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STRATEGIC MARKET PERSPECTIVE

Business Integration Opportunities in European Telecommunications

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Business Integration Opportunities in European Telecommunications

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Abstract

This report examines trends, events, and issues that will have an impact on the European telecommunications industry and those vendors that supply Business Integration (BI) services to the industry. The report provides forecasts of growth in spending on BI related services by telecommunication providers over the period 1995 - 2000, at an overall European level as well as within the major country markets of Europe.

BI services comprise the following activities:

- Systems Integration, Turnkey Systems, Professional Services

Dynamics within the telecommunications industry are analysed from the perspective of the different types of telecommunications provider, namely:

- PTTs — i.e. the state owned, or formerly state owned, provider of basic telephony services

- Alternative/emerging telecommunication providers — largely organisations from a non-telecommunications background who are offering telecommunication services, utility companies being the most prevalent example

- Mobile and cellular telecommunications operators

- Cable television organisations who also offer telephony services

- Internet telephony providers.

The report analyses the major IT systems and applications being developed by telecommunications providers and the technologies being utilised in these projects. It provides details of the types of external BI services these organisations require and how these will change over the medium term.

Finally, the report illustrates the telecommunications related interests of eleven leading European Business Integration vendors and provides rankings of the leading vendors at a European and country market level.

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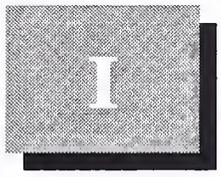


Introduction

A Objectives

The opportunity which the European telecommunications sector presents to Business Integration (BI) vendors has grown explosively over the last 18 months.

The telecommunications sector has replaced the financial services sector as the most dynamic area for the adoption of new technologies and has led some to dub it *The New City*; *The City of London* (i.e. the UK's financial services sector) being the last area to witness such high growth rates of IT related investment.

However, this explosive growth is not unsurprisingly attracting growing numbers of vendors into the European marketplace. These include traditional, existing European BI players who are attempting to manoeuvre their services offerings away from low growth or stagnating vertical markets, as well as players new to the European market or new to the IT services industry altogether.

This situation is creating heightened levels of competition in a market which is undergoing, and will continue to undergo for some time, fundamental structural transformation.

The principle objective of this report is to gain a better understanding of the dynamics vendors need to be aware of in order to compete successfully in the increasingly aggressive European telecommunications market.

The report also examines the complex regulatory framework unfolding at different rates in different countries and which raises questions over the pace at which profitable business opportunities will become available.

The document offers forecasts of the telecommunications related opportunity available to vendors across the three Business Integration sub-delivery modes of Systems Integration, Turnkey Systems, and Professional Services.

Specific issues the report considers are:

- Identifying the key business pressures which are facing established and new providers of telecommunications services
- Examining the major applications these players will be developing over the next five years
- Understanding what technologies will be of particular importance to the telecommunications sector
- Providing quantitative and qualitative analysis of the service opportunity presented by these developments
- Studying the competitive position of major BI vendors in the telecommunications market.

This study provides analysis into these questions and issues from the viewpoint of the telecommunications services provider.

Analysis of the data provides considerable insight into various aspects of the enormous opportunity which the telecommunications market is presenting, and will continue to present over the next five years.

B
Methodology

The report analysis responses from major European telecommunications providers to a telephone based questionnaire, attached in Appendix B. The report analyses their requirement for system integration, turnkey systems and professional services assistance.

Interviews were conducted with 20 respondents, split across the UK, Germany, and France. Supplementary interviews were conducted with organisations in Italy and Sweden.

Exhibit I-1 provides a list of organisations interviewed across Europe.

Eleven leading European Business Integration (BI) services vendors were also interviewed as to understand their views of the way in which they see services opportunities developing over the next five years.

In addition to the data gathered through these interviews, information from INPUT's prior information services and systems integration research both in Europe and America was used to formulate the conclusions and observations presented in this report.

Lastly, a comprehensive analysis of secondary research sources was undertaken enabling primary research to be placed in context.

Exhibit I-1

Telecommunications Organisations Interviewed

British Telecommunications
Deutsche Telekom
France Telecom
Telecom Italia
Telia
Telia Mobitel
AT&T
Generale des Eaux
Ionica
Veba
MFS
SITA
Cellnet
Unisource
Atlas
Atlas Copco
Nynex
Bell CableMedia
CableTel
Energis

Source: INPUT

C
Report Structure

Chapter II consists of the Executive Overview which is a summary of the key findings, analysis, conclusions and recommendations of this study.

Chapter III presents an analysis of the key trends and issues in the European telecommunications market. It examines the regulatory background driving many of the major changes in the marketplace and which are creating demand for new types of service. It discusses the different pressures facing operators in both traditional PTT areas of service and in areas of new media provision such as cable, mobile, Internet. It also discusses the competitive landscape and the emergence of non-European vendors as a significant threat to existing European players.

Chapter IV examines the key BI services requirements European telecommunications providers currently have, examining the major applications being developed to support both existing services and new enhanced services.

Chapter V examines opportunities and challenges presented by the major country markets of Europe, namely France, the UK, Germany, Italy, and Sweden. For each country it analyses:

- Applications being developed
- Technologies being utilised
- Requirements of external IT services vendors.

It also lists the leading Business Integration services providers in each of these country markets.

Chapter VI profiles eleven of the leading Business Integration services vendors in the European telecommunications industry.

Appendix A provides the questionnaire used in interviewing telecommunications organisations for this report.

Appendix B provides the questionnaire prompt used in interviewing vendor organisations for this report.

Appendix C lists the exchange rate details used for compiling this report.

Appendix D defines the Business Integration market.

D
Related Reports

- US Telecommunications Opportunities & Trends, 1995 — 2000
- Multimedia; Implications for Business Integrators, 1994
- Systems Integration Market — Europe, 1995–2000 (1995)
- Business Integration Market, Competitive Analysis (1995)
- The Impact of BPR on Systems Integration, 1995
- The European Business Integration Marketplace 1995
- Managing Risk in Systems Development Contracts (1994)

II

Executive Overview

A
Telecommunications Liberalisation Unleashes Chaos and Confusion

With the count-down towards the full liberalisation of telecommunication services in 1998, the European telecommunications marketplace has become one of the most dynamic areas for Business Integration (BI) vendors keen to target high growth market opportunities.

However, the differing pace of liberalisation across individual country markets and thus new service provision, is creating an extremely fragmented marketplace in which telecommunications organisation's requirements of BI vendors are unfolding at an uneven pace.

Exhibit II-1 highlights the major characteristics of BI services in the European telecommunications sector.

Exhibit II-1

Major Characteristics of Business Integration (BI) Services in the European Telecommunications Sector

- Telecommunications – highest growth opportunity in the overall marketplace
- Obsolescence of IT systems creates continuing demand
- Network integration requires BI solutions
- Fragmented marketplace creates opportunity for established and emerging IT services vendors

Source: INPUT

The challenge for Business Integration wishing to benefit from the undoubted opportunities this marketplace is creating is to identify the different approaches and service requirements required by different types of telecommunications providers and approach these organisations with appropriates offering.

What is appropriate to a large, pan-national *defensive* PTTs is inappropriate to the new breed of *aggressive* alternative telecommunications providers.

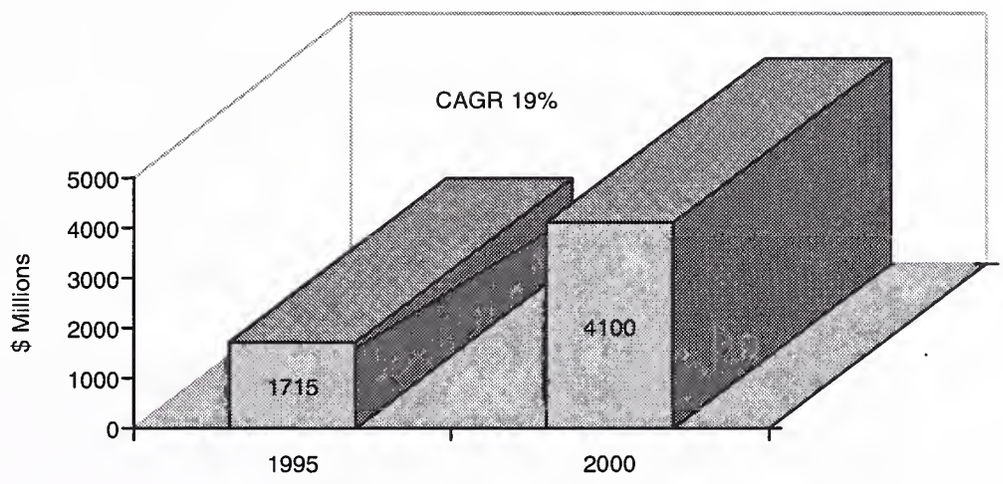
B

Business Integration Services will Grow at 19% CAGR Until 2000

Exhibit II-2 provides details of the growth of the Business Integration (BI) marketplace within the European telecommunications industry in the period 1995 to 2000. Exhibit II-3 analyses growth rates within the major country markets in Europe over the same period.

Exhibit II-2

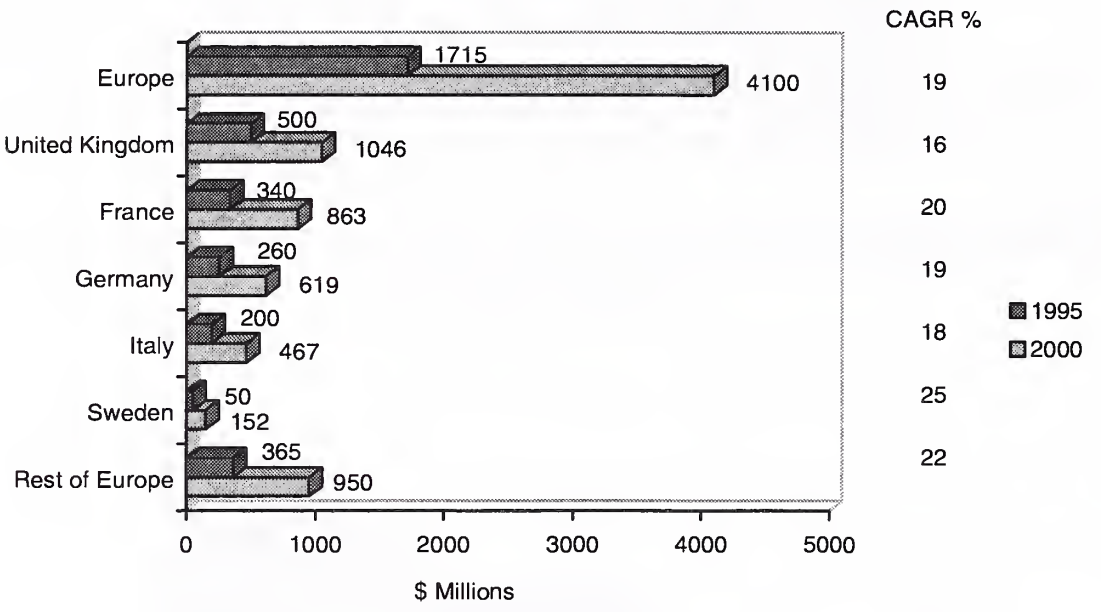
Business Integration Services Growth in the Telecommunications Sector, Europe 1995–2000



Source: INPUT

Exhibit II-3

Business Integration Services — Major Country Market Growth, Europe 1995–2000



Source: INPUT

National telecommunication organisations who have been used to a sheltered life under the protective wings of governments, acting in effect as monopolies, are now rallying to position themselves against companies they would never before have considered competitors in a competitive environment awash with alliances, ground-breaking technology, and fierce competition.

Most noticeable in the UK telecommunications market, which is ahead of the rest of Europe in terms of deregulation, competitors are not only other telecommunications companies expanding their geographical reach but also cable-TV companies, cellular phone companies and new players such as utilities.

Across the nations of the European Union there is a wide range of telecommunications service provision. For most countries in north-west Europe there is little growth in voice telephony, though some southern European countries, such as Greece, are thriving as they strive to catch up.

This stagnant situation in basic voice provision has led the major PTT's such as British Telecommunications to embark on extensive above and below the line advertising campaigns, run almost continuously, to attempt to encourage people to spend more time on the telephone.

By comparison the market for mobile telephony is expanding extremely quickly. This is true both of GSM (Groupe Speciale Mobile) and Personal Communication Network (PCN) based offerings.

The pace at which the underlying technical infrastructure develops across the different country markets however is proving to be largely consistent. Though there are local differences such as the growth of ISDN in Germany, contrasted with switched packet stream networks in France, and leased line strategies in the UK, the degree of per capita telecommunications related investment is on a par between the major country markets within Europe.

C

Differing IT Systems and Applications being Developed — Telco IT Systems have High Degree of Obsolescence

The next five years are crucial to the development of the telecommunications industry both in terms of adoption of new services and in the pace at which these new services are built and rolled out into the marketplace.

By 2000 the European telecommunications industry will be virtually unrecognisable with the structure of the industry having changing fundamentally.

Competitive conditions akin to those which have reshaped the computer industry (falling cost, new entrants, rapidly changing technologies etc.) are impacting in the telecommunications industry.

Rather than their being a relatively easily identifiable number of national champions it will be less easy to group service providers according to regulatory models (e.g., PTT, privatised national carrier), transport type (e.g., wireless, wireline), or geography.

Instead the industry will be made up of many types of players of all sizes, dealing in various markets. Already there is emerging a multi-tiered market (global, national, regional, value-added resellers, etc.), which is the future shape of the industry. This will be a shape which will support many different operational approaches and most importantly for IT service providers require a variety of different approaches to IT delivery and support.

Telecommunication organisations can broadly be divided into two categories; a few, extremely large organisations (the survivors) and the remainder which must search for international partners, together which some niche operators (mainly start ups).

Only a few organisations can hope to survive as a significant or even dominant partner in a group. For the Rest, for PTT's in both Central and Eastern Europe, even in Western Europe, the best they can hope for is a continuing role in the delivery of services for an international group, in which they are the minor partner, operating as some sort of local representative office.

For European PTT's the future, it appears, is bleak. Automation and globalisation will unceasingly require cuts in their workforces as they increasingly face competition from big international players such as AT&T, MCI and Sprint. One response to these threats has been to

form joint ventures with these new players, such as the link ups between Deutsche Telekom, France Telecom and Sprint and BT's relationship with MCI.

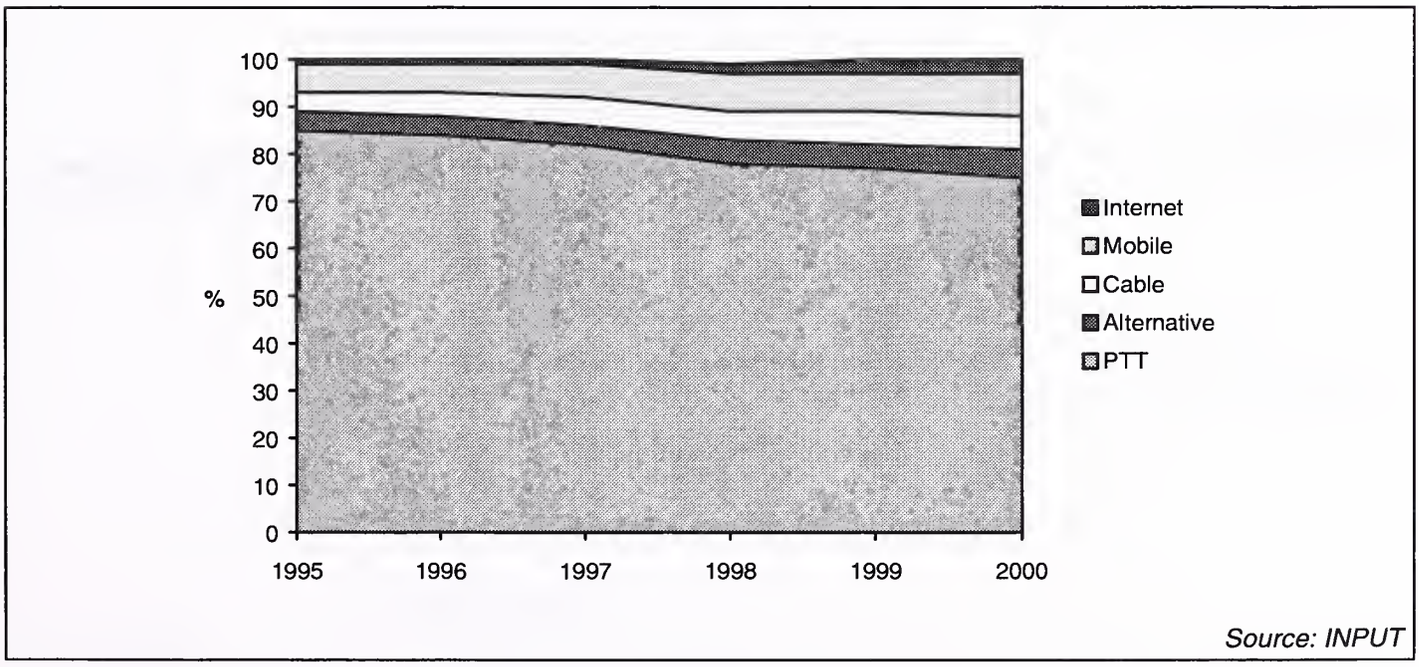
Faced with economies of scale and scope of these global firms and the development of global brand names in telecommunications, most notably AT&T, it is difficult to see a future for the smaller PTT's other than as integrated units within a global telecommunications operator.

Exhibit II-4 analyses the rate at which new types of telecommunication service will penetrate the European marketplace whilst Exhibit II-5 presents a forecast of Business Integration revenue growth related to the five major types of telecommunication service over the course of the next five years.

In this rapidly changing new environment the priority for both established and emerging telecommunications providers is to build networks quickly and efficiently, not least because of the time pressures they are under from franchise awarding bodies. Telecommunications providers who do not demonstrate that they can start to offer promised services within a reasonable timeframe are under the very real possibility that their franchise will not be renewed.

Exhibit II-4

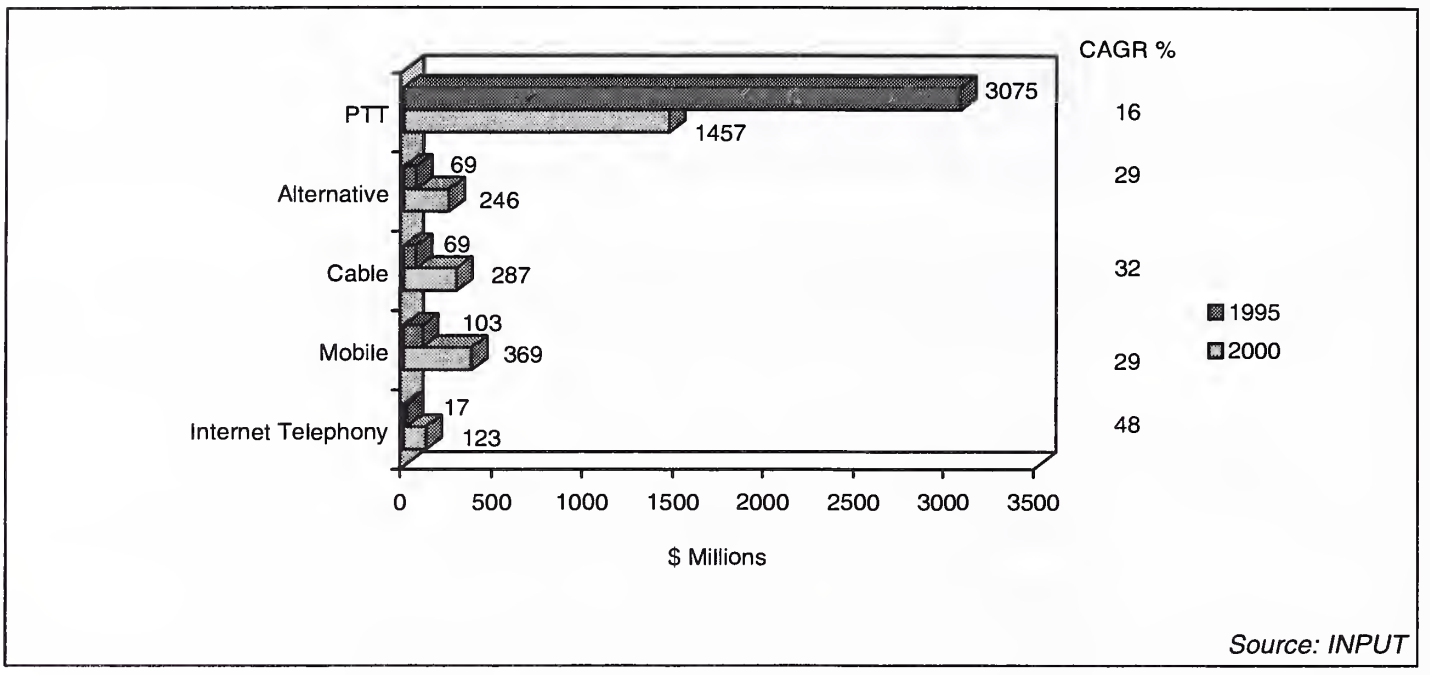
Telecommunications Penetration Rates, Europe 1995–2000



Source: INPUT

Exhibit II-5

Business Integration Revenues by Telecommunications Type, Europe 1995–2000



Source: INPUT

Exhibit II-6 lists the key functional areas within telecommunications organisations which will produce opportunity BI vendors over the medium term, whilst Exhibit II-7 lists the key applications and technologies of importance to telecommunication providers.

Exhibit II-6

Telco Functional Areas — Key Opportunities for BI Vendors

- Business Management
- Network Management
- Service Management
- Content Provision Management

Source: INPUT

Exhibit II-7

Key Applications/Technologies

- Data Warehousing
- Neural Nets
- Groupware
- Workflow
- ISDN
- ATM
- Wireless

Source: INPUT

Once networks have reached an adequate level, a process that can take up to three years, the emphasis within a telecommunication provider switches to upgrading the systems to enable the provision of more and better services. Telecommunication organisations tend to concentrate on a "first thing first" basis, focusing on voice and data provision currently, whilst recognising the potential for higher risk applications such as video-on-demand (VOD), further downstream.

Telecommunications companies expect to constantly introduce new services over the coming years as network infrastructures become richer, and resultantly have aggressive plans to develop new software and extend existing software.

The majority of IT related investment within telecommunications organisations has been in network management systems and Subscriber Management Systems (SMS). Functions within Subscriber Management Systems typically include:

- sales order processing
- credit checking
- database maintenance
- billing

- query handling.

It is generally recognised however that a second, and in some cases a third, generation of these systems will be required within the next two years. These second and third generation systems will need considerable extension in terms of functionality over previous generations.

Most non-PTT telecommunication organisations are currently engaged in re-developing their SMS, having reached the conclusion that their existing systems which could hardly be considered legacy systems, are already inadequate.

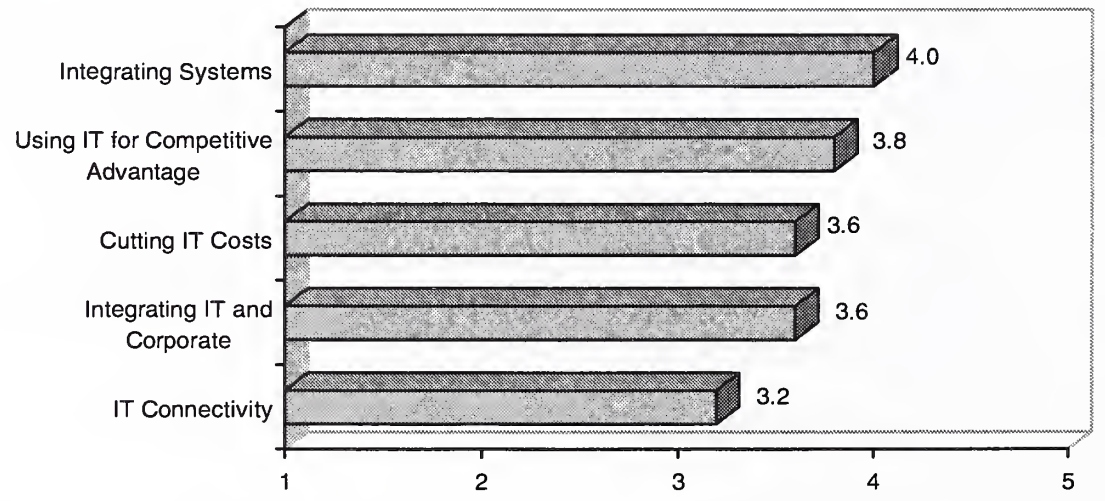
SMSs are typically designed around a single database and a single platform with little support for modular extension or expansion. This integrated approach has been seen to be cost-effective and relative simple.

However, in more mature PTTs, there is a considerable amount of complexity, of legacy systems, different platforms, and unintegrated applications.

Exhibit II-8 shows that integrating systems is still the main focus of telecommunication providers' current IT operations.

Exhibit II-8

Focus of Current IT Operations



Sample of 20 European Telecommunications Organisations *Source: INPUT*

Service order complexity is continuing to grow as new applications are introduced. At the point of deregulation order and customer information systems are typically old and inadequate; some of the less mature national PTTs still manage with manual based systems.

One feature of service order complexity is flexible billing. Statements that provide a summary followed by a listing of detailed calls are fast becoming the norm across the major country markets of Europe.

These new applications are in some cases having to be built from scratch rather than as modular extensions on top of existing systems. This is clearly expensive, time consuming and inefficient. One of the reasons for this situation is that the underlying infrastructure is not sufficiently scaleable and robust to support such extensions.

To counter this, new systems are now being developed around the Telecommunications Management Network (TMN. The lower elements of TMN are "network facing" but need to communicate with the higher elements which are "customer facing" such as service management functions including order taking, provisioning, billing and customer query handling.

Service management systems link into the "top end" of TMN, the Business Management layer, which contains all the management information enabling executives to interrogate subscriber populations, usage rates and the costs of providing the service.

Over the next five years there will be an industry wide migration to new technologies and standards such as TMN. There will be a steady movement towards open platforms which will support a wide range of variety of packaged applications software, UNIX based servers and workstations.

The exception to this will be the still proprietary AS/400 which is widely used as a main platform for SMSs, as is DEC's Alpha range.

Introducing new technology to facilitate enhanced service ordering is extremely complex. At the same time as demand increases technology continues to change rapidly.

Major investments in a specific application can be outdated very quickly. Some applications can be outdated even before the development is complete.

Of course this situation, if handled correctly by BI vendors, will continue to provide great opportunity over the next three to five years.

D

Complex Network Integration Challenges Play to the Strengths of Business Integrators

As the 1994 Bangemann report (the series of recommendations made to the European Commission which acted as the catalyst behind the current phase of deregulation) pointed out "all revolutions generate uncertainty, discontinuity, and opportunity. Today's is no exception. How we respond, how we turn current opportunities into real benefits, will depend on how quickly we can enter the European Information Society. In the face of quite remarkable technological developments and economic opportunities, all the leading global industrial players are reassessing their strategies and their options."

These conditions of course spell incredible opportunity for Business Integration vendors. Exhibit II-9 illustrates that BI vendors will of great importance to telecommunications organisations as they develop the next generation of telecommunications service and functionality. Customer service will continue to be the key focus of IT spend in telecommunications organisations, as shown in Exhibit II-10. The high levels of "churn", customers swapping subscriptions amongst different service providers, is invariably due to problems with customer service. The need to focus on this area will be paramount over the next two to three years.

Exhibit II-9

Use of External IT Service Vendors

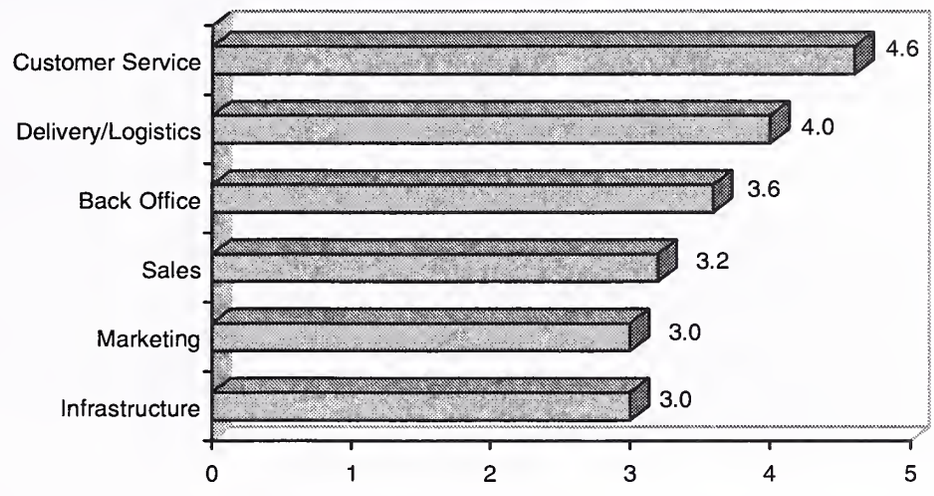
100% of Respondents stated that they would require external support in their ongoing and planned build/integration/development projects

- Management Consultancy 80%
- Systems Integrator 60%
- Systems House 60%
- Outsourcer 20%

Source: INPUT

Exhibit II-10

Focus of IT Spend on Business Functions



Sample of 20 European Telecommunications Organisations *Source: INPUT*

The challenge for Business Integration vendors is to identify the different approaches and service requirements required by different types of telecommunications providers and approach these organisations with appropriate offerings.

Succeeding in this period will not be easy however, as the industry transforms and the characteristics of success change. The challenge for service vendors is to understand the impact on the industry of these changing characteristics and learn how to play the new game with new rules.

Huge rewards will be available to those service providers who can flourish amidst the chaos and confusion that the European marketplace will present over the next five years as it reshapes itself.

A key aim behind the Bangemann report is "standardisation ... essential to achieve network connection and interoperability of services at an international level. Interconnection of networks and interoperability of services and applications (will) become increasingly important as competition is introduced, if fragmentation is to be avoided."

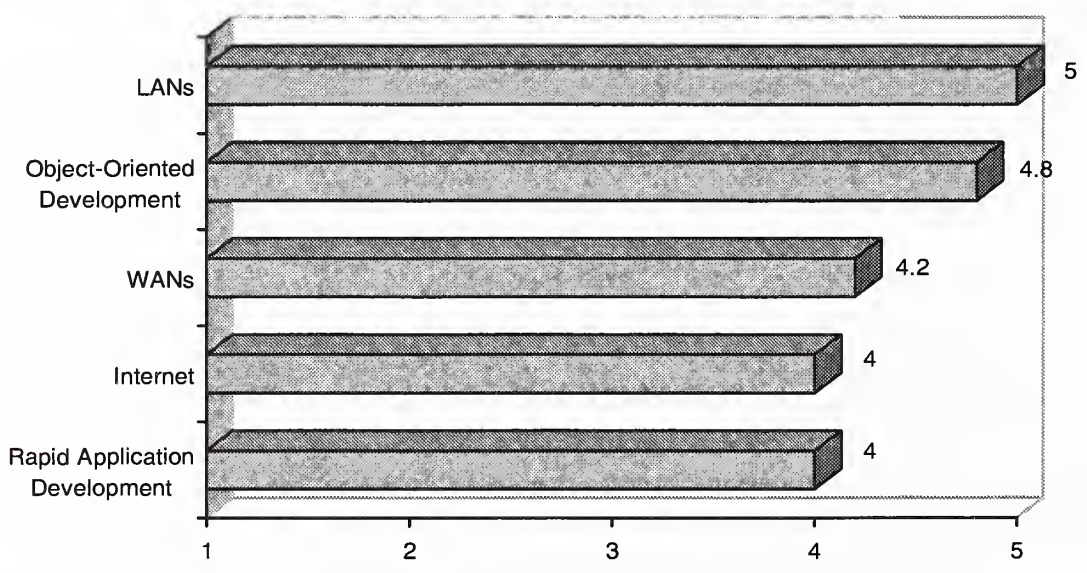
The report states that "the challenge is to provide interconnections for a variety of networking connections (e.g. fixed and new types of networks, such as mobile and satellite) and basic services such as ISDN."

These aims, of course, play straight into the hands of systems integrators and professional services firms, whose background is in large scale integration projects, and projects which have for some time had a growing component of networking involved.

One of the main drivers behind the success of the telecommunication industry over the next five years will be the efficient integration of fixed and mobile networks. Exhibit II-11 shows that although customer services is the ultimate aim of systems building and integration, the technical challenges facing telecommunications organisations are broadly similar to non-telecommunications companies; namely utilising WANs and other forms of networking technology to build infrastructures capable of supporting increased levels of business service.

Exhibit II-11

Technical Focus of Current IT Operations



Sample of 20 European Telecommunications Organisations *Source: INPUT*

The complexity of building the networks that are required for the provision of new telecommunications services coupled with technologies shorter product life cycles, and hence greater risk of failure in systems development, will led to increasing calls on skills which are the prime offering of the Business Integration (BI) community.

E

Leading Business Integration Vendors In European Telecommunications

Exhibit II-12 shows the leading BI vendors in the European telecommunications market in 1995.

Exhibit II-12

European Telecommunications Sector — Leading Business Integration Vendors 1995

Rank	Company	1995 Estimated Revenue ($ Millions)	1995 Estimated Market Share (%)
1	Cap Gemini Sogeti	185	11
2	IBM	172	10
3	Digital Equipment Corp	128	7
4	Andersen Consulting	127	7
5	Groupe Bull	100	6
6	Siemens Nixdorf	93	5
7	Sema Group	86	5
8	Electronic Data Systems	77	4
9	ICL	74	4
10	Sligos	55	3
	Total Listed	1097	64
	Total Market	1715	100

Source: INPUT

Within the overall BI market the leading ten vendors account for only 64% of the total marketplace, demonstrating how diverse and complex are the requirements of different types of telecommunication providers in different country markets. Fragmentation in the marketplace in terms of both supply and demand is such that there are extremely attractive niches across the broad spectrum of technological and business solutions demanded from telecommunication organisations.

With telecommunications having rightly come to be regarded as one of the most attractive opportunities in the overall European BI marketplace its is unsurprising that the leading vendors in the telecommunications sector should mirror so closely, with one or two exceptions, the leading vendors in the total European market.

CGS, struggling to match the extremely high growth rates of the increasingly powerful American vendors such as EDS and CSC in the overall market, have experienced healthy growth in the telecommunication sector, and now see this area as one of its most important strategic areas for future competition in Europe. CGS have has a number of major references in the European telecommunications market including both France Telecom and Deutsche Telecom, TeleNord, Mercury in the UK, Telia in Sweden and Telicom Italia.

CGS have between 200-250 telecommunications-dedicated staff employed in France and Germany and in most other European countries have at least 100-200 staff.

When CGS' European telecommunications divisions (CIG) was initiated 2-3 years ago, pan-European telecommunications business growth rates were of the order of 20%. Currently these are reaching 40%.

Groupe Bull are similarly focusing on the telecommunications sector and believe its strong partnerships with both Motorola and France Telecom offer the company an advantage in the European marketplace.

ICL similarly regard its relationship with a telecommunications organisation, it is 15% owned by Northern Telecom of Canada (15%), as one offering competitive advantage.

ICL has two telecommunications software products, SIMS, a software integration switch network, and Prospero, a front end billing system, which have found favour in the marketplace, and look set to offer increasing opportunities across Europe in the next two years.

Andersen Consulting, who regard themselves as business facilitators rather than as IT specialists are coming to be seen as an increasingly influential player in the redefinition of the communications market, which it labels the "Infocosm". Major clients who Andersen Consulting have been working for include Belgacom, Telephonica and AT & T Wireless services (formerly McCaw Cellular Communications Inc.).

EDS, the coming giant in Europe, is involved in a broad spectrum of telecommunications consulting throughout Europe, strengthened by its acquisition of AT Kearney.

EDS are working with a number of major companies including Hutchison Telecom and its Orange mobile service in the UK. It has also been undertaking systems development work for France Telecom

and Telecom Italia, and in Germany offering advice to new telecommunications entrants such as Intercom, Fabercom, RWE and the new GMS entrant, E Plus.

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III

Changing Conditions in the European Telecommunications Market

A

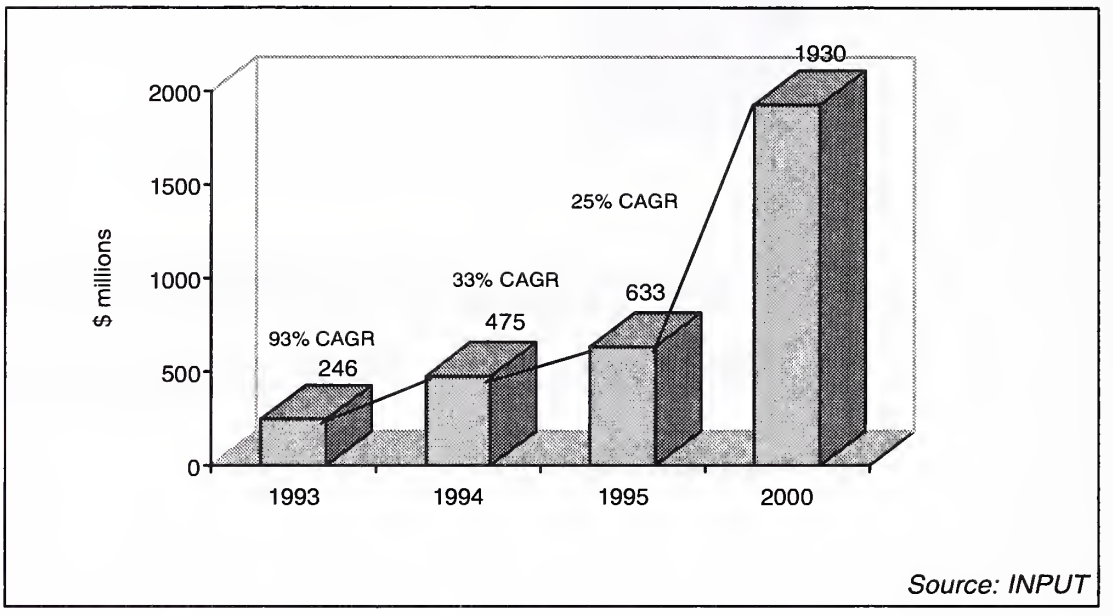
Liberalisation and Opportunity Unfolding Unevenly Across Europe

With the count-down towards the full liberalisation of telecommunication services in 1998 and the long heralded convergence of telecommunications and IT industries, the European telecommunications marketplace is one of the most dynamic areas for Business Integration (BI) vendors keen to target high growth market opportunities.

Exhibit III-1 provides details of the growth of the Systems Integration (SI) marketplace within the European telecommunications industry in the period 1993 to 2000 and contrasts these heady growth rates with those of the overall SI marketplace shown in Exhibit III-2. Exhibits III-3 and III-4 show the increasing importance of the telecommunications sector within the overall SI marketplace as it comes to represent 20% of the overall opportunity up from 12% in 1995.

Exhibit III-1

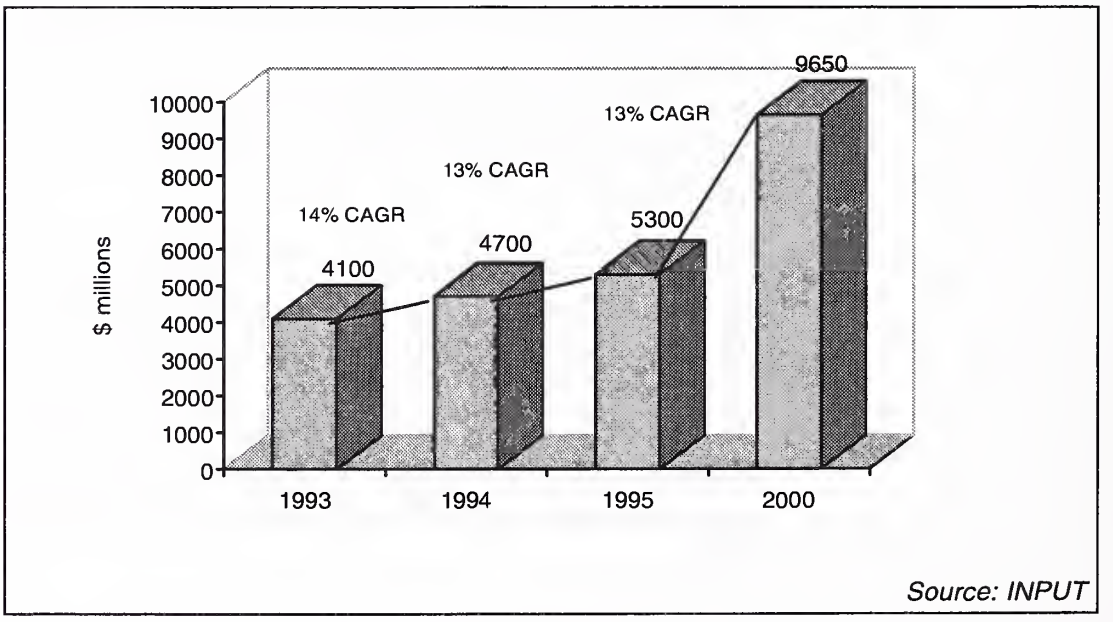
Systems Integration Services Growth in the Telecommunications Sector, Europe 1993–2000



Source: INPUT

Exhibit III-2

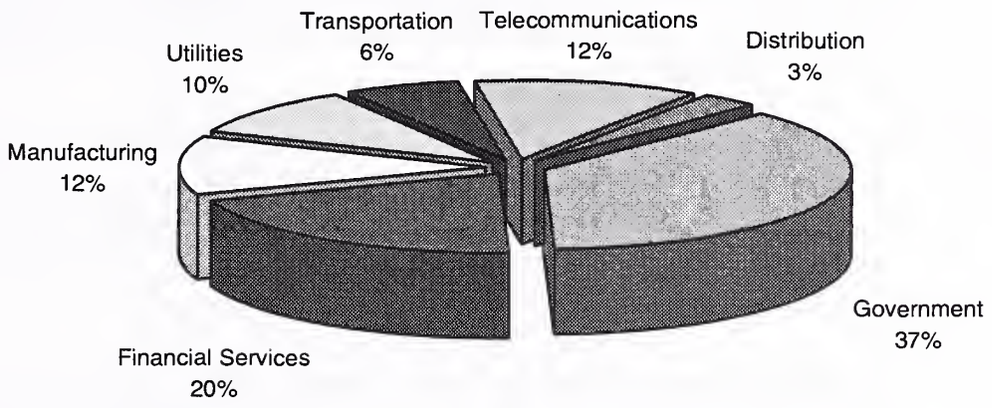
European Systems Integration Market 1993–2000



Source: INPUT

Exhibit III-3

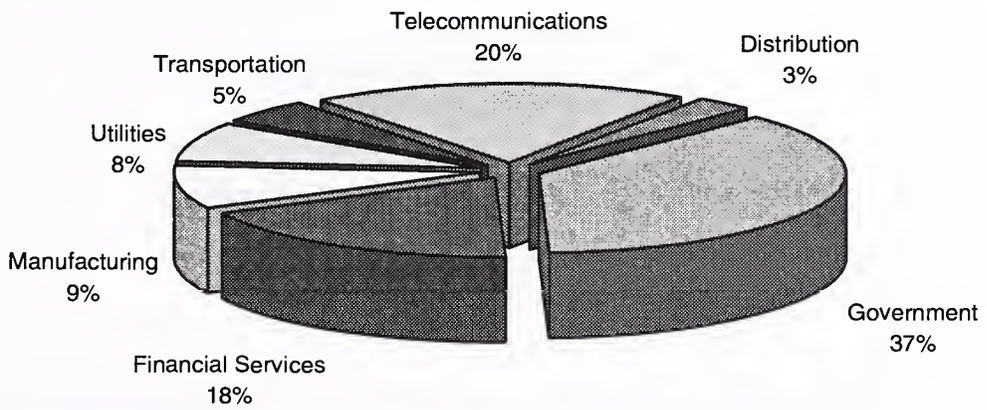
Systems Integration Industry Sector Analysis, Europe 1995



Source: INPUT

Exhibit III-4

Systems Integration Industry Sector Analysis, Europe 2000



Source: INPUT

National telecommunications, who have been used to a sheltered life under the protective wings of governments acting in effect as monopolies, are now rallying to position themselves against companies they would never before have considered competitors in a competitive environment awash with alliances, ground-breaking technology, and fierce competition.

Most noticeable in the UK telecommunications market, which is ahead of the rest of Europe in terms of deregulation, competitors are not only other telecommunications companies expanding their geographical reach but also cable-TV companies, software manufacturers, cellular phone companies and many more.

Since this increased competition is strongly influenced by the convergence of telecommunications and computer technology, it is at this point unclear what types of organisation, let alone the names of the actual companies, will emerge as overall winners in the market.

Exhibit III-5 illustrates the changing nature of the competitive landscape within the telecommunications market.

Exhibit III-5

Telecommunications Competitive Landscape

- IT/Telco partnerships
  - IBM – Stet
  - MCI – SHL Systemhouse
  - AT&T Solutions, NCR
- Growth of "alternative networks"
  - Utilities, Banks, Retailers

Source: INPUT

Across the nations of the European Union there is a wide range of telecommunications service provision. For most countries in north-west Europe there is little growth in voice telephony, though some southern European countries, such as Greece are thriving as they strive to catch up.

This stagnant situation in basic voice provision has led the major PTT's such as British Telecommunications to embark on extensive above and below the line advertising campaigns, run almost continuously, to attempt to encourage people to spend more time on the telephone. BT's "It's Good to Talk" campaign is an example of this.

By comparison the market for mobile telephony is expanding extremely quickly. This is true both of GSM (Groupe Speciale Mobile) and Personal Communication Network (PCN) based offerings.

The pace at which the underlying technical infrastructure is developing across the different country markets is however proving to be largely consistent. Though there are local differences such as the growth of ISDN in Germany, contrasted with switched packet stream networks in France, and leased line strategies in the UK, the degree of investment on a per capita basis is on a par between the main telecommunications nations.

B
Uncertain Future for National PTTs

By 2000 the European telecommunications industry will be virtually unrecognisable with the structure of the of the industry having changing fundamentally. Rather than their being a relatively easily identifiable number of national champions it will be less easy to group service providers according to regulatory models (e.g., PTT, privatised national carrier), transport type (e.g., wireless, wireline), or geography.

Instead the industry will be made up of many types of players of all sizes, dealing in various markets. Data communications and value-added service providers are now allowed to lease lines from any supplier. Already emerging is a multi-tiered market (global, national, regional, value-added, resellers, etc., which is the future shape of the industry; a shape that supports many different operational approaches and most importantly for IT service providers requires a variety of different approaches to IT delivery and support.

Telecommunication organisations can be divided into two categories; a few, extremely large organisations and the remainder, searching for international partners, together which some niche operators such as International Simple Resale (ISR) vendors which offer services such as "calling cards" and "call back".

Only a few organisations can hope to survive as a significant or even dominant partner in a group. For the Rest, for PTT's in both Central and Eastern Europe, even in Western Europe, the best they can hope for is a continuing role in the delivery of services for an international group, in which they are the minor partner, to operating as some sort of local representative office.

For PTT's the future is bleak. Automation and globalisaton will cut their workforces and they face competition from big international players such as AT&T and joint ventures such as Deutsche Telekom-France Telecom- Sprint and BT-MCI plus many specialist players, for example, in mobile services and value-added services.

Faced with economies of scale and scope of those firms and the development of global brand names in telecommunications, most notably AT&T, it is difficult to see a future for the smaller PTT's other than as integrated units within a global telecommunications operator.

C

Telecommunications Marketplace is Extremely Fragmented

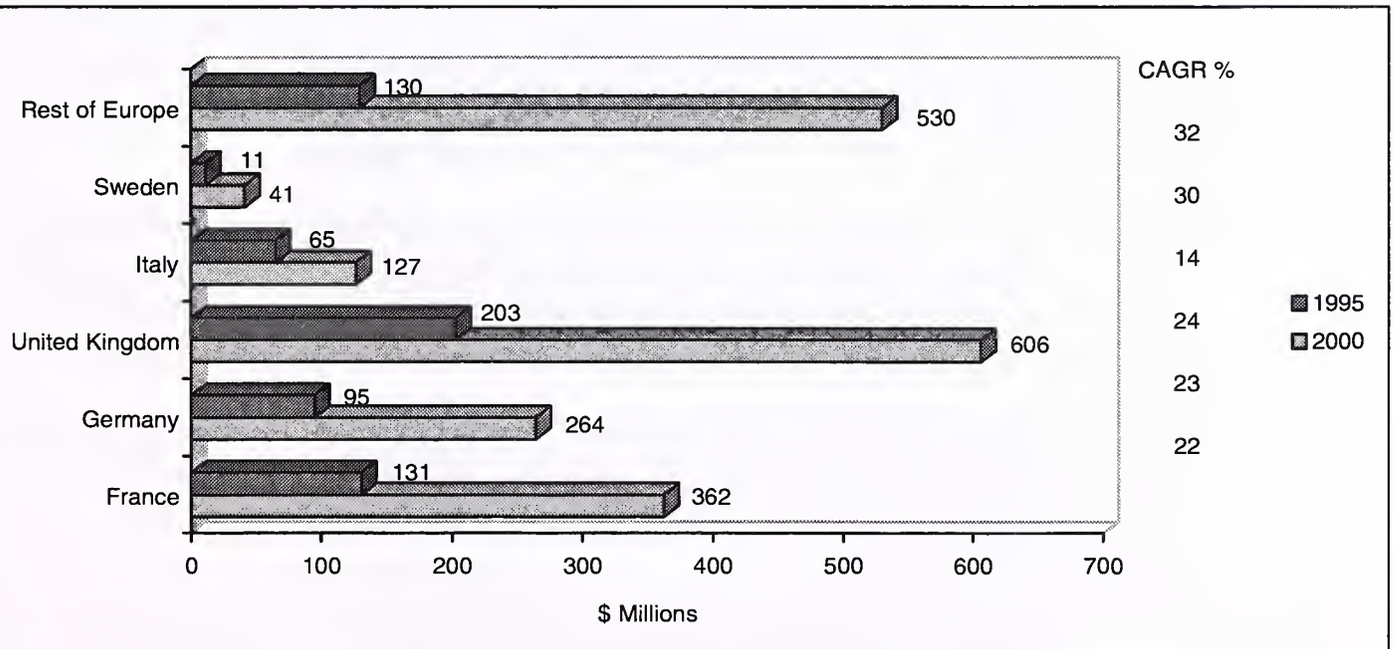
Apart from the adoption of new technology, the major force changing the environment for Telco has been the European Union with its pro-active policies for the creation of a single market in telecommunications. One of Bangemann's key recommendations was to argue against a fragmented European telecommunications infrastructure.

However, this fragmentation is very much in evidence presently and only the UK, Sweden and Finland currently have fully liberalised voice telephony and the underlying infrastructure. Other European countries are at very different stages in privatising their PTT's; Tele Denmark, Telecom Norway, Belgacom, Telecom Italia (formerly known as STET), and Koninklijke PTT Nederland (KPN) are the next tranche expected to move towards full liberalisation, whilst even Albania is now considering selling its PTT.

Exhibit III-6 shows the growth of telecommunications related SI across the major country markets of Europe between 1995 and 2000, reflecting the very different stages of maturity of different European markets.

Exhibit III-6

Growth of Telecommunications Related Systems Integration in Major Country Markets, 1995–2000



Source: INPUT

Full deregulation of telecommunications provision across Europe is scheduled to be in place by the end of 1997, as imposed by Brussels. There are however, five-year delays agreed for Spain, Portugal, Ireland, and Greece and a two-year delay for Luxembourg. The European Union has used threats against member states under Article 90 of the Treaty of Rome to force the introduction of competition.

Exhibit III-7 shows the current extent of liberalisation and deregulation across the major country markets of Europe and compares them with the US and Japan.

Exhibit III-7

Europe — Telecom Liberalisation

Country	Fixed	Cable	Mobile	Leased
France	M	LM	C	R
Germany	M	M	C	R
Japan	C	LM	C	R
USA	LM/C	LM	LD	U
United Kingdom	C	LM	C	U

Key: M = Monopoly D = Duopoly C = Competition L = Local
R = Restricted U = Unresticted

Source: INPUT

The aims of these initiatives are the creation of markets for services and products which span the EU, the building of Trans-European Networks (TENs) and services, with the promotion of the transition from distinct national markets to a single market.

Directives have co-ordinated the introduction and internetworking of GSM, have obliged member states to licence a second competing GSM operator and forced the early granting of a licences which will allow new suppliers to attack the existing dominance of in-situ PTTs.

Mobile telephony licences area attracting many different types of new entrant, from manufacturers such as Motorola and Ericcson, to utilities such as Veba in Germany and computer firms such as Olivetti.

Regulation in Europe, like many other things in Europe, is slowly passing from ministers and government officials to quasi-independent agencies, though some are still closely linked to PTTs or politicians.

Access by foreign companies has historically been on a reciprocal basis, which has limited firms from, especially, the US. This however, in the face of the EU's interest, is now changing. For example, AT&T now have a full licence to operate in the United Kingdom.

European PTTs have, in return, had difficulty obtaining licences in the US, since they have been designated dominant carriers, but this situation will inevitably change. European PTT's will need to achieve international critical mass in order to compete in the US and other non-European markets. BT's recent, ultimately aborted, talks with Cable & Wireless were predicated on the idea of building this international capability.

Although there is no doubt that the liberalisation process is speeding up in these and other markets, liberalisation does not always equate with privatisation. For example in Italy, STET, the telecommunications holding company, claims to be committed to liberalisation and is already operating in a competitive market against organisations such as Unisource. STET, however is still largely state owned, and the rate at which it is converted to non-state ownership is still far from decided.

The European PTTs are facing competition, not only from new technology such as wireless, Internet telephony, etc. but also from companies who have their own networks. Exhibit III-8 lists a number of the main utilities offering telecommunication services.

Exhibit III-8

Utilities Entering the Telco Market

Organisation	Country
Energis	United Kingdom
Norweb	United Kingdom
Generale des Eaux	France
RWE	Germany
Veba	Germany
Banverket	Sweden
Nederlandse Spoorwogen	Holland
GEB Rotterdam	Holland

Source: INPUT

Liberalisation will leave these companies free to build and market the excess capacity of their networks. These new players' main assets will not be their physical networks but rather their customers, billing systems, and their brand names. Other companies involved include the German industrial corporation, Thyssen, which has an alliance with BellSouth to bid for a licence for telephony services in Germany after 1998 and TBT Communications AB which is a joint venture between BT, TeleDanmark, and Telenor, formed to offer domestic and international telecom services in Sweden.

D

Telecommunications Alliances have Become the Norm

All over Europe telecommunications companies have become involved in a frenzied round of joint venturing and partnering aimed at expanding operations into new territories but more importantly at protecting interests in traditional markets.

Perhaps the most high profile of these has been the series of arrangements between France Telecom and Deutshce Telekom. The alliance between Deutsche Telekom, France Telecom, and Sprint resulting in the carrier Global One (launched early 1996) was announced in 1995 and has since been attempting to position itself as a leading international telecommunications player.

Deutsche Telekom, France Telecom, and Sprint have formed a new phone company, Phoenix, for global voice and data services. France Telecom and Deutsche Telekom have a series of joint ventures addressing different segments of the overall market which complement Phoenix, formerly known as Atlas. The other most noticeable joint venture is Eunetcom, which aims at the business data market.

In April 1996 BT and Cable & Wireless announced an intention to merge creating a $51 billion company. Although this deal has officially been called off, due to complexity in obtaining the necessary approvals from governments and the European commission, it is expected that BT and C&W will attempt to bring the deal to consummation over the course of the next year, away from the prying eyes of the press and City analysts.

This merger will have implications in other countries, especially Hong Kong where C&W has a 57.4% stake in Hong Kong Telecom. Both merger partners also have strong alliances in Germany, BT with Viag and RWE and Cable & Wireless with Vebacom, the telecommunications arm of the Veba Group.

Mergers in Europe could forge a wave of new alliances and joint ventures around the world led by US companies wanting to establish themselves in Europe with the deregulation in 1998.

One such company is AT&T, who already have a joint venture with Unisource (PTTs from the Netherlands, Sweden, Switzerland, and Spain) in Europe but needs to increase its presence in the European marketplace. AT&T may be interested in acquiring Mercury Communications, Cable & Wireless' U.K. company if the BT deal does

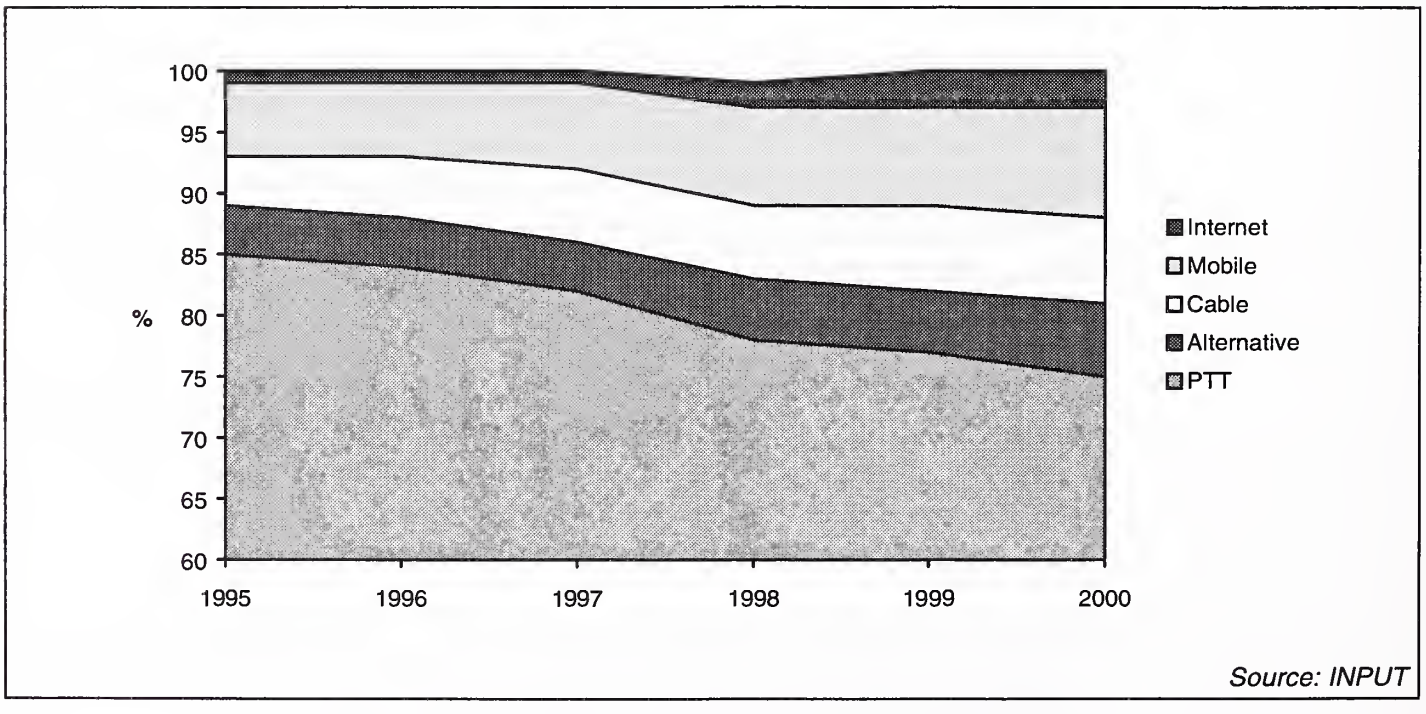
eventually go through. It is unlikely that the merged company will be allowed to keep Mercury, since that would severely limit any competition for BT in the U.K.

France Telecom, Bell Atlantic and Olivetti are other organisations that have formed strategic alliances to compete in the European market. These three organisations have joined forces to establish a company that will operate and manage a telecommunications network in Italy. While Olivetti will be in the forefront of designing the solutions and services for the Italian market, the partnership with France Telecom and Bell Atlantic will secure access to global services. Olivetti already has Infostrada — a joint venture with Bell Atlantic — active in the Italian market.

Exhibit III-9 analyses the rate at which these new types of telecommunication service will penetrate the European marketplace whilst Exhibit III-10 presents a forecast of Business Integration revenue growth elated to the five major types of telecommunication service over the course of the next five years.

Exhibit III-9

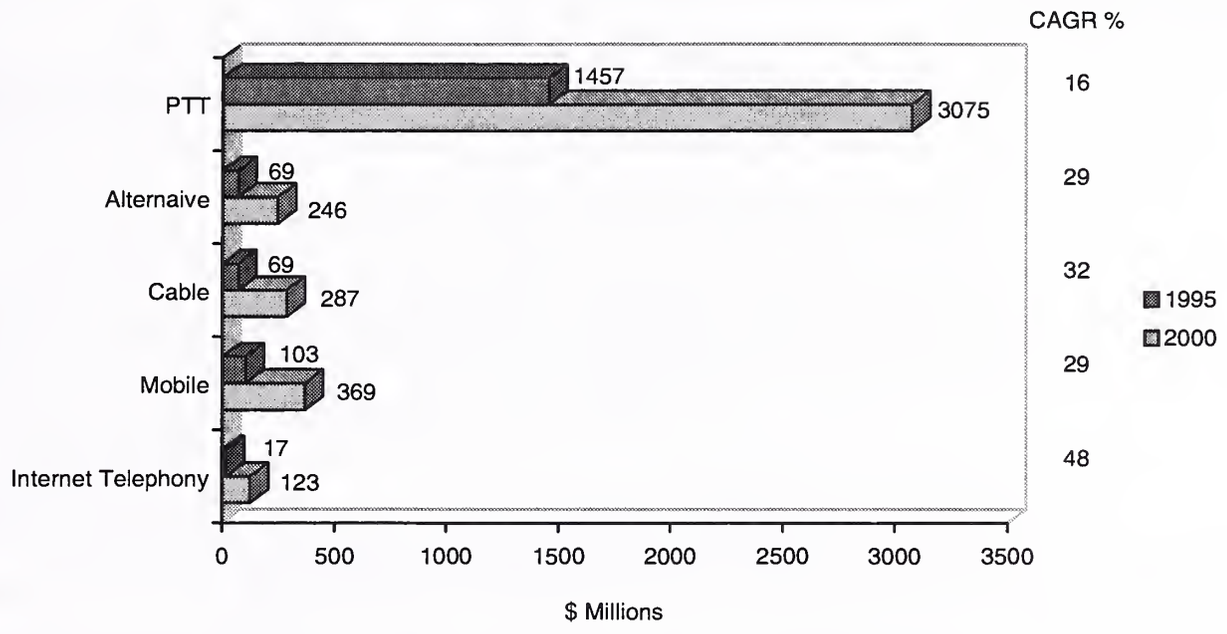
Telecommunications Penetration Rates, Europe 1995–2000



Source: INPUT

Exhibit III-10

Business Integration Revenues by Telecommunications Type, Europe 1995–2000



Source: INPUT

E
Internet Telephony Set to Increase Penetration Rates

One of the most interesting developments in the world-wide telecommunications market in the last year has been the realisation that the Internet may provide a new channel for telephony services.

This new development has been given legitimacy by the recent move of IBM, amongst others, into offering Internet telephony. IBM has announced that it will enter the Internet telephony market by offering software enables telephone calls over the Internet combined with data transmission. Other players in this market are VocalTec Ltd, Camelot Corp., and Quarterdeck Corp. The availability of telephony on the Internet has increased over the past year or so, with IPhone from VocalTec and DigiPhone from Camelot being the first shrink wrapped products. IPhone is by far the largest of the two, since Camelot reputedly has had problems getting a satisfactory product to market.

In the beginning, the use of Internet telephony was hampered by the fact that it was half-duplex, working like a CB-radio transmitter. Exhibit III-11 provides an analyses of Internet Host distribution by country which covers the major country markets of Europe whilst Exhibit III-12 illustrates what IT managers in leading European IT user organsiations think are the potential benefits of utilising the Internet.

Internet telephony does not rate highly on their horizon presently but as software improves this approach can in the future be considered a threat to the traditional telephony services. Internet telephony providers still have to overcome congestion and long response times before this service can be considered an alternative in the business segment. But these problems are being overcome and solved; technology constraints will not be the major limiting factor in marketplace acceptence.

Many of the multimedia applications which are becoming increasingly important along with Internet telephony will depend on broadband, high speed technologies, though it is arguable that narrowband technology may be capable of providing many services normally associated with broadband as compression technology becomes more available.

Integrated Services Digital Network (ISDN) is proving to be the channel for Internet telephony availability. ISDN, which dates back over 15 years, was originally an attempt to achieve an advanced service over existing copper cables in the local loop. However, the long

gestation period of these developments has meant that ISDN has ceased to be state-of-the-art now that it is slowly being rolled out.

ISDN is, it is arguable, a technology developed for a market that no longer exists. No longer can a PTT roll out a service safe in the knowledge that customers will happily accept it. PTT's now face true competition; competition which is unlikely to recede, and an environment based on servicing genuine customer needs.

However, as ISDN becomes gradually more realistically priced its roll out will become more prevalent and its undoubted benefits may yet come to be more widely utilised. The Internet may be the application which ISDN was looking for.

Exhibit III-11

Internet Host Distribution by Country

Rank	Country	Domains	Share (%)
1	USA	4,268,648	64
2	Germany	350,707	5
3	United Kingdom	291,258	4
4	Canada	262,644	4
5	Australia	207,426	3
6	Japan	159,776	2
7	Netherlands	135,462	2
8	France	113,974	2
9	Finland	111,861	2
10	Sweden	106	2

Source: INPUT

Exhibit III-12

Potential Internet Benefits

Potential Internet Benefit	Average Rating
Delivering Information	4.4
Receiving Feedback	4.3
Enhancing Customer Service	4.2
Responding More Quickly	4.2
Adding New Sales Channel	4.0
Targeting Individuals	3.8

Sample of 90 Leading European IT Users *Source: INPUT*

F

Marketplace Uncertainty Set to Produce Enormous Opportunity for Business Integration Services Vendors

As the 1994 Bangemann report, the series of recommendations made to the European Commission which acted as the catalyst behind the current phase of deregulation, pointed out "all revolutions generate uncertainty, discontinuity, and opportunity. Today's is no exception. How we respond, how we turn current opportunities into real benefits, will depend on how quickly we can enter the European Information Society. In the face of quite remarkable technological developments and economic opportunities, all the leading global industrial players are reassessing their strategies and their options."

These conditions of course spell incredible opportunity for Business Integration vendors.

The challenge for Business Integration vendors is to identify the different approaches and service requirements required by different types of telecommunications providers and approach these organisations with the appropriate offering. What is appropriate to a large, pan-national PTT will be completely inappropriate to a regional cable player.

Exhibits III-13 and III-14 show the overall BI opportunity in the European telecommunications industry analysed by its constituent components over the course of the next five years.

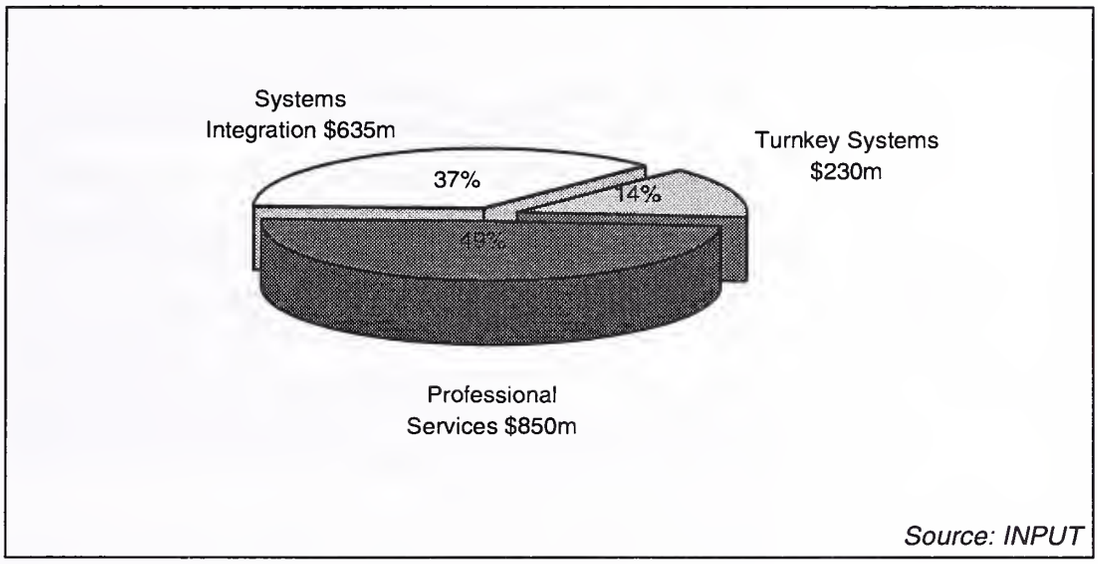
Succeeding in this period will not be easy however, as the industry transforms and the characteristics of success change. The challenge for service vendors is to understand the impact on the industry and learn how to play the game with new rules.

Financial resources and marketing will be the decisive factors in who will survive in the market and will ultimately be more important than research and innovative development. The competitive conditions which have reshaped the computer industry (falling cost, new entrants, rapidly changing technologies etc.) will also happen in the telecommunications industry. Service differentiation in marketing capabilities, cost and the ability to do understand the buyer's requirements will be of crucial importance.

Huge rewards will be available to those service providers who can flourish amidst the chaos and confusion that the European marketplace will present over the next five years as it reshapes itself.

Exhibit III-13

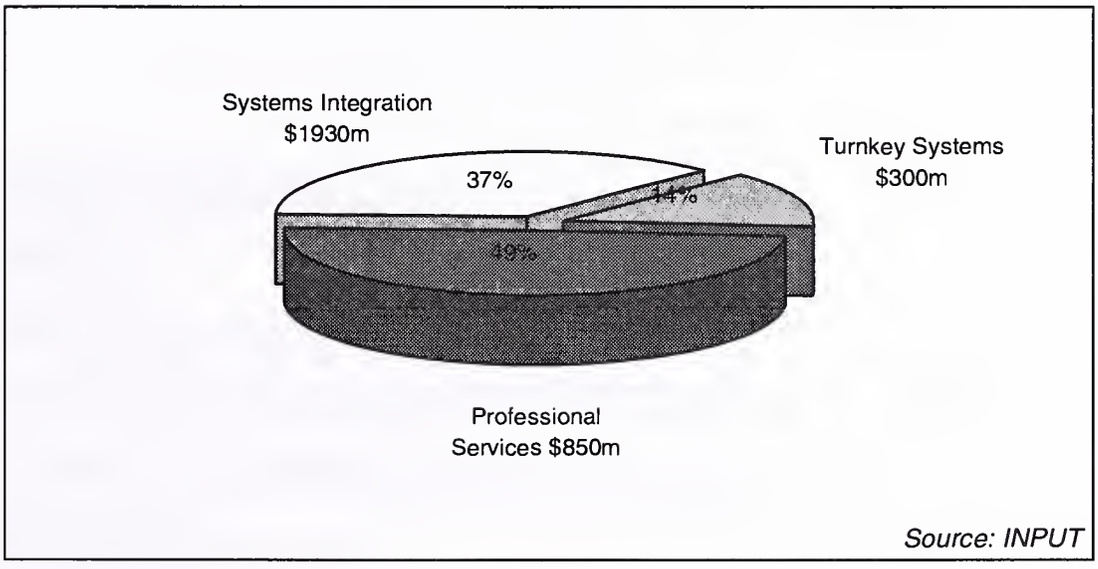
Business Integration Market by Sub-Delivery Mode, European Telecommunications Sector — 1995



Source: INPUT

Exhibit III-14

Business Integration Market by Sub-Delivery Mode, European Telecommunications Sector — 2000



Source: INPUT

Customers are increasingly demanding global , or at the least pan-European, services from suppliers. One of the best examples of this is the growing uptake of GSM mobile telephony enabling users to roam across most of Europe, and increasingly into parts of Asia. Some business organisations want highly sophisticated services, such as global virtual private networks, whilst others require high capacity digital "pipes" with which they can build their own networks.

Technology comes with shorter product life cycles and hence greater risks of failure.

Another of the main drivers behind the Bangemann report and the subsequent initiatives of the European Commission is "standardisation ... essential to achieve network connection and interoperability of services at an international level. Interconnection of networks and interoperability of services and applications (will) become increasingly important as competition is introduced, if fragmentation is to be avoided."

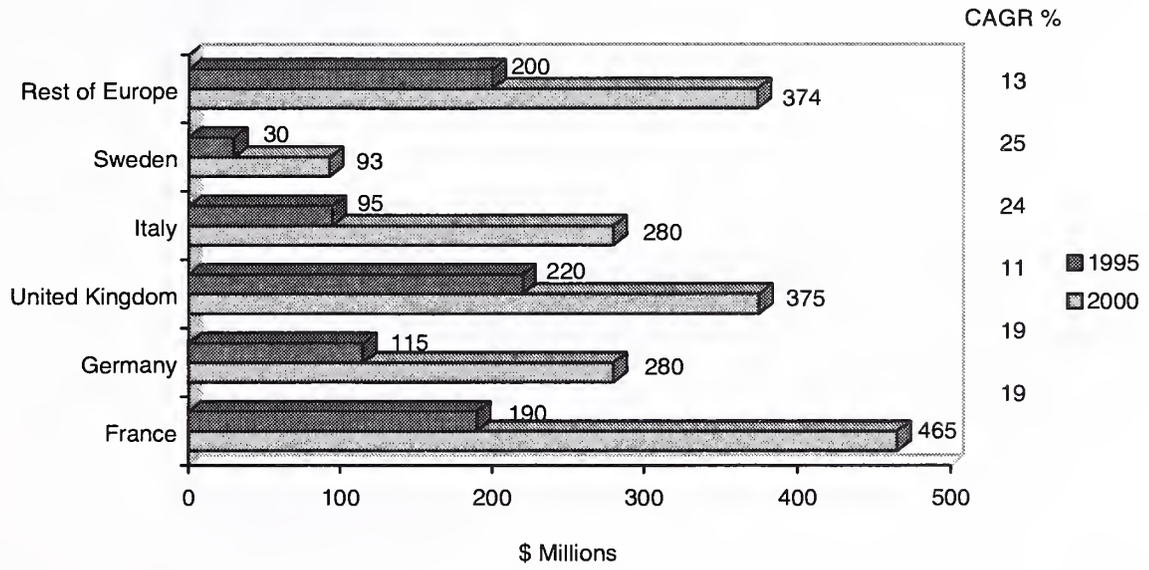
The report states that "the challenge is to provide interconnections for a variety of networking connections (e.g. fixed and new types of networks, such as mobile and satellite) and basic services such as ISDN."

These aims, of course, play straight into the hands of systems integrators and professional services firms, whose background is in large scale integration projects, and projects which have for some time had a growing component of networking involved. Exhibits III-15 and III-16 illustrate the growth of the Professional Services and Turnkey Systems markets in the European telecommunications sector over the medium term.

One of the main drivers behind the success of the telecommunication industry over the next five years will be the efficient integration of fixed and mobile networks. The complexity of building the networks that are required for the provision of new telecommunications services will call on the skills which are the prime offering of the Business Integration (BI) community.

Exhibit III-15

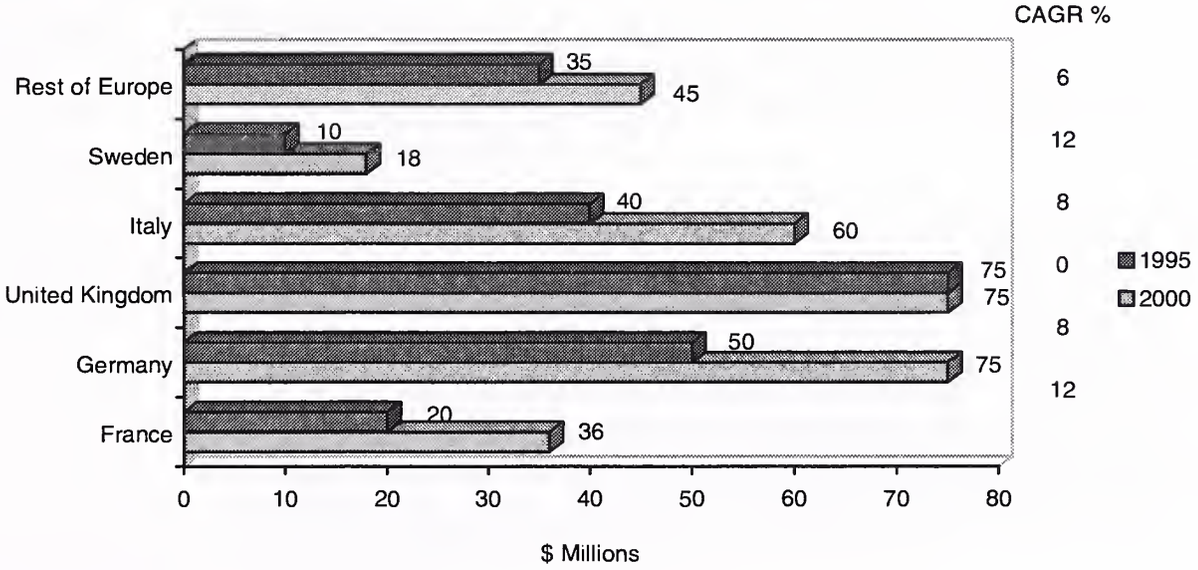
Growth of Telecommunications Related Professional Services in Major Country Markets, 1995–2000



Source: INPUT

Exhibit III-16

Growth of Telecommunications Related Turnkey Systems in Major Country Markets, 1995–2000



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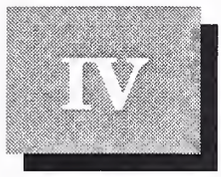


Business Integration Services Requirements — Building the Infrastructure for the Next Century

A
Telco IT Systems have High Degree of Obsolescence

The next five years are crucial to the development of the telecommunications industry both in terms of adoption of new services and in the pace at which these new services are built and rolled out into the marketplace.

The priority therefore for telecommunications providers is to build networks quickly and efficiently, not least because of the time pressures they are under from franchise awarding bodies. If telecommunications providers do not demonstrate that they can start to offer the promised services within a reasonable timeframe then there is the very real possibility that their franchise will not be renewed. A situation like this, yet to happen, would obviously produce a scenario where there would be no return whatsoever on any investment involved.

Once networks have reached an adequate level, a process that can take up to three years, the emphasis within the telecommunication provider switches to upgrading the systems to enable the provision of more and better services. Telecommunication organisations tend to concentrate on a "first thing first" basis, currently focusing on voice and data provision currently, whilst recognising the potential for

higher risk applications such as video-on-demand (VOD), further downstream.

It is interesting to note that much of the promise of VOD appears to have disappeared. Without exception the various trials in the US, the UK, and the rest of Europe, have shown up the fact that the technology required to fully roll out VOD is still not robust enough to support the interactivity required to make this service offering viable. Most of the ongoing trials are running far behind schedule and most of the organisations who were so vocal about VOD 18 months ago, are now much more reticent about talking up its prospects.

Telecommunications companies use IT extensively, expect to constantly introduce new services over the coming years as network infrastructures become richer, and as a result have aggressive plans to develop new software and extend existing software.

The majority of IT-related investment has been, so far, in network management systems and Subscriber Management Systems (SMS). However, it is already recognised that a second generation of these systems will be required within the next two years. These second generation systems will need considerable extension in terms of functionality over the first generation systems.

Most of the organisations interviewed for this survey were engaged in re-developing their SMS, having reached the conclusion that their existing systems, which could hardly be considered legacy systems, were already inadequate.

SMSs are typically designed around a single database and a single platform with little support for modular extension or expansion. This integrated approach is seen as cost-effective and relative simple. However, in the more mature PTTs, their is a considerable amount of complexity, of legacy systems, different platforms, and un-integrated applications.

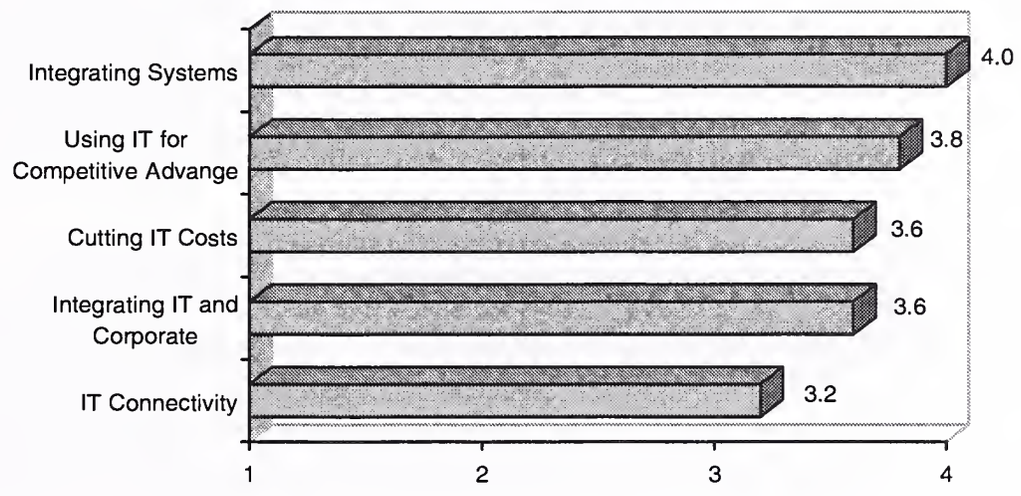
Exhibit IV-1 shows that integrating systems is still the main focus of current IT operations.

Exhibit IV-2 shows the key applications which telecommunications organisations will be developing over the course of the next year.

Service order complexity will continue to grow as many new applications are introduced. At the point of deregulation order and customer information systems are typically old and inadequate. Some of the less mature national PTTs still manage with manual based systems.

Exhibit IV-1

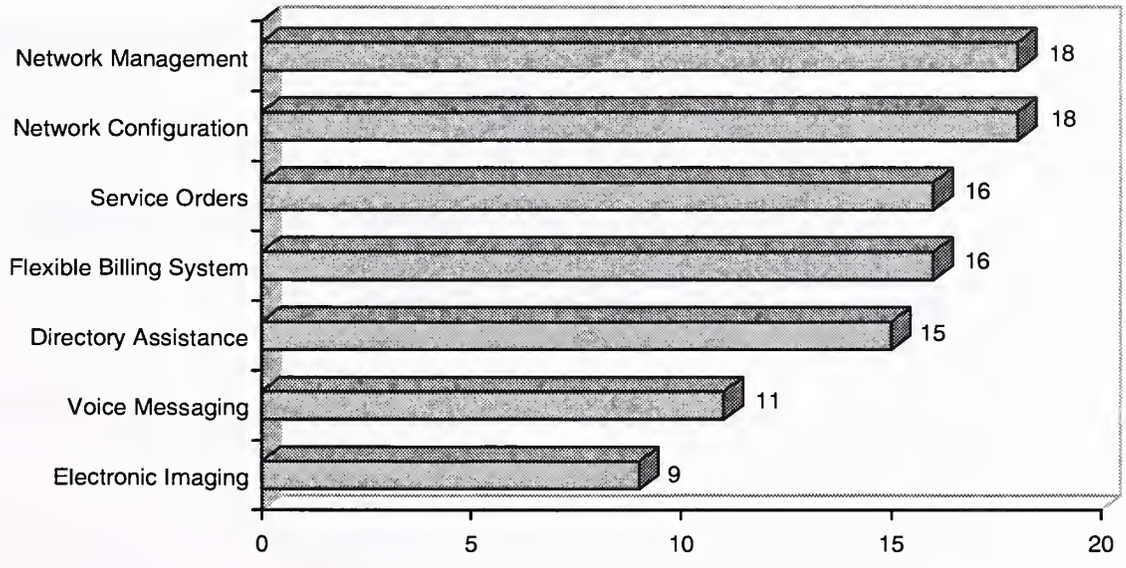
Focus of Current IT Operations



Sample of 20 European Telecommunications Organisations *Source: INPUT*

Exhibit IV-2

Key Applications being Developed in the Next Year



Sample of 20 European Telecommunications Organisations *Source: INPUT*

Introducing new technology to facilitate enhanced service ordering is extremely complex. At the same time as demand increases technology continues to change rapidly. Major investments in a specific application can be outdated very quickly. Some applications can be outdated even before the development is complete.

Of course this situation will continue to provide great opportunity for BI vendors.

Consumers are also requesting flexible billing. Statements that provide a summary followed by a listing of detailed calls are fast becoming the norm across the major country markets of Europe. There is some evidence to suggest that this in turn will be replaced by replaced by EDI based billing which will cater for new services such as voice messaging or E-mail.

Most telecommunication related infrastructure follow the Telecommunications Management Network (TMN) as shown in Exhibit IV-3. The lower elements of this pyramid are "network facing" but need to communicate with the higher elements which are "customer facing" such as service management functions including order taking, provisioning, billing and customer query handling.

Exhibit IV-3

The TMN Model

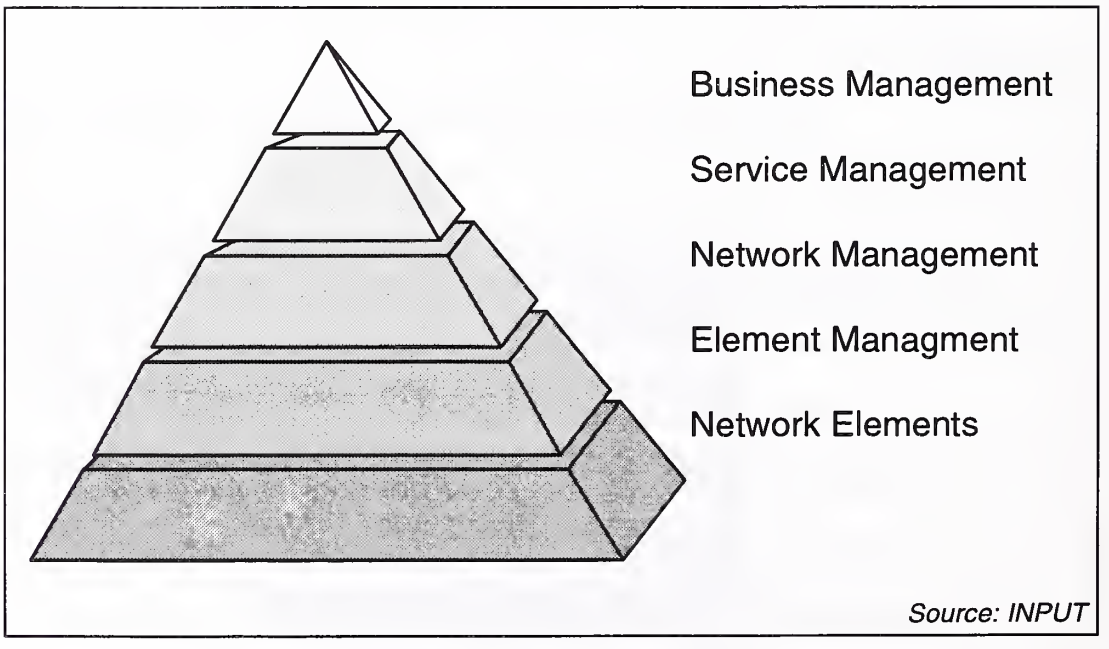
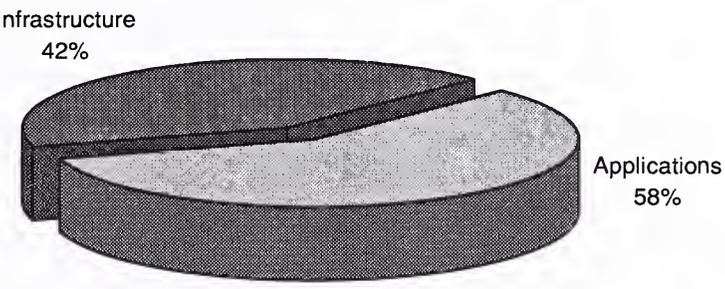


Exhibit IV-4 shows the current split between application (customer facing) and infrastructure (network facing) related IT-spend.

The service management systems link into the top end of the pyramid, the Business Management layer, which contain all the management information which enables executives to interrogate subscriber populations, usage rates and the costs of providing the service.

Exhibit IV-4

Relationship Between Application and Infrastructure-Related IT-Spend



Sample of 20 European Telecommunications Organisations *Source: INPUT*

Over the next five years there will be an industry wide migration to new technologies and standards. There will be a steady movement towards open platforms which will support a wide range of variety of packaged applications software, Unix based servers and workstations.

The exception to this will be the still proprietary AS/400 which is widely used as a main platform for SMSs as is DEC's Alpha range.

Networks currently being built are designed to support planned expansion, in terms of new services and growing populations, over the next three to five years. Systems are required to be fully flexible and fully scaleable.

Functions within Subscriber Management Systems typically include:

- sales order processing
- credit checking
- database maintenance
- billing
- query handling.

B

New Technologies will Continue to Facilitate New Types of Telecommunications Services

Exhibit IV-5 summarises a number of key developments in technology and their impact on nearly all providers of telecommunications companies.

Exhibit IV-5

New Technology Impact on Telecommunications Providers

- Decentralisation
- Data/System Integration
- Greater Customer Control
- Systems Flexibility

Source: INPUT

As with many industries the information systems function in telecommunications organisations is becoming increasingly decentralised, most prominently in marketing and customer services departments. Marketing and service functions are assuming greater responsibility for defining and managing development requirements and projects.

Organisational decentralisation and the growing need for integration of data across functional areas are driving a need for the integration of systems. Data about customers and their service needs must be available to operational and support departments.

Historically the major PTTs developed the bulk of their systems internally. There have been a number of reasons for this:

- Few vendors have been able to provide applications suitable to users who believe that their environment has been far too complex to be addressed through packaged application

- Industry managers have believed that the high degree of integration needed between switch and support application systems necessitated a dedicated staff

- Until deregulation staff sizes were of limited importance. Because prices were based on the company's cost structure there was little incentive to reduce overhead costs.

These circumstances are however changing as is the nature of the build requirement as shown in Exhibit IV-7. Most large PTTs, especially British Telecommunication, have had to make substantial reductions in personnel numbers and staff productivity has become mandatory as staff numbers have reduced.

At the same time the nature of systems has changed; although specialised switching systems have remained extremely complex there has been a growing emphasis on applications that support basic operational systems. The shift towards digital and ATM technology has fostered greater ease of integration between switching and control systems and support systems. The process of developing customer support and sophisticated billing systems requires less industry knowledge and more design and development expertise. However, Exhibit IV-6 shows that industry knowledge is still crucial when organisations choose a Business Integration vendor to support them in their build activities.

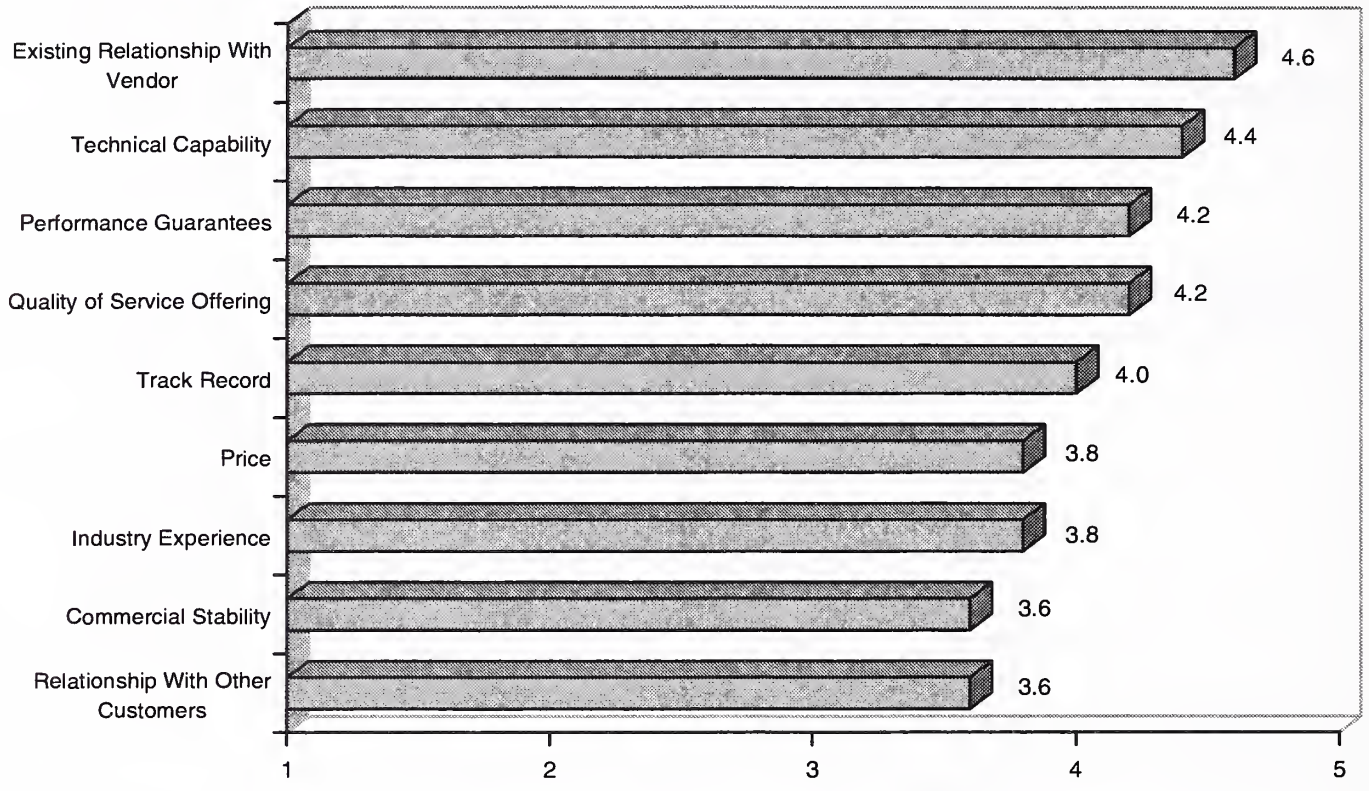
Systems are becoming more complex and require greater knowledge of business applications. The ability to develop new applications and functionality requires a greater appreciation of the needs of the business. For instance, developing workflow applications utilising E-mail or Groupware products required an understanding of business interactions not just telecommunications expertise.

Customers increasingly recognise the value of the many services that telecommunications providers are beginning to provide. Many large business customers have demonstrated interest in the use of services such as software-defined networks, network management and virtual digital networks. Digital technology is allowing customers to control their networks and services and creating increasing demand for this type of control.

Large and small customers are demanding greater flexibility in defining services that will best match onto their needs. Older technology has traditionally not allowed much flexibility in these areas; customers either accepted or declined to accept the defined service. Today however, consumers want to be able to select specific services and to change these choice quickly and easily. New technology is facilitating this.

Exhibit IV-6

Factors in Selecting Service Vendors



Sample of 20 European Telecommunications Organisations *Source: INPUT*

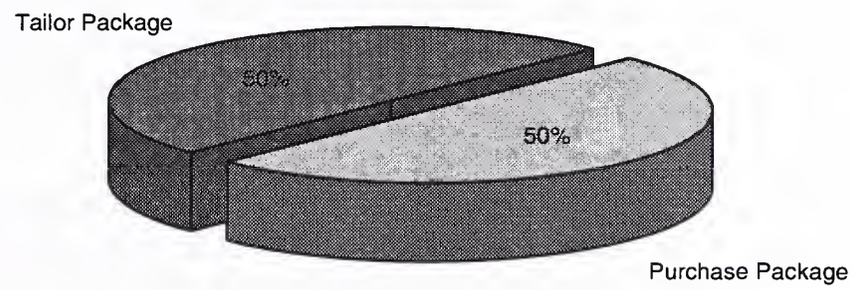
C

Telecommunications Seek Packaged Solutions and Services

Exhibit IV-7 shows the method by which telecommunications organisations source IT systems and applications. None of the respondents to this report claimed to develop systems through pure custom development. The survey base was split evenly between those who acquired a package from a software product company, and those who then proceeded to tailor this package to their own individual needs. Anecdotally respondents stated that IT systems should be bought in wherever possible; a finding that supports the contemporary received wisdom which stresses a move to package software based development.

Exhibit IV-7

Method of Application Acquisition/Development



Sample of 20 European Telecommunications Organisations *Source: INPUT*

This finding also supports that need for speed in systems building to meet the onerous demands of franchise awardees.

In the large PTTs there are commonly at least two information systems organisations. The first is dedicated to developing and managing the carriers switching systems whilst the second is responsible for the organisation's internal and support systems and customer facing operations.

This distinction is crucial to Business Integration services providers as the requirements of the two different organisations are quite different. The operations organisation is more interested in the technical detail of the organisations infrastructure. The customer facing organisation is more interested in understanding the business implications of systems build and operations.

In some PTTs this distinction is blurring, but it still the norm in the less mature markets.

D
Use of External Services Companies Set to Grow Extensively

Professional services vendors are in great demand to assist large organisations in identifying, planning, and developing major new systems. Vendors that have experience in developing large, complex integrated systems will find a ready market as PTT's, cable and mobile companies develop, and re-develop, comprehensive new systems capabilities.

As a result of continued staff reductions and the growing complexity of systems, many telecommunications organisations are using professional services firms to develop system specifications and perform systems enhancement because such firms have a broad knowledge of application needs and requirements.

Use of professional services firms can also reduce implementation time, especially if the firm utilises a Rapid Application Development methodology. As systems criticality grows, due to the development of revenue-producing services, reducing development time becomes more important.

The simple fact of skills shortages is another, and often overlooked, issue. Professional services firms can also provide an effective way of training information systems staff in new processes and procedures.

Growth in systems integration (SI) will complement professional services as larger carriers and cable companies invest in new technologies to support new information services, electronic imaging systems, and network switching devices.

SI services are being used to link critical operations, such as customer service/maintenance systems and billing and application systems. The objective of all these developments is to improve customer responses and services and to establish the basis for higher speed services and specialised services based on interactivity.

In the immediate period following deregulation, PTTs have typically devoted extensive resources to enhancing their primary applications software. The majority of legacy systems have either been enhanced or replaced. However, the process of integrating existing major systems and incorporating new areas, such as EDI, is just beginning.

Customer service systems, containing profiles of a wide variety of features and services must increasingly be linked to maintenance and network configuration systems. Charges for features must be integrated with charges for maintenance and troubleshooting.

Exhibit IV-8 presents INPUT's analysis of BI vendors capabilities across a range of different criteria which build on the views of telecommunications organisations surveyed for this report who have used various BI vendors . These "before" and "after" views are presented in Exhibits IV-9 and IV-10.

Exhibit IV-8

Comparison of Vendor Capabilities in Telecommunications-Related Systems Integration

	Alcatel TiTN	ATT	Northern Telecom	IBM	MCI	Sprint	France Telecom	CGS	EDS	CSC	Andersen Consulting
Knowledge/understanding of telecommunications operators' business	***	***	***	**	***	***	***	*	**	**	**
Presence in other sectors of activity	*	***	*	***	*	*	*	***	***	***	***
Competencies in networks and communications	***	***	**	**	***	***	***	**	**	**	**
Competencies in information systems	**	*	*	**	*	*	*	***	***	***	***
Recognise consulting activity	*	*	*	*	-	-	*	*	**	***	***
References in major telecommunications projects	*	***	**	**	**	**	**	**	***	***	***
Ability to operate in partnerships	*	**	**	**	**	*	**	**	*	*	*
Competency as a telecommunications equipment vendor		***	***	*	-	-	*	-	-	-	-
Skills in software design	*	**	*	**	*	**	*	**	**	**	**
Responsiveness of the organisations	**	**	*	**	*	*	*	**	**	**	***
Project management skills	**	**	**	***	**	**	**	**	***	***	***
Quality of systems development	**	**	**	**	**	**	**	**	**	**	***
Outsourcing offering	*	-	-	***	-	-	**	**	***	**	***
Associated services in education and training	**	**	*	***	*	*	*	**	**	**	***
International references	*	***	**	**	*	***	*	*	**	**	***
International presence	*	**	**	***	*	**	*	*	***	**	***
European presence	***	*	*	***	*	*	***	***	**	**	**

*** = Weaker ** = Stronger**

Exhibit IV-9

Perceptions of IT Services Vendors' Capabilities

*Views of Telecommunications Organisations who **have not** used the following vendors*

Andersen Consulting	4
IBM	4
Logica	3
AT&T	3
Olivetti	3
Syntegra	3
Siemens Nixdorf	3
Computer Sciences Corporation	3
Digital Equipment Corporation	3

On a Scale of 1 – 5 where 1 = Extremely Capable *Source: INPUT*

Exhibit IV-10

Satisfaction Ratings of IT Service Vendors

*Views of Telecommunications Organisations who **have** used the following vendors*

Groupe Bull	5
Andersen Consulting	4
IBM	4
Logica	3
AT&T	3
Olivetti	3
Syntegra	3
Siemens Nixdorf	3
Computer Sciences Corporation	3
Digital Equipment Corporation	3

On a Scale of 1 – 5 where 1 = Extremely Satisfied *Source: INPUT*

E

Telecommunications Organisations Welcome Reward Sharing Approaches to Systems Development

Vendors must investigate the possibility of forming long-term partnerships with telecommunication organisations, sharing risks and investments, in return for the opportunity to obtain a form of preferred treatment.

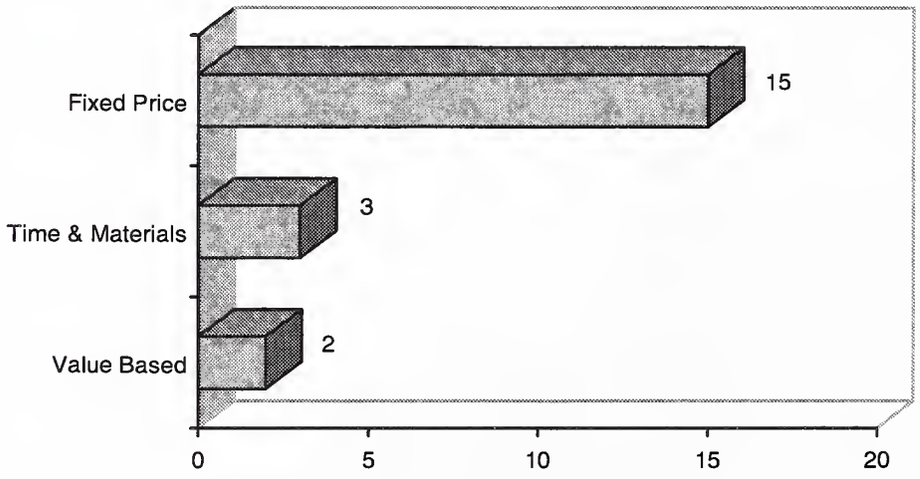
In contrast to the traditional adversarial model of contract between a customer and its suppliers, value-based arrangements allow a vendor the time in which to learn at first hand about the needs of a customer. This approach can make an attempt to gain genuine market understanding, which is a quality telecommunications organisations state the vendor community lack.

Although value-based deals are still somewhat nascent and customers still express a firm preference for fixed price deals, risk sharing deals will grow in importance over the coming years.

Exhibit IV-11 shows the telecommunications organisations surveyed for this report views on their favoured contract approaches.

Exhibit IV-11

Favoured Contract Approaches

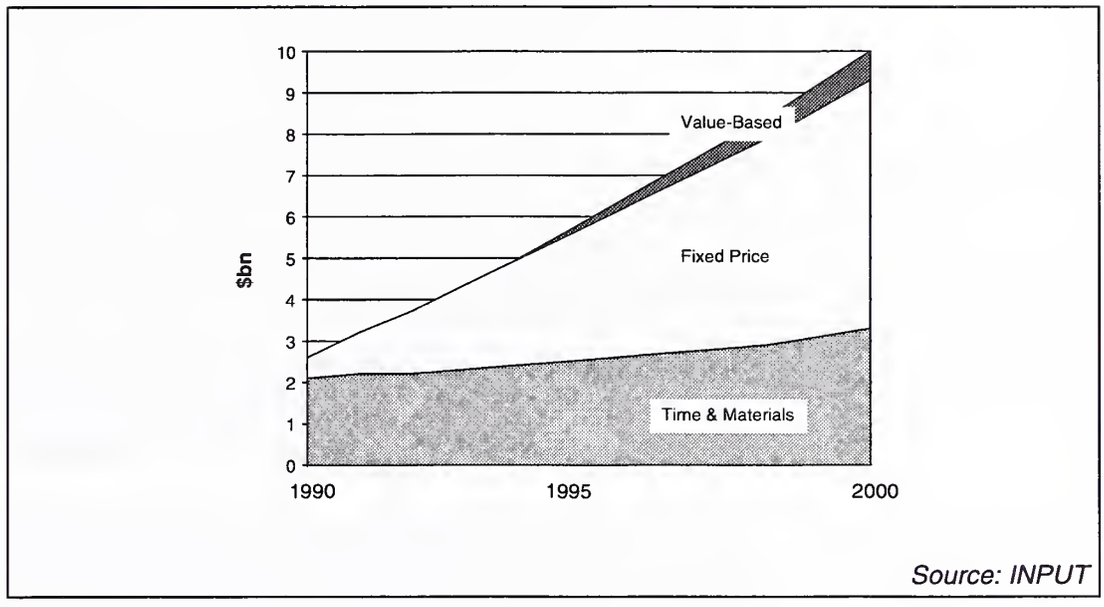


Sample of 20 European Telecommunications Organisations *Source: INPUT*

Exhibit IV-12 contrasts this with a forecast of the overall proportions of value-based, time and materials, and fixed priced contracts at the overall European level over the next five years.

Exhibit IV-12

Contractual Approaches to European Systems Integration Projects 1990-2000



Source: INPUT

The main advantage of risk-sharing deals will be that this type of arrangement will allow both the supplier and the customer to react more quickly to unstable marketplace competitive conditions.

Value-based pricing has rapidly become a major issue for Business Integrators over the last 18 months. It is though, a contentious topic which is dividing opinion in the European project services community.

Value-based pricing can be defined as the linking of project price to the achievement of specific business goals within a client organisation. If the project succeeds in achieving these goals then the vendor is rewarded with a share of the savings or potentially more importantly of the increased revenues.

This approach has benefits for both the client and the vendor as value-based pricing focuses management attention on the achievement of the client's business goals.

Value-based pricing provides vendors with an incentive to address business problems rather than just minimising their own commercial exposure while delivering a technical solution.

The emergence of this concept is the result of a maturing of IT development and integration processes, in turn a consequence of the increasingly embedded role technology plays in business processes.

It is becoming increasingly inappropriate to examine, and more importantly change, business processes without examining, understanding and changing the technology underlying and facilitating these processes. IT is also becoming a much more significant cost as its uses change.

Vendors and users now concede that it is artificial to draw a distinction between strategy and implementation; that unless one knows what each part plays, one cannot understand the other; that one needs strategy knowledge to do successful implementation and implementation knowledge to do strategy.

As a result technology services organisations are being forced to understand business issues which historically have been above them on the theoretical strategy/operations "value chain".

IT development and integration projects have moved from lowest based unit prices towards "best economics"; from cost to value, or from service provision towards business outcomes.

Supporting this dynamic is the fact that many major user organisations have, over the last five years of recession and slow post-recession growth, been through huge cost saving engagements with management consultancies and find now that there is not a lot more cost to be stripped out.

Consultancies and the new "management services" organisations, as vendors such as EDS and Andersen Consulting could be characterised, are thus moving more towards revenue generation engagements and are looking for shares of the value they claim process-rich-IT systems will deliver.

The scepticism these developments are producing (from vendors not driving these concepts) is understandable. There are clearly serious complications in defining and isolating specific measurable metrics which can be used to judge the long term success or failure of a contract.

The ability to separate the causal correlation's between the development of an IT system and the subsequent fortunes of a company is a key issue.

Shareholder value is the most difficult one of the business metrics to relate to. Defining deals on this basis will undoubtedly be difficult to negotiate with senior client executives.

Sceptics have also raised the question as to whether the dynamic of value-based delivery of products and services is happening in other business areas and if not, why not.

Why is this going to occur in IT/business relationship; is there anything intrinsically special about IT?

The concept of value based delivery is also occurring at the same time as partnering is becoming a key concern for IT users and vendors.

A willingness to enter into partnering relationships based on trust is not intrinsic to north European cultures, where organisations have historically only been comfortable dealing on a contract basis. Value and long term business relationships challenge these historical tenants.

Partnering needs to be based on shared risks and shared rewards and vendors will need to put money where their mouths are; quick win, short term thinking will have no place in this types of relationship. When, at the beginning of a contract it is unclear what the configuration of the deal is going to be, and it is therefore difficult to hammer issues into a hard contract, both sides of the equation will be required to demonstrate good deals of trust, with the onus, if anything, being heavier on the vendor's side.

The jury could be said to be still out as to whether users are demanding these approaches; users are certainly wise to sales messages of partnership and value which come to them through an historical filter.

Some users have stated that value based contracts appear a bad basis for commercial relationships and potentially represent a lawyers' field day.

Vendors are selling to experienced people who have had seen many different contract approach appear and disappear; vendors need be aware that often they are selling to bruised and sceptical people who may firstly believe that partnership and value are not the way to proceed, and secondly regard them purely as marketing hype.

The key to operating value-based contracts is in defining what are the projects business benefits and how will these be measured. Only then can contractual arrangements be struck

towards payment; a 50% payment up front and a delay of 12 months before final payments are made may be fairly typical.

Vendors face the question of whether these delays, and potentially longer delays of 2-3 years before the results can be proved and payments be made, are acceptable and attractive.

The ability to engage potential customer's senior executives in discussion about the contribution technology can make to an organisation in terms of value rather than purely cost is giving certain vendors an edge in the marketplace's consideration of service providers.

The development of the concept of "value-delivery" is part of the process of creating a differentiated, premium position and attempts to move a vendor up the value chain of positioning, pricing, and profitability away from pure IT based systems integration where margins are under intense pressure.

The development of this "value proposition" is in many ways analogous to the development over the last five years of Business Process Reengineering which, though as a theory has had many detractors, has had a significant impact on the systems development and integration industry.

As in the early period of the BPR movement there are, as yet, only fragmented details about the actual structure of these types of contract; vendors are, unsurprisingly, cautious about laying competitive details on the table. This tantalising situation of course plays into the hands of the doubters and sceptics.

Vendors should regard value-based contracts as another string to the bow not another bow; this is also undoubtedly a large versus small project issue. Is it only going to be large projects where business metrics come into play.

Some organisations will experience significant problems and become spectacularly unstuck. Scandal will no doubt drive out the charlatans and will emphasise the firms with a strong brand image.

The market will also see a number of vendors getting burnt because they didn't understand the real implications and then cutting down drastically, the deal making culture is not appropriate to these situations.

However, more and more contracts are being struck in this way (Delivering IT to non IT metrics) and though it should be recognised as a leading edge, and that the proportion it represents of overall contracts is still small, it is a major stage in the growing maturity of the marketplace.

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V

Major Country Market Analysis

A
France — New Mobile Services Set to Grow Rapidly

Though discussed since 1990, the transformation of France Telecom into a privatised company has not yet formally begun, though the process is still officially on schedule. A series of laws passed in July and December 1990 instituted the separation of telecommunications services aimed at ending the monopoly and providing competition.

To this end a series of major restructurings of the organisation have been undertaken culminating in early 1996 with a major reorganisation following the submission of the text of the deregulation law to parliament in April 1996. The law establishes a three-person regulatory authority that will oversee the technical aspects of deregulation.

Under the new environment France Telecom will be assigned the task of supplying universal service, such as specially tariffed services for the disadvantaged, phone booths, and directory services. The company will get the costs for these services covered from a "universal service fund". The finance will come from interconnection charges and contributions from all operators. Contributions will be prorated according to market share. Other operators can provide the above services but will not be compensated from the fund. There will be no limit to the number of operators or the types of services they can offer.

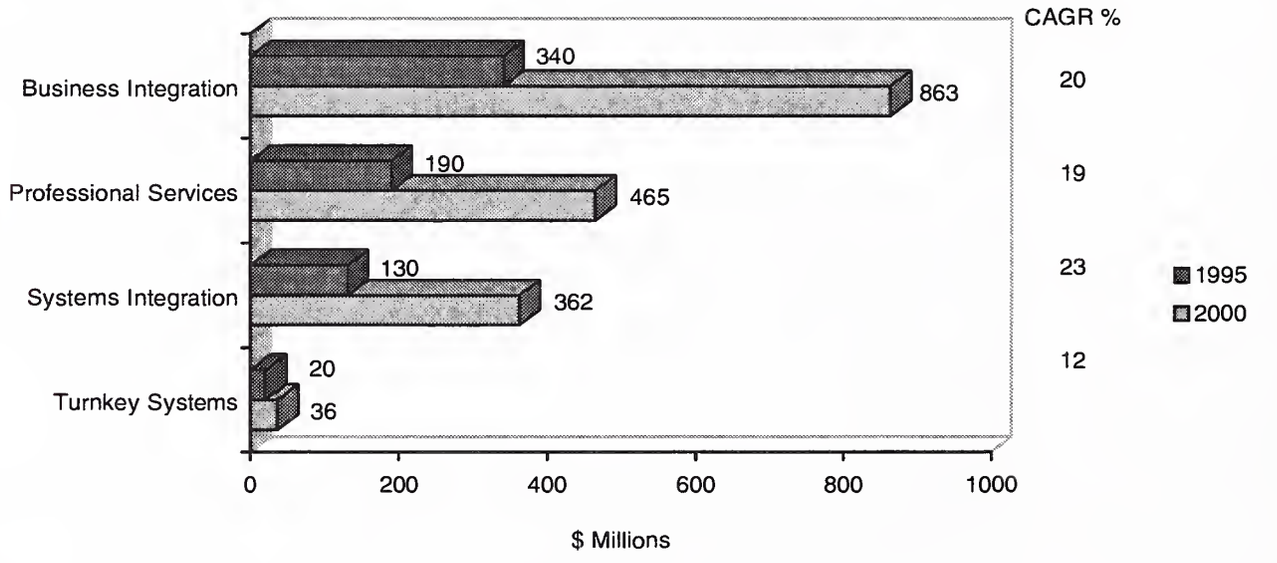
New service providers in France include the second cellular operator in competition with France Telecom, SFR, whilst Bouygues Telecom have been granted a license to operate a PCN service.

Exhibit V-1 provides forecasts of the growth rates of Business Integration services in the French telecommunication sector over the period 1995 to 2000, whilst Exhibit V-2 presents an analysis of these revenues amongst the five major types of telecommunication services; the traditional PTT operator (i.e. France Telecom), alternative and emerging competition to this, in France primarily Compagnie Generale des Eaux; cable and mobile telecommunication companies, and lastly the small but growing segment of Internet telephony.

These forecasts are based on the scenario, presented in Exhibit V-3 of the changing shape of telecommunication penetration rates within the French market until the end of the century. Under this scenario France Telecom's current control of 85% of the French telecommunications population will recede to 75%, with cable and mobile telecommunications services accounting for just over 20% of the market.

Exhibit V-1

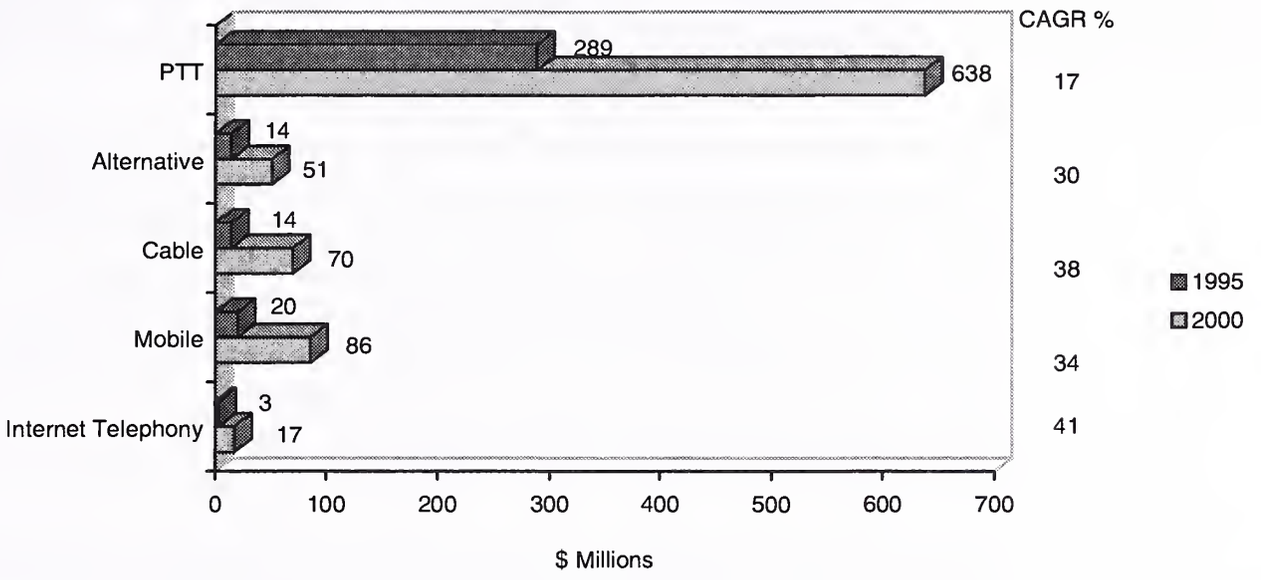
Business Integration Services Growth in Telecommunications Sector, France 1995–2000 ($m)



Source: INPUT

Exhibit V-2

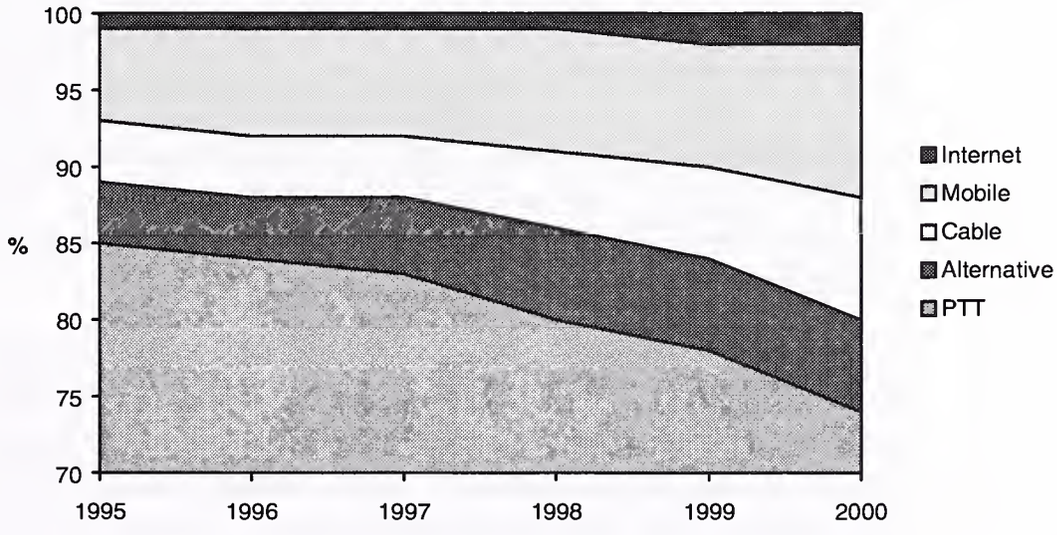
Business Integration Revenues by Telecommunications Type, France 1995–2000



Source: INPUT

Exhibit V-3

Telecommunications Penetration Rates, France 1995–2000



Source: INPUT

In cable and mobile, France is some way behind the other major country markets. Sweden, for example, has four million mobile phone users, whilst in France, a country with a population of 60 million, there are presently only one million users. However, France Telecom is investing heavily in rectifying this situation and these numbers will grow rapidly over the course of the coming years.

France Telecom, it is arguable, have lost the lead that it once had in European telecommunications markets, and its position on a global stage is beginning to falter. Although it has an ultra modern network which is 100% digitised, the ongoing resistance to the proposed changes in the national telecommunications market within French society is a complicating factor in accurately forecasting the rate at which it will attempt to become a truly international telecommunication player. These dynamics also complicate attempts to forecast the downstream opportunity for IT services vendors.

Currently, workers within the organisation are involved in a series of regular strikes aimed at stopping the privatisation process. It is commonly felt that senior managers are sympathetic to these actions. Though France Telecom is due to be privatised within the next three years, there are many sceptics who argue that this deadline many come and go without any real change.

France Telecom is aiming at prioritising developing ATM technology and directing investment in the local loop towards wireless and fibre optic in its trunk routes and is focusing on developing wideband services based on existing fixed network technologies, rather than purely on fibre optic networks. France Telecom are attempting to use normal telephone lines with ADSL or HDSL, which they argue, are enough to satisfy the requirements of business and residential consumers.

France Telecom's international alliance with Deutsche Telekom is regarded by the organisation as a way of gaining opportunities in the data networking market as well as in voice, and in the longer term as a way of developing company networks which can managed at an international level. It is also seen as a way of bringing through new technologies from international accounts into national markets.

Exhibit V-4 presents an analysis of leading Business Integration vendors in the French telecommunication sector.

Exhibit V-4

French Telecommunications Sector — Leading Business Integration Vendors 1995

Rank	Company	1995 Estimated Revenue ($ millions)	1995 Estimated Market Share (%)
1	Cap Gemini Sogeti	46	14
2	Sligos	36	11
3	IBM	26	8
4	Andersen Consulting	25	7
5	Sema Group	22	6
6	Groupe Bull	20	6
7	Alcatel	19	6
8	Syseca	17	5
9	FTLIS	13	4
10	EDS	11	3
	Total Listed	261	77
	Total Market	340	100

Source: INPUT

B

United Kingdom — Worldwide Test Bed for Truly Open Telecommunications Competition

The UK has been at the forefront of telecommunication deregulation in Europe because of the ideological position taken by the British Government, under the leadership of Margaret Thatcher, in the mid 1980's. The UK market has been almost totally open to competition since 1992 though there has been full scale competition to BT since 1986.

The UK telecommunications market now has more than 150 licensed operators in a market overseen by a regulator, Oftel, which sets tariff levels and adjudicates on other issues which affect competition in the marketplace.

The role of Oftel has been extremely important in opening up the UK market to players other than British Telecommunications (BT) and in dictating the way in which BT should compete with newer forms of service provision. For example, BT has been forced to make more than £1 bn of price cuts in the last 3 years. Oftel still view BT as too profitable and may look for further caps on pricing. This ironically and unintentionally affects BT's competitors in the market since their competitive parameters are mostly in undercutting BT on price.

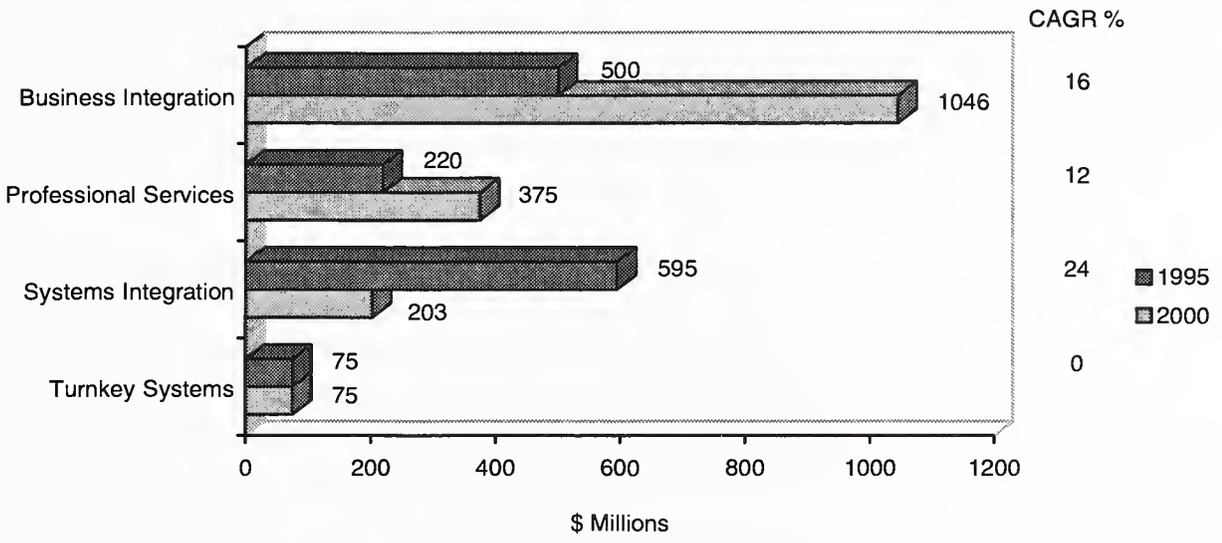
Deregulation, coupled with the ongoing intervention of Oftel are the primary reasons why the UK market is the most advanced telecommunications market in Europe, and hence why its uptake of Business Integration related services has been, and will continue to be in the medium term, higher than in larger overall economies.

Exhibit V-5 provides forecasts of the growth rates of Business Integration services in the UK telecommunication sector over the period 1995 to 2000, whilst Exhibit V-6 presents an analysis of these revenues amongst the five major types of telecommunication services; the traditional PTT operator, alternative and emerging competition to this; cable and mobile telecommunication companies, and lastly in Internet telephony.

IT related investments are being made at many different levels and promise to continue leading to even greater levels of competition. Advances in technology have created the potential for new services which in turn have allowed additional competition; particularly in mobile telephony.

Exhibit V-5

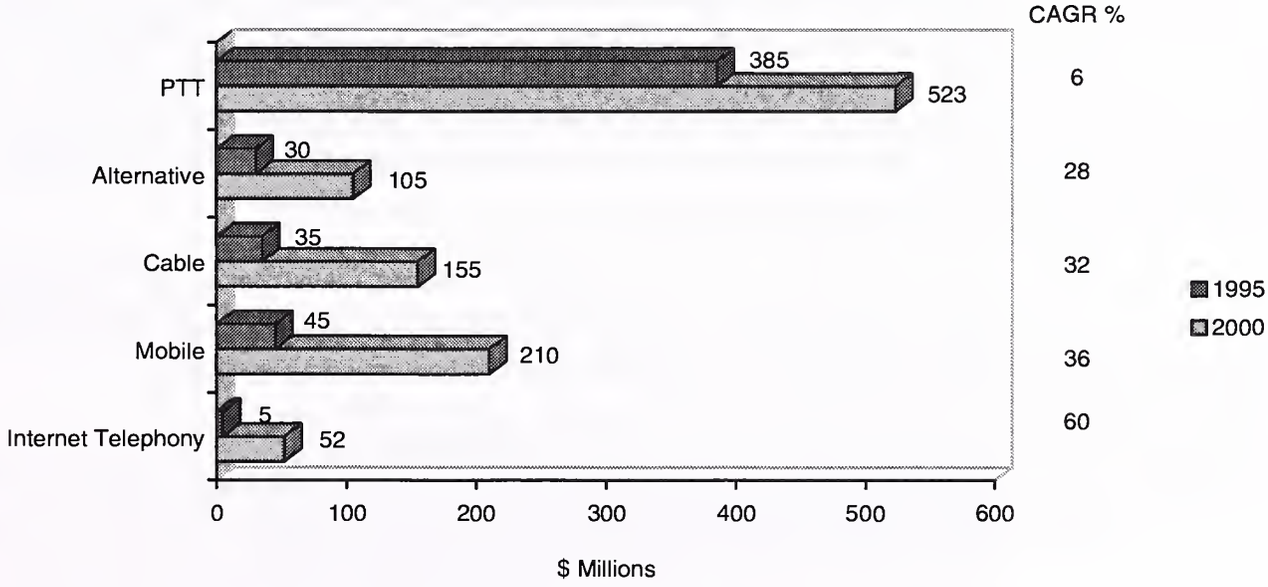
Business Integration Services Growth in Telecommunications Sector, United Kingdom 1995–2000 ($m)



Source: INPUT

Exhibit V-6

Business Integration Revenues by Telecommunications Type, United Kingdom 1995–2000



Source: INPUT

British Telecommunications now faces competition from many different sources; Cable & Wireless, was one the first to attempt to offer services which directly went "head to head" with BT. C&W, the UK's old Imperial phone service, was nationalised in 1947, privatised in 1981, acquired Mercury which was created in 1982 to compete against BT and has since then attempted to end BT's de facto monopoly on phone services. Mercury has grown solidly in the UK, but has retrenched from offering full competition to BT and is now concentrating purely on offering mobile services.

New firms are now in turn challenging Mercury. For example, COLT in the City of London and WorldCom on Trans-Atlantic business. The recent launches of Energis and Ionica, who will provide radio-based local loop services, are other examples. Energis Communications Ltd is a subsidiary of the National Grid PLC which operates England and Wales' electricity grid. Energis uses the electricity grid to transport voice services, by wrapping fibre optic cable around the earth wire slung between electricity pylons.

In addition to offering services to large volume customers and SMEs, Energis aims to resell capacity to other telcos which do not presently have an infrastructure in the UK, such as AT&T and Telia, the Swedish operator. AT&T are leasing lines from existing operators but provide more feature-rich voice and data services to, large international accounts known to them in the US market.

There are four mobile phone operators in the U.K. Mercury One-2-One, owned by Cable & Wireless, Orange (floated in London and New York in March 1996), Cellnet, and Vodaphone. Initially mobile telephony in the UK was offered by Cellnet, a joint venture between BT and the premises security company, Securicor. These offerings used the TACS standard.

In 1993 the first of the new GSM services was offered by Vodaphone, with Cellnet following in 1994. The most recent licences have been for DCS-1800 services, marketed as One-2-One and Orange.

A major criterion for success for mobile phone operators is coverage. After two years in the market, Orange has a national coverage of 85% while Cellnet and Vodaphone have achieved more than 95% coverage in 10 years. One-2-One has concentrated on the south-east of the country and has only a 40% coverage. However, it aims to have 95% coverage by the end of 1997. Cellnet and Vodaphone each have about 44% of the mobile market with the other two operators sharing the remainder almost equally.

The market is divided between analogue and digital services, with the former being offered only by the two original operators. The government has set a deadline for Cellnet and Vodaphone to convert all their customers to the digital network, based on the GSM (Global System for Mobile) standard, by 2005. The two companies have around 2 million customers each but at present only around 300,000 Cellnet customers and 450,000 Vodaphone customers are on GSM. Orange and One-2-One both use PCN (Personal Communication Network), a variant of GSM.

Another technology that will compete with both the mobile phone and the traditional telephone company is radio-based telephone service. In the U.K., Ionica is the first company to offer this type of service. The company is initially focusing on residential and small business markets. Radio-based services can challenge telephone companies in the area where they have traditionally had complete control - the local loop. Radio-based services are relatively simple to roll out since it only requires establishing a base station and then connecting users. Ionica holds a national licence in the U.K. and is required to have a 75% coverage of England and Wales within four years of its launch.

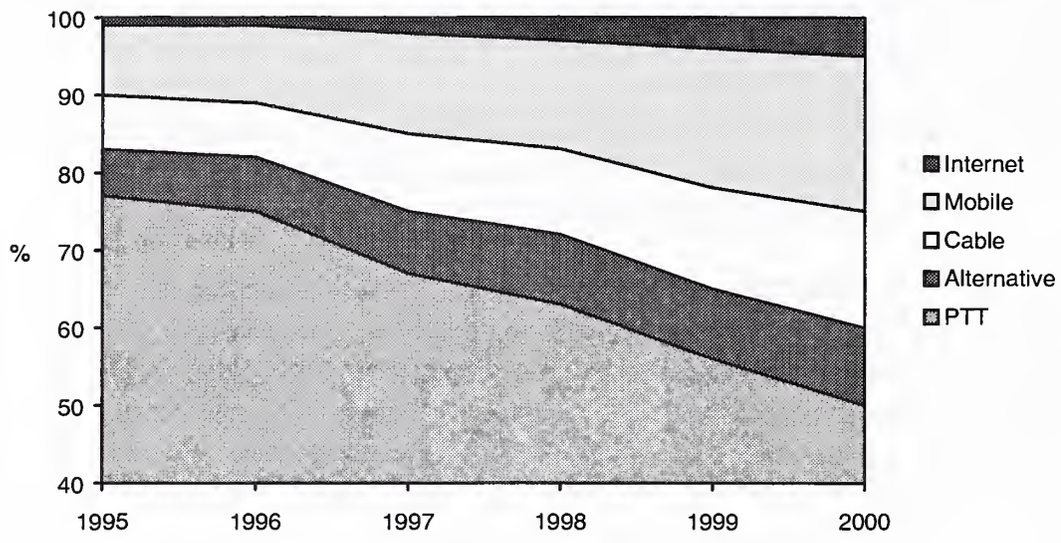
Cable operators have invested £5.2 billion in the U.K. and are committed to further investments of £6 billion before 2000. Cable companies hope to achieve the same penetration levels as have been seen in the U.S. where two-thirds of homes subscribe to cable. In the U.K. cable pass some 6 million homes, but only one in five have taken the service. Instead, the satellite TV company BSkyB is realising record profits. The cable operators originally believed that they could obtain a 50% penetration but they have now lowered their forecast to 30%. Nynex's cable-TV penetration has been stuck at 20% since 1994, which is close to the average figure from the Independent Television Commission (ITC) of 21%. At the same time the churn rate (drop-outs from the service) is running high at around 30% for Nynex.

The forecasts in Exhibits V-5 and V-6 are based on the scenario, presented in Exhibit V-7 of the changing shape of telecommunication penetration rates within the UK until the end of the century. Under this scenario British Telecom's current control of 77% of the British telecommunications population will dramatically recede to 50%, with mobile telephony taking the greatest part of the non-PTT telecommunications market.

Although mobile telecommunications will be the largest part of the non-PTT market, cable will also grow substantially. Cable companies have seen an enormous opportunity in offering telephony services, undercutting BT on price.

Exhibit V-7

Telecommunications Penetration Rates, United Kingdom 1995–2000



Source: INPUT

This service is doing reasonably well and should be further helped by number portability, which will be introduced later in 1996. The future also holds the prospect of a major take-up on Internet access.

One reason that cable could become a major force in connecting users to the Internet, is that cable modems can carry data at much higher speeds, up to 27 million bps, than ISDN lines (128,000 bps). However, ISDN is today available all over Britain while cable covers a much smaller portion.

Foreign Direct investment (FDI) in the UK telecommunications market is still limited but growing, primarily through the presence of US carriers participating in cable television franchises, many of which now offer telephone services.

Exhibit V-8 provides an analysis of leading Business Integration services vendors in the UK market.

Exhibit V-8

United Kingdom Telecommunications Sector — Leading Business Integration Vendors 1995

Rank	Company	1995 Estimated Revenue ($ Millions)	1995 Estimated Market Share (%)
1	IBM	52	10
2	Cap Gemini Sogeti	46	9
3	Andersen Consulting	44	9
4	Syntegra	43	9
5	ICL	26	5
6	Digital Equipment Corp	26	5
7	Siemens Nixdorf	23	5
8	Electronic Data Systems	23	5
9	Sema Group	22	4
10	Groupe Bull	20	4
	Total Listed	325	70
	Total Market	500	100

Source: INPUT

C

Germany — Major Challenges Produce Major Opportunities for IT Services Companies

Reforms in 1994 have legally separated Deutsche Telekom from Postbank and Postdienst with the role of regulation transferred from a Government department, the Bundesminister fur Post and Telecommunikation (BMPT), to an independent non-governmental body. These moves followed those made in 1990 which finally broke up the cartel for telecommunications which had been led by Siemens, Robert Bosch Telekom and Standard Electrik Lorenz.

Though privatisation of Deutsche is imminent, BT's experience has led some commentators to argue that privatisation may have come too late to allow Deutshce Telekom to compete as an international telecommunications operator. BT's recent past would suggest that it takes an extremely long time to reshape the organisation structure of such a large and ingrained body and to devise workable business strategies in new global environments whilst making the fewest number of necessary mistakes.

Deutshce Telekom AG is due to privatised in tranches between the third quarter of 1996 and 2000. This phasing is to allow the market to digest the shares successfully. At an estimated size of DM80 billions, an all-at-once flotation would have been extremely high-risk.

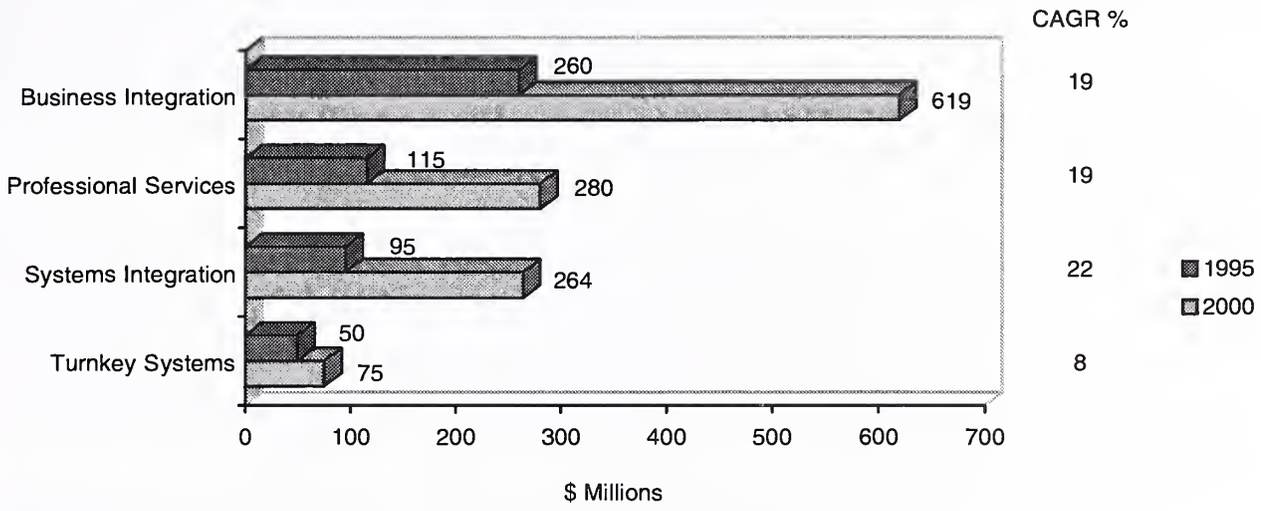
Exhibit V-9 provides forecasts of the growth rates of Business Integration services in the German telecommunication sector over the period 1995 to 2000, whilst Exhibit V-10 presents an analysis of these revenues amongst the five major types of telecommunication services; the traditional PTT operator, alternative and emerging competition to this; cable and mobile telecommunication companies, and Internet telephony.

Deutsche Telekom is basing much of its future strategy on its links with France Telecom and Sprint. However, this move represents any number of daunting challenges in terms of organisational reforms, accentuated by national differences and sensitivities, whilst facing tough competition from AT&T, BT-MCI, and Unisource, amongst others.

The deal provides Deutsche Telekom and France Telecom access to the US market and makes available the marketing skills of Sprint in Europe. These skills will be of particular importance to an organisation who admit that they lag far behind in terms of the sophistication of the way in which they approach the market.

Exhibit V-9

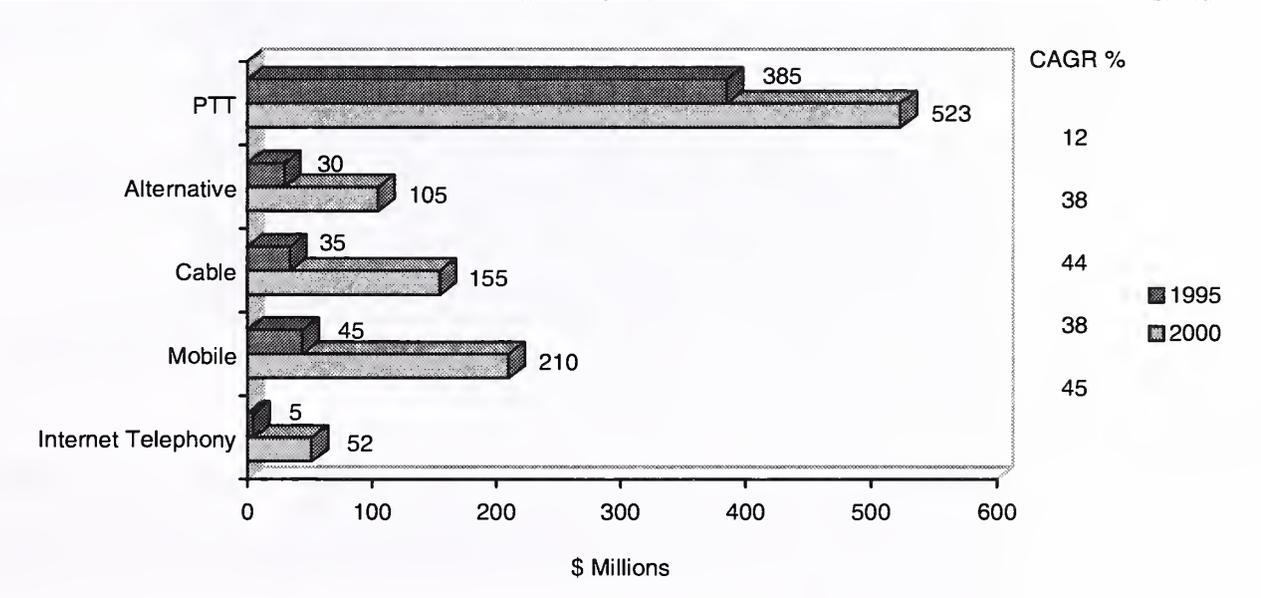
Business Integration Services Growth in Telecommunications Sector, Germany 1995–2000 ($m)



Source: INPUT

Exhibit V-10

Business Integration Revenues by Telecommunications Type, Germany 1995–2000



Source: INPUT

Germans commonly highlight the lack of customer orientation on the part of Deutsche Telekom, the time to install lines, lack of itemised billing, and an overall lack of choice in service provision, compared with consumers experience in the US and the UK. These limitations are generally recognised within the organisation. The aims include the provision of one-stop shopping and pan-European services such as 800 freephone, calling cards, virtual private networks, data and voice networks.

Part of the reason for this situation and one of the complicating factors in Deutsche Telekom's recent progress has been the impact of the reunification of East and West Germany. Through the need for a massive phase of investment in the former Soviet Block country investment in the old West Germany has come to something of a standstill.

Increasing competition in Germany is certain to make it extremely unlikely that Deutsche Telekom will recover the enormous investments it has made in bringing the former East Germany somewhere near up to speed.

At a political level opportunities to introduce competition have largely been ignored or fudged. A second cellular operator has been licensed to provide a GSM service to compete with DeTeMobil, Deutsche Telekom's mobile offering. This operator is a consortium led by Mannesmann GmbH, including Pacific Telesis and Cable & Wireless. The third mobile player is E-Plus.

DeTeMobil are forging ahead with innovative new developments including applications such as being able to access e-mail programmes from a mobile phone.

Deutsche Telekom is well advanced in its utilisation of ISDN, however, it lags behind other advanced mature country markets in terms of the overall service provision.

Recognising this Deutsche Telekom have embarked on an extensive period of investment in the local loop to ensure as its annual report puts it that "the information superhighway does not end in Germany in a dirt road".

They are aiming at providing standard optical fibre access to about 1.5 households by the end of 1996, and if this is successful Deutsche Telekom will be the first organisation to install household optical fibre access on this scale.

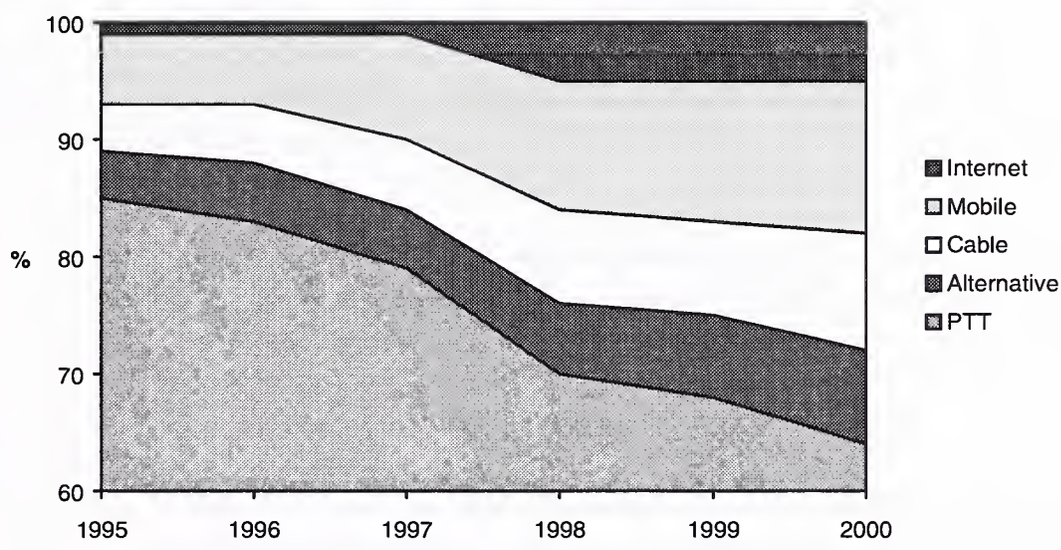
In other initiatives, Deutsche Telekom have recently begun to move overseas in addition to the Sprint venture, acquiring a share of Matav, the Hungarian PTT and in 1994 a stake in the Societe European des Satellites for $300m, which broadcast TV under the branding Astra, across Europe.

The forecasts in Exhibits V-9 and V-10 are based on the scenario, presented in Exhibit V-11 of the changing shape of telecommunication penetration rates within the German market until the end of the century. Under this scenario Deutsche Telekom's current control of over 85% of the British telecommunications population will slowly decline to nearer 65%, with mobile telephony taking the greatest part of the non-PTT telecommunications market.

Exhibit V-12 provides an analysis of leading Business Integration services vendors in the German market in 1995.

Exhibit V-11

Telecommunication Penetration Rates, Germany 1995–2000



Source: INPUT

Exhibit V-12

German Telecommunications Sector — Leading Business Integration Vendors 1995

Rank	Company	1995 Estimated Revenue ($ Millions)	1995 Estimated Market Share (%)
1	IBM	34	13
2	Cap Gemini Sogeti	28	11
3	Digital Equipment Corp	23	9
4	Siemens Nixdorf	23	9
5	Andersen Consulting	19	7
6	Electronic Data Systems	19	7
7	Compunet	17	7
8	Groupe Bull	15	6
9	Computer Sciences Corp	12	5
10	AT&T	12	5
	Total Listed	202	77
	Total Market	260	100

Source: INPUT

D
Italy — Increasingly Moving to Mobile Telephony

In early 1995 Telecom Italia took over the former responsibilities of the myriad host of telecommunications organisations which for many years ran the countries telecommunications interests. These included SIP, Iritel, Italcable, and Telespazio.

The majority share holding of Telecom Italia is held by STET, the Italian telecom holding company, which in turn is 53% owned by IRI, the Italian state holding company.

The Italian telecommunications market, though simplified by the actions of the last two years still presents a formidable challenge to those attempting to offer services into it and full privatisation still appears some way off, though it is slated to happen this year. Restructuring of the overall industry is still underway with Siemens recently being chosen as a strategic partner for Italtel.

Telecom Italia has suffered from low levels of investment in its public switch network. However, this has been, to a degree, rectified over the course of the last few years and since 1993 there has been a considerable programme of investment to modernise networks and extend the coverage of the networks to something approaching nation-wide coverage. Resultingly, over 70% of the network is now digital.

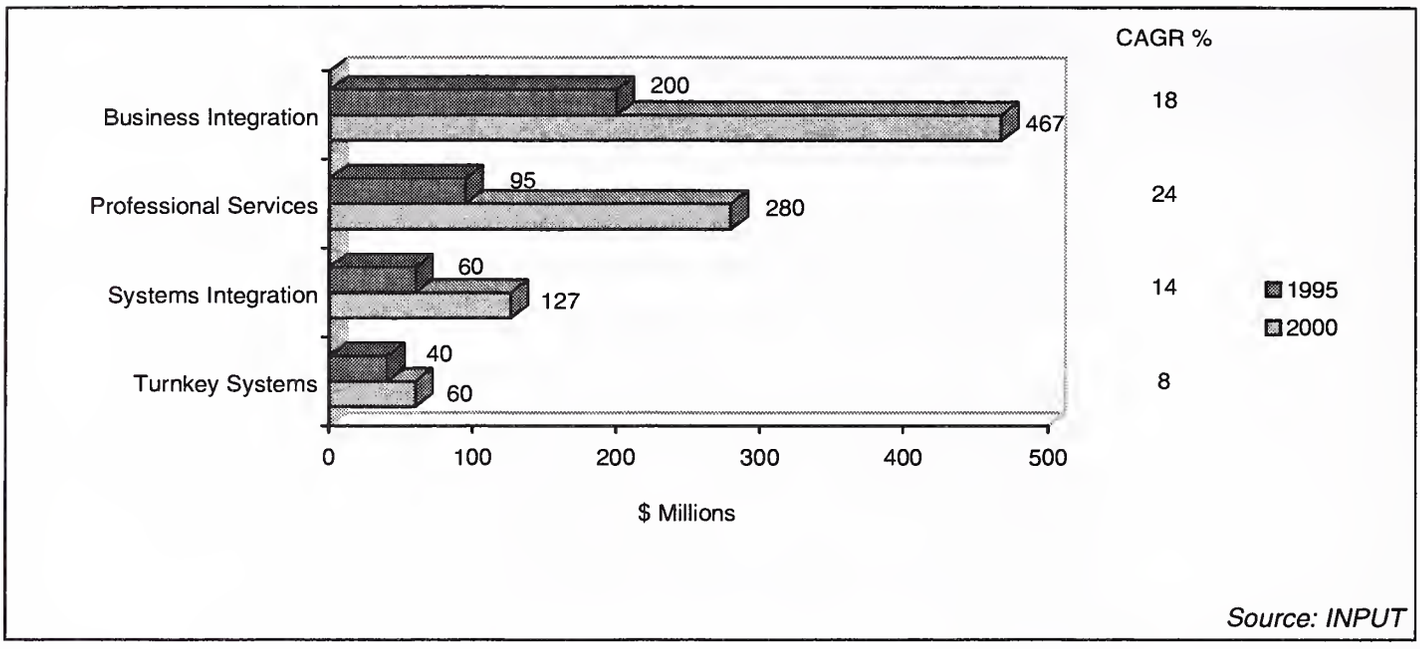
Telecom Italia is focusing on developing an extensive new fibre optic network to attempt to reduce costs for large volumes of broadband traffic. At the same time the organisation is attempting to align tariffs with those of other mature countries, recognising that its traditional high rates have reduced demand for new services.

Exhibit V-13 provides forecasts of the growth rates of Business Integration services in the Italian telecommunication sector over the period 1995 to 2000, whilst Exhibit V-14 presents an analysis of these revenues amongst the five major types of telecommunication services; the traditional PTT operator, alternative and emerging competition to this; cable and mobile telecommunication companies, and lastly for the growing segment of Internet telephony.

These forecasts are based on the scenario, presented in Exhibit V-15 of the changing shape of telecommunication penetration rates within the Italy until the end of the century. Under this scenario Telecom Italia will retain a substantial part of the overall telecommunications market.

Exhibit V-13

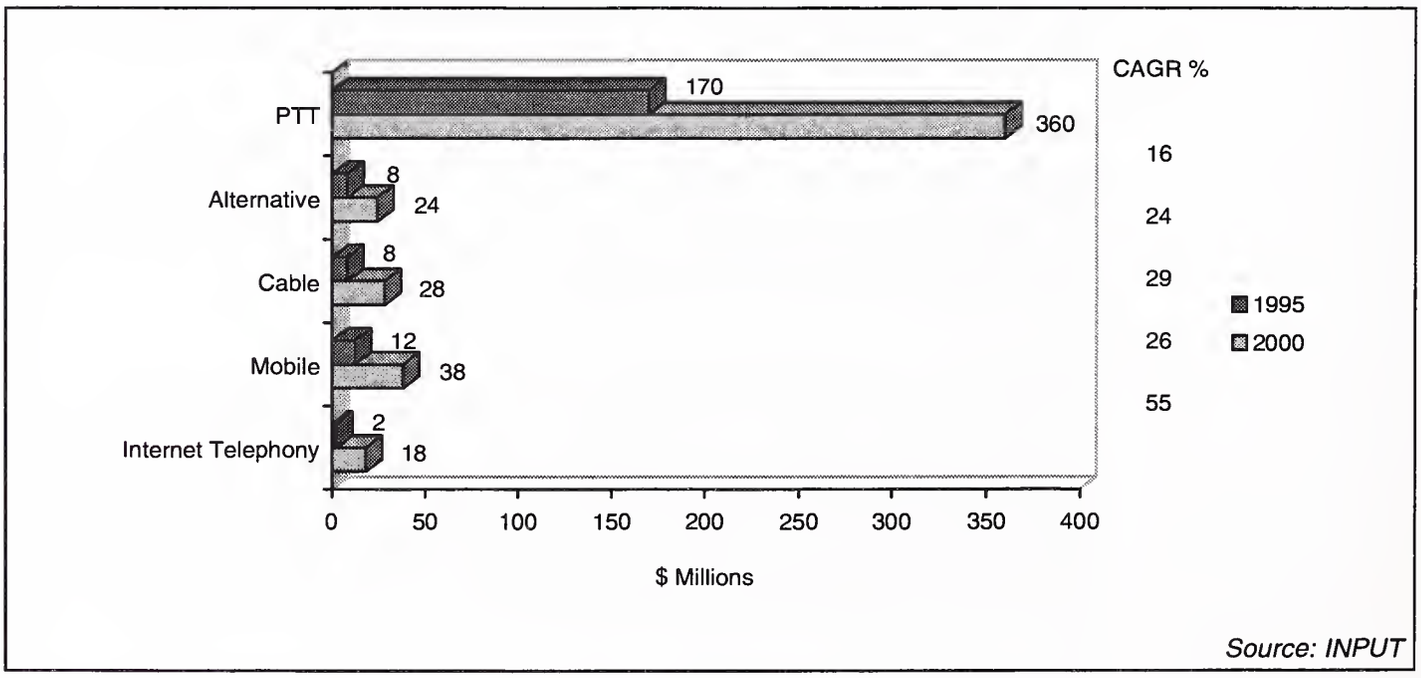
Business Integration Services Growth in Telecommunications Sector, Italy 1995–2000 ($m)



Source: INPUT

Exhibit V-14

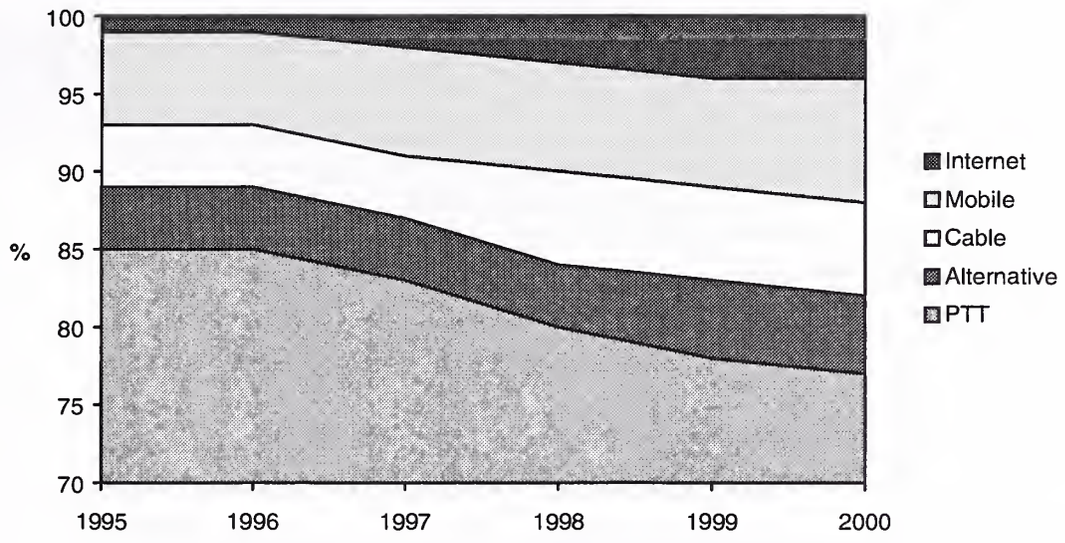
Business Integration Revenues by Telecommunication Type, Italy 1995–2000



Source: INPUT

Exhibit V-15

Telecommunication Penetration Rates, Italy 1995



Source: INPUT

The take up of mobile services in Italy has been rapid with the development of a cellular network which now has over three million users. Telecom Italia state that there will be 10 million cellular users using GSM technologies by 2000. Telecom Italia Mobile, the state owned mobile provider is now being provided with competition by Omnitel-Pronto Italia, a joint venture involving Olivetti, Air Touch, and the US company Cellular Communications. The Mobile telephony population will grow quickly and by 2000 will represent 15% of the overall market. Cable and Internet telephony will account for the remaining 5%.

Telecom Italia is fast attempting to develop its IDSN capabilities, particularly in the under developed regions of the South. The organisation is developing its ATM capabilities and is currently running a number of ATM feasibility projects.

Exhibit V-16 provides an analysis of leading Business Integration services vendors in the Italian market in 1995.

Exhibit V-16

Italian Telecommunications Sector — Leading Business Integration Vendors 1995

Rank	Company	1995 Estimated Revenue ($ Millions)	1995 Estimated Market Share (%)
1	Cap Gemini Sogeti	37	18
2	Groupe Bull	25	12
3	IBM	21	10
4	Finsiel	18	9
5	Olivetti	18	9
6	Andersen Consulting	13	6
7	Sema Group	9	4
8	Hewlett-Packard	5	2
9	Alcatel	4	2
10	Logica	2	1
	Total Listed	149	75
	Total Market	200	100

Source: INPUT

E

Sweden — Telia Faces Significant New Competition

In 1993 the state run National Telecom Agency (Telestyrelsen) became the regulatory body for telecommunications in Sweden. Televerket became a public limited company, although still 100% state owned and changed its name to Telia AB. Telia will be privatised in the course of the next two years.

Though the provision of basic network services is open to competition it is in the area of data transmission services and international telephony that Telia AB's virtual monopoly is effectively challenged.

However, at the overall level Sweden is one of the most open telecommunications markets in the world.

In basic voice provision Telia is being challenged by Tele2, 40% owned by Cable & Wireless. In cellular, the state owned mobile player, Telia Mobitel, is faced with competition from Comvik, and NordicTel, in which AirTouch have stakes along with Vodafone and the Swedish automobile manufacturer, Volvo.

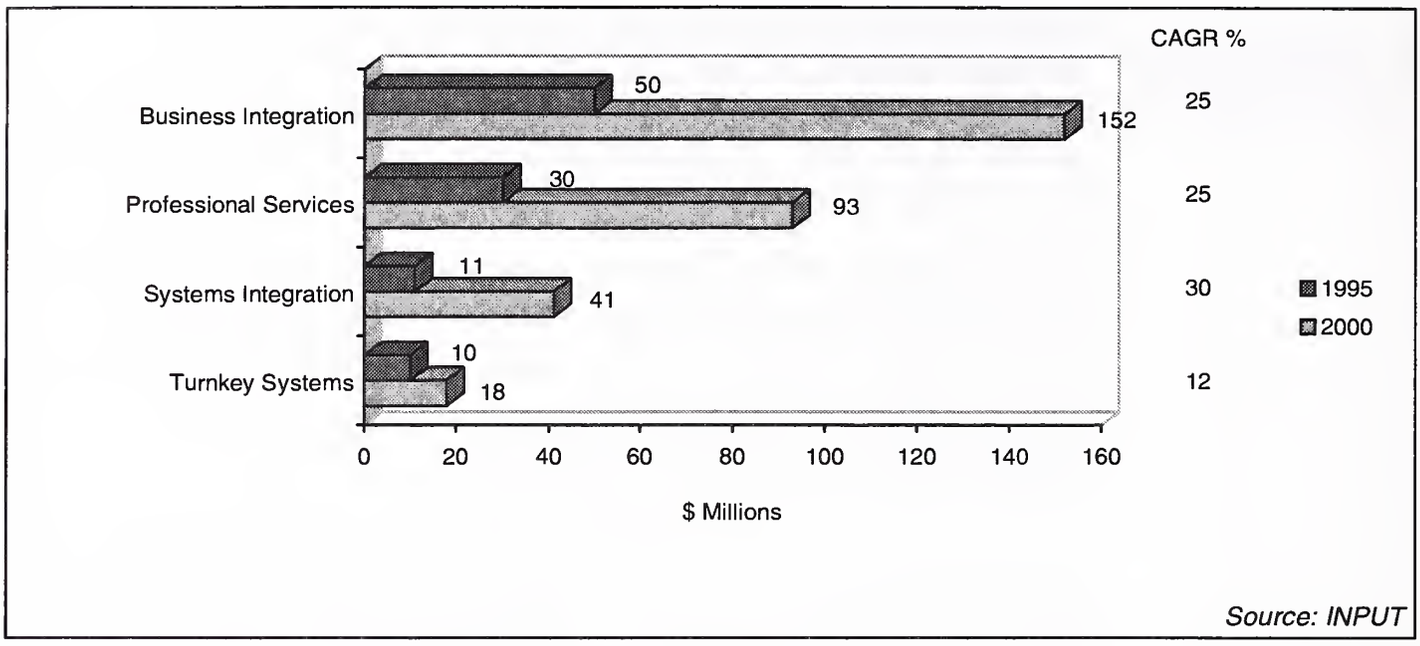
Exhibit V-17 provides forecasts of the growth rates of Business Integration services in the Swedish telecommunication sector over the period 1995 to 2000, whilst Exhibit V-18 presents an analysis of these revenues amongst the five major types of telecommunication services; the traditional PTT operator, alternative and emerging competition to this; cable and mobile telecommunication companies, and Internet telephony.

These forecasts are based on the scenario, presented in Exhibit V-19 of the changing shape of telecommunication penetration rates within the Swedish market until the end of the century.

Exhibit V-20 provides an analysis of leading Business Integration services vendors in the Swedish market in 1995.

Exhibit V-17

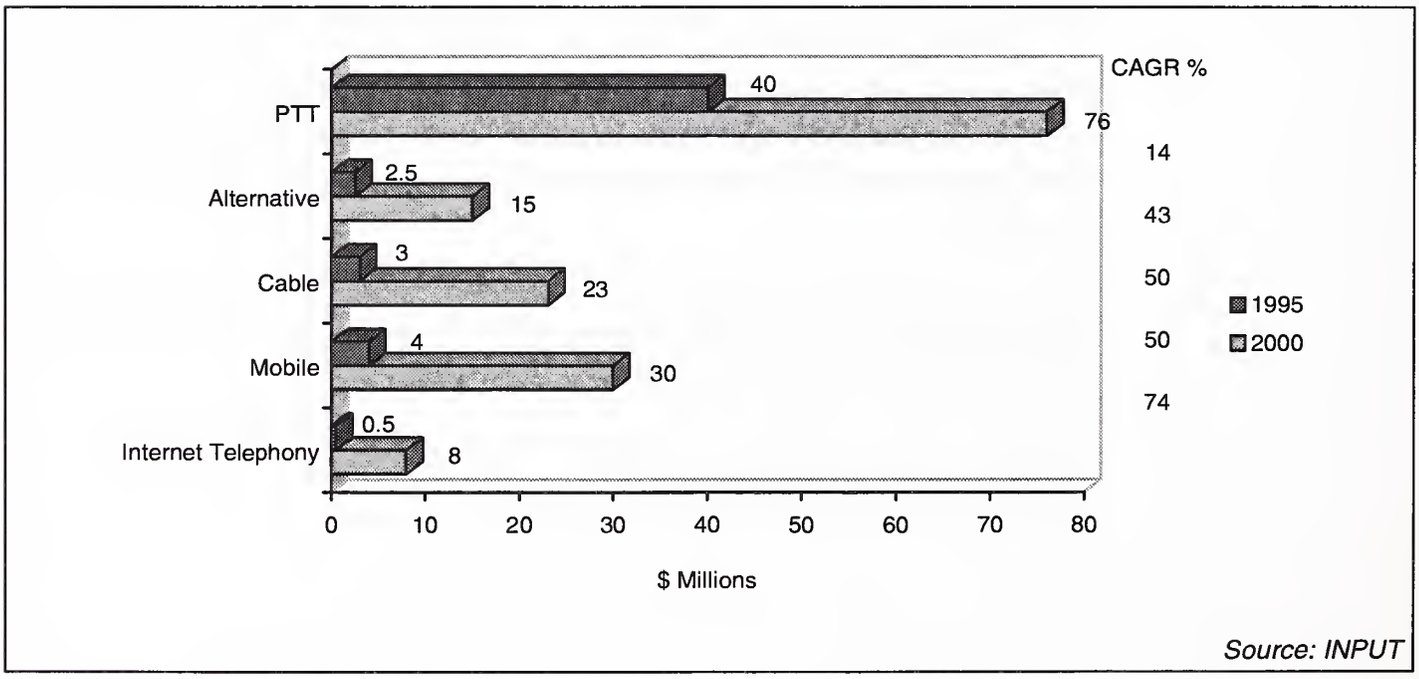
Business Integration Services Growth in Telecommunications Sector, Sweden 1995–2000 ($m)



Source: INPUT

Exhibit V-18

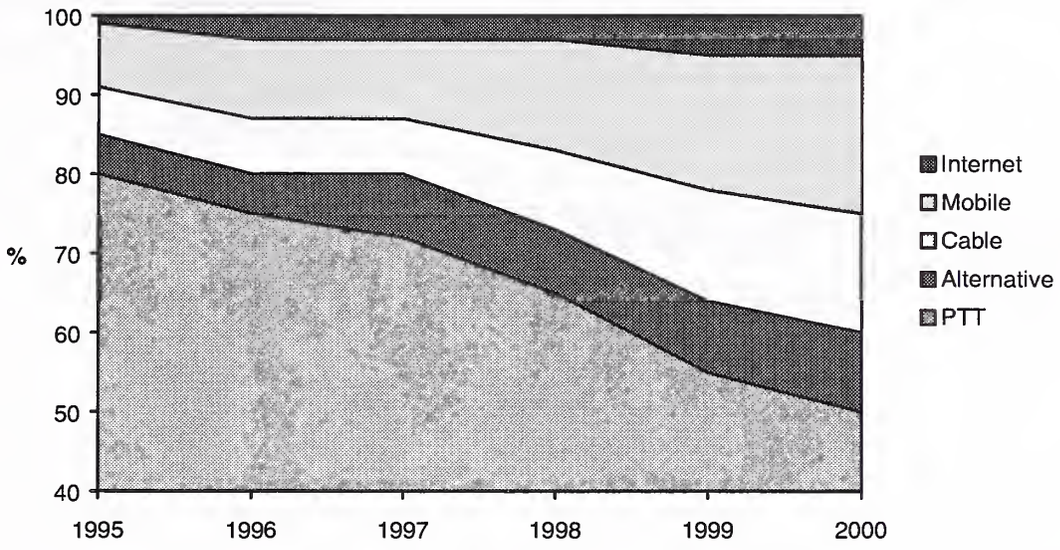
Business Integration Revenues by Telecommunication Type, Sweden 1995–2000



Source: INPUT

Exhibit V-19

Telecommunication Penetration Rates, Sweden 1995



Source: INPUT

Exhibit V-20

Swedish Telecommunications Sector — Leading Business Integration Vendors 1995

Rank	Company	1995 Estimated Revenue ($ Millions)	1995 Estimated Market Share (%)
1	Cap Gemini Sogeti	9	18
2	Celsius	8	15
3	Andersen Consulting	6	13
4	Groupe Bull	5	10
5	Siemens Nixdorf	5	9
6	ICL	4	7
7	Electronic Data Systems	4	8
8	Sema Group	4	8
9	Compunet	2	4
10	Logica	2	2
	Total Listed	49	98
	Total Market	50	100

Source: INPUT

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VI

Profiles of Leading Business Integration Services Vendors in Telecommunications

The following chapter provides short profiles of 11 leading Business Integration vendors focusing on their service offerings and capabilities in the European telecommunications sector.

A

Syntegra — Major Challenges and Opportunities in the New World of Telecommunications

Syntegra is a wholly owned systems integration division of British Telecom (BT) and was formed from a number of BT profit centres in 1990. By the year 2000, Syntegra's stated aims are to become:

- A leading prime contractor for large communications intensive projects
- A leading systems integration vendor in selected global markets.

In 1995, Syntegra had approximately 1550 employees and an annual turnover of £220 million. Of this, about 15% of staff and 15% of revenues can be ascribed to the telecommunications sector — i.e. approximately 250 employees generating annual telecommunications revenues of £30 million.

Given that Syntegra is a fully owned subsidiary of BT, in the telecommunications sector, its telecommunication fortunes are to an extent dependent on those of its parent. At present it is estimated that 98% of BT's revenues are generated within the UK.

This market is suffering the 'double whammy' of increased penetration by competing mobile phone operators and protracted disputes with Oftel over permissible rates of return on capital. These may decline from around 15% currently to as low as 8% in the near future, if the government regulator succeeds in reducing BT's monopoly powers.

These external forces limit Syntegra's ability to capture more telephony - related IT business. Whereas in general the IT service vendor market for telecommunications is growing at about 20% annually, Syntegra's telecommunications growth is static and may actually have declined over the last couple of years.

Syntegra's best prospects for increased growth in the telecommunications service sector reside with BT's ability to compete with AT & T as a global telecommunications provider. To further this aim, in 1993, BT formed a strategic alliance with MCI, with the objective of providing global communications services. The partnership aims to attain leading edge technologies in international voice and data networking.

Within Europe, approximately 90% of Syntegra's telecommunications business is UK-based, with the remaining 10% based in continental Europe. Syntegra's 1995 acquisition of Paris-based Europe Informatique (EI) may help to broaden its offshore focus, given EI's expertise in client-server systems and implementation of SAP applications. To date, all Syntegra's non-UK work has been project-based.

As a BT subsidiary, Syntegra is limited to serving BT's PTT business and mobile phone subsidiary Cellnet. Project phases commence with Syntegra's provision of professional services followed by systems integration support. The main focus of projects is as follows:

- Card related services
- Document image processing
- Network traffic management systems
- Data mining
- Data migration.

Syntegra is active in the deployment of:

- Client/server technology
- Federated databases.

Syntegra is developing:

- Object orientation technology
- Multi-media capabilities.

When BT operated as a near monopoly, Syntegra's connection to its parent has been an historical competitive advantage — BT was growing rapidly and follow on work to Syntegra could be assured. However, as the number of players entering the UK telecommunications sector has increased, and main growth has shifted to the mobile phone sector, the usefulness of Syntegra's dependent status on BT appears increasingly limited.

One on hand, as a subsidiary of a BT, it cannot compete for IT service vendor work with BT's competitors. On the other hand, Syntegra is being made to compete with other IT service vendors such as Logica for some of BT's own work. Moreover, this total dependence on the parent company is limiting the skill set of Syntegra's work force.

Syntegra's best opportunity to compete for Telecommunications business lies in its ability to offer its services *independently* of its parent, so that it may gain access to new technologies outside of BT's core activities.

The emerging batch of new telecommunications may be seen as an increasing competitive threat to Syntegra. Unlike BT, these new telephony suppliers are at the forefront of change in emerging technologies and better placed to sell their newly acquired technological know-how to third parties.

Syntegra's professional services arm is also perceived to be faced with increasing competitive pressures, as demand increases for US-based telecommunications experience.

B

Logica — Well Placed in European Telecommunications Markets

Logica competes in the following vertical markets (percentage of 1994 total revenues in brackets):

- Manufacturing (20%)
- Transport (9%)
- Utilities (10%)
- Telecommunications (10%)
- Banking and finance (25%)
- Insurance (7%)
- Government services (16%)
- Systems software products (3%).

In 1995, Logica had approximately 3500 employees worldwide and a June 1995 FYE revenue of £250 million, with after tax profits of £20 million. 50% of revenues were derived in the UK, 26% in Europe, 14% in North America and 10% Asia/Pacific/Middle East.

Within Europe its main telecommunications markets, in descending order, are the UK, Sweden, the Netherlands, Belgium, Italy, Germany and the Czech Republic. Excluding project managers, between 50 to 100 employees are employed directly in telecommunications business within Europe, and 1995 the sector generated some $54 million in revenues.

Logica's telecommunications business has its main focus in the following applications:

- Customer care
- Customer billing
- Network traffic management systems
- Data warehousing/mining

- Fraud control.

With its breadth of staff resources, the company is able to put together comprehensive packages of IT services tailoring systems integration expertise with professional services consulting and turnkey systems provision. The mobile telecommunications market is perceived to be the main vehicle for future growth, whilst Internet telephony is viewed to offer new consulting opportunities. Logica is active in the deployment of:

- Voice interfacing and voice recognition technology
- Intelligent networks
- GSM (group special mobile).

Logica's highest European growth rates have been achieved in Sweden in collaboration with Telia. In the UK, key telecommunications clients include:

- Racal — specification and construction of Vodaphone billing system
- Hutchison Telecom — management of telepoint customer administration
- BT/DSC — network management of local loop
- Energis Communications Limited — implementation of Energis calling card and the integration of two separate billing and telemarketing systems to create a one-stop customer service centre
- A North American mobile telecommunications provider — evaluation of the viability of a UK license application.

Logica appear well placed to capitalise on future growth in the telecommunications industry, and particularly the mobile sector, given its already established client base. It has a long-standing record of industry expertise and has developed a globalised network of subsidiaries, including a strong presence in the United States. It also has a strategic position in leading edge technologies including neural networks, speech recognition and signal processing.

Logica operates in fragmented markets across Europe, and this, in Logica's view, has limited the dominance of any one competitor. Logica see Anderson Consulting as a key future threat to its professional telecommunications consulting activities, but perceives its main competitive advantage as being its "ability to more accurately match the needs of its clients — bespoke or otherwise".

Logica's success in forming strategic partnerships has facilitated its ability to keep abreast of technological change — the experience gained through "learning on the job" with blue chip clients has been a major factor in its becoming a top ten European systems integration company.

C
Groupe Bull — Telecommunications; A Key Vertical Market

After suffering continual losses in the period between 1989 and 1994, in 1995 Groupe Bull returned to net profits of FF306 million. The return to growth at the overall group level is the result of extremely strong performance in what Bull characterise as their growth businesses (including systems integration and professional services) and has compensated for a decline in their basic businesses (enterprise servers and maintenance revenues).

With the announcement in late 1995 of a new ownership structure, Bull appear to have reached a period of financial and strategic resolution. NEC and France Telecom are planned to hold 17% of Bull's stock, Motorola 17%, Dai Nippon and IPC, the Singaporean company each with 4%, IBM with just under 2% and Bull employees with between 5 and 10%.

Groupe Bull's Business Integration and Outsourcing interests are now branded under the name, Integris. In Europe, Integris has over 400 staff dedicated to providing systems integration solutions to telecommunications businesses.

European staff are located at three core competency centers, with the country split of personnel as show in Exhibit VI-1.

Integris also has 2 to 3 people 'on the ground' in most European countries. In addition, in the near future, a UK customer care division is planned.

Worldwide, other key markets include Brazil (50 -70 current Telecommunications dedicated staff) the United States (in conjunction with Motorola) and China (two operating bases are planned here in the near future, designed to target South East Asian markets).

The location of Integris' telecommunications staff are shown in Exhibit VI-1 whilst Integris' telecommunications related revenues are shown in Exhibit VI-2. Over a four year period between 1994 and 1997 inclusive, these current and projected SI revenue figures translate as a CAGR of approximately 37.5%. These revenues represent one third of the total turnover Group Bull makes from sales to the telecommunications industry, the remaining two thirds being derived from equipment and infrastructure sales.

In the near future, greatest growth is expected to derive from servicing new entrants to the mobile communications market — e.g. the French utility companies and Bouygues, a French construction conglomerate.

Exhibit VI-1

Integris — Location of Telecommunications Focused Staff

Country/Region	Number of Employees	Nature of Business
Scandinavia	approx. 50	Voice processing/intelligent networks
Germany	150-200	Customer care and billing
France	approx. 20	Telecommunications management networks

Source: INPUT

Exhibit VI-2

Current and Forecast Integris Revenues in Telecommunications

Year	Revenues in US$ millions
1994	56 (excluding Wang)
1995	70
1996	92 (forecast)
1997	145 (forecast)

Source: INPUT

About 55% of Integris' telecommunication related revenues are attributable to applications.

Applications expertise is held in the following areas:

- Control of PC's through LANS and WANS
- Operational support systems (wireline and wireless; CATV)
- TMN management based on ISM
- Open voice and enhanced services — intelligent networks and peripherals
- Intelligent Networks — service nodes
- Call centres.

In conjunction with partners such as Motorola, Integris is capable of providing SI and professional service offerings across PTT, cable and mobile telecommunications. Internet telephony is being handled separately by a division managed by NEC. Key European reference sites include France Telecom, Deutsche Telecom, SITA and Telia in Sweden.

Integris' sees its three main competitive advantages as being:

- Strong partnerships forged with other leading IT players including Tandem Computers, NEC, Motorola and France Telecom
- Its pan-European bias, providing "favoured account" status with Euro-centric companies
- Direct expertise in manufacturing, permitting better integration of technologies.

Groupe Bull see that its main competitors in the SI area are IBM, Andersen, Sema, Logica and CGS and from a technology perspective, IBM, HP and Digital are perceived as its main competitive challengers.

D

Andersen Consulting — Huge Opportunities in the "Infocosm"

Andersen Consulting (AC) is a globalised organisation, employing over 32,000 people in 152 offices and 47 countries. The firm uses an organisational matrix structure, combining and integrating services from its various service lines and delivering what it describes as "business integration solutions". The matrix melds together the combined inputs of three divisions:

- Competencies, resources and quality
  - strategic services
  - TIS
  - BPM
- Markets
  - products
  - financial services
  - public sector
  - telecoms
  - utilities
  - health care
- Regions
  - EMEAI (Europe, Middle East, Africa and India)
  - The Americas
  - Asia/Pacific

The European organisation (EMEAI) including the Middle East, Africa and India, operates through 60 offices in 24 countries. However, whilst EMEAI exists as a geographical entity, from a telecommunications perspective, the business is global. For reference purposes, the EMEAI operation employs approximately 900 staff dedicated to telecommunications business, of whom about 85% are consultants.

In September 1995, AC established a Communications Industry Group responsible for targeting communications industry clients worldwide, an area it labels the "Infocosm". This global structure comprises both geographic specialists and business integration specialists.

The reorganisation is a determined effort on the part of Andersen Consulting to transcend servicing clients in regional trading blocks (NAFTA/EC/ASEAN), choosing instead to create a fluid operational structure aimed to service the needs of globalised telecommunications players.

The firm's Communications Industry Group has more than 4,000 consultants worldwide, many of them skilled in several disciplines. This multi-skilling permits Andersen Consulting to gain added marketing leverage, with individuals promoted as geographical market specialists *and* industry specialists.

Exhibit VI-3 shows Andersen's worldwide and EMEAI derived revenues.

Exhibit VI-3

Current and Forecast Andersen Consulting Revenues from Telco Projects

Year	Worldwide Telco Revenues in US$ millions	EMEAI Telco Revenues in US$ millions
1992	192	26*
1993	239	34*
1994	364	52*
1995	573	124
1996	590 (forecast)	148* (forecast)

Source: INPUT

For the last three consecutive years, Andersen Consulting's worldwide telecommunications practice has achieved the fastest growth rates of any of the firm's six market sectors.

In 1996, Andersen Consulting anticipates its worldwide revenues to reach $4.22 billion: assuming the worldwide telecommunications practice accounts for between 13.5 -14% of this total, INPUT forecasts Andersen Consulting's worldwide telecommunications revenues to be $590 million and its EMEAI telecoms revenues to be $148 million. This translates as a 1995-96 EMEAI telecommunications growth rate of between 30-35% CAGR.

In revenue terms, Andersen's largest European markets are Germany, France, UK, Spain, Italy. The practice is also active in Hungary and Scandinavia.

As a business facilitator rather than an IT specialist, Andersen Consulting relies on the R & D resources of its client partners to supplement its lack of technical 'hands on' expertise. Main clients who have been influential in this pedagogical process include Belgacom, Telephonica and AT & T Wireless services inc. (formerly McCaw Cellular Communications Inc.).

The main applications being developed by Andersen in conjunction with its clients include:

- Customer contact solutions, including customer care and billing systems
- Wireless communications
- Network support services
- Implementation of interactive broadband networks.

Given the worldwide trend towards telecommunications deregulation, Andersen Consulting appears well placed to meet industry globalisation, and is perhaps uniquely placed to offer the following:

- Strength in multi-disciplinary, front end management consultancy skills, including in-depth experience in SI and BPR
- Credibility in business consulting with senior executives of a *non-IT* background
- A flexible matrix structure, permitting skills to be mixed and matched to suit the precise needs of its customers and cross fertilisation of ideas across functional, regional and geographic sectors
- A results-oriented culture which compels staff to offer a level of dedication and flexibility above and beyond industry norms. This means that its 'rapid reaction force' approach to worldwide business is achievable.

E

Alcatel — Targeting Business Integration Opportunities

Alcatel Alsthom is a recently privatised international producer of infrastructure equipment for the communications systems, energy and transport sectors.

Alcatel, the communications systems division, is responsible for two thirds of Alcatel Alsthom revenues and has in excess of 124,000 employees, of which 70 to 200 staff are dedicated to European SI telecommunications business (including sales).

Since 1993, Alcatel's telecommunications equipment business has been put under increasing cost cutting pressure by major PTT customers, who have forced down public switching prices by more than 25% in Germany and Spain and 10% in France and Italy. In turn, growth in equipment sales has slowed to 5% CAGR between the years of 1993-1995. Compounding these difficulties, growth in Alcatel's software development business has also been stagnant, reaching a nadir of stagnant growth between 1991 and 1993.

In contrast, in 1993, Alcatel's technical integration/implementation revenues grew by 20% and its IS consulting revenues by 30%: 1995 projected revenues for these businesses stand at an increase of 20% over 1994.

These businesses will play an increasingly important role for Alcatel in future, as the company restructures its telecommunications business to improve strategic orientation and competitiveness for the forthcoming deregulation of the European telecommunications market.

In 1995, Alcatel generated $60 million of SI telecommunications revenues worldwide, half of which resulted from European business, and the remainder split chiefly between markets in Indonesia, Brazil, India and China. The largest single customer was France Telecom, responsible for $20 million of business.

Alcatel's European SI telecommunications revenues are forecast to grow at 36% CAGR between 1995-1997, with the breakdown as shown in Exhibit VI-4.

Exhibit VI-4

Alcatel Systems Integration Forecast Revenues 1995–1997

Year	Revenues in $ millions
1995	30
1996	40 (forecast)
1997	70 (forecast)

Source: INPUT

The main technologies being developed by Alcatel are in:

- ATM (Asynchronous Transfer Mode)
- SDH (Synchronous Digital Hierarchy) transmission (also known as SONET)
- Intelligent networks
- GSM (Global System for Mobile Communications) Networks
- Microwave transmission
- TFTS (Terrestrial Flight Telephone System)
- Voice recognition (Brazil subsidiary)
- Rapid application development.

The main applications they are involved with are:

- Customer care and customer billing
- Modifications to the interfaces of information systems interfacing with the Internet (in conjunction with Oracle)
- Open software solutions for GSM, cable.

As a major worldwide telecommunications equipment and service provider, Alcatel is able to provide a comprehensive range of consulting services spanning IS consulting, technical integration and software development. In practice, most of its SI clients are French-based utilities seeking to expand into the telecoms field and include:

- RATP (Paris Metro)

- Auto Route Sud de la France
- SNCF (French National Railways)
- Bouyguef (GSM services).

The mix of Alcatel's consulting services to these clients is approximately 50% marketing advice, 50% network architecture.

Alcatel's broad based telecommunications operations span equipment manufacture, network systems capabilities and customer services. The company is also engaged in leading edge research in "information superhighway" technology including advanced ATM switching.

From an SI perspective, this strong technical base affords Alcatel the opportunity to expand its professional consulting capabilities. Having been a telecommunications supplier over many years, Alcatel also has in-depth knowledge of the industry and business practices of main PTTs. However, Alcatel perceives that its SI consulting arm does not have a high profile in the marketplace and more marketing effort is necessary to increase the profile of its services.

Within France, main competitors were quoted by Alcatel as Cap Sesa Sema, and France Telecom's subsidiary Telis.

Worldwide, their main competitors were perceived as HP, IBM, Andersen Consulting (because of its strong references and business integration know-how), Coopers and Lybrand and AT&T (because of the broad-based background similar to its own). Alcatel see four companies as their main competitive threats in future: AT&T, HP, EDS and Andersen Consulting.

F
ICL — Seeking Leverage from Software Solutions

ICL is co-owned between Fujitsu (85%) and Northern Telecom of Canada (15%). In March 1996, as a result of a pre tax loss of £183M in 1995, the company announced that it was divesting its manufacturing capabilities to its parent Fujitsu, enabling the company to focus on SI services and software development.

ICL's main industrial markets are the retail and financial sectors, whilst in the telecommunications sector, the company is a successful niche player, with 50 dedicated telecommunications staff operating from the UK. The company also has further divisions operating from Sweden, and strategic alliances/subcontracts with Hewlett Packard, Telifonica in Spain, Kainos of Northern Ireland and BSW of South Africa.

ICL's current revenues from its software division are $25 million per annum, and forecast revenue growth is estimated at 20-25% CAGR. Unlike the unsatisfactory profit margins in many of ICL's businesses, INPUT estimates is telecommunications business is generating gross profit margins in excess of its corporate target range of 7-8% per annum.

Sales emphasis has necessarily moved away from the UK, where ICL has 95% market coverage of call revenue business in land line operations and 30% coverage of mobile facilities.

In practice, most of the company's present revenues are being generated outside of Europe. For example, deregulation in India has lead to a significant opportunity for ICL: over 50 telecommunications companies compete in this market and its call revenue management system has been sold to both early adopters seeking the potential for service differentiation through customised billing and late adopters forced to narrow the competitive gap.

Post deregulation of the EC telecommunications market, ICL expects a similar rise in the number of new telecommunications to eventuate in Europe, particularly if Internet telephony becomes a widely used platform for further service providers to compete. In other words, the sales potential of its product it directly proportional to the number of new telecommunications entrants accessing the market.

ICL has two telecommunications software products:

- SIMS (Service Independent Mediation Systems) — software integration switch network to corporate IT system

- Prospero — a front end billing system allowing high resolution gross margin analysis, rapid alteration of retail price mechanisms and fraud control.

Within 18 months, ICL also plans to launch another billing product on the European market.

ICL's main telecommunications focus is the provision of business solutions centered around its current software products. The company occupies middle ground between switches suppliers and other allied software services. Surprisingly there is little evidence of collaborative efforts with Fujitsu in the European telecommunications sector. However, under the Fujitsu brand name, the two companies are jointly pursuing mobile telecommunications business in Indonesia.

ICL's telecommunications division has proven that it can succeed in occupying competitive niches and avoid damaging head to head competition with bigger players. For example, while it perceives Hewlett Packard, Nokia and Kenan as potential competitors, it has a reseller agreement with the former.

Given the size of the telecommunications market in general, ICL could, and should be a more aggressive player, using its parent companies to generate further leverage.

ICL anticipates more competitors entering its markets in both the software supply business and in systems integration. Andersen Consulting and EDS are perceived to be increasingly dominant as SI competitors.

G

CGS — Telecommunications Represents 11% of Total Revenues

CGS has recently undergone a major restructuring, resulting in an operational "new" CGS made up of Cap Gemini Sogeti, Gemini Consulting and debis Systemhaus. Excluding equipment manufacture, CGS has approximately 2000 employees dedicated to telecommunications business. The country split of personnel is shown in Exhibit VI-5.

Exhibit VI-5

CGS — Location of Telecommunications Focused Staff

Country	Percentage of Employees
Germany	35%
France	35%
Sweden	17%
Italy	10%
Netherlands	3%
Total	100%

Source: INPUT

In 1994, the European telecommunications and media business generated $230 million, representing 11% of CGS's total revenues. Worldwide, revenues are generated in the following proportion:

- SI projects (60%)
- Professional Services (25%)
- Integrated system management including FM and AM (15%)
- Consulting services for telecommunications (10%).

Worldwide telecommunications/media growth is forecast at 20% CAGR, with the highest rates of growth occurring in Asia/ Pacific. Within Europe, 11% CAGR growth is forecast.

CGS competes in four main business areas:

- Service support systems, including intelligent networks
- Network management

- Customer care and billing
- Corporate management systems.

CGS has a number of major references in the European telecommunications market:

- France Telecom
- Deutsche Telecom
- TeleNord
- Mercury
- Telia
- Telicom Italia
- Bouyguef.

CGS perceives that it has two types of competitor; big systems integrators, of which Anderson and EDS were named and computer equipment manufacturers, of which internationally Siemens and IBM were named, plus Groupe Bull in its home market of France.

Owing to the liberalisation of the European telecommunications industry, CGS anticipates increased merger activity and the likelihood that most telecommunications will have dedicated SI divisionsThe latter trend is perceived to be both a threat and an opportunity.

H

EDS — European Practice Growing Rapidly

EDS was purchased as a wholly owned subsidiary of General Motors (GM) in 1984 but announced in August 1995 that it would sell its stake in EDS in a tax free exchange of stock for holders of GM's class E shares. The GM contribution to EDS' world revenues fell from 41% in 1992 to 36% in 1994, as EDS has continued to develop non-GM business. FYE 31.12.94, EDS' worldwide revenues were $ 10.05 billion, of which the European division (including South Africa) contributed $1.8 billion.

The company operates via a matrix structure, divided into nine industry sectors and a 'virtual organisation' in Europe at national level. Telecommunications business is targeted through the company's worldwide Communications Industry Group (CIG), which also handles media and 'infotainment' business. Globally, CIG employs 5000-6000 qualified staff, including approximately 1500 consultants dedicated to European communications business.

There are between 200-250 telecommunications-dedicated staff employed in Germany and most other European countries have at least 100-200 staff. Poland and Hungary have 20-25 CIG staff each.

When the European CIG business was initiated 2-3 years ago, pan-European telecommunications business growth rates were of the order of 20-40%. Currently the German division of CIG is growing at 30-40% due to clients' restructuring in the run-up to deregulation of the German telecommunications market in late 1997. Revenue data is not released at industry sector level, however, INPUT estimates European CIG 1995 turnover to be between $200-250 million.

EDS is involved in a broad spectrum of telecommunications consulting throughout Europe. The following is a cross section of activity:

- UK — Hutchison Telecom (wireless communication)
- France — France Telecom (development work)
  — TDF (systems management)
- Italy — Telicom Italia (system development, pay TV, video on demand).

- Germany — Intercom, Fabercom, RWE Teliance, CNI, Thyssen AG (advice to new telecommunications entrants)
  - — Deutsche Telecom (broadcasting technology)
  - — E Plus (new GMS entrant).

EDS is active in developing a customer billing system which is flexible across different telephony formats including landlines, wireless services, and on-line services.

The firm has also designed and developed a multi-media OLE controlled platform to allow closed business group customers to access secure on-line services. Companies will also be able to use the service as an Intranet. EDS is currently seeking partners to promote this system, which is perceived by EDS to be a major competitor to America On Line.

The main technologies being utilised and developed by EDS include:

- ATM
- Intelligent billing systems
- Customer care
- Video on demand broadcasting
- Set-top boxes.

In parallel with Andersen Consulting, EDS' organisational matrix provides flexibility of response in a rapidly changing marketplace. The recent acquisition of A.T. Kearney management consulting in 1995 has strengthened EDS' market position. The two groups work autonomously and only operate in tandem when requested by clients.

EDS quoted IBM, CAP Gemini, Andersen Consulting, CSG and the 'big telecoms' such as AT & T as its main competitors.

EDS anticipates more competition emerging from telecommunications organisations setting up new SI divisions. It believes that relatively few of these will be successful, given their lack of IT experience. Within the telecommunications industry, forced merger activity is also expected, particularly among the growing band of new telecommunications operators, whom it perceives cannot survive in their present numbers.

I

AMS — Capturing the Mobile and Cellular Market

American Management Systems (AMS) are one of the smaller and less well known players in the European Business Integration (BI) marketplace.

However, this is changing. Due to careful marshalling of resources in selected niche vertical markets, most notably they have experienced rapid growth over the last two years and are aiming to be a $200m professional services operation in Europe by 1997.

AMS, headquartered in Fairfax, Virginia, have been active in Europe since 1990. The firm was formed in the United States in 1970 as a business problem solving firm by analysts who broke away from the Office of Systems Analysis at the Department of Defense.

AMS's international breakthrough came in the late 1980's when Barclays Bank in London bought a trade finance software package developed for the New York market aimed at managing letters of credit. On the back of this success a more strategic European focus began in 1991.

Exhibit VI-6 shows AMS's worldwide and European revenues between 1990 and 1994.

Exhibit VI-6

AMS Revenues 1990–1994 ($m)

	1990	1991	1992	1993	1994
Worldwide	260.3	284.4	332.5	364	459
Europe	0	9	19	29	76

Source: INPUT

1994 European revenues rose by 166% to $76 million. Europe now represents 16% of total revenues. Worldwide revenues grew by 26% in 1994. AMS's 1995 European revenue target is $120m.

European revenues for the first half of 1995 were up by 133% driven by a 95% increase in telecommunications related revenues and a 50% increase in financial services revenues. These increases were primarily due to continued generation of business with clients who started large projects in late 1994.

25% of European revenues are generated from the financial services sector; 75% from the telecommunications sector. This is contrasted with a world-wide analysis where telecommunications accounts for 18% of revenues and financial services 17%.

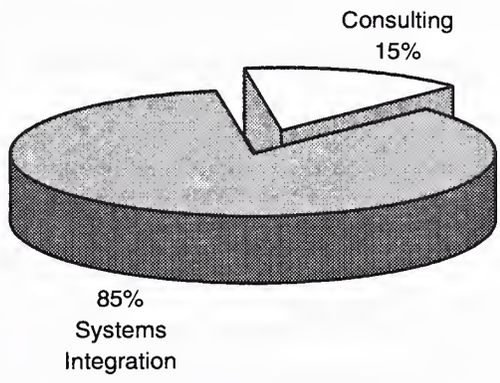
AMS have grown their European presence from 75 staff in 1991 to 525 as of mid 1995 and plan to 600 people by the end of the year. They are hiring aggressively from European business schools as well as taking staff from the larger pan European service vendors and management consultancies.

The largest proportion of staff is in Germany where they have 200 employees. The rest of their staff are spread across offices in London, Stockholm, Madrid, The Hague, Brussels, Bern, and Lisbon.

Exhibit VI-7 provides a breakdown by delivery modes of AMS's European revenues.

Exhibit VI-7

AMS Worldwide Revenues — Analysis by Delivery Mode



Source: INPUT

85% of EC revenues are derived from systems integration (SI) projects. The remaining 15% is generated by management consultancy assignments. Roughly half of SI contracts are full bespoke projects and half utilise mainly existing software kernels.

AMS's background is in the consulting market and they stress that consulting continues to be a core strategic offering as it offers the prime means of developing long term relationships based business. AMS do not suggest that they are in the *visioning business*, where they perceive Mckinsey, Boston Consulting Group, Mercer and Bain to hold the high ground, but do claim to operate in the follow-on strategy

market. AMS's marketing operation follows the classical consultancy, rather than the professional services, model with day rates estimated to be comparable to the big six consulting firms.

In 1994 AMS established an initiative called Achieving Breakthrough Performance which is an attempt to strengthen their ability to provide a full range of skills and expertise needed by clients to help them to gain significantly higher levels of performance. Building on established business analysis skills AMS have set out to create new business, rather than technological, focused methodologies to assist clients in process renewal, organisation development and change management.

AMS claim their critical differentiation in the European marketplace is in their understanding of:

- The strategic contexts of their chosen vertical markets
- The appropriate adoption of relevant technologies
- The impact of change.

In the United States AMS operate across six vertical markets:

- Finance Services
- Telecommunications
- Insurance
- State Government
- Education
- Healthcare.

In Europe, however, AMS focus purely on financial services and telecommunications, although they are looking to expand into healthcare.

Demand for professional services staff in the telecommunications sector is growing extremely rapidly and AMS appear to be well placed to benefit from this demand. AMS's vertical market focus will continue to be on anchor clients in these areas and from a geographic perspective the UK and Germany.

AMS have enjoyed enormous demand for their services in the GSM cellular market where their focus has been on customer administration and billing systems. Present clients include Airtouch International formerly Pacific Telesis and in Belgium Proximus, formerly Belgacom.

Airtouch took a 26% stake in the German mobile provider, Mannesmann Mobilfunk, in 1993 and subsequently introduced AMS systems.

AMS are now attempting to leverage their services into the increasingly deregulated fixed network environment across Europe and have already been successful in this strategy by winning major customer service contracts with the Swiss and Dutch PTT's.

In Sweden AMS have been working with the leading cellular services provider, Telia Mobitel. As with all European telecommunications markets Teli Mobile are having to adapt to fierce challenges for market share as well as large increases in customers. These markets are intensively competitive and customer services is proving to be a key competitive weapon. AMS have developed comprehensive customer care and billing systems and claim that this has helped Teli Mobile overcome aggressive competition from international cellular carriers.

In the United States AMS's clients in the telecommunications sector include major players such as AT&T, Bell Atlantic, Bell South, Pacific Bell, US Spring amongst others.

The firm is looking to leverage opportunities in Europe as these giants increasingly attempt to extend their reach outside of the United States.

In the US cable market AMS are a major partnership-based supplier to Bell Atlantic. They expect to replicate this type of relationship in Europe as the European cable market expands.

Cable operators presently can not offer variable pricing as do telecommunication vendors. This however is changing and once cable operators begin offering interactive programmes, and video on demand services their customer contact and billings systems will need vigorous updating.

Billings systems it has been suggested are redundant almost as soon as they are finished and require immediate updating to keep pace with developments in service portfolios. This is clearly a promising area of opportunity which AMS are keen to exploit.

AMS aim to perform software development in partnership with clients claiming that this offers three advantages, namely:

- Lowering the cost and risk of development
- Ensuring there is a market for the product once it is developed
- Offering entree points to other companies who are interested to see what has been developed in competitor organisations. - i.e. customers realise that an existing utilised package will be cheaper and ready more quickly.

To counter the accusation that this is a one-way deal AMS stress that this approach offers significant advantages to customers as well. These include:

- Customers gain royalty payments on software developed jointly which is then marketed by AMS to other customers
- They obtain a system which in time may generate revenues
- A continuing commitment to the system's enhancement, as the market evolves
- It enhances the partnership ethos that AMS claim is core to their philosophy and which attempts to guarantee success.

AMS claim to be a market leader in delivering *business benefits* (fast becoming the new mantra for IT services firms) to their selected niches. AMS stress that they are actively attempting to tie their financial remuneration to the achievement of their clients' business objectives.

AMS's view is that this style of operation dovetails closely with the primary critical success factors for systems integration firms; not developing technical skills but in understanding their customers business better than their competitors do. This they claim is also supported by their consistent targeting of senior managerial rather than technical buying points.

However, AMS are heavily active in technology issues and state that 80% of new projects are based on distributed architecture; though only half of revenues are derived from client/server related development work.

AMS are currently developing C/S versions of all their existing legacy based software applications and claim that they have further advanced C/S capabilities than players such as Andersen Consulting or CSC. They are also heavily focused on object technology which they see allows systems to be developed at considerably cheaper cost.

Interestingly AMS view the European market as far less homogenous than some of the large US services vendors do. The UK, they suggest, is quite similar to the US in the adoption of services vendors in that the market is used to buying consultancy and IT services.

AMS state that continental Europe is some 10 to 15 years behind the UK and that user organisations are far less comfortable with buying business consultancy and services from technology vendors.

This however, is changing and continental European companies are increasingly looking for prospective technology partners who understand the business issues and are able to implement recommendations. This, AMS argue, offers them very real opportunities to continue on their steep upward curve over the medium term.

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Questionnaire

Business Integration (BI) is INPUT's term to describe all project related activities in the area of systems integration, turnkey systems development, and professional services, whether on a time and materials, fixed price, or other basis.

However, it specifically excludes all activity undertaken as part of an outsourcing contract, maintenance contract, or a processing services contract. It also excludes software product sales not undertaken as part of wider project activity, for example shrink wrapped software.

Questionnaire Respondent Details

Company Name _____

Respondent Name _____

Job Title _____

Annual Turnover of Company _____

(Please state Currency) _____

Number of Employees _____

Q1 Are you planning to undertake large scale ($500,000 +) systems development or integration projects over the course of the next year ?

Yes _____

No _____

Currently Considering _____

[If this question is answered "NO" please terminate interview]

Q2 What are the major challenges facing your organisation over the next two years ?

_____

_____

Q3 What are the major challenges facing your IT function over the next two years ?

_____

_____

Q4 What is the current primary focus of your IT operation ?

_____

_____

Q5 To what extent is your IT spend directed towards the following business functions ?

(Please rate on a scale of 1-5 where 1 = not at all and 5 = very strongly)

Customer Service _____

Finance/Accounting _____

Delivery/Logistics _____

Sales _____

Marketing _____

Manufacturing/Operations _____

Inventory _____

Administration/Support Functions _____

Logistics _____

IT Infrastructure _____

Research and Development _____

Other (please describe) _____

_____

_____

Q6 Which of these business processes do you most need implementation or integration assistance with both presently and for planned projects ?

(Please rate on a scale of 1-5 where 1 = not at all and 5 = very strongly)

	Presently	Planned
Customer Service	_____	_____
Finance/Accounting	_____	_____
Delivery/Logistics	_____	_____
Sales	_____	_____
Marketing	_____	_____
Manufacturing/Operations	_____	_____
Inventory	_____	_____
Administration/Support Functions	_____	_____

Logistics _____ _____

IT Infrastructure _____ _____

Research and Development _____ _____

Other (please describe) _____

_____

_____

Q7 What applications do you intend implementing over the course of the next year ?

_____

_____

Q8 Do you intend to implement any of the following applications over the course of the next year ?

Network Management systems _____

Network Configuration systems _____

Service Orders systems _____

Flexible Billing systems _____

Electronic Imaging _____

Software Defined Networks _____

Directory Assistance _____

Voice Messaging _____

Electronic Funds Transfer _____

EDI _____

Q9 How do you expect to source these applications ?

Purchase standard package _____

Tailor standard software package _____

Through custom development _____

Other _____

_____

Q10 What proportion of your external IT budget is spent on *application* development and/or integration projects as opposed to *infrastructure* development and/or integration projects respectively? [Please ensure these add up to 100%]

Application-related _____

Infrastructure-related _____

Q11 To what extent is your IT operation currently focused on the following issues ?

(Please rate on a scale of 1-5 where 1 = not at all and 5 = very strongly)

Integrating systems _____

Cutting IT costs _____

Changing IT platforms _____

Creating a new information architecture _____

Improving systems development processes _____

Developing cross-functional information systems _____

Reengineering business processes using IT _____

Developing decentralised systems _____

Establishing IT connectivity to suppliers/customers _____

Using IT for competitive advantage _____

Using leading edge technology _____

Improving IT Human Resources _____

Integrating IT and corporate aims _____

Other (please describe) _____

_____

Q12 What are the key technologies your organisation is currently implementing ?

_____

_____

Q13 Which of the following technologies is your organisation either using, implementing, piloting, researching, or not active in ?

(Please rate on a scale of 1-5 where 5 = using, 4 = implementing, 3 = piloting, 2 = researching, 1 = not active)

Client-Server _____

LANs _____

WANs _____

MANs _____

Object-orientated development _____

Video-conferencing _____

CD-Roms _____

Groupware (i.e. Lotus Notes) _____

Internet Access _____

Rapid Application Tools _____

Distributed Databases _____

RISC technology _____

Software reengineering _____

Fibre-optics _____

Digital Switching (i.e. ATM) _____

Electronic Imaging _____

Artificial Intelligence _____

Other (please describe) _____

_____

Q14 Which of these technologies do you most need external service assistance with ?

(Multiple responses accepted - Please rate on a scale of 1-5 where 1 = not at all and 5 = major need)

Client-Server _____

LANs _____

WANs _____

MANs _____

Object-orientated development _____

Video-conferencing _____

CD-Roms _____

Groupware (i.e. Lotus Notes) _____

Internet Access _____

Rapid Application Tools _____

Distributed Databases _____

RISC technology _____

Software reengineering _____

Fibre-optics _____

Digital Switching (i.e. ATM) _____

Electronic Imaging _____

Artificial Intelligence _____

Other (please describe) _____

_____

Q15 (a) Do you intend to use external IT service vendors to assist you in your IT systems development or integration initiatives ?

Yes _____

No _____

Currently Considering _____

Q15 (b) If "yes" or "currently considering" what type of external service vendor will you use ?

[If "No" please go to Q16]

System Integrator (e.g. IBM, EDS, CSC) _____

Outsourcer (e.g. FI, CFM) _____

Systems House(i.e. Logica, CGS) _____

Management Consultancy (e.g. C&L) _____

Other (please describe) _____

_____

Q15 (c) Can you name them ?

_____

_____

Q16 Have you used any of the following IT services organisations for systems development or integration projects ? Can you indicate how satisfied you were with their services ?

(Please rate on a scale of 1-5 where 1 = extremely dissatisfied and 5 = extremely satisfied)

If you have not used a particular vendor can you indicate how capable you consider this vendor to be this in assisting your organisation with future for systems development or integration projects.

(Please rate on a scale of 1-5 where 1 = incapable 5 = extremely capable)

Vendor	Have Used	Rating	Have Not Used	Perception of Capability
EDS				
IBM				
CSC				
Digital				
AT&T				
Logica				
Groupe Bull				
Syntegra				
Sema Group				
Olivetti				
CGS				
Siemens Nixforf				
Andersen Consulting				
ICL				

Q17 What are the primary skills you require from an external IT services vendor in assisting you with systems development or integration projects?

_____

_____

Q18 (a) How much would you expect to spend with an external IT services vendor on systems development or integration projects ?

_____

_____

Q18 (b) Typically, what would this represent as a proportion of an overall project ?

_____

_____

Q18 (c) Over the last year has your proportion of overall IT spend on external development or integration services increased, decreased or remained static ?

Increased _____

Decreased _____

Remained static _____

Q19 In judging which IT services vendor to select how important are the following criteria ?

(Please rate on a scale of 1 to 5 where 1 = not important and 5 = very important)

Criteria	Rating
Vendor's price proposal	
Vendor's commercial stability	
Vendor's relations with existing customers	
Your existing relationship with the vendor	
Quality of the vendor's offerings/services	
Vendor's commitment to partnering	
"Culture" of the vendor	
Vendor's innovation in contracting	
Vendor's commitment to protecting your intellectual property rights	

Q20 In judging which IT services vendor to select how important are the following qualities of a vendor ?

(Please rate on a scale of 1 to 5 where 1 = not important and 5 = very important)

Vendor Qualities	Rating
Technical capability	
Staff qualification	
Timeliness of response	
Track record	
Performance guarantees	
Application knowledge	
Industry experience	
Process knowledge	
Process reengineering skills	
Ability to demonstrate IT's business benefits	
The management of risk	
Ability to work with non-IT staff	
Other	

Q21 How important is a vendor's ability to offer "one-stop-shopping" across communications and computing based services ?

(Please rate on a scale of 1 to 5 where 1 = not important and 5 = very important)

_____

_____

Q22 How important is a vendor's international capability ?

(Please rate on a scale of 1 to 5 where 1 = not important and 5 = very important)

_____

_____

Q23 In large scale systems development/integration projects what form of contract pricing does your organisation favour ?

Fixed price _____

Time & materials _____

Value based _____

Other (please describe) _____

_____

Q24 Is innovation in contract pricing attractive and important to you organisation?

(i) Attractive

Yes _____

No _____

(ii) Important

Yes _____

No _____

Q25 In the longer term [3-5 years] what are the major types of information systems projects you expect your organisation to undertake ?

_____

_____

Thank you very much for your time and assistance with this questionnaire

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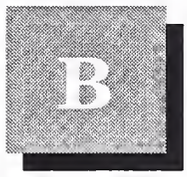


IT Services Vendors — Interview Prompt

Name of Divisional Head

Brief Overview of CV Background

Other Senior Telco staff & CV Background

Numbers of "Qualified" Staff

Country Split of Personnel

Current Revenues from Telcos

Country Split of Revenues

Forecasts of Revenue Growth

Current Numbers of Telco Clients

Reference Sites

Detail of Projects (as many as possible)

Relevant services offerings;

	Systems Integration	Professional Services	Turnkey Systems
PTT			
Cable			
Mobile			
Internet Telephony			
Other			

Key Applications being Developed (try and relate to above grid)

Key Technologies being Utilised (again related to grid)

Leading Competitors ?

Views of Leading Competitors ?

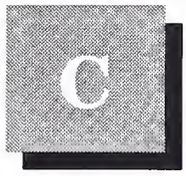
Leading Competitors in Five Years ?

_____

_____

_____

Ask for Flyers/Brochures



Exchange Rates

Exhibit C-1 shows the exchange rates used for the analysis in this report.

Exhibit C-1

US Dollar and ECU Exchange Rates 1996

Country	Currency	US Dollar	ECU
Europe	$	1	0.781
France	FF	4.89	6.27
Germany	DM	1.43	1.83
United Kingdom	PS	0.644	0.825
Italy	Lira (K)	1.59	2.03
Sweden	Sek	6.63	8.49
Denmark	DK	5.54	7.10
Norway	NK	6.32	8.09
Finland	FM	4.34	5.33
Netherlands	Dfl	1.6	2.05
Belgium	BF	29.4	37.70
Switzerland	SF	1.15	1.47
Austria	Sch	10.1	12.40
Spain	Ptas	121	155.00
Ireland	IP	0.624	0.800
Portugal	Esc	149	191.00
Greece	Dra	237	291.00
Eastern Europe	$	1	0.781

Source: INPUT

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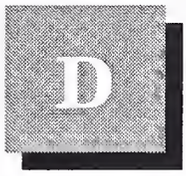


Business Integration Defined

Business Integration, as defined by INPUT, is a "meta" term which reflects the increasingly embedded role technology plays in business processes as shown in Exhibit D-1.

From the point of view of tracking vendors' Business Integration revenues, this meta terms has three delivery sub-modes, Systems Integration, Turnkey Systems and Professional Services. Exhibit D-2 illustrates how these sub-modes fit into INPUT's mapping of the overall software and services industry.

The complexity of mapping definitions to the nature of the "real world" is such that it is unrealistic to completely mirror the complexity of supply and demand in the marketplace. This complexity is especially evident in the areas INPUT tracks within its Business Integration Programme. It is necessary, therefore, to regard INPUT's definitions as, to some extent, conceptual models of marketplace activity.

Exhibit D-3 illustrates the primary difference between the turnkey systems delivery mode and the systems integration delivery mode. The major difference between the two delivery modes is one of customisation. SI projects are defined as being more than 50% customised. Clearly, the 50% cut off line is an arbitrary figure.

However, there are **real** differences in the marketplace between these two delivery modes. Exhibits D-4 and D-5 provide more detailed analyses of these differences.

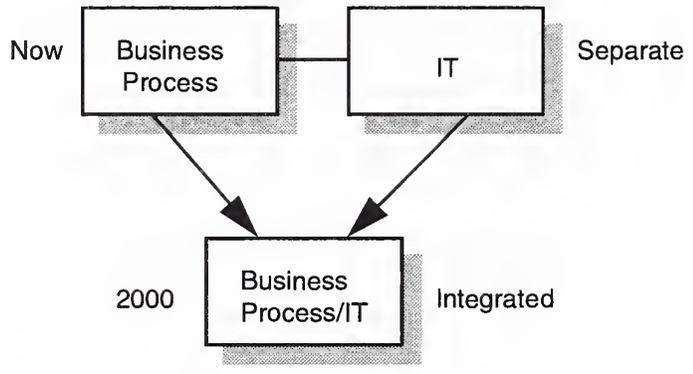
The purpose of presenting the three delivery modes or conceptual modes within the broad term "Business Integration" in this report is to offer vendors the ability to use the analysis in a variety of ways.

Combining the SI and TK delivery modes may be appropriate for certain country markets but inappropriate in others; for example, it is appropriate to combine the delivery modes in German market whereas it is inappropriate to do this in other country markets such as the UK and France and particularly at a European level where this combination would contort a true picture of marketplace competition.

The provision of data and analysis under the meta level allows users of this report the freedom to combine the basic data provided in any way that they see fit and present their own vision of marketplace competition.

Exhibit D-1

Integration of IT and Business Processes



Source: INPUT

Exhibit D-2

Information Services Industry Structure

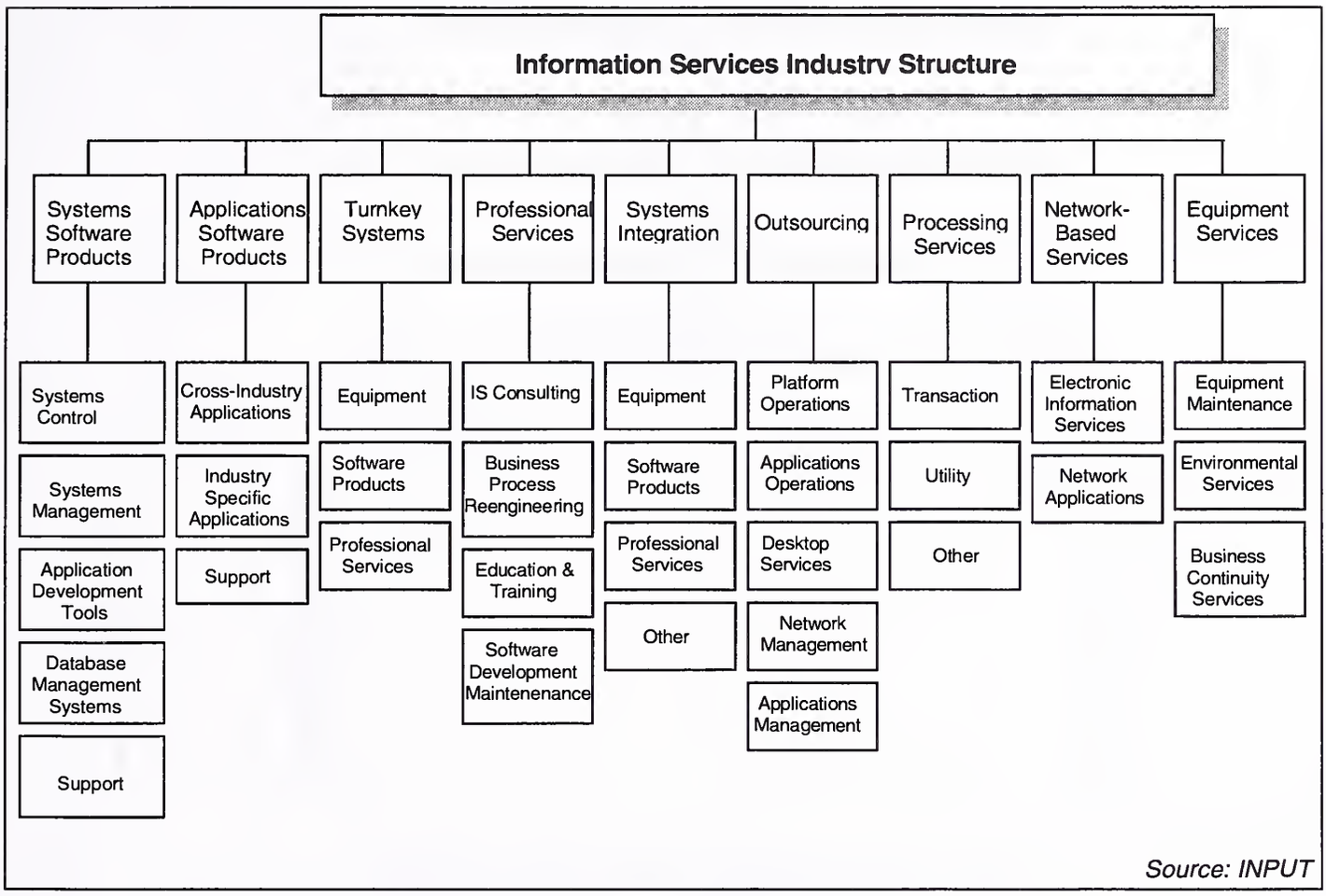


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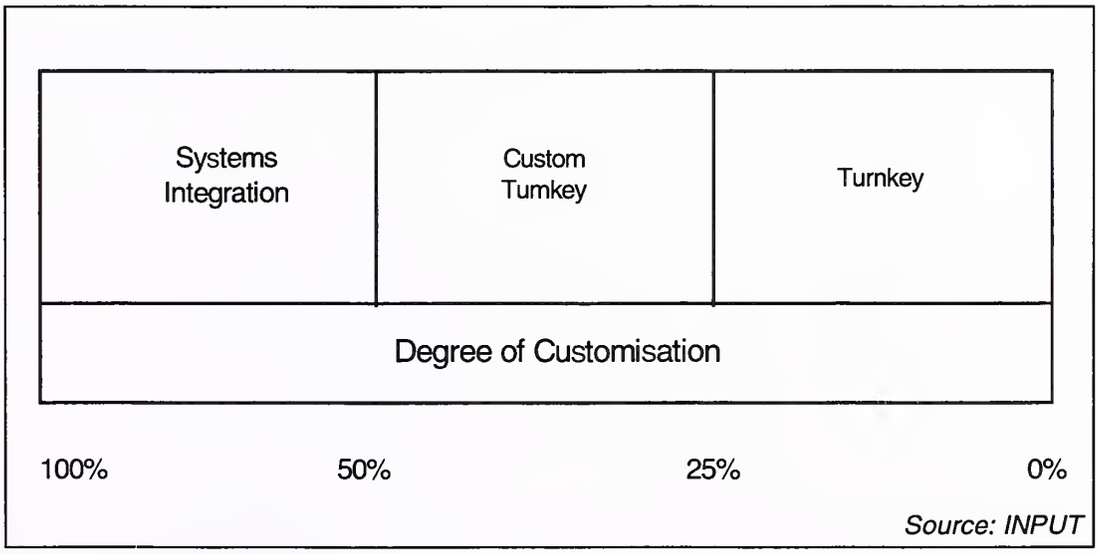
Exhibit D-3

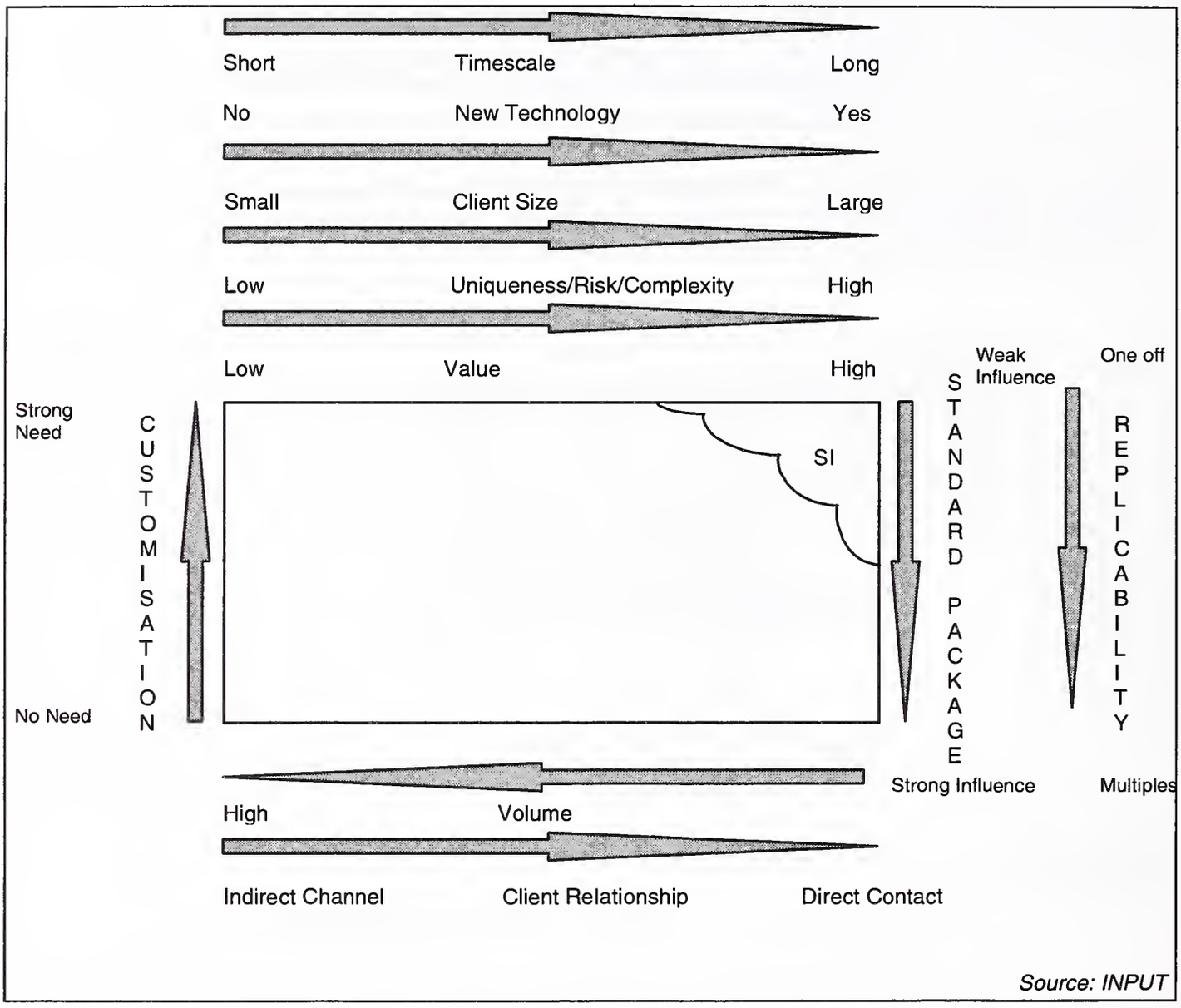
The Customisation Spectrum



Source: INPUT

Exhibit D-4

Systems Integration and Turnkey Mapping



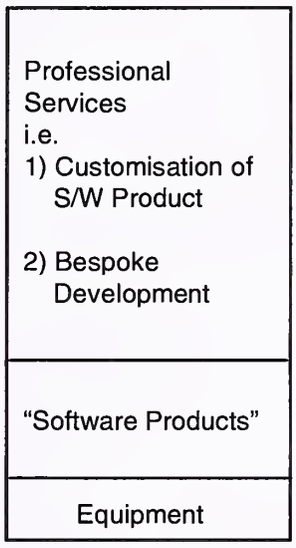
Source: INPUT

Exhibit D-5

Similarity/Differences Between Systems Integration and Turnkey Systems

Systems Integration

- Prime Contractor
- Contract = $2m(+)
- Top 10 suppliers have 85% of the $4.6 bn market

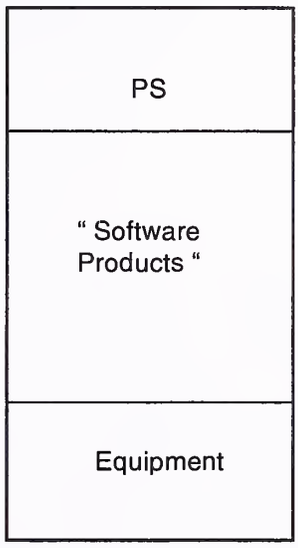


Relative Proportions

Contract Components

Turnkey

- Lower Risk
- Fewer subcontractors
- Contract = $55-K (+)
- top suppliers have 40% of the $11 bn market



Contract = $5-K (+)

Top suppliers have 40% of the $11 bn market

Contract Components

Source: INPUT

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