U.S. PROFESSIONAL SERVICES MARKET

1987 - 1992

INPUT

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U.S. PROFESSIONAL SERVICES MARKET, 1987-1992

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U.S. Professional Services Market, 1987-1992

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Abstract

This annual report provides analysis and perspective, user expenditures, and forecasts for the U.S. Professional Services Market from 1987 through 1992. Market size and growth are provided for 14 industries.

The issues, trends, and events impacting the market are presented and analyzed. The market is segmented into federal government and commercial sectors to provide additional insight into professional services activity. The newest and fastest growing opportunity, called Systems Integration, is discussed. Business and market opportunities are provided.

The report contains 66 pages and 30 Exhibits. It is part of a four-volume series describing the information services market and its delivery modes. The three other volumes are: *U.S. Processing/Network Services, 1987-1992; U.S. Software Products Market, 1987-1992*; *and U.S. Turnkey Systems Market, 1987-1992*.

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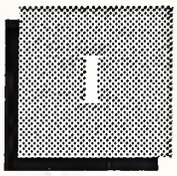


Introduction

This report is part of a four-report series produced each year for INPUT's Market Analysis and Planning Services (MAPS). The four reports segment the Information Services Industry into Processing/Network Services, Software Products, Professional Services, and Turnkey Systems. INPUT calls these segments "delivery modes".

Readers of this report are encouraged to read and review the other three reports if there is interest in the rest of the information services industry, or to complement the reader's principal interest in this volume.

A

Market Structure

This report structures the professional services market into Contract Services and Systems Integration. Exhibit I-1 shows the structure and further segmentation of Contract Services. As each of the subsegments is discussed, a definition and description of the related services will be provided. See Appendix B for definitions of each of the subsegments.

B

Purpose of the Report

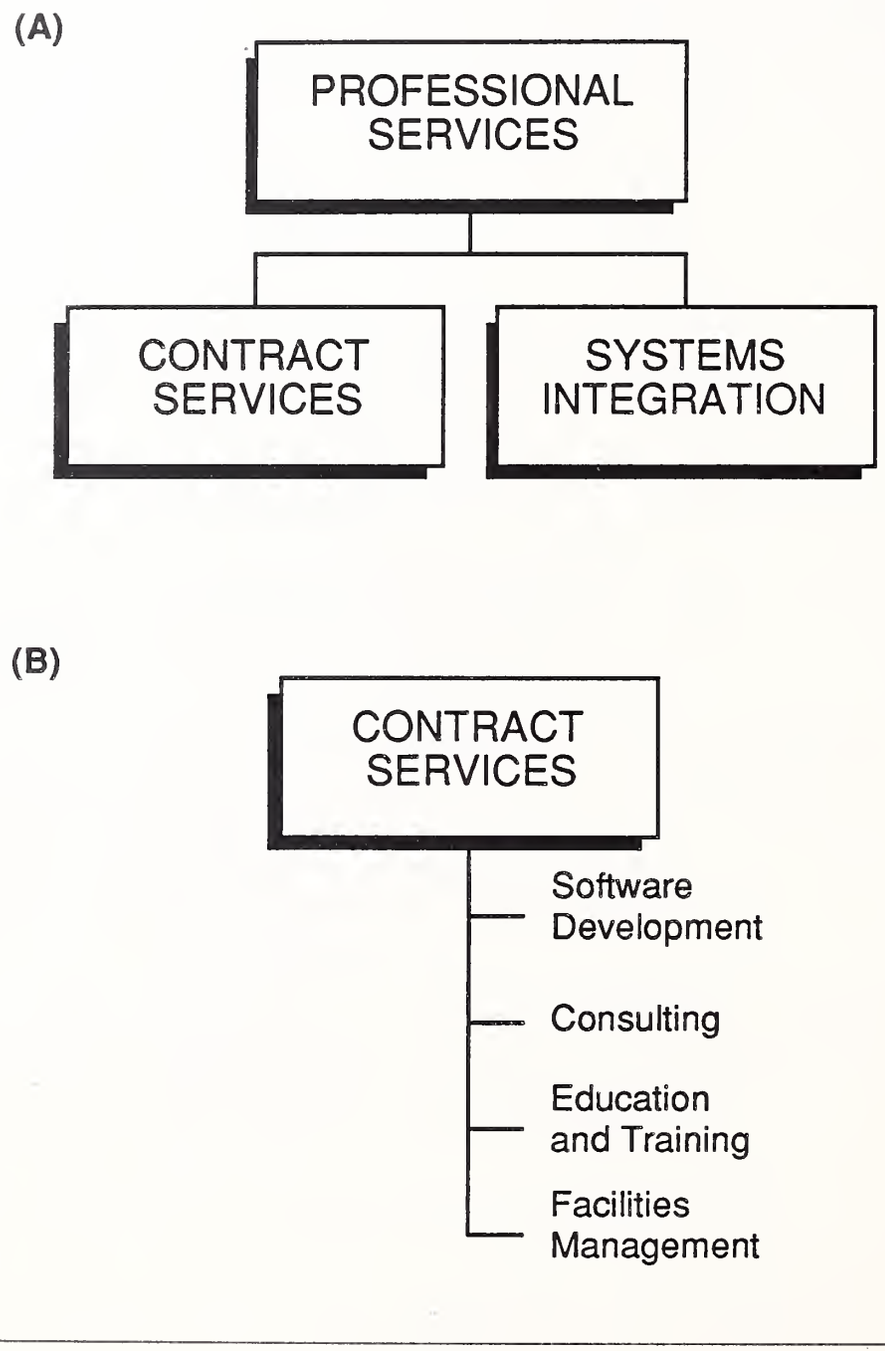
This report reviews and analyzes the professional services market and highlights the five main activities of the two segments that make up the market for each sector—i.e., Commercial and Federal.

The report is designed to provide vendors with information and insight that will allow them to:

- Identify new markets and possible product opportunities.
- Assess the product penetration of their competitors and determine potential market directions.

EXHIBIT I-1

PROFESSIONAL SERVICES MARKET STRUCTURE



- Assist in prioritizing investment dollars and calibrating an appropriate rate of return.

- Review the driving forces that are shaping the market.

C

Scope and Organization

The report focuses on activities in the U.S. market and only considers user expenditures that are noncaptive and generally available in the market. This is especially important in that some large organizations have information services divisions that provide services to that corporate entity. In most instances these services are not won on a competitive basis.

This report is organized as follows:

- Chapter II is the Executive Overview, which provides an overview of the report and highlights the most significant information.

- Chapter III analyzes the market and forecasts user expenditures for the commercial sector and the federal sector. In addition, the market size and growth for 14 industry-specific market segments are presented, as well as competitive events and market leaders.

- Chapter IV describes the market opportunities that are available to the professional services vendors and some new directions and trends. In addition some recommendations are provided.

- Appendix A provides INPUT definitions.

- Appendix B provides the professional services data bases.

D

Report Methodology

- The information used in the report is obtained from the ongoing interviews and survey work that INPUT carries on with vendors and users of Information Services.

- The inflation rates used during the forecast period are shown in Exhibit I-2.

- Expenditures or revenues presented are U.S. only, not worldwide.

- For a complete view of the market, readers should review the other three annual reports written on the information services markets. In addition, it is recommended that the reader refer to the three-ring binders that also are provided by the MAPS program and that segment the market into 19 industry-specific and cross-industry sectors.

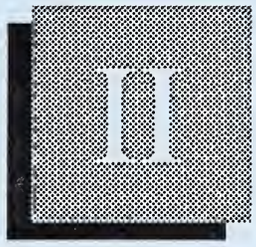
INPUT welcomes comments, suggestions, and thoughts about this report.

EXHIBIT I-2

INPUT INFLATION ASSUMPTIONS

YEAR	INFLATION RATE (Percent)	NOMINAL GNP GROWTH (Percent)	REAL GNP GROWTH (Percent)
1987	3.3	6.1	2.8
1988	4.1	7.5	3.4
1989	3.0	6.9	3.9
1990	3.0	6.6	3.6
1991	2.0	5.5	3.5
1992	2.0	5.4	3.4

Source: U.S. Department of Commerce



Executive Overview

II

Executive Overview

A

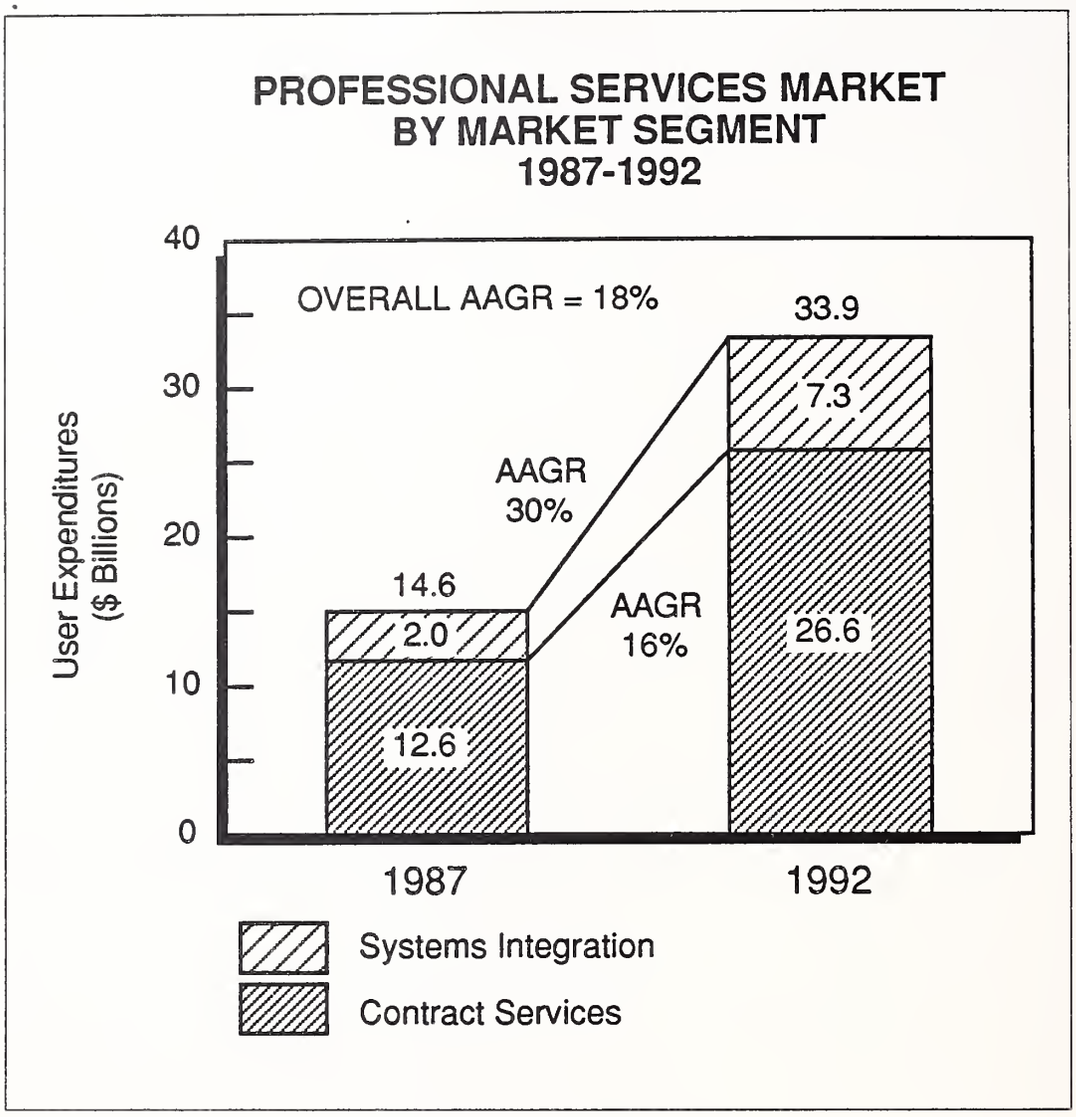
The Professional Services Market is Growing

The total professional services market is growing at an annual rate of 18%. The total market includes Contract Services, which is growing at 16% and Systems Integration,which is growing at 30%. (Note: This Systems Integration Segment is the professional services component only and does not include hardware and/or software products.) Systems Integration professional services represents 14% of professional services in 1987. In 1992 it will grow to 22% of the professional services delivery mode. Exhibit II-1 shows the total market.

This growth is based on the importance to users of large-scale systems, and the time frames that these systems would require if left to the limited resources of the internal IS departments. These large-scale systems require the latest hardware/software/communications technology to provide the competitive advantage desired from these systems, which are addressing "Mission-Critical" applications.

It has become more and more apparent that the applications backlog in most enterprises is not being reduced, and that major resources are required to maintain the existing systems. Furthermore, the skill set and experience of the internal staff is limited, thereby making outside services more appealing.

EXHIBIT II-1



B

Software Development Continues to Be the Largest Delivery Mode

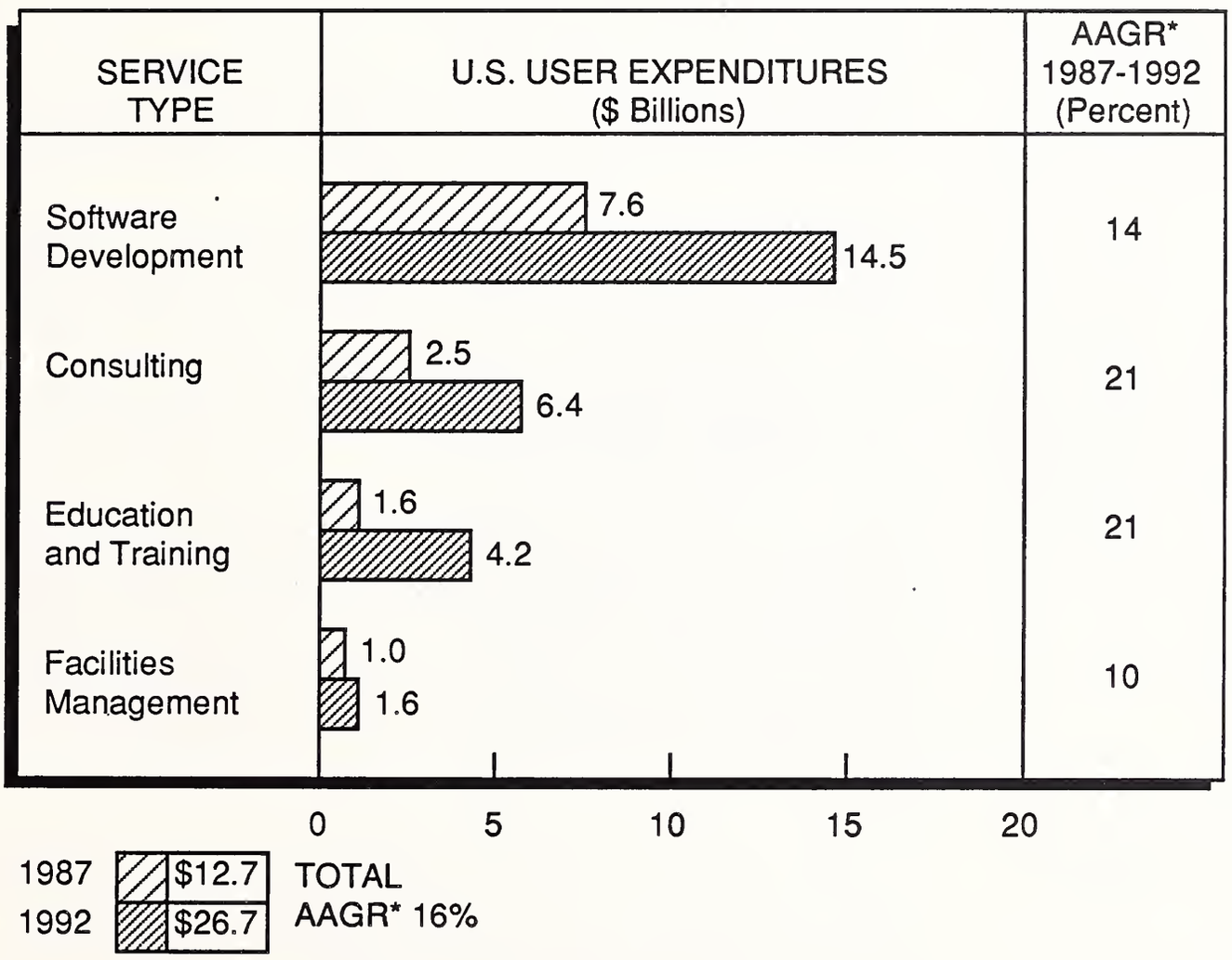
The software development portion of Contract Services is the largest mode, and will continue to be the largest over the forecast period. Its growth rate has dropped to 14%, but this reduction may be misleading. The new segment of systems integration includes professional services, along with the necessary hardware/software and communications. The largest component of professional services in systems integration is software development. Thus, the decrease in growth of software development is actually a shift from "traditional" professional services to systems integration professional services.

Exhibit II-2 shows Contract Services modes and their growth rates.

Consulting, and Education and Training, are both growing at annual rates exceeding the growth rate of the entire Information Services industry. This high rate is primarily due to the increased requirement to harness new technologies, which are growing in sophistication, complexity, and

EXHIBIT II-2

CONTRACT SERVICES MARKET BY MODE 1987-1992



* Average Annual Growth Rate

impact on the enterprise. Users need to look and understand before they leap. And while the unit price is declining as new technologies achieve volume production, the total price to implement the programs that are currently contemplated is increasing.

C

Systems Integration—A Growing Market

Systems Integration is one of the fastest growing major segments of the Information Services market as monitored by INPUT. (Note: It is only exceeded by Data Center Management (Microcomputer) Software, which is growing from essentially a nonexistent base.) Commercial Systems Integration has come into its own in 1987 and is riding the crest of a wave. The large-scale programs that have begun in 1987 guarantee continued expenditures in the follow-on years of the contracts.

Many of the programs are multiyear, multimillion-dollar deals—e.g., IBM's $300 million program with Ford to implement office automation. It does not take very many of these projects to prove this market is real.

It will require vendors with deep pockets to participate in the larger programs, as well as take on the prime responsibility for smaller programs. Having industry-specific expertise, general-business credibility, and a willingness to participate will allow smaller professional services outfits to bootstrap themselves into moderate-sized programs. Zero Systems (recently acquired by Sterling Software) is an example of a professional services firm that has been successful in bootstrapping.

The Federal Government segment of Systems Integration is forecast to grow 15% over the five-year forecast period. This growth will occur in spite of the federal government's desire to contain the federal deficit—outmoded systems need to be replaced and respecified. The commercial segment is forecast to grow at 38% over the forecast period. Exhibit II-3 shows the two sectors and provides user expenditure levels for 1987 and 1992. (Note: The user expenditures shown include hardware/communications, software, and professional services in this instance.)

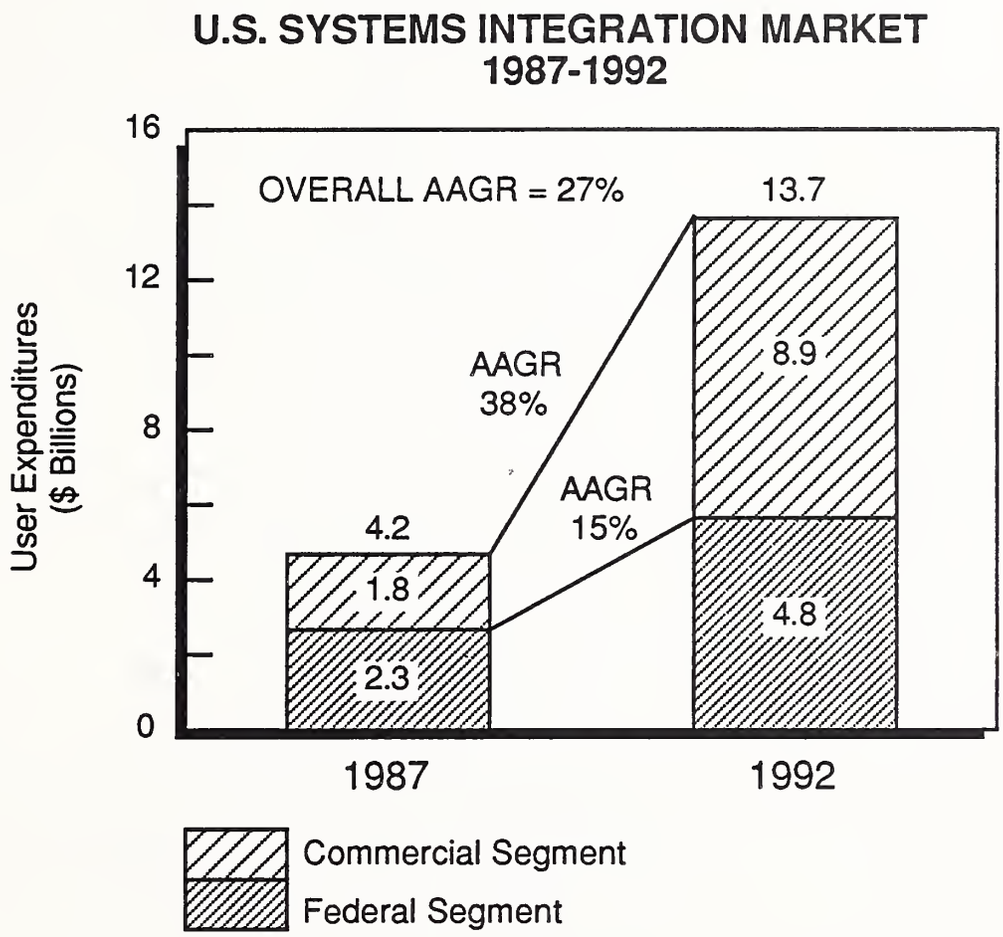
D

Opportunities and Recommendations

The professional services market is growing as fast as it can, considering the major product being sold is "people." INPUT believes professional services opportunities are still significant as enterprises come to the realization that going outside the organization is an acceptable and even desirable way to enhance the IS systems needed.

Professional services firms will improve their chances for success by specializing in industry-specific systems and applications. Those applications can be used as a springboard to grow within a particular industry. INPUT's industry segmentation shows that Banking and Finance, Discrete Manufacturing, and Medical are the three largest vertical markets in terms of expenditures in the Information Services industry. Many professional services firms will naturally chase after these industries. However, there is ample opportunity to provide services in other industries, and some companies have grown quite nicely by focusing elsewhere. Examples are American Management Systems in state and local government, and Computer Task Group in Telecommunications.

EXHIBIT II-3



Note: System Integration expenditures include hardware/software/communications and professional services.

Developing alliances with vendors in the other delivery modes can offer significant opportunities. Examples are the relationships between Computer Task Group and Relational Technology, and between Arthur Young and Knowledgeware. Although the aforementioned vendors are Software Products companies, similar opportunities are likely to exist in Processing/Network Services and/or Turnkey Systems.

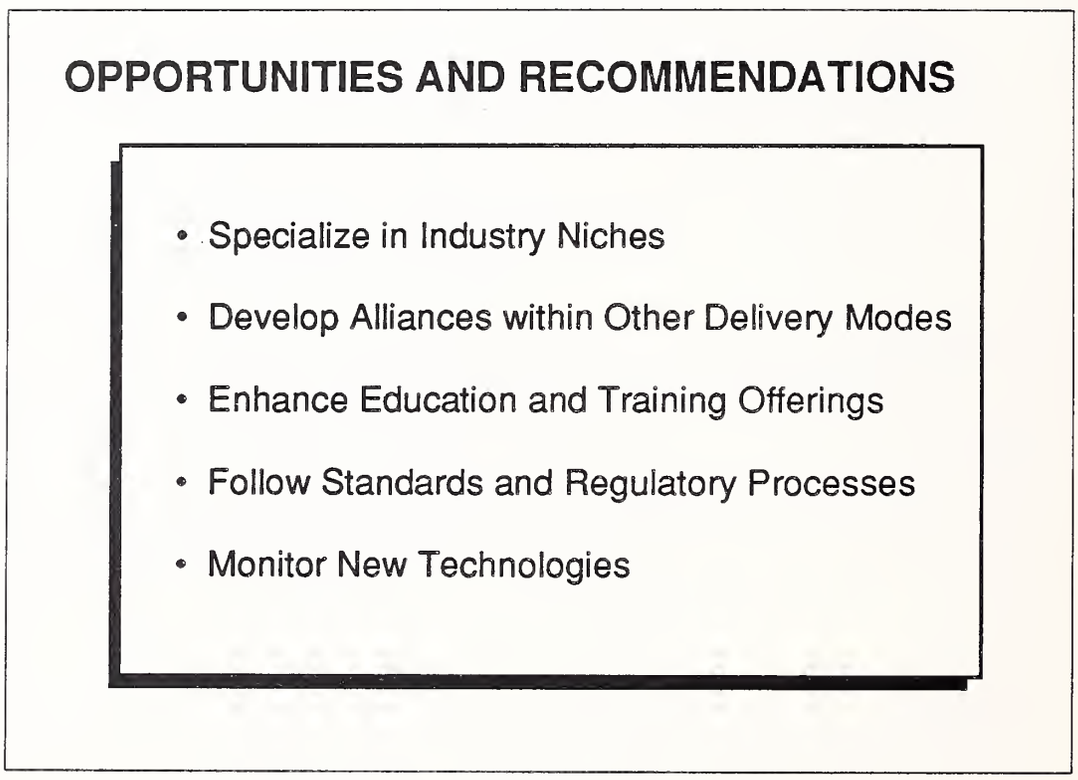
Providing consulting or education and training support, or software development as subcontractors to vendors in other delivery modes are ways of broadening a revenue base and entering new markets.

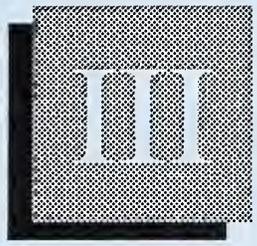
The benefit to the professional services firm is the "open door" it provides for follow-on business and the move toward specialization.

Successful professional services companies will allocate resources to monitoring technology and beginning the learning curve as early as possible. This approach develops "new" expertise and becomes something that can be propagated. Following regulatory processes in certain industries is mandatory, to develop the appropriate expertise to do consulting and/or education and training. As an example, following FCC actions and proposals is absolutely required to provide professional services in the telecommunications industry.

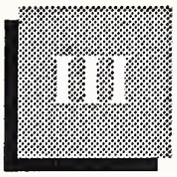
Exhibit II-4 shows the important opportunities and recommendations for professional services vendors.

EXHIBIT II-4





Market Analysis, Overview, and Competition



Market Analysis, Overview, and Competition

A

Professional Services Market Overview

1. Market Overview

The professional services market continues to grow from a 1986 user expenditure level of $12.3 billion to a 1987 level of $14.6 billion. This represents 19% annual average growth. In addition, over the five-year forecast period Professional Services will grow at an 18% AAGR, reaching user expenditures of $33.9 billion in 1992. Specifics are in Exhibit III-1.

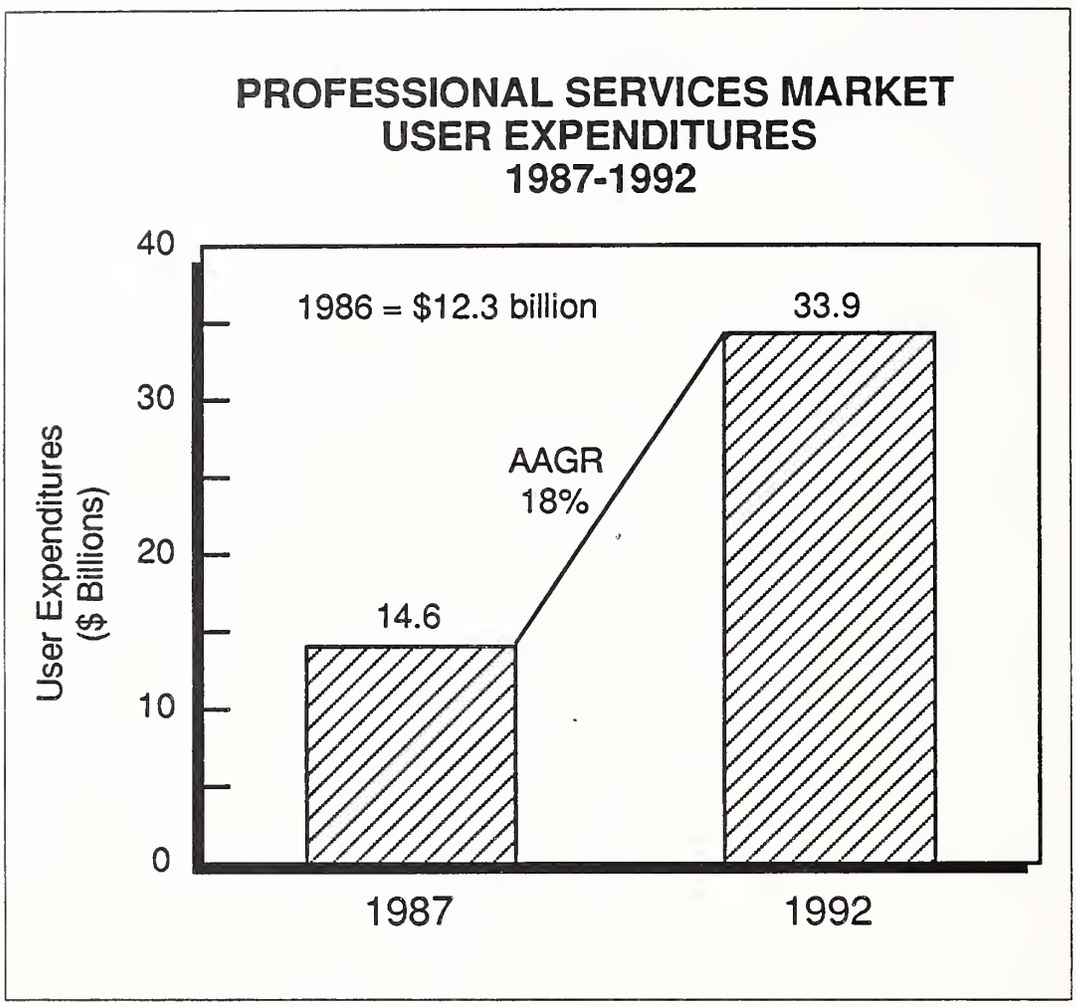
Factors contributing to this growth are based in large measure on the application systems that many users require to maintain a competitive posture while performing mission-critical applications that are key to the operations "heart" of the enterprise. These application systems require experienced and skilled personnel who are generally not available inside the organization.

To be in a position to implement a large application systems plan in a responsible time frame, many vendors have cultivated industry-specific expertise as well as applications and systems experience. This vendor credibility is a key factor in the propagation of business.

Professional Consulting is used to make informed selections from the myriad of applications software or turnkey systems that are available to satisfy the user's need. Professional Services firms provide a perceived (and usually accurate) impression of being impartial to the selection process. By contrast, a consultant from a software products company offering a certain flavor of software will try to sell that flavor.

As systems become more complex, professional services vendors are utilized based on their experience in customizing or developing application systems. Their ability to perform specialized, one-time services such

EXHIBIT III-1



as a particular application module or a hardware conversion from one platform to another (generally necessitating an operating system conversion) is deemed extremely beneficial. The use of an outside service prevents the hiring of staff that is only useful for a limited time frame.

2. Market Participants

Numerous professional services organizations are monitored and accounted for in the INPUT forecast. These participants range from being directly involved as their principal mode of business, to being tangentially or complementarily involved as a means to augment and/or influence their core business. Whatever the situation, the result is a "people-oriented" and "people-intensive" business.

Note: In the following sections, when professional services firms are ranked or revenues provided, the ranking will be for only those services that are performed by people. People are the prime ingredient in what INPUT is now defining as "Contract Services." These services are distinguished from Systems Integration activities which by definition are

the combination of hardware, software, and/or professional services to develop a system to be delivered to the client. These activities do have a hardware and well-defined software component that should not be confused with the people orientation of the contract services. See Exhibit I-1 for the subsegments of Contract Services.

3. Professional Service Business Structure

The Professional Services market is structured as previously mentioned in Chapter I. There are five submodes of service that professional services firms engage in: System Development, Consulting, Education and Training, and Facility Management (all of which are categorized as Contact Services) and Systems Integration. These categories are the means by which the professional services firms deliver their capabilities, or are segments by which these companies report their business activities.

Another way to structure professional services activities is by markets served; Industry-Specific or Cross-Industry.

Still another structural approach is to look at some of the business performance factors used by professional services companies. Some of these factors are:

- Potential work to be considered, based on presence, expertise, and revenue levels from assignments in vertical markets.
- Assignments that can be performed based on the capabilities of the company, technological strengths, and other business factors.
- Assignments that can be obtained, based on certain resources such as management strength and depth, and marketing considerations.

B

Structuring the Market on the Basis of Performance

Using performance factors to structure the market leads to specific vendor capabilities that support these performance factors. That is, certain vendor capabilities are required to support the performance factor method of structuring the professional services market.

Exhibit III-2 shows the relationship of performance factors to Vendor Capability. A few additional comments amplify the Exhibit. Taking the points one by one:

- Market presence is the vendor capability that has the most impact for work to be considered in market segments. Those vendors who have the most market presence in particular industry segments have the best possibility to be sought after by users in that market sector.

EXHIBIT III-2

PROFESSIONAL SERVICES MARKET STRUCTURE BASIS OF PERFORMANCE METHOD

PERFORMANCE FACTOR	VENDOR CAPABILITY OR REQUIREMENT
Work to be Considered	Market Presence/Knowledge
Ability to Entertain Work	Product/Service Breadth, Technological Strength
Ability to Gain Work	Resources (Management and Marketing)
Ability to Deliver Work	Project Strength and Vendor Resources

- Product and service breadth, technological breadth, and resources have a real and perceived relationship to the company's ability to actually perform the work. These factors relate to management, personnel expertise, vendor size, and vendor financial condition. These criteria are the essence of the work effort the vendor can perform, and are the key to users selecting this particular professional services organization.

- Resources committed by the professional services firm is management and marketing staff have an important bearing on obtaining the work. This is generally scoping and positioning activity, showing the prospect/client the company's desire and commitment to do the work.

- The last performance factor deals with the execution of the professional services program. Execution requires project management skill and vendor resources available to meet the needs of the client's project in a timely and efficient manner.

This alternative view of how the professional services market can meet demand leads to numerous selection criteria that are employed by prospective clients to determine the best fit for a particular project requiring outside professional services.

There are several classes of vendors that provide a wide spectrum of services and capabilities. Exhibit III-3 shows vendor classes as a func-

tion of the performance criteria, ranging from a narrow niche-oriented view to a wide, all-encompassing perspective. Specific vendors can be placed in each of these categories based on their focus, market presence, product and services breadth, technological breadth, project strength, and available resources.

EXHIBIT III-3

VENDOR CLASSES AND RANGE OF SERVICES USING VENDOR PERFORMANCE STRUCTURE

VENDOR CAPABILITY	RANGE	
	NARROW	WIDE
Market Presence	Single Market Focus	Number of Industry—Specific Markets
Product and Service Depth/Breadth	Single INPUT Segment, e.g., Education & Training	All Five INPUT Segments in Professional Services
Technological Depth/Breadth	Specific Focus on Delivery of Professional Service, e.g., a Particular Programming Language	Broad-Based Capability to Support Myriad of Facilities e.g., Multiple Languages, 4GLs, Application Development Tools
Project Strength	Minimal Schedule Management	Sophisticated Project Management and Systems Integration Skills
Resources	Support for Single, Specific Service, and Limited Level of Knowledge or Expertise. Typically Small Number of Employees and Offices	Extensive Technical and Project Management Capability, Management Strengths, Strong Marketing, Typically Large Number of Employees and Offices, International Presence

C

Professional Services Market Sizing

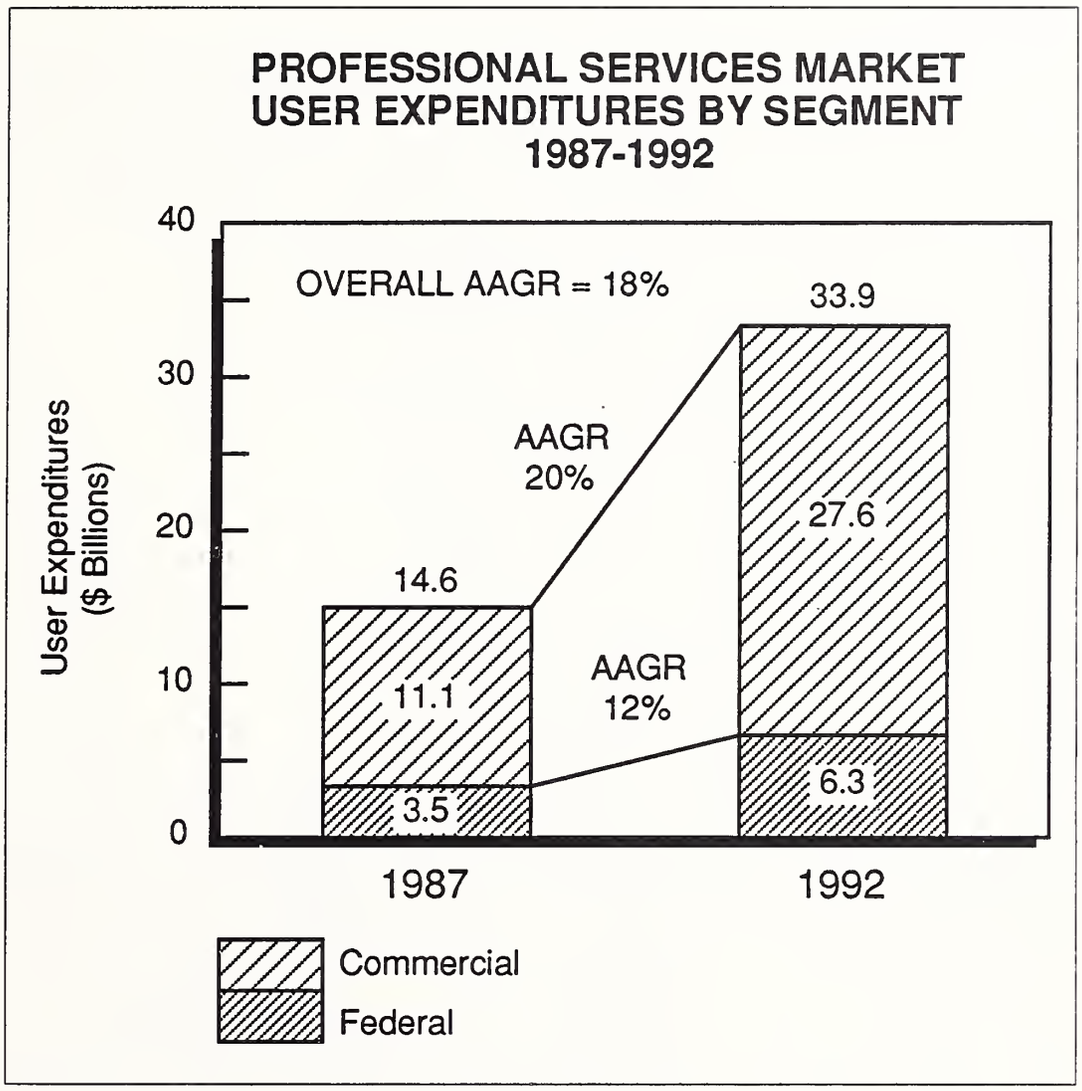
INPUT forecasts that the Professional Services delivery mode will grow at an annual rate of 18%, from a base of $14.6 billion in 1987 to $33.9 billion in 1992 (see Exhibit III-1). The fundamental reasons for this sustained growth are:

- The sophistication of mission-critical systems requiring expertise in networking, applications development, consultative services, education, and training generally not found within most companies—i.e., skillset.
- The need to develop systems that provide mission-critical advantages while satisfying the average and normal requirements of the enterprise—i.e., limited resources.
- The need to be more effective in using the systems that have been implemented. This need requires expanding computer users' knowledge throughout the organization—i.e., training needs.
- The previous success of professional services companies in implementing large-scale systems, provides credibility and confidence to other enterprises that have similar needs—i.e., track record.
- The experience in managing projects to satisfactory completion on time without overruns—i.e., business management.

The Professional Services market has two distinct segments: Federal and Commercial. (Note: Commercial in INPUT's definition includes state and local governments.) These segments are distinct in applications, the sales and marketing process, and implementation requirements. Vendors that have been successful in one segment have not usually been effective in the other.

The two segments are contrasted in Exhibit III-4. The growth rate for the federal government sector is only 12%. This slow growth is due in large measure to the pressures of the Gramm-Rudman-Hollings legislation and other follow-on legislation that is likely to put fiscal restraint on the government. However, the growth rate for the commercial sector is 20%, fueled by the large-systems requirements (also known as systems integration) that have developed in this segment. (Note: INPUT monitors the Systems Integration market values in a separate program. Systems Integration market values in that program do include the hardware dollars and project management dollars or fees. Only the contract services components are covered in this report.)

EXHIBIT III-4



D

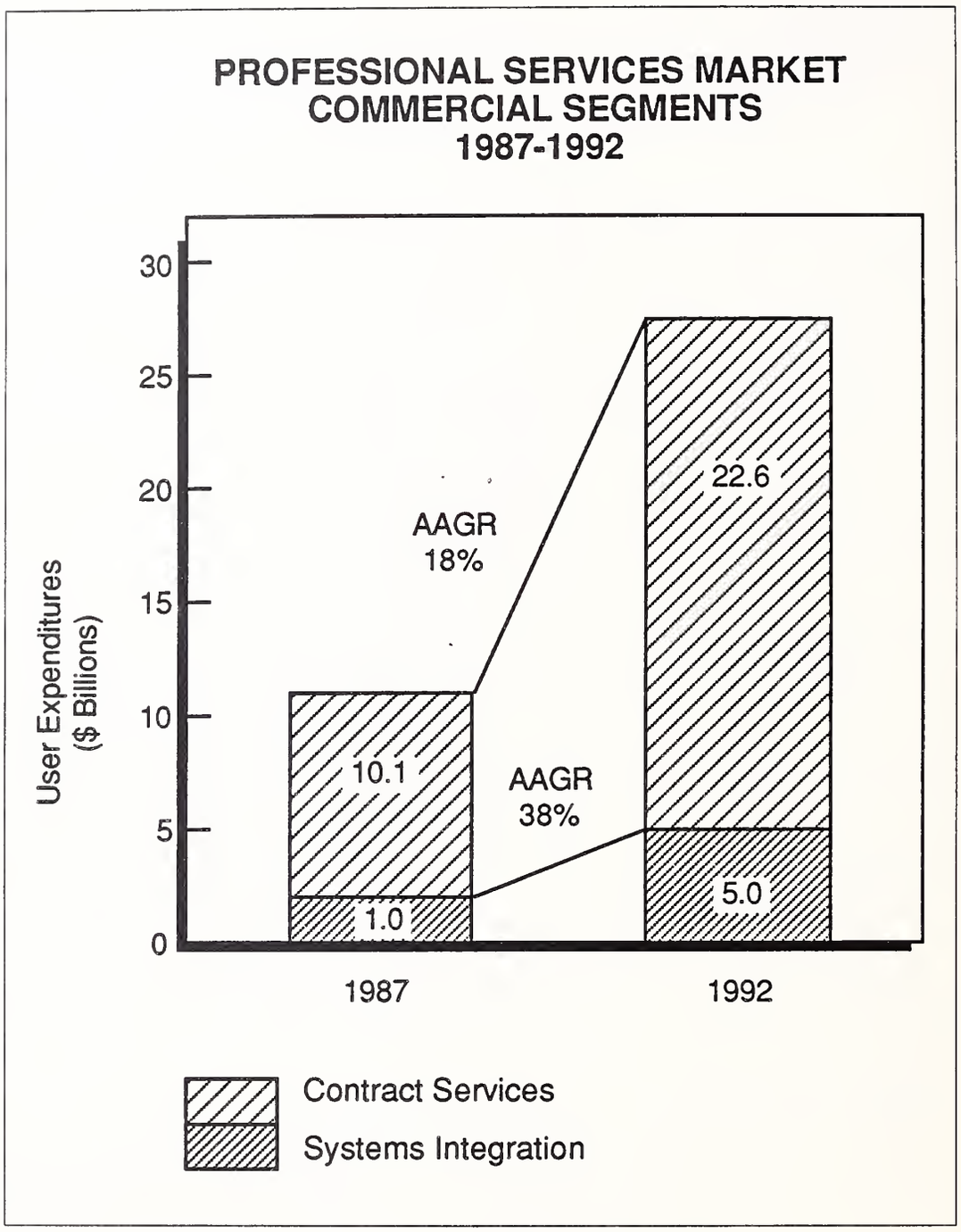
Major Professional Services Markets

1. Commercial

The commercial segment is the fastest-growing segment of the professional services market. The commercial segment is further divided into Contract Services and Systems Integration. This division is shown in Exhibit III-5. Currently, Systems Integration is only 9% of the Commercial market. In 1992, Systems Integration will be 18% of the Commercial volume.

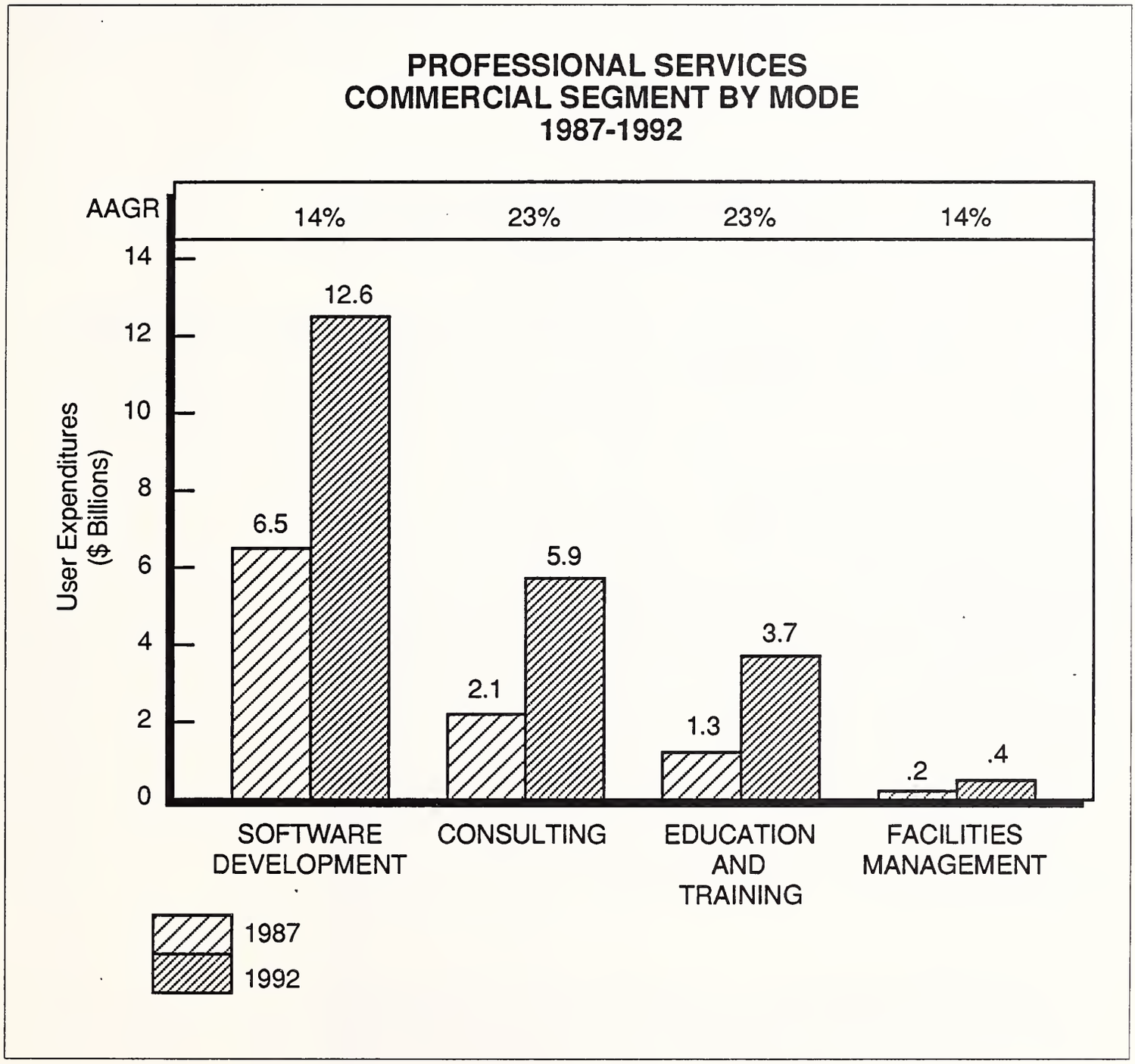
Exhibit III-6 describes the Commercial Contract Services segment, divided into its four modes. The Consulting mode and the Education and Training mode are growing at 23% each due to the sustained demand for the imparting of knowledge and the need to compliment existing internal skills. The need for such knowledge is a direct consequence of the enterprise's using more workstations and microcomputers to assist its employees in more productively performing tasks in its underlying business.

EXHIBIT III-5



Facilities Management in this delivery mode is a very small part of Commercial Contract Services. In this type of Facilities Management the client owns the equipment. In the commercial sector this ownership is rare because enterprises that wish to proceed in the direction of facilities management generally have the computer services performed on vendor-owned equipment, thereby using what INPUT calls processing Facilities Management.

EXHIBIT III-6



Another view of the commercial segment is to look at industry-specific markets. Exhibit III-7 divides the entire market segmented into specific industries. (Note: For completeness the Federal segment is included.)

EXHIBIT III-7

PROFESSIONAL SERVICES
USER EXPENDITURES BY INDUSTRY
1987-1992

INDUSTRY SECTOR	USER EXPENDITURES ($ Millions)		1987-1992 AAGR (Percent)
	1987	1992	
Discrete Manufacturing	2587	6593	21
Process Manufacturing	1226	3715	25
Transportation	180	526	24
Utilities	357	718	15
Telecommunications	594	1359	18
Distribution	714	1588	17
Banking & Finance	1723	3868	18
Insurance	1054	2239	16
Medical	314	848	22
Education	75	116	9
Services	184	505	22
Federal Government	3513	6251	12
State & Local Government	1768	4778	22
Other Industry-Specific	321	769	19
TOTAL	14610	33873	18

The commercial sector accounts for 76% of the total professional services market. It will continue to grow at a 20% AAGR, to become $27.6 billion in 1992. In 1987 the professional services commercial sector is $11.1 billion.

- After the Federal Government sector, the largest commercial sector is Discrete Manufacturing. It accounts for almost 18% of the commercial professional services commercial market in 1987. The major thrust here is to develop more-cost-effective manufacturing systems to provide U.S. companies with an opportunity to compete with offshore manufacturing. IBM Charlotte is a $300 million investment that is a model for obtaining low-cost manufacturing using automation, robotics and the latest in production techniques. Arthur Andersen has excelled in this market segment and held its second annual manufacturing exposition in conjunction with the Autofacts symposium. This exposition showed a large commitment to putting together the types of manufacturing systems U.S. firms need.

- The third largest market segment is State and Local Government. It overcame Banking and Finance, which fell to fourth, due to the major efforts of State and Local Governments to become more attuned to the prevailing technologies in information services. State and Local Governments have not been active (until recently) in developing automated systems for the services they provide their constituents. There is a realization that consulting activities can help improve productivity and curtail the seemingly endless red tape associated with previous manual systems. Consultants are routinely used to create RFP's and monitor vendor selection in large-system procurements. Education and Training is benefitting State and Local Governments as a conscious effort is made to upgrade the skills and knowledge of the government employee. And finally, in the Systems Integration mode, State and Local Government has become one of the largest users in an effort to modernize their services with total systems designed to solve their applications requirements.

- Banking and Finance users require the expert skills and resources available from professional services outfits to help develop leading-edge, fully integrated systems and networks needed to provide more-competitive services to clients.

The leading professional services vendors in the commercial segment for 1986 are shown in Exhibit III-8. IBM is again the leading provider of professional services, growing by 25%, from $875 million in 1985 to the 1986 level of $1,094 million. This represents approximately 4% of IBM's U.S. business. In May of 1987, IBM formally announced a business thrust into commercial systems integration. INPUT believes this thrust is part of a corporate mandate to participate more fully in enlarging the nonhardware business. While the rest of IBM was attempting to

EXHIBIT III-8

PROFESSIONAL SERVICES LEADERS
1986
COMMERCIAL SEGMENT

RANK	VENDOR	USER EXPENDITURES ($ Millions)	MARKET SHARE (Percent)
1	IBM	1094	12
2	Arthur Andersen	500	6
3	Unisys	294	3
4	Peat, Marwick, Main	240	3
5	Wang	172	2
6	Electronic Data Systems	156	2
7	Computer Sciences	135	1
8	Computer Task Group	135	1
9	BDM International	125	1
10	AGS	109	1
11	Digital Equipment Corp.	109	1

"downsize" through early-retirement programs, non-rehiring of departing personnel, and mission readjustments, the professional services group was permitted to hire "at will" and in many instances from the outside.

2. Federal Government

The U.S. government still is the largest "user" of information services in the world. In 1987, more than $17 billion was spent on information technology. There are more than 128,000 federal workers involved with over 22,000 medium- and large-scale computer systems and more than 275,000 microcomputers.

The federal agencies were among the first organizations to develop automated information delivery systems. These systems were designed to meet the government's need for reliable and efficient data processing services. Today, however, the government finds itself dependent on outdated, cost-inefficient systems.

The federal government has a need through the remainder of the decade to steadily improve the quality and quantity of data processing services. This must be done, in part, by overcoming the handicap of a rapidly aging equipment inventory. However, constraints applied by budget and personnel reductions make the goal that much harder to achieve. Gramm-Rudman-Hollings and recent proposed budget deficit accords by congress place a throttle on government expenditures. There will be an obvious impact on computer systems.

The federal government does not currently have the in-house staff required to support the quality and quantity of required DP-related services. Consequently, much of the work that would otherwise remain in-house will be contracted. This need for outside professional services contractors to support the requirements of the federal government is evidenced by increasing budget allocations, the need to expand federal DP capabilities through a modernization program, and the implementation of policies that freeze federal staffing levels and move more information services support functions to the private sector.

Many of the existing inventory of computer systems lack flexibility, transaction speed, and memory to satisfy current and future requirements. Most current and planned acquisitions are aimed at upgrading or replacing these systems. An objective of the upgrades is a reduction in the long-term costs of maintenance and software development that has frequently resulted when information systems support requirements changes without corresponding changes in systems capabilities.

a. Forecast

The federal government is in the process of modernizing its computers and data processing systems. There will be a continuing demand for contracted professional services. The federal government professional services market will increase, from $3.5 billion in 1987 to $6.3 billion in 1992, an average annual growth rate of 12% (see Exhibit III-7). The need for professional services to support the government is rebuilding goals will continue to make federal government professional services the largest single, externally-contracted information services segment of the federal market. Professional services expenditures represents 63% of all the federal government's Information Services expenditures.

The federal government professional services market will continue to demonstrate moderate growth as the government seeks to improve both the quality and quantity of automatic data-processing-supported services within budget constraints. Key among the forces that will sustain this market are:

- A workforce heavily committed to maintaining existing software systems and inadequately staffed to develop much-needed new systems. The federal government is not immune from the same problems occurring in the commercial sector. In fact, because the federal government was so proactive in its computer procurement early on, it is saddled with older hardware/software systems that are being pushed to the limits of usefulness.

- The need to implement more-efficient systems within the constraints of the federal budget and the new requirement to minimize budget deficit pressures.

- Executive directives that now require federal agencies to utilize contractors rather than perform the work in-house if outside contracting proves to be cost-effective.

- The use of technology, particularly in the area of microprocessor systems, at a rate that requires the importation of expertise. Professional services in software development, and education and training benefit most from this need.

There are some negatives to participating in the federal market, including the liabilities of contracting in a highly regulated and adversarial environment, the business risks associated with unique user requirements, and the increasing amount of competition. In addition, the long, detailed procurement process adds to the expense of participating in this market.

- The federal government professional services market has become increasingly competitive in the past few years. Small businesses, minority-owned businesses, and large aerospace vendors represent three types of new competitors that have come to this market from nontraditional business areas.

Continuing federal budget pressures as well as growing competition have created a price-sensitive market where the winners are working with progressively narrower margins, more tightly controlled overhead, and reduced management structure. Among the practices with which vendors must contend are:

- "Should-cost" estimates that agencies typically establish before reviewing bids. These estimates include an independent review of the specifi-

cations, an estimate of the likely cost of the project, and/or a comparison of the cost of in-house versus contractor performance of services in an attempt to determine if in-house development is, in fact, more cost-effective than commercial acquisition.

- Congressional pressures for fixed-price contracts to avoid cost overruns.

- "Extended Work Week" offerings by vendors willing to provide more than 40-hour work weeks of professionals without compensating salary increases; these offerings therefore cost the government less for a given level of performance. At risk is retention of the really innovative professionals with different lifestyle goals that conflict with long hours.

b. Leaders

As shown in Exhibit III-9, this market is dominated by systems houses and hardware firms. These firms require a broad range of in-house or consultant skills to meet systems integration and implementation requirements. Some hardware firms are providing systems employing other companies' hardware in order to best meet client needs and price requirements. An example is Unisys, which has more IBM hardware placed in the government than IBM has placed itself.

Competition in the federal government professional services arena is complicated by the continually changing pattern of vendor teams for different programs. Today's bidding partners are tomorrow's competitors, and vice versa. This is essentially true of the large-scale systems integration bids that require unique skills for a contract award.

E
Professional Services Delivery Modes

1. Overview

The Professional Services delivery mode is segmented into Contract Services and Systems Integration. Contract Services is divided into subsegments and some of the types of activities in each subsegment are shown in Exhibit III-10. These activities are discussed briefly below.

2. Contract Services

a. Software Development

This area is sometimes called programming and analysis, and is the mode of professional services that involves the customizing and development of applications. Some of the activities in this submode are:

- Custom software development. This is the activity requiring the development of unique specifications and programming to satisfy the indi-

EXHIBIT III-9

PROFESSIONAL SERVICES LEADERS
1986
FEDERAL GOVERNMENT SEGMENT

RANK	VENDOR	USER EXPENDITURES ($ Millions)	MARKET SHARE (Percent)
1	Computer Sciences	525	15
2	Grumman Data Systems	211	6
3	BDM International	197	6
4	Unisys	196	6
5	Planning Research (Emhart)	188	5
6	TRW/Systems Development	165	5
7	General Motors/Hughes	134	4
8	Logicon	130	4
9	IBM	127	4
10	Bolt, Beranek & Newman	110	3

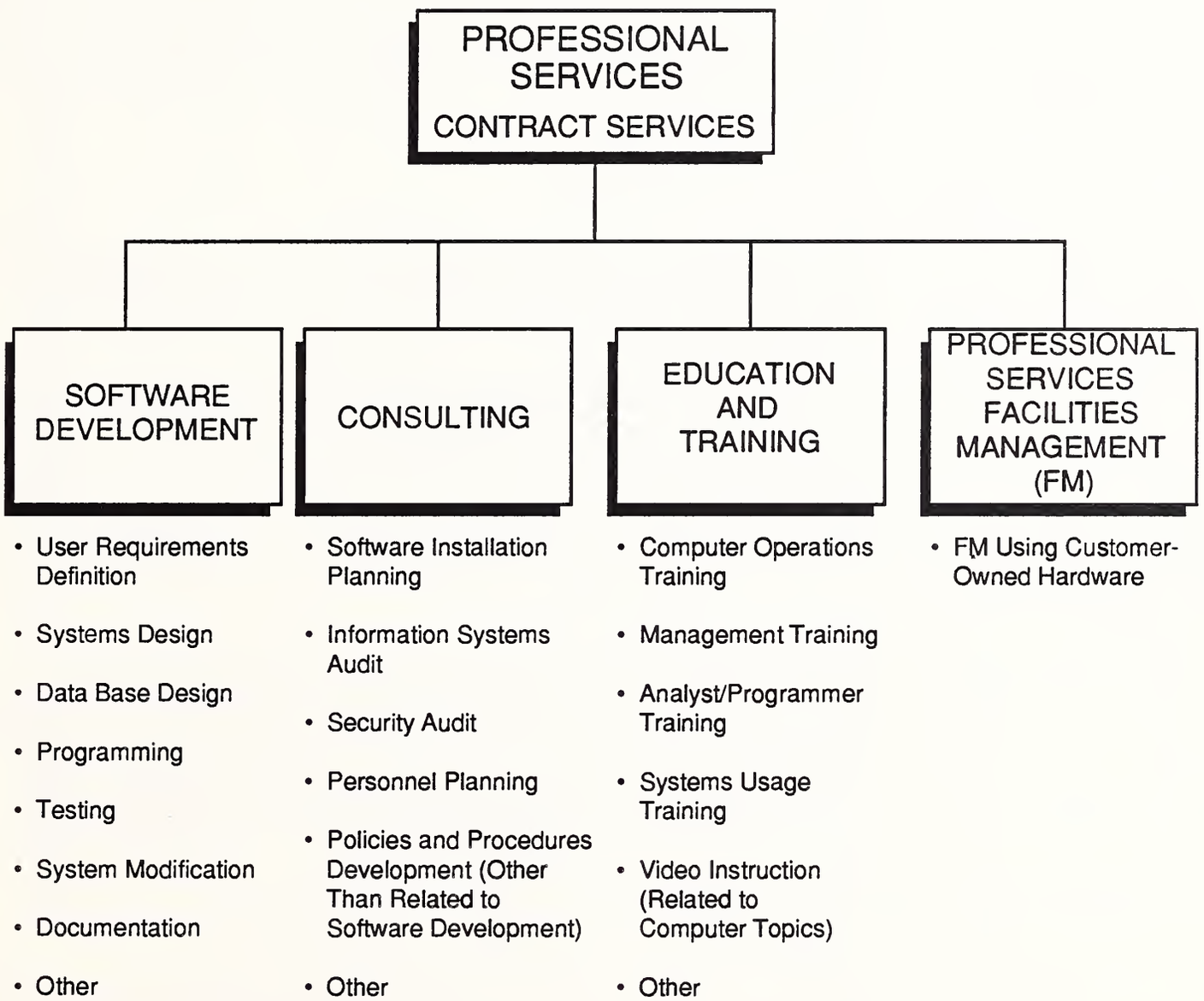
vidual needs of the enterprise. As expected, there is a high labor content in performing these activities.

- Modification of commercially available software packages. This activity involves a small customization to the existing application to personalize the software. Several professional services firms have alliances that foster this activity. Examples are Arthur Andersen as an implementor of MSA's Accounting Software systems, and Computer Task Group as implementor of Relational Technology's Ingres DBMS software systems.

Other activities included in this submode are: software testing, software conversion (generally software running under one operating system, ported to another), the maintenance and enhancement of existing applications, and the independent testing and validation of software packages for vendors.

EXHIBIT III-10

PROFESSIONAL SERVICES MARKET STRUCTURE
CONTRACT SERVICES



b. Consulting

Consulting involves the use of industry knowledgeable and experienced personnel to develop specifications particular to an enterprise's unique requirements. Consulting entails activities such as: disseminating knowledge to an organization to apprise them of techniques or capabilities that may be beneficial, or looking into the feasibility and/or requirements of applying new technologies. Other activities in this category are: system audits, management perspective, and validation of plans or programs developed by internal members of the organization.

c. Education and Training

This submode involves the important activity of preparing internal staff for new information that will generally make them more productive in using computer systems. The education and training of professionals, managers, and nonskilled (in computers) personnel is necessary to develop new skills, knowledge, and capabilities in new programming languages, new programming techniques, systems procedures, and operational requirements pertinent to the enterprise. There are several techniques employed, ranging from classroom-type instruction to self-paced programmed instruction. New techniques that have become popular are interactive video-based systems and computer-based systems.

d. Facilities Management

Facilities Management (in the professional services delivery mode) entails providing the staff required to perform the operation and maintenance of the computer hardware systems owned by the client. This type of facilities management is fairly common in the federal government where outside firms are contracted to run an entire computing facility, from actual operations to resource planning and even software development.

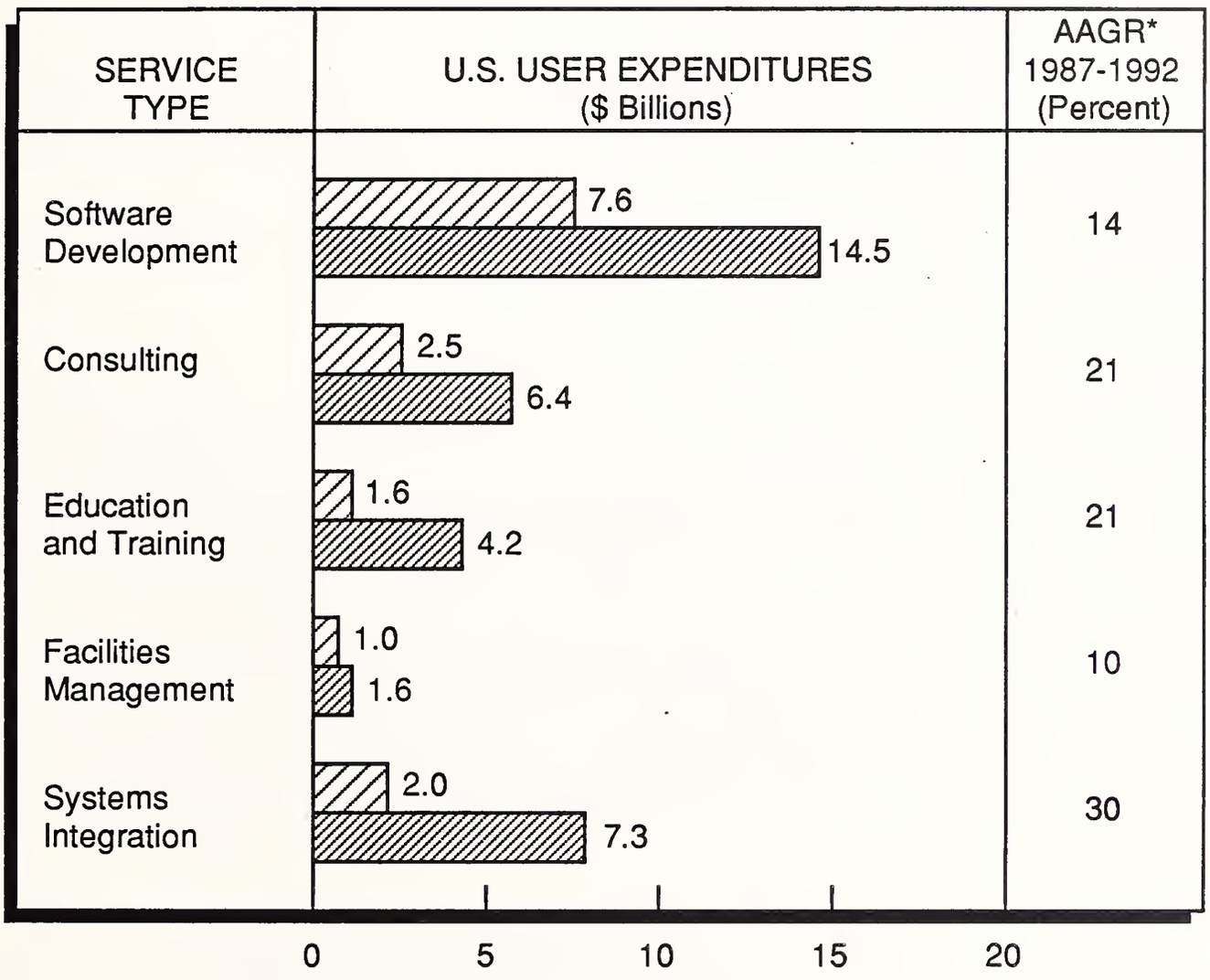
e. Forecasts

The forecasts for the contract services segments of professional services are shown in Exhibit III-11. Software Development is the biggest portion of contract services, representing 60% of the expenditures in1987. This percentage will decrease to 54% in 1992. Some of the reasons for this decrease are:

- There will be faster growth of the other segments in contract services (except facilities management) due to the need to acquire more knowledge and capabilities internal to the organization.

EXHIBIT III-11

PROFESSIONAL SERVICES MARKET BY SERVICE TYPE 1987-1992



Contract Services

1987	$12.6
1992	$26.6

AAGR* 16%

* Average Annual Growth Rate

- There will be more implementation work performed in-house due to the sophisticated software tools coming onstream in the next few years in the form of DBMSs (containing screen painters, 4GLs, etc.), 4GLs, CASE products, and other application development tools.

- The requirement to expend internal resources for maintenance and the enhancement of the older systems, will diminish as new methodologies are implemented to better automate these needs. This change will free resources that can be used to develop applications internally.

- Some of software development will shift into the systems integration subsegment as users define their needs in terms of the entire system instead of the "software" to accomplish the applications need.

Each Contract Services segment will be fully discussed to provide additional insight.

(i) Software Development Segment

Although reasons were provided above that suggested the software development subsegment will decline slightly as a percentage of the Contract Services segment, it should be observed that INPUT is forecasting that this subsegment will grow at an average annual rate of 14% over the five-year forecast period, to reach the $14.5 billion level (see Exhibit III-11). This growth will occur for several reasons provided below.

The user community doesn't have the resident skills to develop the sophisticated systems required to implement mission-critical or competitive advantage systems. Most of the resident expertise is tied up in maintaining and enhancing the "current" working systems. The lack of resources is due to declining growth rates in IS budgets, and the pressure for cost reduction to remain competitive. Some of this burden is borne by the IS groups.

Furthermore, the recent world stock market crash will not provide a level of confidence to warrant the hiring of permanent staff to develop the necessary systems. This lack of confidence suggests the use of outside contract services to implement these important systems. Once the systems are delivered, the manpower and resources needed to perform the implementation are radically decreased and leave with the systems integration contractor. It is INPUT's belief that as many as 20% of Systems Integration projects will lead to serious inquiries for Facilities Management.

Professional services firms have been rapidly building expertise and specializing in certain industry-specific sectors, thereby becoming even more competitive to the "make vs. buy" analysis most corporate groups employ prior to using outside contract services. Corporate dilution of the

expertise to maintain existing systems, coupled with the current economy cautions, and tempered by the levels of expertise and knowledge the professional services firms have amassed, provides a very compelling and decided advantage to going outside.

Furthermore, corporate users are using a "tool box" approach to have outside services initiate the development of "core" modules that can be built upon over time. This approach allows a corporate IS group to hedge and bring in its own resources at particular points in a lengthy software development program, or to continue to use the outside contract services.

Another issue negatively impacting the software development market's growth is the willingness of vendors in other delivery modes to take on professional services activities. Their activities will take some of the business that formerly went to firms that were pure players in this market. It is INPUT's belief that the increased competition will exert pressures to control prices charged for software development activity.

The leaders in the software development segment are shown in Exhibit III-12.

EXHIBIT III-12

PROFESSIONAL SERVICES LEADERS
1986
SOFTWARE DEVELOPMENT SEGMENT

RANK	VENDOR	USER EXPENDITURES ($ Millions)	MARKET SHARE (Percent)
1	IBM	598	9
2	Arthur Andersen	303	5
3	Planning Research (Emhart)	192	3
4	Computer Sciences Corp.	185	3
5	Unisys	176	3
6	Peat, Marwick, Main & Co.	116	2
7	Bolt, Beranek & Newman	108	2
8	TRW/Systems Development	105	2
9	Wang	105	2
10	Price Waterhouse	95	1

(ii) Consulting Segment

This segment of contract services is the second largest. INPUT estimates that user expenditures will increase from $2.5 billion in 1987 to $6.4 billion in 1992, an increase representing and annual growth rate of 21%. Exhibit III-11 shows the size and growth of this subsegment of Contract Services relative to the other subsegments. Exhibit III-13 shows the market leaders for this subsegment.

EXHIBIT III-13

PROFESSIONAL SERVICES LEADERS
1986
CONSULTING SEGMENT

RANK	VENDOR	USER EXPENDITURES ($ Millions)	MARKET SHARE (Percent)
1	IBM	256	13
2	Unisys	127	6
3	Computer Sciences Corp.	85	4
4	BDM International	85	4
5	Booz, Allen and Hamilton	75	4
6	Digital Equipment Corp.	65	3
7	Logicon	60	3
8	TRW/Systems Development	60	3
9	Arthur D. Little	53	3
10	Wang	51	3

The consulting subsegment is an important factor in professional services; it is the area of functionality that validates the plans and expenditures being considered by the IS group. The level of capital expenditures, the sophistication of systems to provide competitive advantage, and the desired gains in productivity and performance invariably require consultive services. The need to have expert counsel on major expenditures is a way to ensure that the systems being contemplated solve the problems and, needs of today and more importantly, tomorrow.

Professional services vendors are in a unique position to provide management with an expert opinion that is objective, up-to-date, forward-thinking, and insightful. As outside eyes to technology, the competition, and other industries, consultants can generally synthesize solutions that are important and beneficial to the enterprise.

An important issue developing in the consulting segment of the business is the effort on the part of nontraditional professional services vendors to provide capabilities in the consulting subsegment. For example, Oracle, the very fast growing DBMS vendor, has started a professional services division that provides consulting and software development for its products. There are currently 200 people providing consulting and software development functions for users. It is likely that Oracle's consulting services are not particularly objective—i.e., the DBMS vehicle is always likely to be Oracle.

In a similar fashion, Relational Technology has entered into an arrangement (alliance) with Computer Task Group to provide similar services for Relational Technology's Ingres DBMS. Heretofore, CTG has had a reputation for being impartial in selecting a DBMS solution for a user's requirements. INPUT believes that this will mainly still be the case, with the consulting and software development activities becoming more distinct project phases. That is, the professional services firm will do its objective consulting to determine the appropriate solution, and then separately offer its expertise to provide for the implementation.

To do the actual implementation, the vendor can offer its expertise in a specific vendor's product or system. However, there still is a fine line, as it would seem consultants providing a solution would be at least slightly predisposed toward a particular system or method.

There are numerous examples of professional services firms having relationships with particular software products vendors as a means to making their professional services practices more successful.

- Arthur Andersen has a relationship with both MSA and McCormack Dodge to implement financial and manufacturing systems.

- Knowledgeware has a relationship with Arthur Young, which performs education, training, and consulting for Knowledgeware's CASE products.

- Computer Associates has relationships with most of the accounting "Big Eight" to implement general ledger software.

- Deloitte, Haskins and Sells has a relationship with Pro Computer Sciences to assist in the use of 4GL.

INPUT is forecasting a large growth in IS expenditures to achieve full network integration. There is a considerable market for taking disparate voice and data networks and integrating them into one cohesive network where voice, data, image, and text are more effectively managed. INPUT is forecasting emergence and fast growth of a telecommunications specialty to provide the consulting and network management necessary to facilitate this integration.

INPUT also sees an opportunity for small, local consulting groups to develop a highly specialized consulting practice in conjunction with small software vendors, to help bring solutions to market. Examples would be local-area networking, microcomputer consulting, etc. This opportunity is the equivalent of a VAR, but with an emphasis on consulting, not products.

(iii) Education and Training Segment

The Education and Training subsegment is growing from $1.6 billion in 1987 to $4.2 billion in 192—a 21% annual growth rate. (See Exhibit III-11 for how education and training compares to the rest of the contract services segments.)

There are several modes of delivery for education and training, namely:

- Classroom or live instruction.

- Multimedia and interactive video (IVI).

- Computer-based instruction (CBT), which includes computer-assisted instruction (CAI) and computer-managed instruction (CMI).

- Self-study or programmed instruction.

Classroom training makes up approximately 70% of the education and training market, with 60% off-site and 40% on-site. Live training is predominant because it is the mode that most people are comfortable with, and the quickest way to prepare material in order to deliver information on new technology.

Live instruction is more important than CBT and IVI in training involving interpool management skills where role-playing and group interaction are key components of the information being taught.

Multimedia and IVI have grown in the past few years. The premise is to provide video instruction with an interactive phase. Respondents are questioned on information and a tailored response to their answers is given on video and/or audio. ASI has been very active in building up its portfolio of IVI courses. Its IVI business has grown from $3 million in 1985 to $15 million in 1986 (worldwide).

CBT has become an effective way of delivering training to users. INPUT defines CBT to include any subject being presented with the use of the computer as part of the transfer of knowledge. Thus, noncomputer topics would be covered if a computer is used as part of the training.

CBT is popular in training noncomputer people because, through the training, the user becomes acclimated to the computer system. The growth of CBT is based on the large number of microcomputers available, the delivery cost of providing the computing resource to facilitate the training, and the large number of people who actually need the training.

Self-study makes up approximately 15% of the education and training market. Approximately one-third is for product-specific programs and the other two-thirds for generic instruction. Self-study is popular with busy executives or people who do not learn easily at the average pace—i.e., they need more time or less time than most people.

Besides the traditional programmed instruction and text books, education and training vendors have become effective in delivering training via audio cassettes (listened to while commuting or jogging) and VCR cassettes.

The leading vendors in the education and training segment are shown in Exhibit III-14. National Education Corporation (Newport Beach) purchased Deltak from Simon and Schuster after the Prentice-Hall/Simon and Schuster merger in 1986. More recently, National Education Corporation announced its intention to acquire ASI and merge its activities with those of the Deltak Group.

(iv) Facilities Management Segment

Professional Services facilities management will grow at a lower rate than the rest of the Information Services market. This subsegment is the smallest in the contract services segment and will be $1 billion in 1987, and $1.6 billion in 1992. This represents a 10% annual growth rate.

EXHIBIT III-14

PROFESSIONAL SERVICES LEADERS
1986
EDUCATION AND TRAINING SEGMENT

RANK	VENDOR	USER EXPENDITURES ($ Millions)	MARKET SHARE (Percent)
1	IBM	171	13
2	McGraw-Hill	114	9
3	Deltak	56	4
4	Unisys	54	4
5	Logicon	54	4
6	ASI	48	4
7	General Motors/EDS	40	3
8	Computer Sciences Corp.	30	2
9	Arthur Andersen	27	2
10	Planning Research (Emhart)	25	2
11	Wang	25	2

Most of the expenditures in this segment come from the federal government where outside contractors are frequently engaged to run government-owned data centers.

Outside contractors are especially prevalent in agencies where the additional staff to run the data centers is difficult to budget or where the special skills needed are for a limited time frame. CSC has been very successful in providing client-owned contractor-operated (COCO) services to the federal sector and the state and local government sector.

INPUT believes the concept of facilities management, COCO, will not grow as much as the other form, called Processing/Network Services FM. This latter is an arrangement where the vendor owns the facilities and delivers the processing power to the client organization. In many instances the actual hardware is not located on the client's premises.

The market leaders in the Facilities Management segment are shown in Exhibit III-15.

EXHIBIT III-15

PROFESSIONAL SERVICES LEADERS
1986
FACILITIES MANAGEMENT SEGMENT

RANK	VENDOR	USER EXPENDITURES ($ Millions)	MARKET SHARE (Percent)
1	Computer Sciences Corp.	235	26
2	Martin Marietta Data Systems	95	10
3	BDM International	75	8
4	General Motors/EDS	75	8
5	Allied/Bendix	36	4
6	Lockheed/LEMSCO	35	4
7	Dynalectron	30	3
8	Unisys	29	3
9	Boeing	25	3
10	Zero Systems	24	3

3. Systems Integration

a. Overview

Systems Integration is the activity of taking the overall requirements for a comprehensive application system and delivering them to the client. Overall requirements include components such as the required hardware and software (both applications and system software) plus the necessary professional services functions of custom software development, education, and training, and of course, the consulting necessary to initiate the systems integration project.

Systems Integration programs generally entail major efforts that require years and millions of dollars to implement. These types of programs have been fairly common in the federal sector over the years. However, in the past few years (mostly the last 18 months) major commercial enterprises have been seeking outside professional services support to take the responsibility for implementation of these "mission-critical" and competitive-advantage systems.

An example of a very large system is the contract won by IBM to implement a $300 million office automation system for Ford Motor Company. State and local governments have been letting out major bids for systems to bring their levels of automation up to the levels found elsewhere in the U.S. economy. Although many of the large-scale systems integration projects receive significant press, there are many smaller systems that still fit the definition.

b. Market Size

Systems Integration was separated as a delivery mode by INPUT in 1986. It is the fastest growing segment of professional services. The commercial portion of Systems Integration is growing at an annual rate of 38%, while the federal portion is growing at an annual rate of 18%, during the five-year forecast period. The federal government has been procuring systems integration services for some time while the commercial sector is just realizing the benefits of this activity.

Overall, the Systems Integration sector is growing at the combined annual rate of 30% from the 1987 level of $2 billion to the 1992 expenditure level of $7.3 billion. (See Exhibit III-11 for a pictorial view.) Note: The expenditures shown are for only the professional services components of the SI programs.

The leaders in this segment are shown in Exhibit III-16. Many of these vendors have been successful in the Federal Systems Integration segment and are looking for ways to capitalize on that success by providing similar services in the commercial sector.

Systems Integration projects by their very nature require a multiplicity of skills and disciplines for successful completion. No one vendor has all the hardware, software, communications, and program management skills to deliver the myriad of applications users are looking for. Even IBM needs to develop alliances and relationships to be a successful participant in this market. (Note: IBM in May 1987 announced a marketing thrust into Commercial Systems Integration and began lining up alliances to be in a position to answer the needs of CSI proposals.)

EXHIBIT III-16

PROFESSIONAL SERVICES LEADERS
1986
SYSTEMS INTEGRATION SEGMENT

RANK	VENDOR	USER EXPENDITURES ($ Millions)	MARKET SHARE (Percent)
1	IBM	195	12
2	Computer Sciences Corp.	125	8
3	Arthur Andersen	120	7
4	Unisys	103	6
5	General Motors/EDS	102	6
6	Science Applications Inter'l	75	5
7	BDM International	70	4
8	Martin Marietta	65	4
9	Planning Research Corp.	50	3
10	Bolt, Beranek & Newman	46	3

Specialization in Systems Integration will become more important as the initial successes provide credibility for the SI vendors and propel them into the leading competitive role in subsequent programs of that type. Arthur Andersen has developed a substantial reputation in Manufacturing, EDS has developed a significant success rate in medical, Control Data has done well in the utilities industry.

Systems integration offers a privileged position to a vendor in that it affords an opportunity to work with the client at the highest levels for a protracted period of time, thereby obtaining account control. INPUT has observed that approximately 10% of the initial CSI projects have ultimately lead to facilities management opportunities. The CSI vendor and its staff become so familiar with the system, the client's way of doing business, and the mission that a natural consequence is to run and maintain the system at its competition. INPUT estimates that CSI projects may lead to 15-20% becoming facilities management opportunities.

The complete Systems Integration market from 1987 to 1992 is shown in Exhibit III-17. This market includes hardware/software/communications expenditures—the entire expenditures required for systems integration. The contract value is the amount of business booked for SI projects, while the expenditure is the amount of dollars actually spent in that year. The INPUT model for how average SI contract expenditures occurs is shown in Exhibit III-18. The INPUT report entitled *CSI Markets, 1986-1992* provides a very detailed discussion of this market. Furthermore, INPUT has initiated a separate subscription program monitoring the Systems Integration market (to start January, 1988).

EXHIBIT III-17

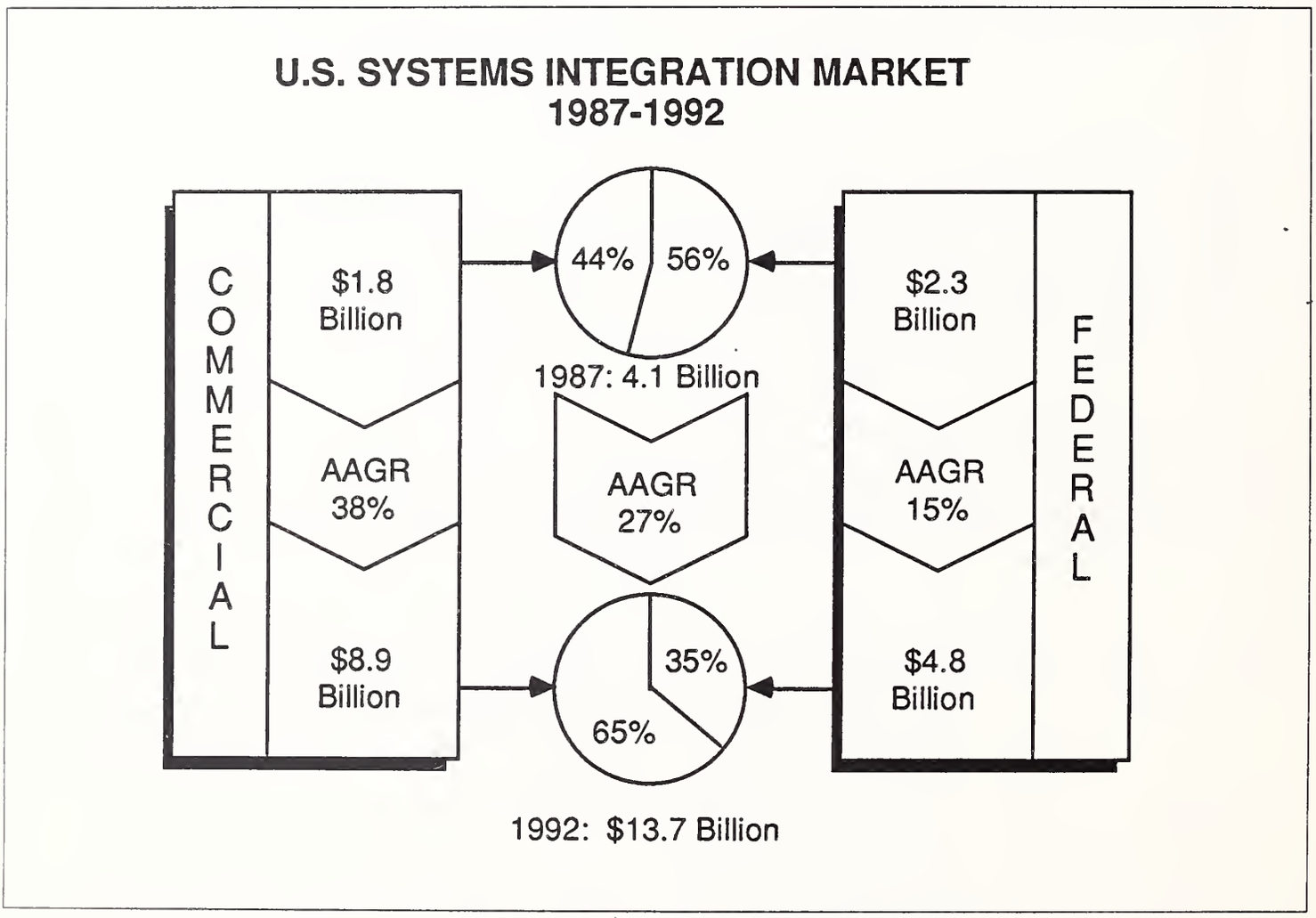


EXHIBIT III-18

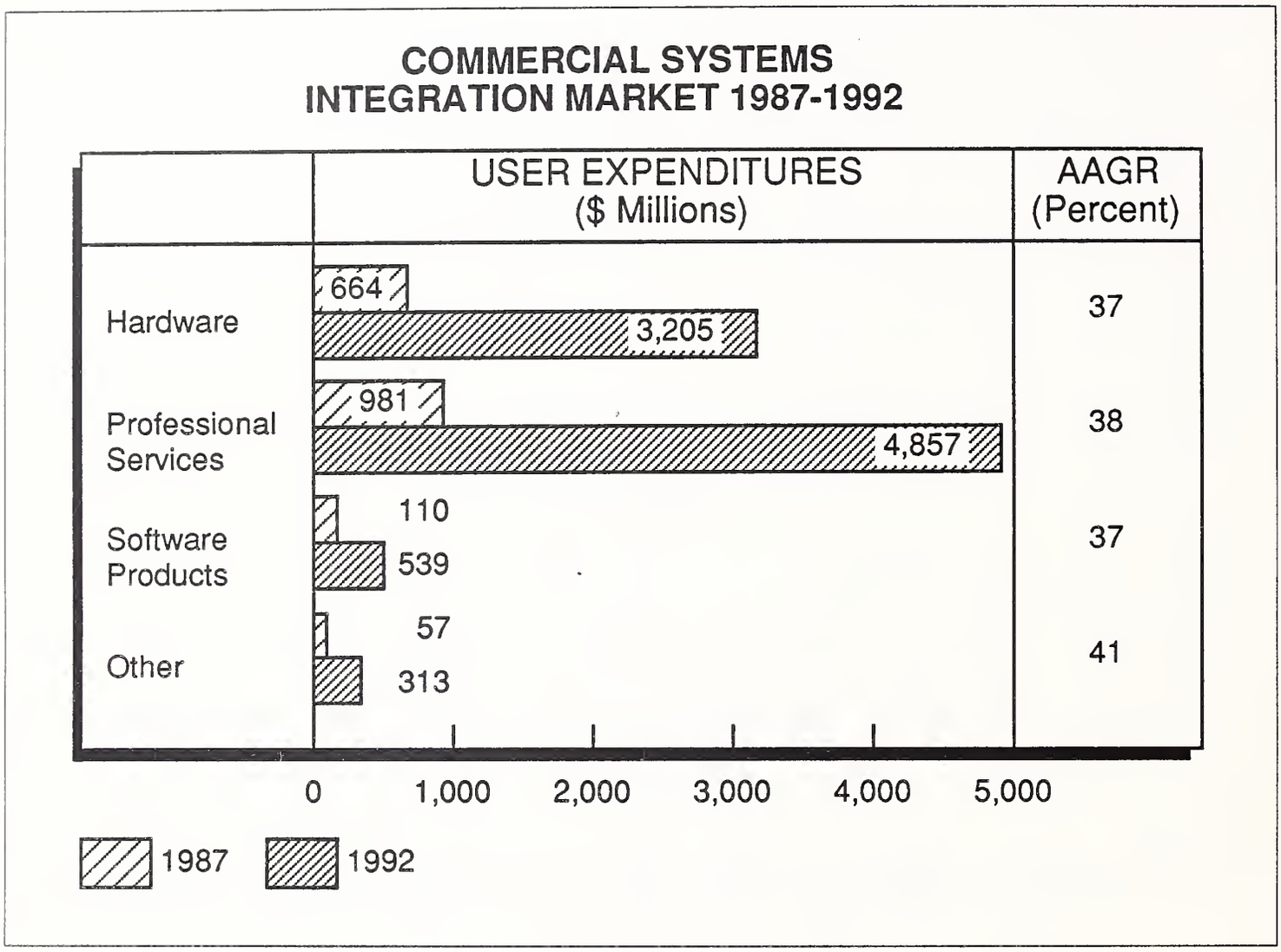
SI CONTRACT EXPENDITURE MODEL

	PERCENT			
	YEAR 1	YEAR 2	YEAR 3	YEAR 4
Computer Hardware		100		
Communications Hardware			100	
Systems Software Packages		100		
Applications Software Packages			100	
Consulting	60	20	20	
Project Management Fees	40	20	20	20
Design/Integration	45	35	20	
Software Development		50	50	
Education/Training and Documentation				67
O & M			33	67
Other			33	100

The software development part of systems integration is a major component and is the same order of magnitude as computer systems hardware. It should be noted that previous to SI being separated as a component of professional services, the software development portion of professional services was forecast to grow at 16%. In this report, growth is forecast to be 14%. The decrease in growth is actually accounted for as a shift from ordinary professional services to the new SI segment. In other words, the software development projects of the past have actually become more sophisticated and complex and in many instances required a combination hardware/software/communications solution. This requirement is now recognized in the SI segment.

Exhibit III-19 separates the Commercial Systems Integration Market into major components. Exhibit III-20 divides the Federal Systems Integration Market into the same major components. Federal Systems Integration represents 56% of the entire Systems Integration market in 1987, but

EXHIBIT III-19



will decline to 35% in 1992. This is due to the significant recognition on the part of the commercial vendors that Systems Integration is an important vehicle for delivery of complex systems.

F

Competition

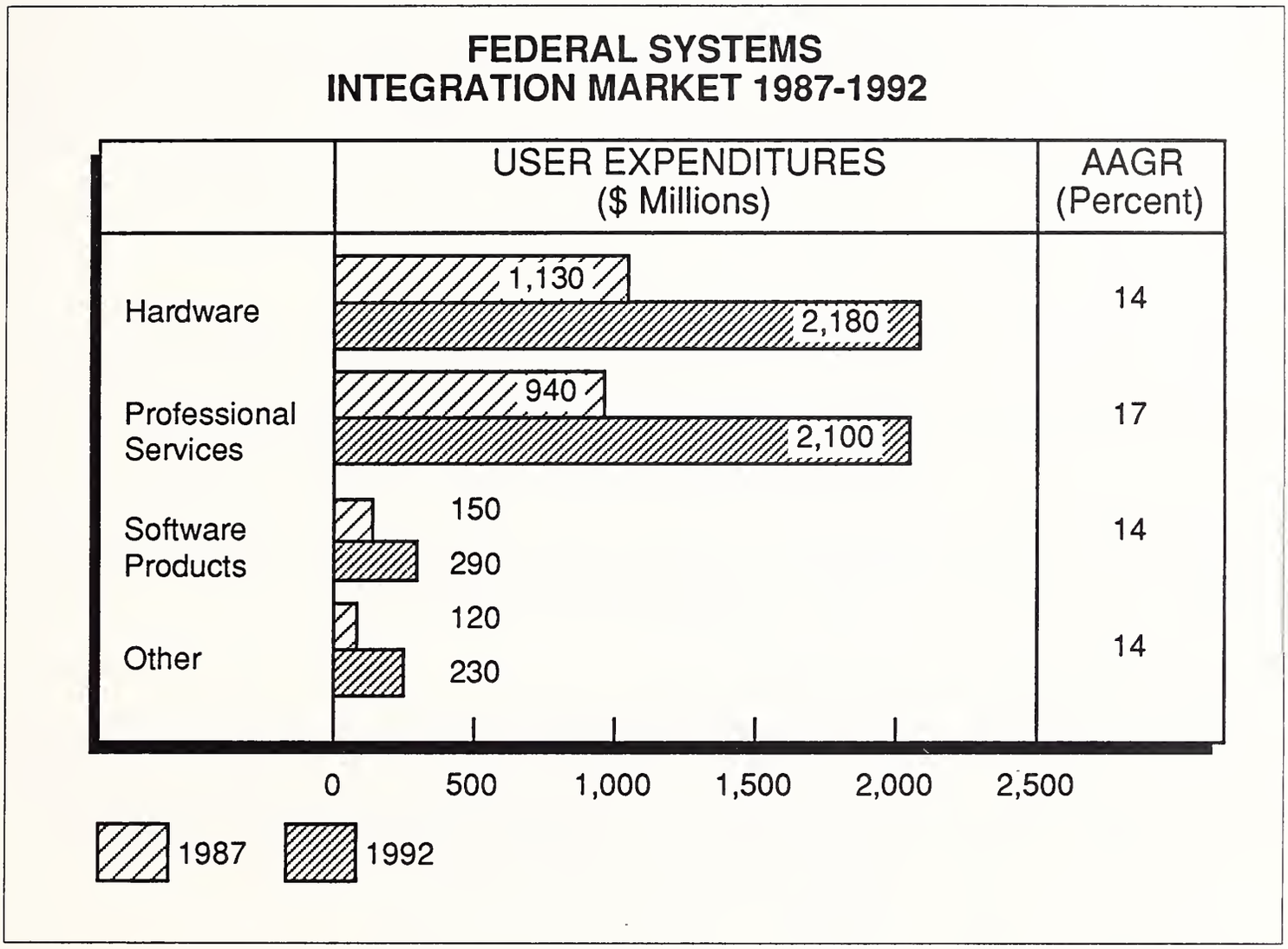
1. General

There are four classes of vendors that compete/participate in the Professional Services segment of the Information Services industry:

a. Computer Manufacturers

Vendors in this class include IBM, DEC, Unisys, and Control Data. Several of the minicomputer manufacturers such as Wang, Prime, and Data General also have programs to participate.

EXHIBIT III-20



IBM has announced a major marketing program to enter the commercial systems integration market, this is a direct outgrowth of federal government programs by the successful IBM Federal Systems division.

DEC has had a professional services program operating as "pseudo-branches" for a time. That program has now been integrated into the local branch offices throughout the U.S. All DEC salespeople are looking for professional services opportunities and can use a local expert to marshall resources from corporate when appropriate.

Unisys, prior to the Sperry association (i.e. Burroughs), worked extensively through the former System Development Corporation for the extensive federal professional services revenues it realized. Coupled with Sperry after the merger, Unisys now places more IBM equipment into the Federal Government sector through Federal Systems Integration contracts than does IBM.

b. Public Professional Services Firms

Several large firms obtain a significant amount of revenue from a core business of professional services. The largest vendor in this class is Computer Sciences, which became the second enterprise to achieve more than $1 billion in revenue from Information Services. (Note that the first is Automatic Data Processing.) Other vendors in this category are BDM International, Planning Research, Computer Task Group, and AGS.

c. Tax/Audit Firms

This class includes the Big Eight firms—i.e., the certified public accountants, all of which have some form of Management Advisory Services (MAS) or consulting activities. Although this dualing has caused some debate about the appropriateness and potential conflict of interest of this activity, most of the accounting firms see professional services as a natural and reasonable complementary business to tax/auditing practices. To date, there has been little conflict of interest and companies such as Arthur Andersen, Peat, Marwick & Main, and Price Waterhouse have developed excellent reputations for quality work.

d. Spinoffs

These are divisions or subsidiaries of companies whose core business is not Information Services. These companies have entered the Information Services business by creation of a division. Examples are several aerospace firms such as Lockheed, Boeing, Martin Marietta, McDonnell Douglas, and Grumman Data Systems.

e. Other

There are other firms that participate in the Professional Services delivery mode, including small private companies, management consultants (who advise in computer-related activities) and vendors in the other delivery modes that offer consultive services to more effectively utilize their offerings. This latter category is interesting because it has provided to many of the firms another significant source of revenue.

A prominent example in the Software Products delivery mode is Oracle. In the past year Oracle has developed a 200-person organization to provide consulting support, training, and application software development for its DBMS products. As a result of these activities, Oracle has entered into another product arena, CASE (Computer-Aided Software Engineering). This entrance provides the means to leverage its fundamental business into complementary areas to sustain the extraordinary growth Oracle has experienced in the past several years.

Oracle's move has forced its competitors—Relational Technology, Informix, and Unify—to offer competitive capabilities. An interesting result of gearing up to compete with adjunct professional services was the alliance between Computer Task Group and Relational Technology. This relationship called for CTG to act as the consulting arm of RTI to provide consulting, education and training, and applications software development.

2. Big Eight Impact

The professional accounting firms have been increasing their penetration of the information services industry. The "Big Eight" has had considerable success in enlarging its management consulting and professional services practice, with Arthur Andersen being the standout. In some circles, in regard to professional services, the Big Eight has been referred to as "Arthur Andersen and the Seven Dwarfs."

While Arthur Andersen's revenues from professional services may equal the aggregate of the other seven, this lopsidedness in no way diminishes the potential in the next few years for the other seven in the Big Eight, as well as the regional accounting firms.

INPUT expects accounting firms to grow above the industry rates of other professional services firms for the following reasons:

- Existing high-level contacts for audit leads to an easy door opener to the professional services side of the accounting practice. Some controversy has arisen regarding possible conflict of interest, with the audit side of an accounting firm having to monitor systems produced by fellow members of the firm. It is INPUT's belief that professional ethics and the conservative nature of the audit staff would not tolerate malpractice from any professional services firm (including its own), and there is a good argument for even more intense security of the professional services performed by the other side of the firm.

- Accounting firms—especially the Big Eight—have a reputation for performing services satisfactory to their clients. Furthermore, there is a loyalty developed by many individuals who are "placed" in management positions when it becomes apparent that partnership status will not be bestowed upon them.

- Accounting practices are becoming involved in the leading edge of information services technology as a direct consequence of providing more services for their clients as well as enlarging their own firms. The audit and tax business is a mature and slow-growing business, and it is difficult to dramatically improve market share and presence. Professional services offers a more available, potential market.

The Big Eight firms have made some "moves" in getting further established in the professional services sector. While not all the moves are exactly in the information services domain, they are indicative of trends in that direction. Exhibit III-21 shows some of the actions taken by the Big Eight firms.

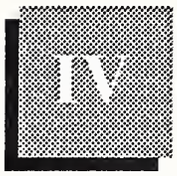
EXHIBIT III-21

BIG EIGHT ACTIONS

FIRM	ACTION OR ACQUISITION	YEAR	INDUSTRY-SPECIFIC
Price Waterhouse	Management Horizons	1985	Distribution
Coopers & Lybrand	Walter Ulrich Consulting	1986	Communications & DP Consulting
Peat Marwick	Regis McKenna (40%)	1986	High-Tech Public Relations
Peat Marwick	Pittiglio Robin Todd & McGrath (40%)	1986	Manufacturing Systems
Peat Marwick	Nolan, Norton	1987	IS Consulting
Deloitte Haskins & Sells	Holland Systems (Joint Venture)		IS Consulting and Planning
Deloitte Haskins & Sells	Vista Systems	1987	Transportation
Arthur Young	Education & Training	1987	Knowledgeware (CASE)
Arthur Young	Foundation System	1987	Software Methodology (CASE)
	Education & Training	Cont.	Seminar Series
	CIO Conference	Cont.	Major IS Leaders in Roundtable Discussions
Touche Ross			
Ernst & Whinney			

IV

Opportunities and Recommendations



Opportunities and Recommendations

A Specialize

Professional Service firms offer services that are labor intensive. The revenues of these firms are essentially measured by the number of billable hours that can be generated. The fundamental resources employed in the professional services delivery mode come in units of one.

The revenue generated per person is based upon that person's billing rate, experience, and number of hours worked.

An opportunity exists for Professional Services firms to train their own people to become more effective sources of revenue, by developing incentives for obtaining industry knowledge. The ability to be specialized in certain industries and cultivate that expertise will lead to follow-on business with similar industry clients.

Arthur Andersen has developed an industry reputation in the manufacturing industry sector. American Management Systems has done well with state and local governments. There is room for more firms in these two industries as well as opportunity in the other 12 industries INPUT monitors.

- Because of its manufacturing expertise, Arthur Andersen has cultivated a special relationship with MSA and McCormack and Dodge, thus providing better information systems and knowledge to clients as a result.

- In addition, Arthur Andersen has initiated a marketing/sales exhibition called Impact that produces exciting results by showing live demonstrations of manufacturing systems that solve real problems. These exhibitions have been held in 1986 and 1987 at considerable expense. The expense is worth it as it reinforces Arthur Andersen's capabilities and generates a large amount of business. Clients just need to say they want a system like the one demonstrated.

B

Software Products

There are several ways that professional services companies can obtain additional opportunities from knowledge of specific software products.

1. Make Tools into Products

Professional Services companies can make products from internally developed tools or applications that fit the needs of the user community. Examples of this are Arthur Andersen announcing Foundation as its CISE (Computer-Integrated Software Engineering) applications development system. CISE is Arthur Andersen's way of extending the CASE-type software product systems to account for "integration" of systems. So far no other professional services or software products firms have used CISE as a marketing term to express their product.

2. Marketing and Sales Alliances

Professional Services companies have an opportunity to develop unique marketing/sales alliances with Software Products companies to provide the consulting and applications development capabilities that smaller software products organizations require. Bigger software products companies should be interested in developing these unique relationships as well, as a means to provide clearer focus for their company resources and minimize custom implementation and/or development. An example is the relationship between Relational Technology and Computer Task Group.

3. Education and Training Opportunities

Education and Training requirements of Software Products vendors can provide an opportunity for Professional Services firms. Smaller companies do not generally have the resources to offer a continuous curriculum or "local" coverage to train their customers on their products. Using a professional services firm can have a major impact on the growth and success of a software product. An example is Arthur Andersen's relationship with Knowledgeware and Conductor Software, wherein Arthur Andersen provides the formal training for these products.

Education and Training is a natural lead into doing custom consulting for the attendees of the training, or as a follow-on to doing more training.

4. CASE Training

Many new software products require significant information and knowledge before the user can make effective use of them. These products are prime candidates for professional services companies to provide education and support. An example would be the fast-emerging market for CASE products. Clearly Arthur Andersen and Peat, Marwick, Main are

not leading candidates to providing the education and training (due to their marketing of their own CASE products) for CASE vendors/users.

C

Follow Standards and Regulatory Processes

There are standards and regulatory process changes occurring all the time. As these occur, opportunities may arise to be the first to take the information and process it to synthesize benefit vendors that can take advantage of the change.

One industry that is more susceptible to regulatory agencies is telecommunications, where the federal government's FCC and states' PUCs all have a say in telephone bills and rates of return. When some new regulation is proposed—for example, the access charge on private networks—the enterprising professional services company can propose to do the custom software development to solve the billing problem.

D

Monitor New Technologies

Many new technologies need an independent perspective to help bring them to the market. As systems become more capable they become more complex. New areas of applications like group technology, object-oriented systems, and even the older artificial intelligence-type knowledge generally require consulting expertise to be used effectively.

Professional Services companies need to be tracking new technologies and to be looking for opportunities to be early implementors by getting the appropriate knowledge or experience with these new technologies.

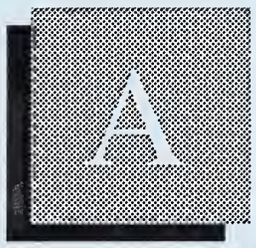
Another opportunity is to opportunistically track IBM's Systems Application Architecture, (SAA) and perform consulting and software development activities modeled after the success some professional services firms enjoyed by being among the first to understand and utilize Systems Network Architecture (SNA).

E

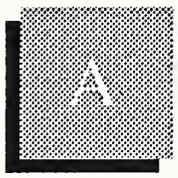
Develop Alliances with Other Professional Services Companies

Systems Integration is emerging as a large, identifiable market. In 1992 it will be more than 25% of the entire professional services market. There is an opportunity for smaller professional services companies to team up with the larger ones to cover those situations where the larger company does not have the staff in-house or is unable to bring the appropriate resources to bear to perform the project. Specialization on the part of the smaller company can be leveraged well, if it chooses niches for specialization carefully. Examples are application development tools such as DBS, artificial intelligence front-end expertise, or specific CASE products and their methodologies.

Providing temporary professional services—i.e., job-shop-type services—will provide filler for both organizations.



Appendix: INPUT Definitions



Appendix: INPUT Definitions

Information Services —Computer-related services involving one or more of the following:

- Processing of computer-based applications using vendor computers (called "processing services").
- Services that assist users in performing functions on their own computers or vendor computer (called "software products" and/or "professional services").
- Services that utilize a combination of hardware and software, integrated into a total system (called "turnkey systems").

A

User Expenditures

All user expenditures reported are "available" (i.e., noncaptive, as defined below).

Noncaptive Information Services User Expenditures—Expenditures paid for information services provided by a vendor that is not part of the same parent corporation as the user.

Captive Information Services User Expenditures—Expenditures received from users who are part of the same parent corporation as the vendor.

B

Delivery Modes

Processing services —This category includes remote computing services, batch services, processing facilities management, on-line data bases, and value-added networks.

- *Remote Computing Services (RCS)* —Provision of data processing to a user by means of terminals at the user's site(s). Terminals are con-

nected by a data communications network to the vendor's central computer. RCS includes four submodes.

- *Interactive* —Characterized by the interaction of the user with the system, primarily for problem-solving timesharing, but also for data entry and transaction processing; the user is on-line to the program/files. Computer response is usually measured in seconds or fractions of a second.

- *Remote Batch* —Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements. Computer response is measured in minutes or hours.

- *Proprietary Data Base* —Characterized by the retrieval and processing of information from a vendor-maintained data base. The data base may be owned by the vendor or by a third party.

- *User Site Hardware Services (USHS)* —Those offerings provided by RCS vendors that place programmable hardware at the user's site rather than at the vendor's data center. Some vendors in the federal government market provide this service under the label of distributed data services. USHS offers:

  ° Access to a communications network.

  ° Access through the network to the RCS vendor's larger computers.

  ° Local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network.

  ° Significant software as part of the service.

• *Batch Services* —These include data processing at vendors' sites for user programs and/or data that are physically transported (as opposed to transported electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.

• *Processing Facilities Management (PFM)* —Also referred to as "Resource Management," "Systems Management," or "COCO" (contractor-owned, contractor-operated). PFM is the management of all or part of a user's data processing functions under a long-term contract of not

less than one year. This would include remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user–either onsite, through communications lines, or in a mixed mode.

- *Value-Added Networks (VANs)* —VANs typically involve common carrier network transmission facilities that are augmented with computerized switching. These networks have become associated with packet-switching technology because the public VANs that have received the most attention (e.g., Telenet and TYMNET) employ packet-switching techniques. However, other added data service features such as store-and-forward message switching, terminal interfacing, error detection and correction, and host computer interfacing are of equal importance.

Processing services are further differentiated as follows:

- *Cross-industry* services involve the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but that cut across industry lines. Most general-ledger, accounts receivable, payroll, and personnel applications fall into this category. Cross-industry data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are included in this category. General-purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or data base is designed for specific industry use, then the service is industry-specific (see below).

- *Industry-specific* services provide processing for particular functions or problems unique to an industry or industry group. Specialty applications can be either business or scientific in orientation. Industry-specific data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are also included under this category. Examples of industry-specialty applications are seismic data processing, numerically controlled machine tool software development, and demand deposit accounting.

- *Utility* services are those for which the vendor provides access to a computer and/or communications network with basic software that enables users to develop and/or process their own systems. These basic tools often include terminal-handling software, sorts, language compilers, data base management systems, information retrieval software, scientific library routines, and other systems software.

Software products —This category includes user purchases of applications and systems software packages for in-house computer systems.

Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement and maintain the package at the user's sites. Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself. There are several subcategories of software products, as indicated below.

- *Applications Products* —Software that performs processing that services user functions directly related to solving a business or organizational need. The products can be:

  - *Cross industry Products* —Used in multiple-industry applications as well as the federal government sector. Examples are payroll, inventory control, and financial planning.

  - *Industry-Specific Products* —Used in a specific industry sector, such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting, airline scheduling, and material resource planning.

- *Systems Software Products* —Software that enables the computer/communications system to perform basic functions. These products include:

  - *System Control Products* —Function during applications program execution to manage the computer system resources. Examples include operating systems, communication monitors, emulators, and spoolers.

  - *Data Center Management Products* —Used by operations personnel to manage the computer systems resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.

  - *Applications Development Products* —Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, compilers, data dictionaries, data base management systems, report writers, project control systems, and retrieval systems.

Professional Services—This category includes consulting, education and training, programming and analysis, and some facilities management as defined below.

- *Software development* —This service develops a software system on a custom basis. It includes one or more of the following: user requirements, system design, contract, and programming.

- *Education and Training* —Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in operations, programming, and maintenance.

- *Consulting Services* —Information systems and/or services management consulting, program assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.

- *Professional Services Facilities Management (PSFM)* —This is a counterpart to processing facilities management, except the computing equipment is owned or leased by the client, not by the vendor. The vendor provides the staff to operate, maintain, and manage the client's facility.

Turnkey Systems (also known as integrated systems)—A turnkey system is an integration of systems and applications software with CPU hardware and peripherals, packaged as a single applications solution. The value added by the vendor is primarily in the software and support. Most CAD/CAM systems and many small-business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, or process control systems, nor does it include Embedded Computer Resources for military applications. Turnkey systems are available either as custom or packaged systems.

- Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors.

- Turnkey systems revenue is divided into two categories.

  - *Industry-specific systems* —that is, systems that serve a specific function for a given industry sector such as automobile dealer parts inventory, CAD/CAM systems, or discrete manufacturing control systems.

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

- Revenue includes hardware, software, and support functions.

Systems Integration —Services associated with systems design, integration of computing components, installation, and acceptance of computer/communication systems. Systems integration can include one or more of the major information services delivery modes—professional services, turnkey systems, and software products. System components may be furnished by separate vendors (not as an integrated system by one vendor, called the prime contractor); services may be furnished by a vendor or by a not-for-profit organization. Integration services also may be provided with related engineering activities, such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

C

Hardware/Hardware Systems

Hardware —Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* —Includes all input, output, communications, and storage devices other than main memory that can be connected locally to the main processor and generally cannot be included in other categories such as terminals.

- *Input Devices* —Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.

- *Output Devices* —Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters.

- *Communication Devices* —Includes modems, encryption equipment, special interfaces, and error control.

- *Storage Devices* —Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories.

Terminals—There are three types of terminals as described below:

- *User-Programmable* —Also called intelligent terminals, including:

  - Single-station or standalone.
  - Multistation shared processor.
  - Teleprinter.
  - Remote batch.

- *User Nonprogrammable*

  - Single-station.
  - Multistation shared processor.
  - Teleprinter.

- *Limited Function* —Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications.

Hardware Systems —Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

- *Microcomputer* —Combines all of the CPU, memory, and peripheral functions of an 8- or 16-bit computer on a chip in the form of:

  - Integrated circuit package.
  - Plug-in board with more memory and peripheral circuits.
  - Console including keyboard and interfacing connectors.
  - Personal computer with at least one external storage device directly addressable by the CPU.

- *Minicomputer* —Usually a 12-, 16- or 32-bit computer that may be provided with limited applications software and support and may represent a portion of a complete large system.

  - Personal business computer.
  - Small laboratory computer.
  - Nodal computer in a distributed data network, remote data collection network, or connected network, or connected to remote microcomputers.

- *Mainframe*—Typically a 32- or 64-bit computer with extensive applications software and a number of peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) applications; also called a general-purpose computer.

  - *Large Computer* —Presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors or parallel processors. Intended for structured mathematical and signal processing and typically used with general-purpose, von-Neumann-type processors for system control.

- *Supercomputer* —High-powered processors with numerical processing throughout that is significantly greater than the fastest general-purpose computers, with capacities in the vicinity of 10-50 million floating point operations per second (MFLOPS). Supercomputers fit in one of two categories:

• *Real Time* —Generally used for signal processing in military applications.

• *Non-Real Time* —For scientific use in one of three configurations:

- Parallel processors.
- Pipeline processor.
- Vector processor.

• *Newer Supercomputers* —with burst modes approaching 300 MFLOPS, main storage size up to 10 million words, and on-line storage in the one- to three-gigabyte class are also becoming more common.

• *Embedded Computer* —Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or platform; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or semipermanent interfaces. May vary in capacity from microcomputers to parallel processor computer systems.

D

Telecommunications

Networks —Electronic interconnection between sites or locations that may incorporate links between central computer sites and remote locations and switching and/or regional data processing nodes. Network services typically are provided on a leased basis by a vendor to move data, voice, video, or textual information between locations. Networks can be categorized in several different ways.

• *Common Carrier Network* —A public access network, such as provided by AT&T, consisting of conventional voice-grade circuits and regular switching facilities accessed through dial-up calling with leased or user-owned modems for transfer rates between 150 and 1200 baud.

• *Value-Added Network (VAN)* —(See listing under Section B, Delivery Modes.)

• *Local Area Network (LAN)* —Limited-access network between computing resources in a relatively small (but not necessarily contiguous)

area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. Uses one of two signaling methods.

- *Baseband* —Signaling using digital waveforms on a single frequency band, usually at voice frequencies and bandwidth, and limited to a single sender at any given moment. When used for local-area networks, typically implemented with TDM to permit multiple access.

- *Broadband* —Transmission facilities that use frequencies greater than normal voice-grade, supported in local-area networks with RF modems and AC signaling. Also known as wideband. Employs multiplexing techniques that increase carrier frequency between terminals to provide:

  ° Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing).

  ° Multiple (time-sequenced) channels via TDM (Time Division Multiplexing).

  ° High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media).

Transmission Facilities— Includes wire, carrier, coaxial cable, microwave, optical fiber, satellites, cellular radio, and marine cable operating in one of two modes depending on the vendor and the distribution of the network.

• *Mode* —may be either:

  - *Analog* —Transmission or signal with continuous-waveform representation, typified by AT&T's predominantly voice-grade DDD network and most telephone operating company distribution systems.

  - *Digital* —Transmission or signal using discontinuous, discrete quantities to represent data, which may be voice, data, record, video, or text, in binary form.

• *Media*—May be any of the following:

  - *Wire* —Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair), to four-wire full- duplex balanced lines.

  - *Carrier* —A wave, pulse train, or other signal suitable for modulation by an information-bearing signal to be transmitted over a communications system, used in multiplexing applications to increase network capacity.

- *Coaxial Cable* —A cable used in HF (high-frequency) and VHF (very high frequency), single-frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance.

- *Microwave* —UHF (ultra-high-frequency) multichannel, point-to-point, repeated radio transmission, also capable of wide frequency channels.

- *Optical Fiber* —Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and TDM for multichannel applications.

- *Communications Satellites*—Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.

- *Cellular Radio* —Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units. Each radio serves a small area called a cell. The computer switches service connections to the mobile unit from cell to cell.

E

Other Considerations

When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorized according to what users perceive they are buying.

The standard industrial classification (SIC) codes are used to define the economic activity contained in generic sectors such as process manufacturing, insurance, or transportation.

The specific industries (and their SIC codes) included under these generic industry sectors are detailed in the exhibit.

EXHIBIT A-1

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Discrete Manufacturing	23	Apparel
	25	Furniture
	27	Printing
	31	Leather
	34	Metal
	35	Machinery
	36	Electronics
	37	Transportation
	38	Scientific and Control Instruments
	39	Miscellaneous
Process Manufacturing	10	Metal Mining
	11	Anthracite Mining
	12	Coal Mining
	13	Oil and Gas Extraction
	14	Mining/Quarrying of Non-Metallic Minerals, except Fuels
	20	Food Products
	21	Tobacco
	22	Textile Products
	24	Lumber and Wood Products
	26	Paper Products
	28	Chemicals
	29	Petroleum
	30	Rubber and Plastics
	32	Stone, Glass, Clay
	33	Primary Metals
Transportation	40	Railroads
	41	Local Transit
	42	Motor Freight
	43	U.S. Postal Service
	44	Water Transportation
	45	Air
	46	Pipelines
	47	Transportation Services

EXHIBIT A-1a

INDUSTRY SECTOR DEFINITIONS (Cont.)

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Utilities	49	Electric, Gas, and Sanitary
Telecommunications	48	Communications
Wholesale Distribution	50	Durable Goods
	51	Nondurable Goods
Retail Distribution	52	Building Materials, Hardware
	53	General Merchandise
	54	Food
	55	Automotive and Gas Stations
	56	Apparel
	57	Furniture
	58	Eating and Drinking
	59	Miscellaneous Retail
Banking and Finance	60	Banks
	61	Credit Agencies
	62	Security and Commodity Brokers
	67	Holding and Investment Offices
Insurance	63	Insurance (Life, Health, Etc.)
	64	Insurance Agents
Medical	80	Health Services
Education	82	Educational Services

EXHIBIT A-1b

INDUSTRY SECTOR DEFINITIONS (Cont.)

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Services	72	Personal Services
	73	Business Services (Excluding Information Services Companies Themselves)
	89	Miscellaneous Services
	66	Combinations of Real Estate, Insurance, Loans, Law Offices
	81	Legal Services
	76	Miscellaneous Repair
Federal Government	N/A	As Appropriate
State and Local Government	N/A	As Appropriate
Other Industries	01-09	Agriculture, Forestry, and Fishing
	15-17	Construction
	70	Hotels, Rooming Houses, Camps, and Other Lodging Places
	75	Automotive Repair, Services, and Garages
	78	Motion Pictures
	79	Amusement and Recreation Services, Except Motion Pictures
	83	Social Services
	84	Museums, Art Galleries, Botanical and Zoological Gardens
	86	Membership Organizations

Appendix: Market Data Base Forecast, 1986-1992

EXHIBIT B-1

PROFESSIONAL SERVICES FORECAST BY TYPE OF SERVICES, 1986-1992

SEGMENTATION	1986 ($M)	1986-1987 Growth (%)	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	AAGR 1987-1992 (%)
Federal Government Professional Services									
Software Development	953	12	1072	1216	1280	1440	1654	1837	11
Consulting	352	5	371	394	434	451	483	500	6
Education and Training	268	11	298	332	367	396	414	449	9
Systems Integration	897	10	984	1189	1400	1636	1916	2285	18
Facilities Management	734	7	788	862	930	998	1074	1180	8
Subtotal	3204	10	3513	3993	4411	4921	5541	6251	12
Commercial Professional Services									
Software Development	5488	18	6483	7368	8452	9662	11040	12634	14
Consulting	1665	25	2089	2519	3093	3817	4742	5860	23
Education and Training	1045	25	1308	1578	1937	2389	2970	3731	23
Systems Integration									
- Project Management	70	43	100	136	189	263	363	492	38
- Design and Integration	143	43	205	279	393	546	756	1037	38
- Operations and Maint.	21	43	30	42	59	85	123	162	40
- SI Software Development	373	42	528	712	983	1361	1871	2555	37
- SI Consulting	86	42	122	164	227	312	431	587	37
- SI Education and Training	23	43	33	46	64	91	130	174	39
Total Systems Integraton	716	42	1018	1379	1915	2658	3674	5007	38
Facilities Management	174	14	199	222	256	294	338	390	14
Subtotal	9088	22	11097	13066	15653	18820	22764	27622	20
Grand Total Professional Services									
Software Development	6441	17	7555	8584	9732	11102	12694	14471	14
Consulting	2017	22	2460	2913	3527	4268	5225	6360	21
Education and Training	1313	22	1606	1910	2304	2785	3384	4180	21
Systems Integration	1613	24	2002	2568	3315	4294	5590	7292	30
Facilities Management	908	9	987	1084	1186	1292	1412	1570	10
Grand Total	12292	19	14610	17059	20064	23741	28305	33873	18

EXHIBIT B-2

PROFESSIONAL SERVICES EXPENDITURE FORECAST BY MARKET SECTOR, 1986-1992

SEGMENTATION	1986 ($M)	1986-1987 Growth (%)	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	AAGR 1987-1992 (%)
Discrete Manufacturing	1988	30	2587	3138	3790	4468	5417	6593	21
Process Manufacturing	1054	16	1226	1347	1707	2279	2909	3715	25
Transportation	149	21	180	220	270	335	419	526	24
Utilities	305	17	357	418	480	552	630	718	15
Telecommunications	464	28	594	725	870	1018	1181	1359	18
Distribution	594	20	714	891	1060	1219	1391	1588	17
Banking and Finance	1417	22	1723	1991	2337	2802	3292	3868	18
Insurance	894	18	1054	1174	1331	1544	1858	2239	16
Medical	252	25	314	376	460	561	690	848	22
Education	66	14	75	78	85	94	105	116	9
Services	155	19	184	207	240	283	378	505	22
Federal Government	3204	10	3513	3993	4411	4921	5541	6251	12
State & Local Government	1498	18	1768	2123	2567	3132	3852	4778	22
Other Industry-Specific	252	27	321	378	456	533	642	769	19
Grand Total	12292	19	14610	17059	20064	23741	28305	33873	18