All these contracts are well over $1M, without including the hardware parts that we are always subcontracting.

Cap Gemini Sogeti is also prime contractor in some European research projects (Espirit, Eureka).

In our accounts, systems integration are not isolated. They represent around 10% of our revenue, and they are in line with the revenue breakdown by activity sector:

- 5% of our revenue derived from the primary sector
- 31% of our revenue derived from the industry
- 12% of our revenue derived from the telecommunication sector
- 22% of our revenue derived from the financial sector
- 19% of our revenue derived from the services
- 11% of our revenue derived from the government.

This shows our good coverage of the total market.

The growth rate for systems integration is expected to be at least equal to the one of the company, which will be around 20% a year, not taking into account potential acquistions.

Revenue by Sector (million pounds)	1985		1986		Percent Change 1985-1986
French turnover (FFM/($M))	990	(145)	1,131	(165)	14%
Other European	748	(109)	986	(144)	32%
U.S.	462	(67)	783	(114)	69%
Consolidated total	2,200	(321)	2,900	(423)	32%
Profit before tax	133	(19)	193	(28)	45%
Organic growth					22%
Number of employees - Worldwide = 7,500					
- U.S. = 2,000					

2. HONEYWELL-BULL

- Honeywell-Bull is facing a particularly challenging period as it attempts to reform itself after the recent merger.

- It is believed by INPUT that it has established a small group in Paris to attempt the formulation of strategy to tackle SI markets. This group is, however, believed to be very small and resource limited.

- The group is named Direction Ingenierie Conseil.

- In other areas of Honeywell-Bull's business that could potentially be developed towards a fuller SI capability, the company has made stronger marketing initiatives.

- For example, the company has stated that it is going to invest about $50 million in attacking the U.K. market for manufacturing automation--a small sum for a true systems integrator. To some extent this initiative is dependent upon continuing links with Honeywell's Control Systems Divisions, now separate from Honeywell-Bull.

D. WEST GERMAN-BASED SI PLAYERS

- Exhibit VI-10 lists the principal indigenous West German companies that are potentially system integration players.

- The major U.S.-owned groups will, of course, be an important factor in the West German SI market; for example, IBM.

- As mentioned elsewhere in this report, the small, but highly specialised engineering consulting firms could well play a very significant role in the development of this market.

- Messerschmitt-Boelkow-Bohm (MBB) is a significant aerospace company which through the consortia MBB-Erno is heavily involved in the European space programme.

- Large manufacturing organisations that are potential players are:

  - Mannesmann (owner of Kienzle, the office computer manufacturer), a widely diversified engineering group.

  - AEG a major electrical engineering company now part of the Daimler-Benz group.

  - Siemens, West Germany's premier electronics company and computer manufacturer.

- In addition to these there are a range of software and services companies that have substantial skill reservoirs and that consequently are likely to figure in the future development of this market.

EXHIBIT VI-10

WEST GERMAN-BASED VENDORS POTENTIALLY ACTIVE IN SI MARKET

- Messerschmitt-Boelkow-Bohm (MBB)
  - Mbb-Erno
- Mannesmann
- Aeg Telefunken
- Siemens
- SCS
- ADV-Orga
- MBP
- GEI
- Softlab

S-PSE

- SCS (Scientific Control Systems) is the West German subsidiary of the SCICON Group. SCS has obtained some embryonic SI type work, primarily in the manufacturing sector.

E. ITALIAN-BASED SI PLAYERS

- There is little evidence in Italy of systems integration contracts actually being awarded. However, it is a strategic issue in Italy as is demonstrated by the high level of activity in developing alliances that will position companies to take advantage of the emerging opportunities.

- Exhibit VI-11 lists those organisations that are considered to be potential participants in the Italian SI market.

- The next chapter gives INPUT's conclusions and recommendations for participants in professional services markets.

EXHIBIT VI-11

ITALIAN BASED VENDORS POTENTIALLY ACTIVE IN SI MARKET

- Selenia
- Olivetti
- Fiat
- Finsiel
- Pirelli
- ITP Group
- Televas
- Italtel

CHAPTER VII - CONCLUSIONS AND RECOMMENDATIONS

VII CONCLUSIONS AND RECOMMENDATIONS

- Difficulties arise in specifying recommendations to vendors as appropriate strategies differ depending on the type of service, stage in company development and/or product life cycle, competitive conditions, and country market environment.

- Although this report has covered the full range of professional services markets, evaluating trends, issues, and opportunities, the focus of INPUT is on emergent market opportunities - with respect to professional services, we have focussed on System Integration (SI).

- Specific recommendations for existing and potential participants in the commercial systems integration market have been given in Chapter V of this report.

A. INDUSTRY TARGETS

- Successful professional services vendors have focussed on a relatively narrow set of criteria for business development and maintained levels of differentiation and profitability via the economies of specialisation.

- Vertical marketing strategies are observable among a wide cross-section of vendors, and existing and potential vendors need to evaluate and focus their

corporate strength and image as specialists in servicing the needs and understanding of the problems, environment, culture, and dynamics of chosen vertical market segments.

- INPUT's research revealed that there are considerable development opportunities in banking and finance, manufacturing, and government.

1. BANKING AND FINANCE

- Deregulation, increased internationalism and competitiveness are fuelling demand for a wide range of subcontractors services in this sector. A key focus is on the integration and automation of backoffice accounting functions and support activities with front office/customer interface activities.

2. MANUFACTURING

- In the manufacturing area, there is continued interest in process control applications, materials handling, and distribution/logistics management.

- Vendors of consultancy and custom software development services should also note that the key opportunity is now with medium-sized organisations; for example, companies who have made long-term systems specification errors with first-time computer installations and/or those organisations who wish to integrate fragmented and uncoordinated departmental computing developments.

3. GOVERNMENT

- The government sector is a key opportunity for vendors who are prepared to invest time and effort to understand procedures and working practices and provide enhanced support for specialist needs. Growth in this sector is being fostered by:

- Acute shortage of skilled in-house staff.

- Increasing government commitment to foster the development of the computer services industry.

- Increasing pressure for accountability and efficiency and also opening up opportunities within local government and the public sector utilities as well as in central government departments.

B. GENERAL RECOMMENDATIONS

- INPUT's research revealed that the structure of the professional services segment of the information services industry is polarising between the increasing dominance of large international players and small niche, specialist players. Medium-sized organisations are being squeezed out from significant opportunities and are prime targets for merger and acquisition plans.

- The European computer services industry is becoming increasingly dominated by the large U.S. software companies, e.g., Computer Associates with its acquisition of Uccel and the consultancy divisions of the large international auditing practices are increasing their market share.

- Consequently, software houses can no longer afford to remain localised and parochial and need to develop critical market position in terms of international presence and support, financial strength, image, vertical market, and application knowledge as well as technical skills in order to survive competitive pressures and user demands for prime contracting.

- The key to future success is to evaluate corporate policy on strategic partnerships, i.e., teaming agreements, joint ventures, marketing agreements, and acquisitions. Effective collaboration is the only realistic approach to dealing

with the risk of trends towards user demands for fixed-price contracts and increased emphasis on support capabilities and client/industry knowledge in the bidding procedure.

- Exhibit VII-1 illustrates INPUT's recommendations to vendor participants.

C. SPECIFIC RECOMMENDATIONS - CRITICAL SUCCESS FACTORS

1. UNDERSTAND AND MANAGE THE RISK INVOLVED

- The process of selecting a vendor for a professional services contract is one of professional evaluation. INPUT's user research revealed that the most important bid evaluation criteria were:
  - Applications knowledge.
  - Overall technical merit.
  - Performance guarantee.
  - Delivery deadline.
  - Track record.
- It is interesting to note that price was rated as being of relatively low importance.
- The research reflects an increasing preference for fixed-price contracts, and vendors must find and implement methods of pricing and contract management that allow them to minimize the risks of performance on a fixed-price basis.

EXHIBIT VII-1

RECOMMENDATIONS - CRITICAL SUCCESS FACTORS

- Critical Market Position - Strategic Partnering
- Focus Corporate Strengths - Industry Targets
- Understand and Manage Risk
- Extend Management Strengths
- Sharpen Marketing Skills and Image
- Improve Relationships with "Stakeholders"

- Increasing usage of standard software packages and kernels is an obvious aid to improving margins on fixed-price contracts, as is the use of automated project management techniques.

- Risk management is further enhanced via specialisation and market intelligence. Bid development now requires in-depth presolicitation intelligence and early executive management involvement. Companies that fail to accurately assess their prospects and understand their political, cultural, and commercial environments waste scarce resources in expensive bidding failures.

- Just as clients employ contractors to overcome personnel shortages, vendors may also face staff shortages in specific hardware and software systems and/or in particular geographic areas. Failure to resolve these shortages in the pre-bid stage is expensive in both overhead and management costs after award. The use of modern telecommunications technologies, e.g., video conferencing, improves the cost-effectiveness of scarce personnel resources.

2. EVALUATE AND DEVELOP UNIQUE CAPABILITES

- With professional services vendors continuing to employ a strategy of niche development, it behoves all vendors to reassess their strategies for competing with this developing expertise. This includes an evaluation of support capabilities, management/client reporting procedures, marketing methods, technical strengths, market intelligence, and track record of performance.

- A key to vendor success is to strengthen expertise in key technologies such as telecommunications, artificial intelligence (AI), and UNIX.

- To a certain extent, the use of advanced software development tools and methodologies is at a more advanced stage of development in Europe than in North America. Consequently, there is a limited window of opportunity for vendors who can implement an integrated software engineering workshop environment covering all phases of the development cycle.

- Overall, this concept suggests that the unique requirements of a targetted opportunity be used to guide a vendor's selection of products, services, capabilities, and strategic partners in order to satisfy user demands for 'one stop shopping' for increasingly complex development contracts. Systems integrators are already familiar with this approach.

3. EXTEND MANAGEMENT STRENGTHS

- A key to success in professional services markets (as in any other industry) is the depth and quality of management professionalism in the organisation.

- Vendors should recognise that skilled staff are a key asset on the balance sheet and undertake planned personnel/management development programmes which improve individuals' personnel skills and professional management skills.

- In recognition of the fact that entrepreneurs do not necessarily make the best management professionals (especially in role-orientated business environments), vendors should strengthen expertise by recruiting professional management skills from outside the information services industry.

- In an environment where technical capability is becoming secondary to knowledge of clients' problems and needs in terms of the value added in a service solution, vendors need to carefully review the balance between technical and commercial management experience. This applies not only to the organisational structure but more closely to manpower planning, succession planning, and personal/career development strategies.

- The information services industry is probably the only commercial sector which has not yet fully mastered the problems of guaranteed on-time, within budget delivery. Consequently, it is suggested that vendors carefully review their systems for internal financial and project control and client reporting procedures. Essentially, this means rapid, effective communications between staff and management, client and contractor. It also implies devolved responsibility and accountability within the vendor organisation.

4. SHARPEN MARKETING SKILLS AND IMAGE

- A key to marketing success is 'customer closeness' and knowledge of a client's 'real' business problems and needs.

- Marketing image is enhanced by first clearly defining the focus of business activities both in the short and long term.

- Clients' perceptions of professionalism, creative problem solving skills, and publicly acknowledged industry/application capabilities are central to success.

- A key factor for marketing success is the ability of vendors to promote the benefits of a service solution to senior commercial management, preferably at a board level, providing evidence of customer knowledge, professionalism, performance reliability, and a 'can do' approach to business.

- Client-contractor communications need to be 'jargon-free' and orientated away from the data processing department.

5. IMPROVE RELATIONSHIPS WITH 'STAKEHOLDERS'

- Effective communications and the management of internal and external relationships is a generic key to commercial success.

- Of particular importance are relationships internally with personnel and externally with financial institutions.

- Technological change is leading to more capital intensive approaches to delivering service solutions. Market growth also leads to substantial increases in demand for working capital.

- It is critical that vendors have access to financial markets not only to finance growth but also to fund product development and meet increasing bidding

costs for large, complex, multi-vendor projects, but also to fulfill ambitions for strategic partnering.

- The ability of organisations to sustain profitable growth is also constrained by their ability to recruit, retain, and motivate adequate levels of skilled human resource with administrative, commercial, and technical skills. Close attention to personnel management is a critical factor for success.

APPENDIX A - DEFINITIONS

APPENDIX A: DEFINITIONS

- INFORMATION SERVICES - The provision of:

  - Data processing functions using vendor computers (processing services).

  - The provision of database access where computers perform an essential role in the processing or conveyance of data.

  - Services that assist users to perform functions on their own computers (software products and/or professional services).

  - A combination of hardware and software, integrated into a total system (integrated systems).

A. REVENUE

- All revenue and user expenditures reported are available (i.e., noncaptive) revenue, as defined below.

- NONCAPTIVE INFORMATION SERVICES REVENUE - Revenue received for information services provided within the four Western European country markets of France, Italy, the U.K., and West Germany from users who are not part of the same parent corporation as the vendor.

- CAPTIVE INFORMATION SERVICES REVENUE - Revenue received from users who are part of the same parent corporation as the vendors.

- OTHER REVENUE - Revenue derived from lines of business other than those defined above.

B. SERVICE MODES

- PROCESSING SERVICES - Remote computing services, batch services, and processing facilities management.

  - REMOTE COMPUTING SERVICES (RCS) - 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. There are four submodes of RCS:

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

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

    . DATABASE - Characterised by the retrieval and processing of information from a vendor-provided database. The database may be owned by the vendor or a third party.

    . USER SITE HARDWARE SERVICES (USHS) - These offerings provided by RCS vendors place programmable hardware on the user's site (rather than in the EDP center). USHS offers:

- Access to a communications network.

- Access through the network to the RCS vendor's larger computers.

- Significant software as part of the service.

- BATCH SERVICES - This includes data processing performed at vendors' sites of user programs and/or data that are physically transported (as opposed to electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include those expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.

- PROCESSING FACILITIES MANAGEMENT (PFM) (Also referred to as 'resource management' or 'systems management') - The management of all or a major part of a user's data processing functions under a long-term contract (more than one year). This would include both remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user, either on-site, through communications lines, or in a mixed mode.

- Processing services are further differentiated as follows:

  - Function-specific services are the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but cut across industry lines. Most general edger, accounts receivable, payroll, and personnel applications fall into this category. Function-specific data base services where the vendor supplies the database and controls access to it (although it may be owned by a third party) are included in this category. General-purpose tools such as financial

planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or data base is designed for specific industry use, then the service is industry-specific.

- Industry-specific 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 as an applications 'tool' that the user employs to produce a unique solution. Specialty applications can be either business or scientific in orientation. Industry-specific database 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 industry-specific 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 users to develop their own problem solutions or processing systems. These basic tools include terminal-handling software, sorts, language compilers, database management systems, information retrieval software, scientific library routines, and other systems software.

- SOFTWARE PRODUCTS - This category includes users' purchases of applications and systems packages for use on in-house computer systems. Included are lease and purchase expenditures, as well as fees for work performed by the vendor to implement and maintain the package at the users' sites. Fees for work performed by organisations other than the package vendor are counted in professional services. There are several subcategories of software products.

- APPLICATIONS PRODUCTS - Software that performs processing to service user functions. They consist of:

  - CROSS-INDUSTRY PRODUCTS - Used in multiple-user industry sectors. Examples are payroll, inventory control, and financial planning.

  - INDUSTRY-SPECIFIC PRODUCTS - Used in a specific industry sector such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting and airline scheduling.

- SYSTEMS PRODUCTS - Software that enables the computer/communications systems to perform basic function. They consist of:

  - SYSTEMS CONTROL PRODUCTS - Function during applications program execution to manage the computer system resource. Examples include operating systems, communication monitors, emulators, and spoolers.

  - DATA CENTER MANAGEMENT PRODUCTS - Used by operations personnel to manage the computer system resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.

  - APPLICATION DEVELOPMENT PRODUCTS - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, data dictionaries, data base management systems, report writers, project control systems, and retrieval systems.

- PROFESSIONAL SERVICES - Made up of services in the following categories:

  - EDUCATION SERVICES - EDP products and/or services - related to corporations, not individuals.

  - CONSULTING SERVICES - EDP management consulting and feasibility studies, for example.

  - CONTRACT STAFF - User-managed temporary EDP staff supplied by service organisation.

  - CUSTOM SOFTWARE DEVELOPMENT - Including system design, programming, testing, documentation, and project development.

  - FACILITIES MANAGEMENT (FM) - The computers are owned by the client, not the vendor; the vendor provides people to operate and manage the facility and communication links, if appropriate.

- STANDARD TURNKEY SYSTEMS - An integration of systems and applications software with hardware, packaged as a single entity. The value added by the vendor is primarily in the software. Most CAD/CAM systems and many small business systems are standard turnkey systems. This does not include specialised hardware systems such as word processors, cash registers, and process control systems.

- Standard turnkey systems revenue in this report is divided into two categories.

  - INDUSTRY-SPECIFIC systems; i.e., systems that serve a specific function for a given industry sector such as seismic processing systems, automobile dealer parts inventory, CAD/CAM systems, discrete manufacturing control systems, etc.

- CROSS-INDUSTRY systems; i.e., systems that provide a specific function that is applicable to a wide range of industry sectors such as financial planning systems, payroll systems, personnel management systems, etc.

- Revenue includes hardware, software, and support functions.

- SYSTEMS INTEGRATION - Services associated with systems design, integration of computing components, installation, and acceptance of comuter/communications systems. Systems integration can include one or more of the major information services delivery modes--professional services, turnkey systems, and software products. System components may be furnished by separate vendors (not as an integrated system by one vendor, called the prime contractor); services may be furnished by a vendor or by a not-for-profit organisation. Integration services may be provided with related engineering activities, such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

C. HARDWARE/HARDWARE SYSTEMS

- HARDWARE - Includes all computer communications equipment that can be separately acquired, with or without installation by the vendor, and not acquired as part of a system.

  - PERIPHERALS - Includes all input, output, communications, and storage devices, other than main memory, that can be locally connected to the main processor and generally cannot be included in other categories, such as terminals.

  - INPUT DEVICES - Includes keyboards, numeric pads, card records, barcode readers, lightpens and trackballs, tape readers, position and motion sensors, and A-to-D (analog-to-dialog) converters.

- OUTPUT DEVICES - Includes printers, CRTs, projection television screens, microfilm processors, digital graphics, and plotters.

- COMMUNICATION DEVICES - Modems, encryption equipment, special interfaces, and error control.

- STORAGE DEVICES -Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories.

- TERMINALS - There are three types of terminals:

  - USER PROGRAMMABLE (Also called 'intelligent terminals'):

    . Single-station or standalone.

    . Multistation-shared processor.

    . Teleprinter.

    . Remote batch.

  - USER NONPROGRAMMABLE:

    . Single-station.

    . Multistation-shared processor.

    . Teleprinter.

  - LIMITED FUNCTION - Originally developed for specific needs, such as POS (point of sale), inventory data collection, controlled access, etc.

- HARDWARE SYSTEMS - Includes all processors, from microcomputers to super (scientific) computers. Hardware systems require type- or model-unique operating software to be functional, but the category excludes applications software and peripheral devices, other than main memory and processor or CPUs, not provided as part of an integrated (turnkey) systems.

  - MICROCOMPUTER (or personal computer or PC) - Combines all of the CPU, memory, and peripheral functions of an 8- or 16-bit computer on a chip, in the form of:

    . Integrated circuit package.

    . Plug-in board with more memory and peripheral circuits.

    . Console--including keyboard and interfacing connectors.

    . Personal computer with at least one external storage device directly addressable by CPU.

  - MINICOMPUTER - Usually a 12-, 16-, or 32-bit computer which may be provided with limited applications software and support and may represent a portion of a complete large system.

    . Personal business computer.

    . Small laboratory computer.

    . Nodal computer in a distributed data network, remote data collection network, connected to remote microcomputers.

  - MAINFRAME - Typically a 32- or 64-bit computer, with extensive applications software and a number of peripherals in standalone or multiple CPU configurations for business (administrative, personnel, and logistics) applications; also called a general-purpose computer.

. Large computer mainframes are presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors (CPUs) or parallel processors; they are intended for structured mathematical and signal processing and are generally used with general purpose von-Newmann-type processors for system control.

. Supercomputer mainframes are high-powered processors with numerical processing throughout that is significantly greater than the largest general-purpose computers, with capacities in the 10-50 MFLOPS (million floating point operations per second) range, in two categories:

- REAL TIME - Generally used for signal processing.

- NONREAL TIME - For scientific use, with maximum burst-mode (but sustained speed) capacities of up to 100 MFLOPS, in one of three configurations:

  . Parallel processors.

  . Pipeline processors.

  . Vector processors.

- Newer supercomputers--with burst modes approaching 300 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-three gigabyte class--are also becoming more common.

- EMBEDDED COMPUTER - Dedicated computer system designed and implemented as an integral part of a weapon or weapon system, or platform that is critical to a military or intelligence mission, such as command and control, cryptological activities, or intelligence

activities. Characterised by MIL SPEC (military specifications) appearance and operation, limited but reprogrammable applications software, and permanent or semipermanent interfaces. May vary in capacity from microcomputers to parallel-processor computer systems. Information services forecasts in this report do not include applications for this type of computer.

D. TELECOMMUNICATIONS

- NETWORKS - Interconnection services between computing resources, provided on a leased basis by a vendor to move data and/or textual information from one or more locations to one or more locations.

  - COMMON CARRIER NETWORK (CCN) - Provided via conventional voice-grade circuits and through regular switching facilities (dial-up calling) with leased or user-owned modems (to convert digital information to voice-grade tones) for transfer rates between 150 and 1,200 baud.

  - LOCAL AREA NETWORK (LAN) - Restricted limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. One of the two types:

    . BASEBAND - Voice bandwidth at voice frequencies (same as telephone, teletype system) limited to a single sender at any given moment and limited to speeds of 75 to 1,200 baud, in serial mode.

    . BROADBAND - Employs multiplexing techniques to increase carrier frequency between terminals, to provide:

- Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing).

  - Multiple (time-sequenced) channels via TDM (Time Division Multiplexing).

- High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media).

- TRANSMISSION MEDIA - Varies with the supplier (vendor) and with the distribution of the network an its access mode to the individual computing resource location.

  - MODE - may be either:

    - ANALOG - Typified by the predominantly voice-grade network of AT&T's DDD (Direct Distance Dialing) and by operating telephone company distribution systems.

    - DIGITAL - Where voice, data, and/or text are digitised into a binary stream.

  - MEDIA varies with distance, availability, and connectivity:

    - WIRE - Varies from earlier single-line teletype networks to two-wire standard telephone (twisted pair) and balanced line to four-wire full-duplex balanced lines.

    - CARRIER - Multiplexed signals on two-wire and four-wire networks to increase capacity by FDM.

    - COAXIAL CABLE - HF (High Frequency) and VHF (Very High Frequency), single frequency, or carrier-based system that

requires frequent reamplification (repeaters) to carry the signal any distance.

- MICROWAVE - UHF (Ultra High Frequency) multichannel, point-to-point, repeated radio transmission, also capable of wide frequency channels.

- OPTICAL FIBER - Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and with TDM for multichannel applications.

- SATELLITES - Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.

- CELLULAR RADIO -Network of fixed, low-powered, two-way radios that are linked by a computer system to track mobile phone/data set units; each radio serves a small area called a cell. The computer switches service connection to the mobile unit from cell to cell as the unit moves among the cells.

E. OTHER CONSIDERATIONS

- When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorised according to what users perceive they are buying.

APPENDIX B - ANALYSIS RESEARCH SAMPLE

APPENDIX B: ANALYSIS OF RESEARCH SAMPLE

- In-depth interviews (nearly all face-to-face) were conducted amongst significant vendors of professional services. In many cases these vendors offered a combination of services amongst the main subsegments of custom system development, IT consultancy, education and training, facilities management, contract staff, and systems integration.

- Telephone interviews were also conducted amongst a wide cross-section of user organisations in France, West Germany, Italy, Belgium, the Netherlands, and the U.K. The respondent sample was also split between functional heads of end-user departments (marketing, finance, production, distribution) as well as management services (data processing).

- The user research addressed levels of usage and attitude towards professional services market segments and was conducted as part of INPUT's extensive biannual market survey.

- Exhibit B-1 shows the analysis of the survey respondents by category and country.

EXHIBIT B-1

ANALYSIS OF INTERVIEWS

COUNTRY	PROFESSIONAL SERVICES VENDORS	GENERAL TELEPHONE SURVEY OF USERS	TOTAL
United Kingdom	21	50	71
West Germany	4	50	54
France	8	50	58
Italy	2	25	27
Benelux	2	25	27
Scandinavia	3	-	3
Total	40	200	240

APPENDIX C - VENDOR QUESTIONNAIRE

APPENDIX C:

PROFESSIONAL SERVICES VENDOR QUESTIONNAIRE

QU: 1a How do you define/segment your PS business and are there any significant changes anticipated over the next couple of years?

_____

_____

_____

_____

QU: 1b INPUT defines the IS-related professional services market as consisting of six sectors, i.e., IS Consulting, Custom Software Development, Education and Training, Facilities Management, Contract Staff and Systems Integration.

Could you please tell me the split of your professional services revenues between these sectors and indicate how you see the balance of your business changing over the next two years?

Sector	1986 (%)	1988 (%)
Consulting	_____	_____
Software Development	_____	_____
Education and Training	_____	_____
Facilities Management	_____	_____
Contract Staff	_____	_____
Systems Integration	_____	_____

QU: 2a Could you please indicate the rate of growth for your professional services business?

1985 _____ % **1986** _____ % **1987** _____ % **(planned)**

QU: 2b Is this below ____ or above ____ the industry average in your opinion?

Comments: _____

_____

QU: 3 How does your Professional Services business breakdown by size of contract (measured in monetary terms)? (Provide other measure if more appropriate).

Monetary	Percentage
< $250,000	_____
< $1 Million	_____
< $5 Million	_____
< $20 Million	_____
TOTAL	100%

Comments: _____

_____

_____

_____

QU: 4 Could you please give me some examples of the types of contracts that you have won recently? (e.g. press cuttings etc)

_____

_____

_____

_____

QU: 5 Please rate the following factors which are leading your customers to contract for your services? (5=Almost Always Influences, 1=Rarely Influences).

Factor	Rating
Shortage of Personnel	_____
Technical Skills Not Available In-House	_____
Time Pressures	_____
Cost Benefits	_____

QU: 5 (cont.)

Factor	Rating
Competitive Advantage Pressures	_____
Increasing Advantage Pressures	_____
Increasing Systems Complexity	_____
Increasing Need to Implement Telecommunications Networks	_____
Need to Support End-User Micro Applications	_____
Rapidly Changing Technology	_____
Implementation Companywide IS Strategy	_____

Others: (please state) _____

_____

_____

Comments: _____

_____

_____

_____

QU: 6 What initiative have you undertaken/are considering to develop your professional services business?

_____

_____

_____

Prompts:

- Joint Venture
- Marketing Agreement
- Acquisition/Merger
- Corporate/Product Image Advertising
- Company Reorganization
- Specialists Staff Recruitment
- Specialists Staff Training Programmes
- Other _____

QU: 7 What were the specific aims of these initiatives?

_____

_____

_____

Prompts

- To enter new market segments (country, vertical, area of expertise)?
- To increase your level of market specialization?
- To achieve critical market position (i.e. size, share, financial strength, risk containment etc).

QU: 8 What are the key skills that are critical to your organization's future success?

_____

_____

_____

(5=Degree of importance essential, 1=not very important)

Prompt	Rating
Project Management	_____
Programming Techniques	_____
Telecommunications	_____
Software Development Methodologies	_____
Computer-Aided Training	_____
Specialist Industry Knowledge	_____
Engineering	_____
Hardware Maintenance	_____
Operations Management	_____
Others: (please state)	_____
	_____

QU: 9 What specific steps is your organization taking to develop key professional services skills?

Prompt

- Training
- Contacts with Academic Institutions
- Industry Associations
- Government
- Arrangements with other organizations

QU: 10 What to you consider to be the principal business development opportunities for your organization?

Prompt

- CIM
- AI
- Education and Training (in which particular areas)
- Consultancy in Specialist Techniques
- IT Strategy Consultancy
- Systems Development
- Systems Integration

QU: 11 What changes do you foresee in the professional services industry structure?

Prompt

- New entrants
- H/W manufacturers (IBM, DEC, UNISYS)

QU: 11 cont. next pg.

Prompt (cont.)

- Bell Orphans (RBOCS)
- Big 8 Accountants
- Management Consultants
- PTTs
- Cottage Industry/Boutique
- Other
- S/W Product Companies

QU: 12 What do you consider to be the most critical factors that will determine your success in professional services markets?

1. _____
2. _____
3. _____

QU: 13 What strategies have you adopted for improving the profitability of your professional services business?

☐ Cost-based services v. value-based services.
☐ Cost of people.
☐ Unique management skills.

QU: 14a There has been much discussion within the industry about the emerging opportunity of Systems Integration. What is your opinion about the stage of development of this market?

_____

_____

_____

QU: 14b What evidence is there of signifcant systems integration contracts being awarded?

_____

_____

_____

QU: 14c What so you think is leading companies to sign these systems integration contracts?

_____

_____

_____

QU: 15a Systems Integration contracts in the US have largely been developed for civil, government and military purposes. What opportunities do yoy see opening up in Europe; what business segments do you consider to be most susceptible to a "Systems Integration" approach?

_____

_____

_____

Which applications:

- ☐ Manufacturing
  - Control _____
  - Testing _____
- ☐ Process Control
- ☐ C³I
- ☐ Engineering
- ☐ Scientific
- ☐ MIS
- ☐ Office Automation
- ☐ Large Real-Time/ Communication Sytems
- ☐ Other _____ (please state)

Which Industries:

- ☐ Military
  - National _____
  - Nato _____
- ☐ Civil Government
- ☐ Chemicals
- ☐ Energy
- ☐ Aerospace and Space
- ☐ Utilities
- ☐ Nuclear Energy
- ☐ Other _____ (please state)

What size of organization:

- ☐ National Government
- ☐ Multinationals
- ☐ Large-Nationals
- ☐ Medium Size companies
- ☐ Other _____ (please state)

QU: 15b Are there any particular technology developments (or perhaps new applicatons of existing computer/communications technology) that are leading to major business opportunities? (e.g. New techniques fpr production control and testing in other engineering disciplines.)

_____

_____

_____

QU: 15c Are you aware of any major capital investment plans that may lead to the granting of systems integration contacts?

Country Government: _____

Industry: _____

QU: 15d Do you foresee different rates of development between different country markets in Europe? (In particular, UK, West Germany, France, and Italy).

_____

_____

_____

QU: 16a What do you consider to be the most important components of a systems integration contract?

_____

_____

_____

Prompts

- Hardware procurement
- Software (product) procurement
- Comms h/w procurement
- Other h/w oriented services (e.g.installation, maintenance)
- Consultancy
- Project Management
- System Design
- System Development
- Education/Training
- Documentation
- Other _____ (please state)

QU: 16b Are there any particular contractual considerations that are important for your potential/actual participation in systems integration? (e.g. consideration of risk).

_____

_____

_____

QU: 17a Is your organization active/interested in developing systems integration business and therefore what role will you take? (e.g. prime contractor, project management, subcontractor, etc.).

_____

_____

_____

QU: 17b Do you intend to be pro-active or reactive towards this market opportunity (i.e., are you actively promoting your organizations capabilities as a systems integrator)?

_____

_____

_____

QU: 17c Are you actively pursuing (or considering) any partnering arrangements or alliances in order to participate in the systems integration market?

_____

_____

_____

QU: 17d Is there a limited "window of opportunity" in these markets?

_____

_____

_____

QU: 18 Please rate the importance of the following factors (5=Extremely important, 1=Unimportant) as barriers to entry for large US services companies entering the Western European systems integration market?

Factor	Rating
Employment of European Personnel	_____
Negative attitude of European Companies to US companies	_____
Limited size of market	_____

Factor	Rating
Price/Competition	_____
High Operating Costs	_____
Lack of established relationships with European contractors	_____
Other Factors _____ (please state)	_____

QU: 19a How would you describe your organization's capabilities/strengths across the following component areas of systems integration?

- **Staff capabilities (skills/experience)**
  - Computer Technology (which areas) _____
    - -System Implementation _____
  - Other Technology (please state) _____
    - -Design/Engineering _____
  - Project Management _____
    - -Advanced Technical Expertise _____
- **Image/Recognition/Track Record**
  - -International Presence _____
  - -Financial Record _____
  - -Marketing/Sales infrastructure _____
- **Industry breadth/or specific sector knowledge**
  - -Customer Base _____
  - -Proprietary capabilities _____
- **Company Strategy**
  - -Independence _____
  - -Strategic Alliances _____

QU: 19b Do you consider that your organization has any key proprietary technologies/ methodologies that give you a strategic lead over others in the industry?

_____

_____

_____

QU: 20 What would you consider to be the main problems to be overcome in gaining a significant presence in this market?

_____

_____

_____

QU: 21 Can you recommend any customers that we might contact for our survey?

_____

_____

_____

QU: 22 Could I please have a copy of your annual report and accounts, other company publications, press releases, etc.?

APPENDIX D - USER QUESTIONNAIRE

APPENDIX D:

BIANNUAL INPUT SURVEY OF EUROPEAN INFORMATION SERVICES MARKETS USER QUESTIONNAIRE

(Relevant Questions to Professional Services Only)

QU: 1 We hear a great deal about how competitive advantage pressures leading companies to make investments in information technology. As far as your organisation is concerned, do you agree that the claims made for the competitive advantage benefits of IT are exagerated?

Strongly Agree	☐	Partially Agree	☐
Disagree	☐	Strongly Disagree	☐

QU: 2 (General Management Only) Could you please tell me how important, in your opinion, is the application of information technology to the efficiency and performance of your department - both in the short and medium term (i.e. in two years' time)?

	Short Term	Medium Term
Vital	☐	☐
Very Important	☐	☐
Fairly Important	☐	☐
Unimportant	☐	☐

QU: 3 (General Management Only) In which areas, if any, is your company/division/department planning significant investments in information technology?

Marketing Information Systems	☐
Business Communications	☐
Materials Handling/Distribution	☐
Factory Automation	☐
Financial Control/Accounting Systems	☐

Other, write in: _____

_____

_____

QU: 2 (DP Management Only)

I am now going to read out a variety of issues concerning data processing which have been experienced by other companies. For each one, could you please rate the seriousness of the issue to your organisation on a scale of 1-5 (with 5 being very serious)?

Issue	Rating
Budget Restrictions	_____
Developing Interactive Systems	_____
Lack of Coherent IT Strategy	_____
Developing Communications Networks	_____
Lack of Telecommunications Expertise	_____
Supporting Micro-Based Systems	_____
Lack of Specialist Programmers	_____
Lack of Systems/Business Analysts	_____
Lack of Project Management Expertise	_____
Training DP Staff	_____
Training End-User Staff	_____
Meeting Deadlines for Applications Development	_____
Keeping Pace with Technological Change	_____

QU: 3 (DP Management Only)

I would now like to ask you your plans for developing applications. Could you please tell me what major applications you are developing, or planning to develop in the next couple of years?

Applications	Developing	Planning to Develop
_____	☐	☐
_____	☐	☐
_____	☐	☐
_____	☐	☐
_____	☐	☐

QU: 4 Are your requirements for any of these developments/investments going to be fully met by your own internal resources?

If YES, Could you please explain the reasons why your organisation has chosen to adopt this approach?

- Cost ☐
- Control ☐
- Security ☐
- Lack of Adequate Alternative ☐
- In-House Expertise ☐
- Other, write in: _____

_____

_____

If NO, Could you please indicate the reasons why external sourcing is important?

- Shortage of Staff ☐
- Meet Objectives Rapidly ☐
- Cost Benefits ☐
- Access to New Technology ☐
- Other, write in: _____

_____

_____

QU: 5 We hear a lot of talk from service suppliers about the increasing trend towards requirements for 'total solutions' or 'one-stop shopping in terms of company's attitudes towards purchasing IT systems. Do you agree that this is trend is applicable to your organisation?

Strongly Agree ☐

Agree ☐

Slightly Disagree ☐

Totally Disagree ☐

Other, write in: _____

_____

_____

Probe/Comments: _____

_____

_____

_____

C. PROFESSIONAL SERVICES

QU: 9 I am now going to read out a list of IT related professional services. For each one could you please tell me if your company/division utilises an external service, or if not, whether it plans to utilise an external service within the next two years?

Service	Don't Use	Use	Plan to Use	Name of Vendor
IT Consultancy	☐	☐	☐	_____
Education and Training	☐	☐	☐	_____
Contract Staff	☐	☐	☐	_____
Facilities Management	☐	☐	☐	_____
Custom System Development	☐	☐	☐	_____

QU: 10a What do you feel are the most important benefits to your organisation of using external IT-related professional services?

1. _____
2. _____
3. _____

QU: 10b What do you think are the three most serious problems associated with using external IT-related professional servcies?

1. _____
2. _____
3. _____

QU: 11 Could you please rate the importance of the following factors (5 = Very Important, 1 = Unimportant) in selecting a vendor of IT-related professional services?

Factor		Rating
Track Record		☐
Financial Stability		☐
Auditor's Reference		☐
Staff Qualifications		☐
Applications Knowledge		☐
Contract Terms:	- Price	☐
	- Performance Guarantee	☐
	- Delivery Deadline	☐
Overall Technical Merit		☐

Other, write in: _____

_____

_____

QU: 12 I am now going to read out a list of types of service vendors. For each one could you please rate on a scale of 1-5 (where 5 = Most Competent) your opinion about their capabilities?

Vendor Type	Rating
Network Service Vendors (e.g. Geisco)	☐
Independent Software Houses (e.g. CGS, Scicon)	☐
Accountancy Firms (e.g. Arthur Andersen)	☐
Telecommunications Companies (e.g. British Telecom)	☐
Equipment Manufacturers (e.g. IBM)	☐
Systems Houses (e.g. EDS)	☐
Management Consultants (e.g. Arthur Little)	☐
Packaged Software Vendors (e.g. Computer Associates)	☐

QU: 13a At this stage I would now like you to give me a general idea of your budget spent on computer services, both in-house and third-party?

	Amount or %
In-House	_____
External	_____
Total	_____

QU: 13b What percentage increase/decrease in expenditures are you anticipating (planning for) during 1987?

_____% DON'T KNOW ☐

QU: 13c Approximately, what is your department's expenditure as a percentage of total company expenditure?

_____% DON'T KNOW ☐

QU: 13d Could you please indicate the breakdown of how your budget on external computer services was spent?

Prompt	Amount/%
Bespoke System Development Contracts	_____
IT Consultancy	_____
Education and Training	_____
Facilities Management	_____
Network Services:	
- Electronic Mail	_____
- EDI	_____
- EFT	_____
- Other	_____
Hardware	_____
Software Packages	_____
	100%

QU: 13e Do you anticipate any growth in your expenditure or external computer services in 1987?

YES ☐ % INCREASE _____ NO ☐

If YES, for what type of services? _____

_____

_____

_____

WE APPRECIATE YOUR COOPERATION IN OUR SURVEY AND WILL SEND YOU A COPY OF THE EXECUTIVE SUMMARY OF OUR RESEARCH FINDINGS.

APPENDIX E - RELATED INPUT REPORTS

APPENDIX E: RELATED INPUT REPORTS

- Professional Service Market Directions, 1985-1990, (U.S.).
- U.S. Professional Services Markets, 1985.
- Cross-Industry Market - Professional Services, 1986, (U.S.).
- Federal Government Professional Services Markets, 1985, (U.S.).
- Federal Systems Integration Market, 1985, (U.S.).
- Commercial Systems Integration Market, 1985, (U.S.).
- Commercial Systems Integration Markets, 1986, (U.S.).
- Software Productivity, 1986, (U.S.).
- Systems Development Productivity, 1987-1992.
- Software Pricing and Support Trends, 1987-1992.
- Western European Information Services Industry, 1987-1992.
- Facilities Management Opportunities in Western Europe, 1986-1991.