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U.S. PROFESSIONAL SERVICES MARKETS 1989-1994

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Market Analysis Program (MAP)

U.S. Professional Services Markets, 1989-1994

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Abstract

This report analyzes the U.S. professional services market from 1989 through 1994. Data include user expenditures, ranking by category of vendor, and comparisons of the shares held by the top 10 vendors. Market growth estimates are provided for 15 vertical sectors.

The primary segmentation of the professional services market is into the following delivery submodes:

- Software development
- Consulting
- Education and training
- Systems operations

The market is also segmented into two sectors, commercial and federal government.

The report presents and analyzes the issues, trends, mergers and acquisitions, joint ventures, alliances, and significant events affecting the professional services market. The report identifies business and market opportunities and provides recommendations to vendors and users of professional services.

This is an update of INPUT's 1988 report on the U.S. professional services market.

The report contains 251 pages and 95 exhibits and is part of a five-volume series discussing the U.S. information services market. The other four volumes are:

- *U.S. Processing Services Market, 1989-1994*
- *U.S. Network Services Market, 1989-1994*
- *U.S. Software Products Market, 1989-1994*
- *U.S. Turnkey Systems/VAR Market, 1989-1994*

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I

Introduction

I

Introduction

This report on professional services is part of a series produced each year by INPUT's Market Analysis and Planning (MAP) service. The series reflects the division of the U.S. information services industry into the following delivery modes:

- Professional services
- Processing services
- Network services
- Software products
- Turnkey systems
- Systems integration

Exhibit I-1 shows the industry delivery modes and their submodes.

A

Purpose of the Report

The *U.S. Professional Services Market, 1989-1994* report analyzes the professional services market and provides readers with information and insights that will allow them to:

- Review the forces shaping the market
- Identify new markets and possible service/product opportunities
- Assess the service penetration of competitors
- Determine likely market directions
- Prioritize investment dollars

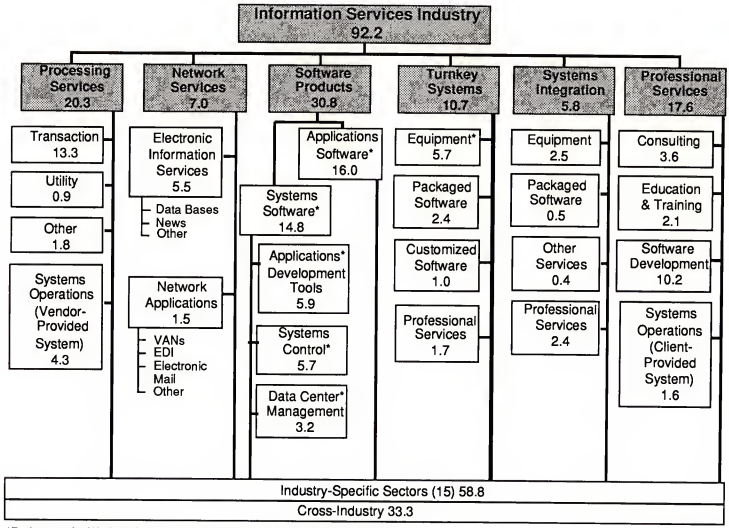
B

Scope and Organization

The report focuses on activities in the U.S. market and identifies user expenditures that are noncaptive (generally available to vendors). This is an important distinction, because some large organizations have information services divisions or subsidiaries that provide professional services to that corporate entity. In nearly all instances, these services are not awarded on a competitive bid basis.

EXHIBIT I-1

Information Services Industry Structure—1989
($ Billions)



*Broken out by Workstation/PC, Minicomputer, and Mainframe segments
Note: totals may not add due to rounding.

Source: INPUT

MFOR-3/90:1

The *U.S. Professional Services Market, 1989-1994* report is organized as follows:

- Chapter II, the Executive Overview highlights the most important information.

- Issues and trends are identified and discussed in Chapter III.

- Chapter IV defines and analyzes the market for professional services and forecasts user expenditures for the commercial and federal sectors. The market size and growth rates for the 15 sectors and a discussion of the key trends in each of the four delivery submodes are presented.

- Chapter V focuses on the leading professional services vendors. New entrants, merger and acquisition activity, and alliances and joint ventures are also identified.

- In response to client requests, Chapter VI contains financial information for professional services vendors, based on company annual reports for publicly traded companies and INPUT's data base for privately held firms.

- User and vendor opportunities and recommendations are presented in Chapter VII.

- Chapter VIII contains several appendices. Appendix A lists INPUT's definitions of professional services information, including:

  - Important terminologies
  - Standard Industrial Classification (SIC) categories
  - Definitions of large, medium, and small organizations for each industry sector

- Appendix B provides the data base for the U.S. professional services market.

- Appendix C reconciles market data for 1987 with data for 1988.

- Appendix D includes select financial information on publicly traded professional services vendors.

C

Professional Services Market Structure

This report focuses on professional services that comprise the following submodes:

- Consulting
- Education and training
- Software development and maintenance
- Systems operations ("facilities management")

Systems integration is now a separate information systems delivery mode. It includes a large professional services component.

D

Professional Services and Customer Services Relationship

Certain computer-related professional services are offered by vendors selling computer systems and related support services. INPUT's Customer Services Program closely monitors such user expenditures.

The relationship between information services professional services and customer services activities occurs in the following three categories:

- Consulting
- Education and training
- Software development; customization; documentation; maintenance

The nature of the overlap and the reconciliation is discussed in greater detail in Chapter IV.

E

Research Methodology

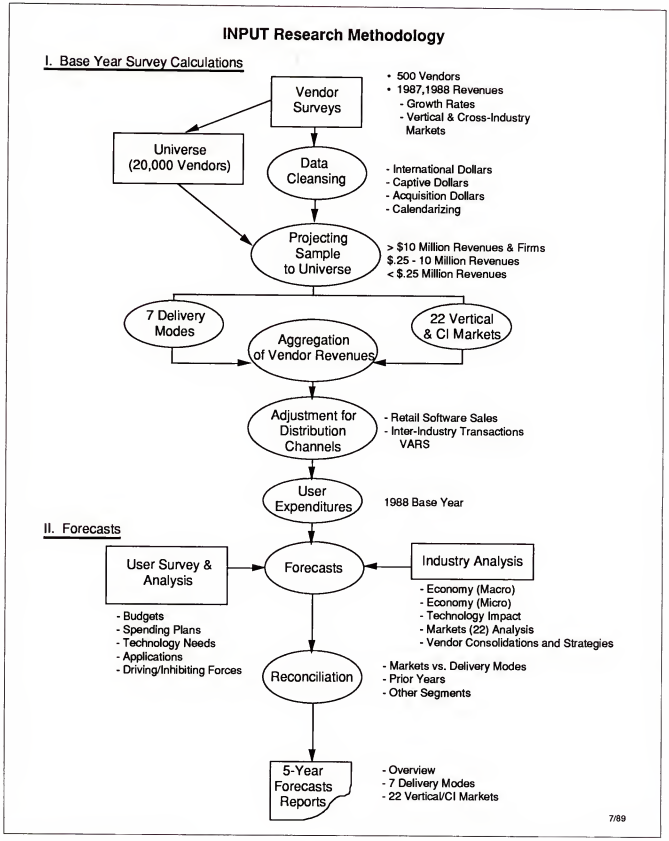
INPUT methodology for data collection, analysis, and forecasting is depicted in Exhibit I-2. During the first half of 1989, INPUT conducted in-depth interviews with 500 information services vendors, including nearly all of the 250 largest firms. The smallest of this group of 250 vendors had about $22 million in revenues in 1988.

Of the 500 companies, annual revenues of the smaller 250 companies ranged from $250,000 to $22 million. Collectively, revenues from all 500 firms represented 65% of total information services industry revenues.

Companies that are not exclusively involved in information services are identified as follows:

- If a division or its subsidiary that markets all information services for a company is generally known by its own name, then it is identified by that name rather than the parent company's name. One example is Boeing Computer Services Company, a division of aircraft manufacturer, The Boeing Company.

EXHIBIT I-2



- If more than one division or subsidiary markets information services, the information is included in and identified by the parent organization's name. An example is Control Data Corporation.

- Organizations are reported according to their legal status as of December 1988.

Companies have been classified according to the delivery mode of service from which they derive the largest proportion of their U.S., noncaptive information services revenues.

In the case of the few very large vendors that did not respond to our survey, their revenues have been estimated, using their own contacts and secondary sources. These estimates were then mailed to the CEO for verification. This process was done for all firms with more than $10 million in professional services revenues. For firms with revenues of less than $10 million (and not specifically covered in the survey), INPUT created a model based on the number of such firms identified in each delivery mode and their expected average annual revenues.

For each company, INPUT subtracted revenues identified as:

- International (non-U.S.)
- Captive (within the organization)
- Acquisitions related

These surveys and estimates produced the initial vendor revenue estimates for 1988. Total base year (1988) revenues are then summed into six delivery modes and 15 vertical and seven cross-industry segments for closer analysis and five-year projections. The revenue data for individual companies only include the following:

- *U.S. revenues* : Only revenues derived from products or services sold in the United States.

- *Professional services noncaptive revenue:* Only revenues available to all vendors in an open, competitive marketplace are included. Revenue derived from sales to a partner or affiliated organizations are excluded. An example would be the sale of professional services from Unisys Corporation's Systems Development Corporation (Santa Monica, CA) to another Unisys division.

- *Calendar-year revenues* : Approximately 30% of the vendors surveyed have fiscal years that do not coincide with calendar years. Revenues of these companies have been adjusted to a calendar-year basis for consistency.

For certain delivery modes, vendor revenues and user expenditures are fairly close. However, many microcomputer software products, for example, are marketed through indirect distribution channels such as retail stores, OEMs, and value added resellers (VARs), where conversion factors must be applied to determine the total market size based on vendor revenues. In addition, some software is sold by vendors into other information services sectors, such as processing services and network services. This software may be used in these other IS sectors' data centers and never be passed to the end user. INPUT deletes such "intraindustry" transactions from its user expenditure market data.

The various conversion factors used in this report to convert vendor revenues to end-user expenditures (market size) figures for each delivery mode is as follows:

• Applications software	1.18
• Systems software	1.10
• Turnkey systems	0.95
• Systems integration	0.99
• Professional services	0.99
• Network services	0.99
• Processing services	0.99

For the 1988 user expenditures defined in this report, five-year market growth rates are projected for each delivery mode and vertical/cross-industry market, based on an analysis of technology, vendor activity, driving and inhibiting forces affecting each market, and the economic outlook for the United States.

F

Economic Assumptions

The inflation rates used in the forecast data base are shown in Exhibit I-3.

EXHIBIT I-3

GNP Nominal Growth Rate Assumptions (Percent)

	1988A	1989E	1990E	1991E	1992E	1993E	1994E
Real GNP	4.4	2.8	2.5	2.3	2.0	2.0	2.0
GNP Deflator*	3.0	4.8	5.2	5.5	5.0	4.5	4.5
Nominal GNP	7.4	7.6	7.7	7.8	7.0	6.5	6.5

* Year-to-year comparisons

G

Sources of Detailed Market Information

For a complete review of the information services market, readers are encouraged to review companion INPUT reports. To gain a bottom-up view of professional services within the information services business, refer to the three-ring binders, provided as part of the Market Analysis Program (MAP) that segment the IS market into 15 industry and seven cross-industry sectors.

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

II

Executive Overview

II

Executive Overview

A

Key Trends and Issues

In the overall information systems (IS) business, the distinctions between products and services are blurring. No longer do companies specialize in a certain product or service. Traditional product companies are adding services; traditional service companies, such as the major public accounting firms, are adding products. In response to market demand, firms offer a full range of products and services aimed at specific industries, based on certain technologies, or utilizing select hardware platforms. Exhibit II-1 highlights an industry trend and two major issues for the professional services delivery mode.

EXHIBIT II-1

Key Trends and Issues

- Trend: Products and Services Markets Blurring
- Issue: Lack of Qualified Personnel
- Issue: New Competitors

To put this changing market in perspective, the 1980s were characterized by software as the central delivery mode, which served to unify processing services, turnkey systems, professional services, and network services. For the 1990s, no single delivery mode will act as the unifying point for the remaining modes. Instead, in response to changing customer needs, integrated solutions will provide the core of the 1990s IS

market structure, with supporting services enveloping the five key delivery modes and integrated solutions. In this view, product attributes will diminish in importance and customer support and related services will differentiate the leaders and followers.

This report identifies two key issues — the lack of qualified personnel and new market competitors. The lack of qualified personnel to perform professional services stems from demographic trends and economic realities. The declining birth rate of the 1960s and 1970s has resulted in fewer entry-level programmers, analysts, consultants, and managers. In addition, professional services firms must identify and attract the right people, pay competitive wages and benefits, and maintain the overall skill levels of its staff through investments in training classes.

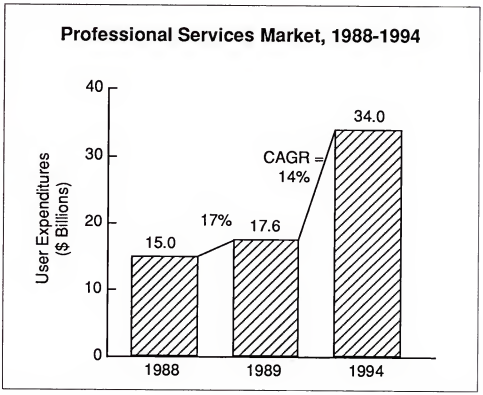
INPUT identified numerous categories of vendors, a few of which are relatively new, which offer professional services. Well-financed firms, such as computer hardware manufacturers and subsidiaries of aerospace/defense firms, as well as some nonprofit organizations, represent formidable competition to established professional services vendors.

B

Professional Services Market User Expenditures

In 1988, users spent $15.0 billion in the United States for professional services. As indicated in Exhibit II-2, user expenditures are expected to grow 17% in 1989, reaching $17.6 billion.

EXHIBIT II-2



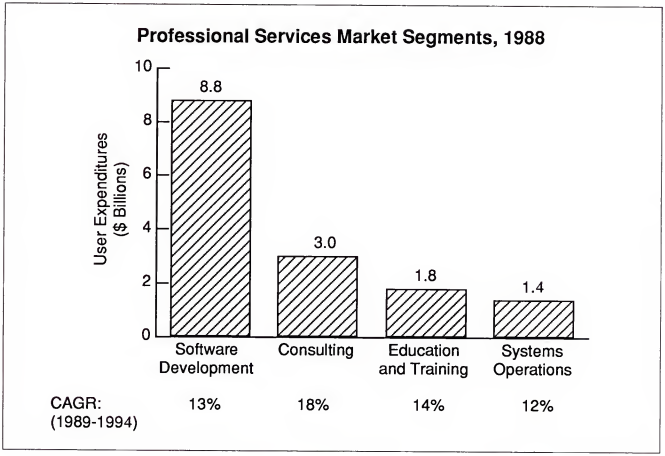
Between 1989 and 1994, the professional services market will grow at a compound annual rate of 14% to $34.0 billion. Exhibits II-3 and II-4 provide important breakdowns of user expenditures.

The professional services market comprises four segments:

- Software development
- Consulting
- Education and training
- Systems operations

As shown in Exhibit II-3, in 1988 users spent $8.8 billion, nearly 60% of the professional services market, for software development and related services. User expenditures in the second-largest segment, consulting, represented about 20% of the total. Expenditures for education and training and system operations accounted for $1.8 and $1.4 billion, respectively.

EXHIBIT II-3



Historically, software development has been the largest segment in professional services. During the past two years, expenditures for consulting and education and training have grown faster than those for software development, reflecting changing user requirements.

Exhibit II-4 indicates user expenditures by vertical sector. The four major vertical sectors (discrete manufacturing, federal government, banking and finance, and state and local government) accounted for nearly two-thirds of 1988 user expenditures for professional services.

EXHIBIT II-4

Largest Industry Sector Professional Services Markets, 1988

Vertical Sector	User Expenditures ($ Millions)	Share of Total Market (Percent)
Discrete Manufacturing	3,120	21
Federal Government	2,910	19
Banking and Finance	1,910	13
State and Local Government	1,900	13

C

Leading Vendors in Professional Services

Vendor revenues at the "top 10" vendors, listed in Exhibit II-5, represent about 30% of total 1988 user expenditures in professional services, compared with 33% in 1987. Professional services revenues for the top 10 vendors grew 10% to 15% versus growth of 30% to 35% for second-tier vendors. Examples of software products vendors in the second-tier offering professional services include: Candle, Computer Associates International, ASK Computer Systems, Keane, Oracle, and System Software Associates.

The top 10 vendors come from three vendor categories:

- Computer systems manufacturers (IBM, Unisys)
- Professional services firms (Computer Sciences, BDM International/ Ford, Logicon, Applied Learning, American Management Systems)

EXHIBIT II-5

Ten Largest U.S. Professional Services Vendors, 1988

Rank	Vendor	Professional Services Revenues ($ Millions)
1	Computer Sciences Corp.	570
2	Unisys	515
3	IBM	400
4	SAIC	370
5	Ford Aerospace*	355
6	Black and Decker**	350
7	NYNEX	240
8	Andersen Consulting	220
9	Logicon	220
10	TRW	210

* Includes BDM International

** Includes Planning Research Corporation and Applied Technology Inc.

- "Big Six" public accounting firms (Andersen Consulting, KPMG Peat Marwick)

D

Opportunities in Professional Services

Although professional services is a huge ($15.0 billion) market, a number of opportunities exist. Exhibit II-6 lists five key opportunities.

First, the constant stream of new technologies will create opportunities for professional services vendors. New and upgraded hardware products include the following:

- File Servers from SUN and others
- IBM's RT (workstation)
- DEC VAX 9000 (mainframe)
- Scanning input devices

EXHIBIT II-6

Opportunities in Professional Services

- New technology-related services
- Telecommunications-related services
- Software development becoming software modification
- Software conversion
- Systems operations

- Image processing and storage systems
- Local area networks

Software products that provide professional services vendors with opportunities include:

- The UNIX operating system
- Artificial intelligence/expert systems
- Distributed relational data base management software
- Image processing and storage
- Object-oriented programming environments
- Computer-aided software engineering (CASE) methodologies

Second, network planning, design, and installation is a rapidly growing application area. As more sophisticated networks are completed, opportunities arise for "network management" by a third-party vendor.

Applications software vendors are meeting more user needs through off-the-shelf or packaged, software. As a result, more new customer applications are being met without extensive software development from scratch. As existing applications were updated, professional services vendors modified their focus. Looking ahead, software development will continue its shift to becoming software modification.

User organizations will require outside assistance for switching from current computing environments to complex computer-aided software engineering (CASE) environments.

Fifth, more systems operations contracts means opportunities for professional services vendors to subcontract the manpower requirement from the systems operations prime contractor. For example, Computer Task Group is providing the personnel, on a subcontracted basis, to IBM, thus

acting as the prime contractor in managing data centers for Kodak Corporation.

E
Recommendations

INPUT's recommendations, summarized in Exhibit II-7, are directed to professional services vendors and users.

EXHIBIT II-7

Recommendations for Vendors and Users

- Key: Add value
  - Consulting, planning, design
  - Project management skills
- Specialize
  - Technical expertise
  - Marketing
  - Hardware
  - Software
- Marketing, marketing, marketing
- For users, key is front-end project effort

1. Recommendations to Vendors

For vendors, the key is adding value. Value can be added through specialization in the following areas:

- Certain hardware platforms
- By emphasizing select systems software (e.g., distributed relational data base management software)
- By understanding a certain vertical sector
- By providing specific services in a select geographic area
- By offering a full range of professional services worldwide

INPUT believes the market has already begun to segment itself into vendors that offer either:

- High value-added services
- Low value-added services

High value-added services include consulting, planning, and design aspects of professional services. These services focus on those activities that precede implementation and require the involvement of senior management at the client company.

Low added-value services revolve around implementation. The market perceives reduced value for COBOL programmers which is reflected in the decreasing salaries for these employees between 1987 and 1988. Large regional, national, and multinational professional services firms cannot charge enough for low added-value implementation services and pay competitive wages and benefits, support the salaries of management, be profitable, and continue to grow. Undifferentiated implementation will increasingly be handled by small, local professional services vendors.

Marketing will separate the successful vendors from the not-so-successful ones. Marketing implies a better understanding of user's needs, developing profitable new services to meet these needs, an understanding of the competition, service alternatives, building and maintaining third-party vendor relationships, and an emphasis on solutions rather than technology.

2. Recommendations to Users

For users, professional services projects will grow in importance as the integration of existing and new applications and systems dramatically affects business operations. Large professional services projects are becoming as complex as systems integration jobs.

The key here is, before the project begins, to determine exactly what is needed, who will act as project liaison with the vendor, frequency of review meetings, and problem resolution procedures. If professional services projects are to be successful, then senior corporate managers must be involved from the start.

III

Issues and Trends

III

Issues and Trends

A

Introduction

Before discussing the professional services market and competitors, it is useful to identify and discuss key issues and trends in the information systems (IS) business.

Certain issues and trends discussed below are oriented to the overall IS market, others focus on the U.S. professional services market.

B

Major Issues in Information Systems

1. Buyer Issues

In response to competitive pressures and the threat of unfriendly take-overs, IS buyers are focusing on core business activities such as manufacturing, design, marketing and sales, and customer support. For the short term, accounting and human resources are not receiving as much attention as may be required. As listed in Exhibit III-1, competitive pressures are critical in themselves, particularly when they come from foreign vendors. They emphasize performance factors in IS, especially cost control.

IS buyers recognize that today's solutions are increasingly complex, often requiring multivendor environments, multiple data base programs, distributed data processing operations, and installation at multinational company locations.

More end users in large and midsize organizations are becoming involved in the IS buying process. In January 1989, an IBM vice president stated that end users are involved in 70% to 80% of IS purchase decisions. Vendors must broaden their marketing efforts to reach a diverse group beyond the traditional buyers in the IS department.

EXHIBIT III-1

Information Systems—Major Buyer Issues

- Core business focus
- Competitive pressures
- Increasingly complex solutions
- Users becoming buyers
- Changing senior management view of IS
- New technology applications
- Shortages in certain skills

Corporate senior managers are again changing their view of IS. It has moved from a cost center to a profit center and back to a cost center. While a properly functioning IS department can lead to strategic advantage, senior managers believe the operation of the IS department is more like a cost center. Kodak, H.J. Heinz, Copperweld Steel, and a regional bank in New York State recently announced that each has hired a third-party vendor to operate corporate data centers, thus validating the cost center view.

Buyers are wrestling with current information management approaches and the integration of new computer peripherals to create new applications. The first challenge is selecting the appropriate model from enterprise-wide computing, distributed processing, and cooperative processing models. The model must be teamed with new technologies such as document/image processing and storage, digital audio tape (DAT), and erasable optical disks.

Organizations are facing shortages of certain professional skills. Shortages have been identified in the following:

- CASE (Computer-aided systems engineering)
- DB2 (IBM's relational data base management system)
- MVS/XA (IBM operating system)
- Operating system expertise in multiprocessing environments
- Software conversion for IBM environments
- UNIX
- Network management
- Network planning and design professionals

2. Professional Services Vendor Issues

Exhibit III-2 presents the major issues now facing professional services vendors. The biggest issue is consolidations and alliances. This is a time of jockeying for market position and lining up appropriate alliances. In order to present a full range of services to a customer, professional services vendor alliances are focusing on gaining access to the following products or capabilities:

- Applications software
- Consulting
- Project design capabilities
- Project management skills
- Network management expertise

EXHIBIT III-2

Professional Services Major Vendor Issues

- Consolidations and alliances
- Focus on repeatable solutions
  - Risk reduction
  - Productivity improvements
- Full-service suppliers
  - "Business change" consulting
  - Some systems operations
- Increasing competition
  - Skills
  - Clients

In addition, professional services vendors are trying to replicate solutions so that they may be offered to a broader audience. Key areas for packaged solutions include products that reduce risk in a project and improve productivity.

Vendors will increasingly be selling experience, methodology, and indirectly, professional services as a type of insurance. The goal is for a user to turn to third-party vendors for a high-quality solution, rather than assume the risks themselves.

Buyers must be convinced of productivity improvements through vendor experience with specific technologies, industry segments, platforms, software products, or some combination of these factors. Getting the first job in a new industry, application, or technology is the hardest one. However, leveraging this experience requires a focused marketing effort.

Successful vendors will offer a full range of services to clients. Business-change management is the professional service requiring the most involvement by the client's senior management. Increasingly, vendors that offer professional services are emphasizing systems operations where they provide the manpower to run the data center or take over the facility, as in the case of Andersen Consulting operating the data center for Maxus Corporation, a Dallas-based energy concern.

Professional services vendors, like their clients, are facing increasing competition for employees with the right set of technical and customer relations skills. More professional services vendors chasing a relatively constant target client base means vendors must offer more valuable services, consolidate, or go out of business.

C
Key Information Systems Trends for the 1990s

1. Services Sell Systems versus Systems Sell Services

In the past, computer hardware vendors used professional services to help sell systems. Services helped sell computer systems and systems and applications software.

The IS industry has evolved to where price, performance, availability of application software, and postsale services are of equal importance in the sale of a computer system. In recognition of this changing emphasis, computer system vendors have established separate profit centers for computer hardware, systems software, and professional services.

2. Information Systems Market Structure

Exhibits III-3, III-4, and III-5 depict INPUT's view of the changing IS market. The IS market in the 1980s, portrayed in Exhibit III-3, has software at its center. Software integrates the other four IS delivery modes.

Other slightly different views of the IS market in the 1990s are shown in Exhibit III-4, which emphasizes the need for integrated solutions that unifies the five IS delivery modes and III-5, which shows a longer-term view.

EXHIBIT III-3

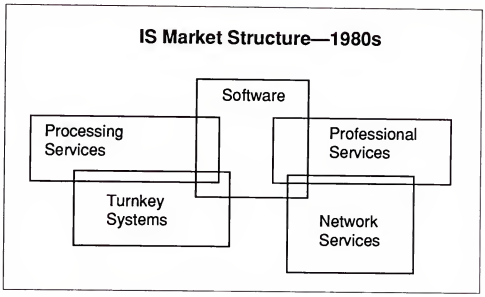
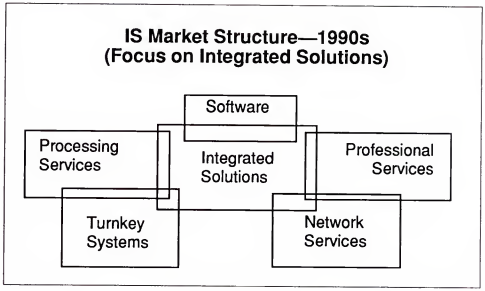
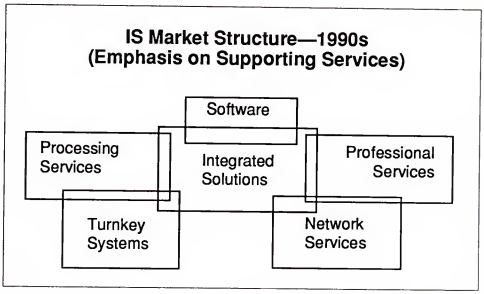


EXHIBIT III-4



It is believed that users' needs will not be fulfilled solely through the offering of integrated solutions. Taking the longer-term view shown in Exhibit III-5, the real unifying force in the industry will be support services. When a customer buys computer systems or application software, processing or professional or network services, or turnkey systems from one or more vendors, one vendor will act as the primary integrator through its support services infrastructure.

EXHIBIT III-5



3. Information Systems Market Internationalization

a. User Aspects of Internationalization

Like the manufacturing and financial services markets, because of legal considerations and actions by vendors and buyers, the IS market is broadening its scope of products and services.

As indicated in Exhibit III-6, market barriers will soften in two key markets, Western Europe and North America, are breaking down. The 1992 agreement between the European Economic Community (EEC) member states will ease movement of goods, services, and capital across Europe In North America, trade barriers between Canada, Mexico, and the U.S. are rapidly diminishing.

Customers buying IS products and services are requesting some form of international capabilities in their specifications. These requirements include support for certain international communications protocols and distributed processing environments, and most importantly, post sale service and support in Western Europe, the Far East, and potentially Eastern Europe.

b. Vendor Aspects of Internationalization

Professional services vendors are also adding to the increasing international flavor of this market. Western European vendors have begun acquiring or investing in U.S. information services vendors. CAP Gemini acquired Systemation and CompAct Data Systems. Volmac Holdings (The Netherlands) acquired about 8% of Computer Task Group and Canada-based SHL Systemhouse acquired the software conversion business of Rand Information Systems.

EXHIBIT III-6

Internationalization of IS End Users

- Collapsing Market Barriers
  - Western Europe
  - North America
- Growing Market Interest/Participation
  - Pacific Rim
- Internationalization of Buyer Requirements

U.S.-based firms are acquiring non-U.S. firms. Computer Sciences Corporation acquired 9% of U.K.-based Inforum Ltd. and purchased CIG Intersys Group in Belgium.

D

Professional Services Market—Driving Forces

User requirements and the changing computer systems business continue to create demand for professional services. As indicated in Exhibit III-7, the continuing applications backlog represents a key demand driver. The use of fourth-generation languages helps users create solutions to relatively simple needs. However, major system upgrades lag user requirements by one and one-half to two years.

Mergers and acquisitions among user organizations leads to tremendous potential for professional services vendors. Linking disparate mission-critical systems and applications solves major problems and heightens user awareness of professional services capabilities.

The lack of skilled personnel at user sites is a two-edged sword. The lack of certain skills creates demand for professional services. However, vendors face similar difficulties that users do in recruiting and retaining persons with specialized IS skills.

New technologies have driven, and will continue to drive, the demand for professional services. Users cannot implement and stabilize technologies as fast as vendors can create new ones.

As the use of communication networks grow, experts in network integration, design, and management will become much more important.

EXHIBIT III-7

Professional Services Market—Driving Forces

- Continuing applications backlog
- Merger and acquisition activity
- Lack of skilled personnel
- Use of new technologies
- Growing importance of communication networks
- Multivendor environment
- Different user "lock ins"
- Role of standards

Although users' installed systems need constant revision and update, the introduction of new computer systems remains a built-in driving force for professional services.

First, an increasing number of organizations (most of the Fortune 1000, for example) are multivendor environments. Digital Equipment Corp. and Hewlett-Packard lead in factory automation while IBM represents the mainstay of commercial data processing. These semicustomized environments require professional services in order for systems and applications to work together.

Despite the talk about open systems and open computing environments, today's computing environment is loaded with vendor-created means to lock customers to that particular manufacturer. If a user desires to make a change, professional services are required to unlock the user from each vendor's proprietary products.

Finally, standards are goals, not hard-and-fast rules uniformly adhered to by all vendors. Until uniform standards are agreed to and followed, professional services vendors will be asked to assist with implementation in standard computing environments.

E

Professional Services Market—Growth Inhibitors

Aside from a major recession, few events can slow the growth of professional services. Exhibit III-8 lists only four inhibitors, none likely to significantly slow growth.

First, unsuccessful, large professional services projects could adversely affect market growth, especially if the news media widely distributes and discusses such an event.

Second, more powerful application development tools will lessen users' dependence on third-party services vendors. However, it can be argued that they will merely enable users to keep pace with the need for more sophisticated applications. In view of changing computing environments (enterprise, cooperative, distributed, fault tolerant, on-line transaction processing, etc.), the most demanding applications will continue to require professional services experts.

EXHIBIT III-8

Professional Services Market—Growth Inhibitors

- Unsuccessful projects
- Increased power of application development tools
  - CASE
  - 4GLs
- Lack of skilled personnel
- Overall slowing of computer/communications industry

The professional services industry revolves around the premise that it can identify, hire, and retain individuals who thrive on constant change, challenge, and work environment. For professional services to continue to flourish, qualified experts must be available. There simply may not be enough skilled personnel to go around. If this becomes the case, then industry growth will certainly slow.

To maintain a sufficient installed base capable of supporting professional services activities, shipments of mainframes and midrange systems must remain at healthy levels. The growth in personal computers,

workstations, network servers, and X-terminal products support higher value-added professional services, such as consulting and project design and management.

F

Professional Services Is Not Systems Integration

Although professional services and systems integration are closely related, they are not the same. Exhibit III-9 highlights major differences.

Simply stated, professional services accomplish part of a client-owned project; systems integration involves planning, managing, and implementing the solution.

EXHIBIT III-9

Differences between Professional Services and Systems Integration

Category	Professional Services	Systems Integration
Project Duration	Can be continuous	Limited
Project Management Responsibility	Usually customer	Prime contractor
Computer Equipment Selection	Customer	Prime contractor for customer
Services Provided	Often a single service (e.g., software development)	Usually multiservice, including hardware/ software integration
Pricing	Time and materials	Fixed-price
Item Purchased	Resources	"A solution"

IV

Markets

IV

Markets

A

Industry Structure

INPUT segments the information services industry into six delivery modes serving 15 industry sectors and seven cross-industry sectors. The delivery modes are:

- Processing services
- Network services
- Turnkey systems
- Software products
- Systems integration
- Professional services

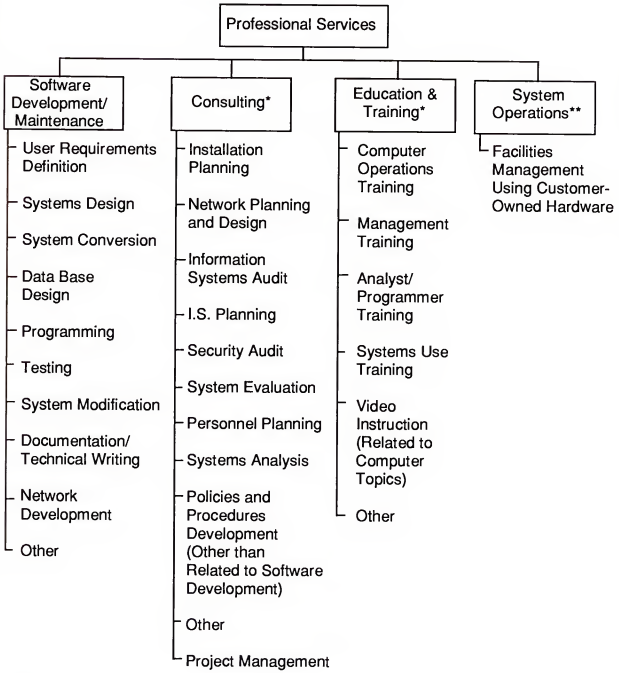
INPUT divides the professional services market into four segments, shown in Exhibit IV-1:

- Software development and maintenance
- Consulting
- Education and training
- System operations (previously called "facilities management")

These categories represent types of services offered in support of the information systems industry rather than generic services. For example, education and training includes services such as computer operations training, management training, and video instruction related to computer usage. In a like manner, consulting services are specific to the IS needs of customers.

EXHIBIT IV-1

Professional Services Market Structure



*Related to computer systems, topics, or issues
**Formerly identified as "Professional Services Facilities Management"

B

Market Structure

Exhibit IV-2 presents the structure of the professional services market based on the category of service provider. The structure places professional services firms into one of three categories:

- Product-based
- Core service-based
- New service-based

Core service-based firms are the industry pioneers, some having offered professional services since the late 1950s. Although the public accounting firm Arthur Andersen & Company (now Andersen Consulting) has been a key player in professional services since the mid-1950s, the new service-based firms generally did not enter the professional services market until the 1960s or 1970s. Product-based firms, which sell primarily computer hardware or other products, entered the professional services market in various years between 1965 and 1984. IBM, with its emphasis on customer service and support, helped build the market for professional services.

C

Professional Services Market

1. Market Overview

The professional services market continues to grow from a 1988 user expenditure level of $15.0 billion to a 1989 level of $17.6 billion, representing a compound annual growth rate (CAGR) of 17%. Over the five-year forecast period shown in Exhibit IV-3, professional services will grow at a 14% CAGR, reaching user expenditures of $34.0 billion in 1994.

INPUT previously forecast a five-year growth rate of 17%. The decrease in growth rate is due primarily to the following:

- The shifting of professional services engagements to more complex systems integration projects

- A forecast of reduced inflation

The continued solid growth in professional services results from the continued pressure on users to maintain and enhance applications systems that are required in order to be competitive in a given industry. These applications systems require experienced and skilled personnel, which may not be available inside the organization when needed, hence the use of outside services. This is in line with the continuing thrust to outsourcing.

EXHIBIT IV-2

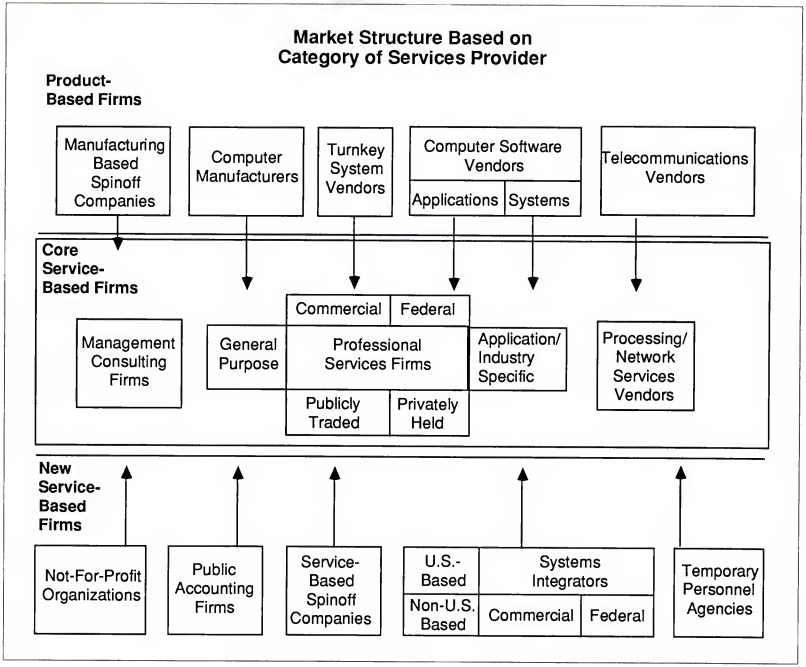
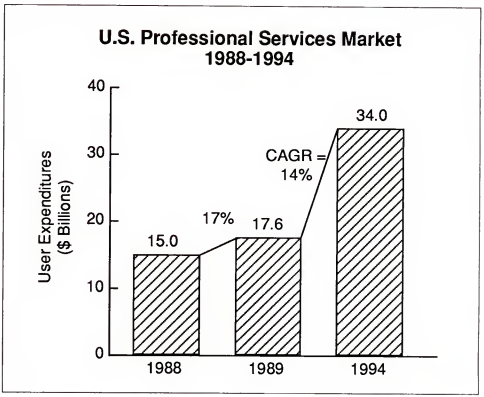


EXHIBIT IV-3



Professional services vendors also bring a unique perspective to problem solving. As a result of their independence, vendors can provide alternative solutions to industry-specific problems.

Professional services consulting helps users select from the myriad of applications software or turnkey systems available to satisfy the user's needs. Professional Services firms attempt to make impartial recommendations in the selection process. By contrast, a consultant from a software products company that offers a certain type of software solution will try to promote that product.

As systems become more complex, users hire professional services firms based on their experience in customizing or developing applications systems. Their ability to perform specialized, one-time services such as a particular application module or software conversion from one hardware platform to another represents substantial added value. The use of an outside service prevents hiring staff that is needed for a limited time frame.

2. User Expenditures by Industry

In 1989, users spent about $17.6 billion for professional services, spread across 15 industry sectors. These expenditures by industry, shown in Exhibit IV-4, range from a high of $3.8 billion to a low of $70 million.

EXHIBIT IV-4

Professional Services User Expenditures by Industry 1989-1994

Industry Sector	User Expenditures ($ Millions)		1989-1994 CAGR (Percent)
	1989	1994	
Discrete Manufacturing	3,775	7,790	16
Process Manufacturing	1,820	3,985	17
Transportation	195	355	13
Utilities	450	830	13
Telecommunications	810	1,700	16
Wholesale Distribution	325	600	13
Retail Distribution	215	435	15
Banking and Finance	2,275	5,200	18
Insurance	1,380	2,655	14
Medical	345	555	10
Education	70	140	15
Services	135	240	12
Federal Government	3,260	4,790	8
State and Local Government	2,185	4,205	14
Other Industry-Specific	320	565	12
Total	17,560	34,050	14

Note: numbers rounded to nearest $5 million.

Spending in 1988 for professional services by the five leading industries accounted for 75% of total user expenditures. The top five industries are, in order:

- Discrete manufacturing
- Federal government
- Banking and finance
- State and local government
- Process manufacturing

Several factors contributed to the current spending levels in the key industries.

Discrete manufacturers are spending heavily to automate the factory floor and the materials management/distribution functions, with the heaviest expenditures for software development.

The federal government has awarded multibillion dollar contracts to replace second-generation computer systems in accounting and finance, logistics, and personnel. As a result, numerous programs must be recompiled or rewritten to effectively operate on the new processors. In addition, consulting expenditures have increased as a result of developing plans to integrate future hardware and software products with existing systems.

Like the federal government, state and local governments are upgrading mainframe-based systems for accounting, revenue collection, and health and human services applications. Professional services firms will be hired to perform extensive software consulting to protect the investment in existing applications software. Since state and local governments must operate on a pay-as-you-go basis, these organizations are major users of systems operations contracts.

Deregulation and internationalization in the banking and finance markets have created sizeable opportunities for professional services firms offering software development, consulting, and systems operations. Use of all professional services except education and training is most balanced in this industry sector.

Process manufacturing, driven by the need to reduce costs, is re-automating its production processes. Process manufacturing companies are also modifying their information systems to yield more customer and marketing data. Lastly, IS upgrades are necessitating extensive investments in skills upgrades for its professional staff. Professional services expenditures in process manufacturing include software development, education and training, and consulting.

3. User Expenditures by Functional Area

In 1988, users' professional services expenditures were concentrated in the following four functional areas:

- Manufacturing/business operations
- Accounting/administration (including office systems)
- Data processing/telecommunications
- Logistics/physical distribution

As shown in Exhibit IV-5, user expenditures for professional services in manufacturing and accounting represent over 50% of the 1988 total.

EXHIBIT IV-5

Professional Services User Expenditures by Functional Area, 1988

Functional Area	User Expenditures ($ Millions)	Percent of Total Market
Manufacturing/Business Operations	4,215	28
Accounting/Administration/ Office Systems	3,455	23
Data Processing/ Telecommunications	2,400	16
Logistics/Distribution	1,950	13
Research and Development	1,350	9
Sales and Marketing	1,050	7
Human Resources	150	1
Other	450	3
Total	15,020	100

The manufacturing and operations area encompasses diverse professional services activities such as upgrading systems for computer-integrated manufacturing, airline reservations, railroad management, and hospital/ laboratory management.

Expenditures in accounting and administration are spurred by the relatively rapid implementation of electronic data interchange (EDI) services. INPUT segments EDI-related professional services into two categories, front-end and back-end.

Front-end EDI professional services include the consulting and software modification necessary to implement EDI services. Back-end EDI professional services, chiefly software modification, result from the need to modify existing or to purchase and modify new accounting and finance software to utilize EDI capabilities fully.

4. User Expenditures by Customer Size

Exhibit IV-6 divides 1988 user expenditures by the size of customer. Customer sizing information is derived from data published in *The U.S. Industrial Outlook* and *Sales and Marketing Management* magazine.

Large users control 53% of 1988 IS expenditures for professional services. Midsize banks control a greater share for professional services than large banks. Midsize organizations represent relatively significant expenditures in the federal government, discrete manufacturing, and process manufacturing sectors.

Appendix A contains definitions of industry sectors and a discussion of the size of user organizations.

5. Software Development Segment

User expenditures for software development in 1988 were nearly $8.8 billion, making this segment the largest of the four professional services submodes. It is expected to grow 16% in 1989 to $10.2 billion (see Exhibit IV-7). INPUT's definition of "software development" includes the following services:

- User requirements definition
- Systems design
- Data base design
- Programming
- Testing
- System modification and maintenance
- Documentation/technical writing
- System conversion
- Network development
- Other services

EXHIBIT IV-6

U.S. Professional Services Expenditures by Organization Size, 1988

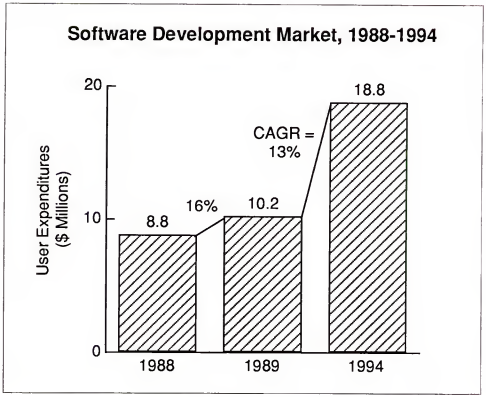
Vertical Sector	User Expenditures ($ Millions)			
	Small	Medium	Large	Total
Discrete Manufacturing	375	780	1,965	3,120
Process Manufacturing	195	500	795	1,490
Transportation	35	45	90	170
Utilities	65	145	200	410
Telecommunications	375	***	305	680
Wholesale Distribution	60	110	110	280
Retail Distribution	15	35	130	180
Banking and Finance	285	1,050	575	1,910
Insurance	240	420	540	1,200
Medical	35	100	165	300
Education	5	20	35	60
Services**	10	20	90	120
Federal Government	440	1,020	1,450	2,910
State and Local Government	150	300	1,450	1,900
Other Industry-Specific*	60	85	145	290
Total	2,345	4,630	8,045	15,020

* Agriculture, automobile services, construction, hotels/motels, nonprofit organizations, recreation/leisure

** Accounting, legal, architects/engineers, business services, repair services (except automobile)

*** INPUT divides telecommunications into large (10 RBOCs: MCI, Sprint, AT&T) and small (1,880 local telco carriers)

EXHIBIT IV-7



In general, software development is driven by new hardware technologies, new generations of software products, and increasing purchases of computers by organizations of all sizes.

Hardware vendors' introductions of new central processors mean more business for professional services firms. The recent round of product introductions (IBM's AS/400, Digital Equipment Corp.'s VAXcluster and VAX 9000 mainframe, Unisys' and Honeywell's mainframes, more single- and multiuser microcomputers) will lead to more software conversion business as users add new applications or modify existing software.

Vendors continue to develop and sell new products aggressively although users have not fully realized the benefits of relatively stable technologies such as higher density disk and tape storage drives, relational data base management software, and 4GLs. Although new products such as optical disks, optical scanners, integrated voice/data products, and computer-assisted software engineering (CASE) packages are useful technologies, they have greatly speeded up the perception that users must pay for exotic products in order to "gain a competitive advantage."

Small businesses converting from manual methods or timesharing to in-house microcomputers or minicomputers also require extensive software

development. Although small businesses need setup and customization of their newly purchased software, future enhancements and modifications to installed application software are professional services.

Packaged software modification is becoming an important component of custom software development. Approximately 20% to 25% of expenditures for mainframe software development activities can be classified as software modification. By listening to what their customers need, software product vendors have directly contributed to the boom in software development. Mainframe, minicomputer, and microcomputer software vendors now offer more functionality for a wider range of customers than ever.

The vertical sectors most heavily utilizing software development services include banking and finance, insurance, and manufacturing. Within manufacturing, industrial automation and material handling applications are receiving increased attention.

More international business for U.S. manufacturing companies and services vendors means adding specific software features such as handling exchange rates and different currency denominations for purchases and sales. The international aspect, though, provides significant opportunity for software development and consulting.

An additional driving force for software development is the so-called trend toward standards. Despite the promulgation of numerous sets of standards, no true standards exist. Hardware and software vendors embed proprietary hooks in their products at levels requiring sophisticated knowledge. Custom software development expertise is needed to overcome the advantage of standard products.

Finally, large organizations, the primary users of software development, are looking to improve the return on their expenditures with professional services vendors. Specifically, sophisticated users want software developed faster with better control of costs.

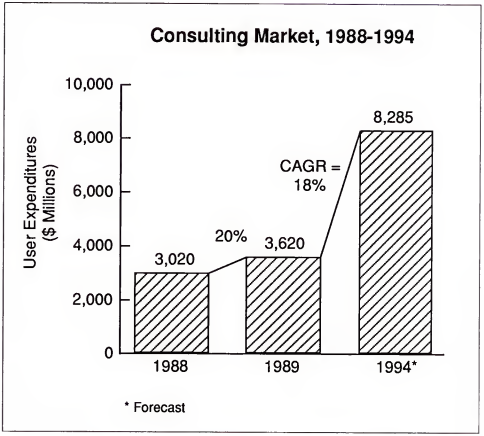
6. Consulting Segment

The consulting segment had 1988 user expenditures of $3.0 billion and is expected to grow 20% in 1989, to $3.6 billion. This growth plus the forecast through 1994 is depicted in Exhibit IV-8. According to INPUT's definition, the consulting segment of professional services includes the following:

- Software installation planning
- Information systems audit
- Security auditing
- Personnel planning

- Policies and procedures development
- Network planning and design
- Information systems strategic planning
- Systems analysis
- Other

EXHIBIT IV-8



In order to get a better understanding of the consulting segment, INPUT evaluated the use of such services by three categories:

- Processing and network services
- Software
- Information services (IS) management

Consulting in support of network management services is currently very lucrative. The proliferation of LANs, WANs, micro-to-mainframe links, electronic data interchange (EDI), and ISDN has created strong demand for knowledgeable persons in network management.

Software is a broader category, encompassing systems and applications software. The demand for systems software (and some applications software) consulting is driven partially by the shift from mainframes to

minicomputers and microcomputers. Consulting in the application software area really translates to applications software maintenance. Users everywhere are searching for the universal solution to easier applications software maintenance. Through consulting services, users are better able to select and utilize existing application generation programs. While these programs do not solve all of a user's problems, they represent an immediate step in the right direction.

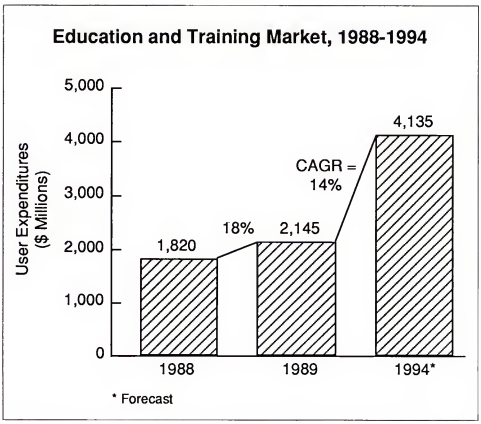
The new consulting services phrase, IS change management, describes the process of moving IS from a centralized, impersonal organization to one with more focus on computing end users. This new focus includes increased user support and training.

Vertical sectors with the greatest need for consulting services are the federal government, discrete manufacturing, transportation, and insurance.

7. Education and Training Segment

Education and training, at $1.8 billion or about 12% of total 1988 user expenditures, is the smallest segment in the professional services delivery mode. This number, depicted graphically in Exhibit IV-9, represents only external user expenditures for such services; monies spent for internal training are not reflected in the figures.

EXHIBIT IV-9



The importance of education and training far exceeds its position based on user expenditures relative to consulting, software development, or systems operations. Rather, it is the foundation upon which IS vendors and large commercial, government, and services customers base their expertise.

As this segment matures, services are becoming increasingly specialized. Specifically, education and training covers the following types of services:

- Systems software
- Hardware platforms
- Technology
- IS management

Education and training for systems software products covers recently introduced packages such as IDMS, IBM's DB2, and Digital's RDB data base management systems.

The introduction of new hardware platforms forces users and software developers to learn the technical ins and outs of these products. Digital Equipment's introduction several years ago of its MicroVAX line of workstations and IBM's recent introduction of the AS/400 midrange system automatically necessitated training and education for users and developers.

IS managers as well as non-IS managers need high-level information on emerging technologies, chiefly robotics, industrial automation, AI, LANs, telecommunications, data communications, and voice/data integration.

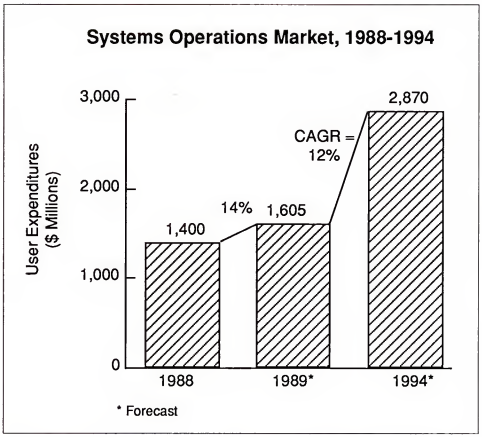
IS managers require exposure to new methodologies for running the IS department. Education and training is required in order to keep up with changes in project management and software development methodologies.

No longer are separate formal training classes offered to users and vendors. Now, employees from client companies can take classes formerly offered only to members of the vendor technical staff. INPUT market data reflects user expenditures for such classes.

8. System Operations Segment

For vendors offering more than one professional service, system operations, with the smallest user expenditures, is the least important segment. Please refer to Exhibit IV-10 for a graphic representation of user expenditures in 1988, 1989, and 1994. This service, operating data processing centers for a fixed fee, continues to have a relatively narrow appeal.

EXHIBIT IV-10



The industry sectors most heavily using systems operations services include, in order:

- Federal government
- State and local government
- Manufacturing
- Banking and finance

9. Current Market Situation

The recent maturation of the professional services market has led to the following trends:

- New market segmentation by users
- Differentiation of vendor services using proprietary products
- Narrowing of specialized alliances between hardware vendors and professional services firms

Exhibit IV-11 summarizes the current situation in the professional services market. Segmenting the market is one way to evaluate professional services activities. While the professional services market can be segmented on the basis of category of service provider and vendor capabilities, INPUT has identified three new user-based market segmentations.

EXHIBIT IV-11

Current Situation in Professional Services Market

- New segmentation by users
- More vendor differentiation of services provided
- Narrowing of specialized alliances

First, user firms are segmenting the market based on the size of the professional services firm. The largest manufacturing, financial services, transportation, or utility organizations require the largest professional services firms. These firms' expertise, international experience, proprietary products, project management skills, and, most importantly, solid financial position ensure that they will receive at least a request for proposal (RFP) to bid on the project.

Second, users divide the professional services market into vendors with unique capabilities and those offering "plain vanilla" services. Vendors have developed proprietary software in computer-aided software engineering (CASE) and project management as the basis for differentiation and maintain this differentiation by not selling their products directly to users.

Third, a key characteristic of the professional services business is the flexible relationships between hardware vendors and vendors that primarily provide services. In this market segment, hardware vendors team with professional services vendors for one project, then compete vigorously with one another for a different project.

In the next two or three years, professional services vendors will form stronger alliances with specific hardware vendors. This new marketing approach will result from the increasing level of specialized knowledge required and smaller services vendors' inability to make a substantial investment in training an internal staff on multiple hardware and systems software products.

D

Professional Services Component of Systems Integration

Systems integration (SI) projects include the following major components:

- Computer equipment
- Telecommunications equipment
- Packaged software
- Professional services

EXHIBIT IV-12

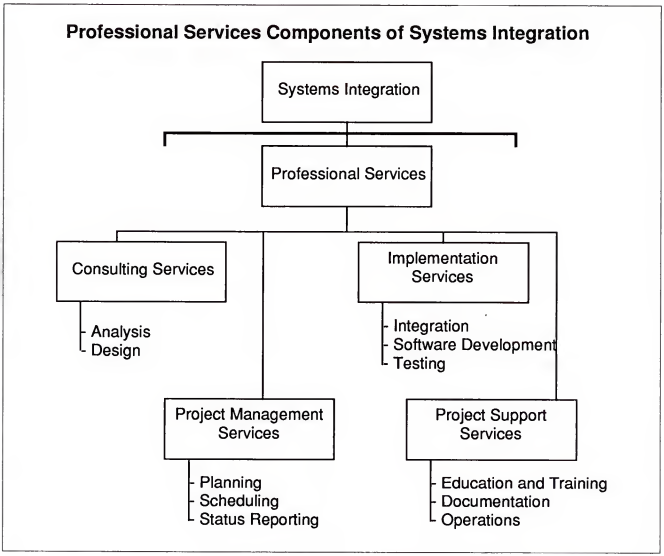


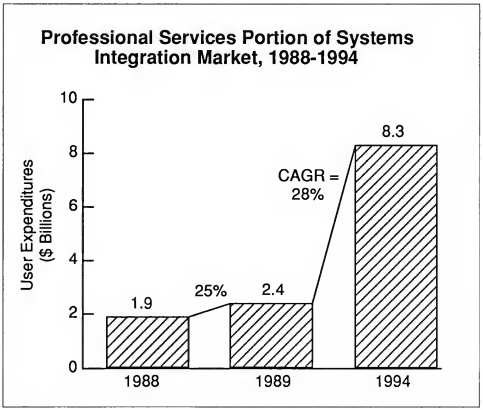
Exhibit IV-12 identifies four professional services activities associated with SI projects:

- Consulting
- Implementation
- Project management
- Project support

Successful vendors will develop capabilities in all areas, either in-house or through alliances with third-party vendors.

Exhibit IV-13 indicates that expenditures for professional services in systems integration will grow at a 28% annual rate through 1994, reaching $8.3 billion. This represents about 25% of the non-SI market. Together, professional services will be nearly a $42 billion market in 1994.

EXHIBIT IV-13



Reflecting the high value added, professional services is the largest and fastest-growing component of SI. Consulting services are frequently the precursor of most systems integration projects. Overall planning assistance, feasibility studies, and cost/effectiveness trade-off studies guide the client to plan for the desired solution.

Fees paid to the integrator for planning, scheduling, and controlling the materials and human resources for the project represent another professional service. Project management (PM) also involves project monitoring and status reporting to the client and risk assumption by the vendor.

The development of new, customized software; the conversion of existing software; or the modification of commercial software packages are key professional services in SI. The level of these services varies by industry; however, the leading industries are, in order as follows:

- Discrete manufacturing
- State and local government
- Banking and finance
- Utilities

Education and training of client staff on the operation of the system and the complete set of documentation for the project are also critical to the success of an SI project.

Some major projects require that the vendor operate and maintain the developed system for a specified time. This is vendor-staffed, on-site support of the system, or system operations. Under some contracts, maintenance is under warranty for a defined period, while under other contracts, operations and maintenance is a specifically negotiated arrangement marking the transition of the system from the "prime contractor" vendor to the client.

E

Overlap with Data from INPUT's Customer Service Program

INPUT's Customer Service Program tracks maintenance and support activities by computer systems manufacturers, software vendors, and third-party maintenance (TPM) vendors.

Faced with slowing growth rates in computer hardware maintenance revenues because of improving product reliability, increased competition, and increased pressure from users to reduce prices, many service organizations have identified professional services as an important growth market.

While specific activities may vary among different vendors' offerings in the professional services area, the basic concept defining professional services is that customer services-based professional services is any service performed for a fee that improves the performance of a computer system.

INPUT refines this definition to include only those services that are appropriately managed or performed by the service organization that

affect the system's support requirements or ability to be serviced. Those activities include:

- Planning (environmental, site, and installation)
- Consulting (performance optimization, network planning and design, network implementation, or cabling)
- Training (on the maintenance of the system)
- Relocation and reinstallation
- Site management (also known as multivendor service coordination)

Exhibit IV-14 presents INPUT's forecast for customer services-related professional services. (Appendix A includes definitions of large and small systems.) These relatively high growth rates are reasonable, given growing user demand for increased system reliability and availability and increasing user activity in these support areas.

EXHIBIT IV-14

Customer Services-Based Professional Services Market Forecast, 1988-1994

Product	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1988-1994 CAGR (Percent)
Large*	350	400	470	580	720	900	1,090	21
Small**	410	470	540	650	810	1,050	1,270	21
Total	760	870	1,010	1,230	1,530	1,950	2,360	21

* Based upon 6% of large-system service revenue
** Based upon 5% of small-system service revenue

For example, IBM announced three major professional services offerings in 1988.

- The first, Customized Operational Services (COS), is a series of site management and planning services that include the following:

- Site readiness services
- Contractor services
- Installation management
- Cabling
- Data center evaluation and design consulting
- Relocation planning and management services.

In keeping with the customized nature of professional services, IBM prices COS on a case-by-case basis.

- A second major IBM professional service offering was its Technical Services Management (TSM) program, under which IBM provides multivendor support for users, either subcontracting the service or, at IBM's discretion, offering the third-party service itself.

- A third major offering announced by IBM in 1988 was Telecommunications Services, Network Support. This offering provides TSM-like multivendor support on a wide range of telecommunications and data communications products. Services range from network problem identification to fix verification from IBM's Network Support Center.

In 1988, Digital Equipment Corporation announced two multivendor services:

- Enterprise-Wide Services is a comprehensive package of planning, program management, and integrated support services drawing from selected service alliances that Digital expects to sign with leading service vendors.

- Its Network Enterprise Management Program serves as a platform for existing network planning and support services, and adds new services resulting from alliances with leading telecommunications vendors.

Hewlett-Packard also entered the world of multivendor service in 1988, introducing its Multivendor Support Operation and a Strategic Partners Program, which is designed to attract OEMs with little or no service presence.

Third-party maintenance organizations also recognized the need to compete in the professional services market. CDC's third-party organization introduced an operating system software maintenance planning and management service called Total Operating Performance Package (TOPP).

V

Competition

V

Competition

A

Leading Professional Services Vendors

1. Introduction

The leading vendors in the U.S. professional services market and various market segments are identified in this chapter. Professional services, defined as those information systems-related services performed for customers, include the following:

- Software development
- Consulting
- Education and training
- Systems operations (formerly facilities management)

2. Market Leaders

The top vendors of professional services in the United States, listed in Exhibit V-1, include two computer system manufacturers, one telephone company, three manufacturing company subsidiaries, and one accounting company.

Leading computer system vendors IBM and Unisys offer professional services through the Complex Systems Division and the former Burroughs Systems Development Corporation subsidiaries, respectively. Although IBM offers a broader range of professional services, Unisys has completed numerous large software development projects. NCR, Digital Equipment Corp., and Wang each has a strong presence in the professional services market.

Suppliers to the federal government include Science Applications International Corp. (SAIC), Planning Research Corporation, and Applied Technology Inc. (subsidiaries of Black and Decker), BDM International (a subsidiary of Ford Aerospace), TRW, and Logicon.

EXHIBIT V-1

Largest U.S. Professional Services Vendors 1988

Rank	Vendor	Professional Services Revenues ($ Millions)
1	Computer Sciences Corp.	570
2	Unisys	515
3	IBM	400
4	SAIC	370
5	Ford Aerospace*	355
6	Black and Decker**	350
7	NYNEX (AGS)	240
8	Andersen Consulting	220
8	Logicon	220
10	TRW	210
11	Computer Task Group	200
11	Ernst & Young	200
13	KPMG Peat Marwick	180
14	Coopers & Lybrand	175
15	CAP GEMINI America	165
15	Computer Data Systems Inc.	165
17	Applied Learning	160
17	Deloitte & Touche	160
17	Grumman Data systems	160
20	Harris Corp.	150

* Includes BDM International

** Includes Planning Research Corporation and Applied Technology Inc.

Two traditional vendors of processing and network services, Computer Sciences Corporation (CSC) and Boeing Computer Services (BCS), have broadened their businesses to include substantial professional services.

The category Services Firms has the greatest number of vendors and is dominated by the Big 6 public accounting firms; Andersen Consulting (a name change by the partners of Arthur Andersen & Company acknowledging the size and growth of its nonaccounting business), Ernst & Young, and KPMG Peat Marwick. All three firms offer software development, consulting, and education and training services. In 1988, Andersen Consulting aggressively moved into the systems operations segment, landing multiyear contracts worth $100 million. One education and training specialist, Applied Learning, joined the leading vendors with 1988 revenues of $160 million.

3. Segment Leaders

The next four exhibits present the leading vendors in each market segment.

a. Software Development

The leading vendors for 1988 in the software development segment, shown in Exhibit V-2, include two computer systems manufacturers, four accounting or management consulting firms, two diversified manufacturing firms, and five vendors of mainly IS-related professional services.

Software development revenues for IBM, Unisys, and SAIC exceed the revenues of many computer manufacturers and software vendors. The top 10 software developers held a combined 1988 market share of nearly 30%.

b. Consulting

In the consulting segment, Booz, Allen, & Hamilton leads, followed by IBM and Arthur D. Little; each has revenues exceeding $100 million. As shown in Exhibit V-3, the top eight vendors hold a combined 22% market share for 1988.

c. Education and Training

As a specialized service, education and training attracts specialized vendors such as National Education Corporation (parent of Applied Learning and Deltak), the largest such vendor as shown in Exhibit V-4.

d. Systems Operations

The eight largest system operations (previously called facilities management) vendors' combined market share was 37% in 1988. Please see Exhibit V-5.

EXHIBIT V-2

Leading Professional Services Vendors Software Development Market 1988

Rank	Vendor	Estimated Vendor Revenues ($ Millions)
1	SAIC	370
1	Unisys	370
3	Ford Aerospace*	240
3	NYNEX (AGS)	240
5	Black and Decker	230
6	TRW	210
7	Computer Task Group	200
7	Ernst & Young	200
7	IBM	200
10	KPMG Peat Marwick	180
11	CAP Gemini America	165
12	Andersen Consulting	120
13	Coopers & Lybrand	95

* Includes BDM International

** Includes Planning Research Corporation and Applied Technology Inc.

EXHIBIT V-3

Leading Professional Services Vendors Consulting Market 1988

Rank	Vendor	Estimated Vendor Revenues ($ Millions)
1	Booz, Allen & Hamilton	135
2	Arthur D. Little	100
2	IBM	100
4	Unisys	90
5	Black and Decker*	85
6	CACI, Inc.	60
7	Andersen Consulting	50
7	Ford Aerospace**	50

* Includes Planning Research Corporation and Applied Technology Inc.

** Includes BDM International

EXHIBIT V-4

Leading Professional Services Vendors
Education and Training Market
1988

Rank	Vendor	Estimated Vendor Revenues ($ Millions)
1	Applied Learning	160
2	IBM	75
3	Andersen Consulting	50
4	Control Data Corporation	40
4	Digital Equipment Corporation	40
4	Price Waterhouse	40
7	Black & Decker	35
8	Syscon Harnischfeger	30
9	NCR Corporation	25
9	Unisys	25

EXHIBIT V-5

Leading Professional Services Vendors
Systems Operations Market
1988

Rank	Vendor	Estimated Vendor Revenues ($ Millions)
1	Computer Sciences Corp. (CSC)	345
2	Martin Marietta Data Systems	85
3	Ford Aerospace*	65
4	Boeing Computer Services (BCS)	50
5	Science Management Corp.	45
6	COMARCO	35
7	Systems & Computer Tech. Corp.	25
8	IBM	20

* Includes BDM International

4. Network Design, Installation, and Management

Exhibit V-6 lists leading vendors in network design, installation, and management. The three largest vendors are located in the Washington, D.C. area, indicating substantial business with the federal government.

5. Categories of Professional Services Vendors

The leading professional services vendors specializing in the federal government are listed in Exhibit V-7. In addition to offering a full range of professional services, many vendors offer systems integration services.

EXHIBIT V-6

Leading Professional Services Vendors in Network Design, Installation, and Management 1988

Vendor	Estimated 1988 Network-Based Professional Services Revenues ($ Millions)
Network Solutions (Vienna, VA)	40
Network Management (Fairfax, VA)	30
Betac International (Arlington, VA)	25
C-TEC Corp. (Wilkes-Barre, PA)	20
Hughes LAN Systems (Sytek; Mountain View, CA)	20
Comsat Technical Services (Clarksburg, MD)	15
Communications Consultants, Inc. (Washington, NJ)	10
DMW Commercial Systems (Ann Arbor, MI)	6
Computer Power Group Americas (Pompano Beach, FL)	5
LAN Systems* (New York, NY)	5

* Purchased in May 1989 by Network Management, Inc.

EXHIBIT V-7

Top Federal Government Professional Services Vendors 1988

Rank	Vendor	Estimated Vendor Revenues ($ Millions)
1	Computer Sciences Corp. (CSC)	480
2	Unisys	380
3	SAIC	370
4	TRW	200
5	CDSI	165
6	Grumman Data Systems	150
6	Harris Corporation	150
8	Black & Decker	145
9	Booz, Allen & Hamilton	130
10	IBM	105

The leading publicly traded firms offering professional services to the commercial sector are shown in Exhibit V-8 and to the federal sector in Exhibit V-9.

More software firms than ever are providing professional services to client companies. Professional services represent a good means for account control and adding value to vendors' current packaged software products. Large software vendors (MSA, Computer Associates International, and Oracle) will begin to aggressively market their professional services capabilities. Exhibit V-10 lists the leading software vendors in professional services.

EXHIBIT V-8

Leading Publicly Traded Firms in Commercial Professional Services 1988

Rank	Vendor	Estimated Vendor Revenues* ($ Millions)	Stock Exchange
1	IBM	295	NYSE
2	Computer Task	200	NYSE
3	Unisys	90	NYSE
4	Analysts International Corp.	85	OTC
5	Computer Horizons	80	OTC
6	Continuum Co.	60	OTC
7	Systems & Computer Technology Corp. (SCT)	37	OTC
8	Keane, Inc.	35	OTC
9	Advanced Computer Techniques (ACT)	10	OTC
9	Teknowledge	10	OTC

* For professional services only

EXHIBIT V-9

Leading Publicly Traded Firms in Federal Professional Services 1988

Rank	Vendor	Estimated Vendor Revenues* ($ Millions)	Stock Exchange
1	Computer Sciences Corp. (CSC)	550	NYSE
2	Unisys	425	NYSE
3	Logicon	220	NYSE
4	IBM	105	NYSE
5	Computer Data Systems, Inc.	86	OTC
6	American Management Systems	85	OTC
6	Bolt, Beranek & Newman	85	NYSE
8	CACI, Inc.	80	OTC
8	Dynamics Research Corp.	80	OTC
8	TELOS Corp.	80	OTC

* For professional services only

EXHIBIT V-10

Leading Software Firms in Professional Services 1988

Rank	Vendor	Estimated Vendor Revenues* ($ Millions)
1	Sterling Software	75
2	Comarco	70
3	M/A/R/C	65
4	Policy Management Systems Corp.	60
5	Oracle	50
6	Compuware Corp.	45
7	MSA	35
8	Computer Associates International	30
9	American Software	25
10	Comshare	15
10	Cognos	15

* For professional services only

Professional services revenues in 1988 for the Big Six public accounting firms exceed $1 billion. Andersen Consulting has received most of the publicity. However, through mergers, Ernst & Young and KPMG Peat Marwick have built sizeable professional services businesses, as shown in Exhibit V-11.

Turnkey vendors account for more than $100 million in professional services, according to Exhibit V-12. Of the six firms listed, only Prime/ Computervision and Auto-Trol Technology sell cross-industry CAD/ CAM/CAE systems; the other firms sell products and services to specific vertical industries.

EXHIBIT V-11

Leading Public Accounting Firms in Professional Services 1988

Rank	Vendor	Estimated Vendor Revenues* ($ Millions)
1	Andersen Consulting	255
2	Ernst & Young	200
3	KPMG Peat Marwick	180
4	Coopers & Lybrand	175
5	Deloitte & Touche	160
6	Price Waterhouse	125

* For U.S.-based professional services only

EXHIBIT V-12

Leading Turnkey Systems Vendors in Professional Services 1988

Rank	Vendor	Estimated Vendor Revenues* ($ Millions)
1	HBO & Co.	40
2	ASK Computer Systems	20
2	Prime/Computervision	20
4	TDS Healthcare Systems	15
5	Profitkey International	5
6	Auto-Trol technology	3

* For professional services only

One class of professional services vendor, manufacturing-based spinoff, represents those professional services firms that have spun off from large manufacturing companies. While six firms are represented in Exhibit V-13, other large spinoffs, such as Boeing Computer Services (BCS) or McDonnell Douglas Information Systems Company, have been classified elsewhere on the basis of their primary IS activity. Nevertheless, as a whole, spinoffs will grow in importance. New entrants include John Deere, Ameritech, Phillips Petroleum, Pennzoil, CSX Technology, and Bethlehem Steel.

EXHIBIT V-13

Leading Manufacturing-Based Spinoff Firms in Professional Services 1988

Rank	Spinoff Firm	Parent Company	Estimated Vendor Revenues* ($ Millions)
1	Grumman Data Services	Grumman Corp.	160
2	Martin Marietta Facility and Professional Services	Martin Marietta	85
3	Baxter-Travenol Labs	Baxter-Travenol	80
4	AT&T Data Services	AT&T	30
5	Xerox Computer Services	Xerox	25
6	Babcock & Wilcox	McDermott Co.	10

* For professional services only

Three processing/network services vendors—Boeing Computer Services, McDonnell Douglas Information Systems, and General Electric Information Services Company (GEIS)—had a good year in 1988 in professional services, with combined revenues at nearly $300 million. Please note the top four vendors listed in Exhibit V-14 sell general purpose processing services versus industry-specific services sold by the remaining eight vendors.

EXHIBIT V-14

Leading Processing/Network Services Vendors In Professional Services 1988

Rank	Vendor	Parent Company	Estimated Vendor Revenues* ($ Millions)
1	Boeing Computer Services	Boeing Co.	125
2	GEIS	General Electric	105
3	McDonnell Douglas Information Systems	McDonnell Douglas	55
4	GTE Telenet Communications	GTE	50
5	Securities Industry Automation Corp. (SIAC)	-	45
6	Equifax	-	35
7	Shared Medical Systems	-	25
8	Quotron Systems	Citicorp	15
[9]	National Computer	-	10
[9]	VISA U.S.A.	VISA International	10
11	Sungard Data Systems	-	7
12	On-Line Computer Library Center (OCLC)	-	6

* For professional services only

The U.S. information systems business includes a handful of non-U.S. firms, which have made their mark in professional services. The most successful is Paris-based CAP Gemini Sogeti, with $165 million in 1988 professional services revenues. While British, Canadian, and Australian firms are market leaders (shown in Exhibit V-15), three of the six firms listed are U.K.-based.

EXHIBIT V-15

Leading Non-U.S. Vendors in Professional Services 1988

Rank	Vendor	Home Country	Estimated Vendor Revenues* ($ Millions)
1	CAP Gemini America	France	165
2	Computer Power Pty. Ltd.	Australia	63
3	Logica/Data Architects	U.K.	30
4	SD/SCICON	U.K.	20
5	Information Consulting Group, Inc. (Saatchi & Saatchi	U.K.	10

* For professional services only

Not-for-profit organizations effectively compete in the U.S. professional services market. Led by MITRE Corporation and TASC, not-for-profits as a group garnered 1988 professional services revenues of more than $600 million, shown in Exhibit V-16.

EXHIBIT V-16

Leading Not-for-Profit Organizations in Professional Services 1988

Rank	Organization	Estimated Vendor Revenues* ($ Millions)
1	Aerospace Corporation	110
2	The Analytical Sciences Corporation (TASC)	105
3	Rand Corporation	95
4	Battelle Memorial Institute	45
5	Cal Tech/JPL	25

* For professional services only

Exhibits V-17 and V-18 show how much colleges and universities received from the U.S. Department of Defense in fiscal years 1987 and 1988, respectively.

EXHIBIT V-17

Top Institutions in Research and Development Spending, Fiscal Year 1987

Institution	Total Funds for R&D ($)
Johns Hopkins University	510,896,000
Massachusetts Institute of Technology	264,416,000
University of Wisconsin at Madison	254,493,000
Cornell University	244,840,000
Stanford University	240,885,000
University of Michigan	224,890,000
University of Minnesota	222,381,000
Texas A&M University	219,853,000
University of California at Los Angeles	188,831,000
University of Illinois at Urbana-Champaign	188,682,000
University of Washington	187,062,000
University of California at San Diego	183,047,000
University of California at Berkeley	175,273,000
University of California at San Francisco	169,436,000
Harvard University	169,074,000
University of Texas at Austin	168,931,000
Pennsylvania State University	165,841,000
University of Pennsylvania	158,334,000
Columbia University	149,904,000
Yale University	145,818,000
University of California at Davis	143,798,000
University of Arizona	138,726,000
University of Southern California	134,995,000
University of Maryland at College Park	126,239,000
University of Georgia	124,442,000
Ohio State University	123,246,000
Georgia Institute of Technology	120,342,000
University of Colorado	112,276,000
Michigan State University	111,810,000
Purdue University	107,131,000

Note: Figures cover only research and development expenditures in science and engineering, and exclude spending in such disciplines as the arts, education, the humanities, law, and physical education.

Source: National Science Foundation

EXHIBIT V-18

Nonprofit Institutions Receiving the Largest Contracts from the Defense Department, Government Fiscal Year 1988

Institution	Contract Size ($)
Massachusetts Institute of Technology	403,665,000
Aerospace Corporation	367,000,000
Johns Hopkins University	353,949,000
Mitre Corporation	351,616,000
Charles S. Draper Laboratory	139,592,000
University of California	66,325,000
SRI International	59,125,000
IIT Research Institute	55,557,000
Carnegie Mellon University	50,014,000
Pennsylvania State University	46,816,000
University of Texas	46,008,000
Rand Corporation	44,928,000
Georgia Institute of Technology	41,395,000
Stanford University	33,773,000
University of Southern California	27,819,000
Analytic Services Inc	27,362,000
Battelle Memorial Institute	24,450,000
Riverside Research Institute	24,434,000
Hudson Institute	23,655,000
University of Washington	20,837,000
University of Illinois	20,697,000
Institute for Defense Analyses	20,657,000
University of Dayton	19,423,000
Utah State University	17,532,000
South Carolina Research Authority	16,161,000
Cornell University	14,004,000
Woods Hole Oceanographic Institution	13,423,000
University of Maryland	13,292,000
Logistics Management Institute	12,297,000
University of Massachusetts	10,389 000

Note: Includes Department of Defense contracts of greater than $10 million to colleges, universities, and other nonprofit organizations. The contracts were for research, development, testing, and evaluation for military projects and for civilian water-resource projects.

Source: U.S. Department of Defense

Given these large numbers and the government's need for solutions, the revenues for professional services (especially software development) may be understated.

Temporary personnel agencies have begun to capitalize on the shortage of qualified programmers/analysts. Exhibit V-19 identifies major players in this high-growth field. All four agencies offer programmers/analysts on a short-term basis.

EXHIBIT V-19

Leading Temporary Personnel Agencies in Professional Services 1988

Rank	Company	Estimated Vendor Revenues* ($ Millions)
1	Computer People	75
2	ADIA	30
3	Worldwide Computer Services	17
4	Blue Arrow/Manpower	15

* For professional services only

The plethora of telecommunications-based professional services problems requires a different approach than that offered by professional services vendors with less direct telecom experience. As indicated in Exhibit V-20, nearly all RBOCs and AT&T have subsidiaries performing professional services. The largest, NYNEX, enhanced its capabilities by acquiring AGS Computers (Mountainside, NJ).

Just as telecommunications companies require certain technical expertise, users in other vertical markets require specific business and technical expertise. To meet these professional services needs, firms specializing in software or processing services are offering professional services. Exhibit V-21 lists firms with expertise in serving customers in finance, insurance, medical, and utilities.

EXHIBIT V-20

Leading Telecommunications Firms in Professional Services 1988

Rank	Vendor	Subsidiary	Estimated Vendor Revenues* ($ Millions)
1	NYNEX	AGS/BIS Group/ NYNEX Service Co.	200
2	Cincinnati Bell	Auxton/Vanguard	105
3	Bell Communications Research (Bellcore)	-	70
4	Ameritech	Ameritech Services/ Ameritech Communications	25
5	AT&T	AT&T Technologies	20
6	Pacific Telesis	PacTel Communications/Multicom	15
6	US WEST	US WEST Communications Services	15
8	Bell Atlantic	Technology Concepts	10
9	Southern New England Telecommunications (SNET)	SNET Systems	5

* For professional services only

EXHIBIT V-21

Leading Industry-Specific Service Firms in Professional Services 1988

Rank	Vendor	Industry Specialization	Estimated Vendor Revenues* ($ Millions)
1	Logica/Data Architects	Finance/insurance	25
2	John Hancock Health Plans	Medical	15
3	E.I. International**	Utilities	10
4	Capsco/PALLM	Insurance	8
5	Dyatron Corp.	Finance	7
5	Infomed	Medical	7
7	Petroleum Information Corp.	Oil	6
7	Philadelphia Suburban Corp.	Utilities	6
9	Utility and Municipal Services	Utilities	4
10	Finserv	Finance	2

* For professional services only

** Formerly Energy International

B

New Entrants to Professional Services

As professional services has matured relatively quickly, it has attracted about a dozen new entrants in the past two years. A key observation of the list of vendors in Exhibit V-22 is the continued entry by Fortune 500 firms into professional services, with many firms leveraging internal experience.

EXHIBIT V-22

New Entrants to Professional Services
1988

Company	Professional Services (s)
• Businessland	Education and training
• Computer Power Group	Education and training
• Computer People	Education and training for DB2
• Westinghouse Communications	Consulting; network integration
• Bell Atlantic Systems Integration Corp.	Network integration
• Texas Instruments	Software development/industrial automation

C

Mergers and Acquisitions in Professional Services

In Exhibit V-23, INPUT identified 12 mergers or acquisitions occurring in 1988 or 1989 involving professional services vendors. Vendors' needs to broaden professional services offerings continues to drive merger and acquisition activity.

Exhibits V-24 through V-32 provide a reference guide to acquisition activities by the following vendors:

- Network Management, Inc.
- Computer Sciences Corporation (CSC)
- ADIA Services
- Computer Task Group
- NYNEX
- Cincinnati Bell Information Services (CBIS)
- Computer Horizons Corporation
- Big 6 public accounting firms

EXHIBIT V-23

Mergers and Acquisitions in Professional Services 1988-1989

Year	Acquiring Firm	Acquired Professional Services Firm	Notes
1989	Andersen Consulting	Courseware	
1989	Computer Horizons	Kearns & Melloy Assoc.	Consulting unit only
1989	Penn Central	Quality Systems	
1989	Brandon Systems	Concentric Associates	
1989	Computer Sciences Corp.	Inforem Ltd. (U.K.)	9%
1989	Computer Sciences Corp.	CIG Intersys Group (Belgium)	
1989	Keane, Inc.	COM-PRO	
1989	Keane, Inc.	Computer Consultants	
1989	Keane, Inc.	DBMS, Inc.	Consulting unit only
1988	Keane, Inc.	Illation, Inc.	
1988	Keane, Inc.	Dataframe, Inc.	
1988	Keane, Inc.	Trigon Consultants	

EXHIBIT V-24

Acquisitions by Network Management Inc.

Year	Company	Specialization	Target Market(s)
1987	CRC Systems, Inc.	Facilities management, network management, planning, analysis, design	Federal government
1988	Programmatics, Inc.	Systems engineering	Federal government, commercial
1988	Network Analysis Center Contel Inc.	Products for network management	-
1989	Account Data Group	Systems integration of LANs	Federal and commercial

EXHIBIT V-25

Acquisitions by Computer Sciences Corporation (CSC)

Date Acquired	Subsidiary
1989	Cleveland Consulting Associates (Cleveland)
1989	LPS, Inc. (Minneapolis)
1989	Inforem, Ltd. (Weybridge, England)
1988	Computer Partners (Boston)
1988	Index Group (Cambridge, MA)
1988	CIG-Intersys Group (Belgium)
1988	Seako, Inc.

EXHIBIT V-26

Acquisitions by ADIA Services

Year	Vendor
1988	International Telemanagement
1988	Comp-u-Staff
1988	Computer Dynamics

EXHIBIT V-27

Acquisitions by Computer Task Group

Date	Company	Price	Skills Acquired
Jan. 1988	Scientific Integrated Systems Services	$10.5 million	Computer systems for manufacturing
Jan. 1987	Analysts International Inc.	$4.6 million for 19.13% of the company	Purchased for investment purposes
Oct. 1986	Maxima Computer Management Consultants, Inc.	Price Unknown	Access to federal government, banks, manufacturers
Aug. 1986	Creative Computing Company	Price Unknown	Data base and data communications expertise
Jan. 1986	Shubrooks International, Ltd. (Great Britain)	Price Unknown	Services to manufacturing & distribution businesses
Apr. 1986	Quadra Systems, Inc. (San Antonio)	Price Unknown	Consulting services to education, energy & manufacturing
Apr. 1986	United Software Consultants, Inc. (Chicago, IL)	Price Unknown	Consulting services to Chicago clients
Sep. 1985	Documentation Resources, Inc. (Phoenix, AZ)	Price Unknown	Documentation for large custom-based software systems
Sep. 1985	Data Force, Inc. (Seattle, WA)	Price Unknown	Custom software for manufacturers & banks
Sep. 1985	Central Computer Systems, Inc. (San Francisco, CA)	Price Unknown	Services for banks
Feb. 1985	Dataware, Inc. (Buffalo, NY)	Price Unknown	Software conversion services
Jan. 1985	Berger, Vernay & Company (Houston, TX)	Price Unknown	Professional services for energy industry & Fortune 500 firms

EXHIBIT V-28

Professional Services Acquisitions by NYNEX

Subsidiary/Company	Estimated 1988 Revenues ($ Millions)
AGS Computers	200
Multiple Technologies Corp. (Detroit, MI)	13
Teco Technologies (Tampa, FL)	8

EXHIBIT V-29

Professional Services Acquisitions by Cincinnati Bell Information Services (CBIS)

Date	Vendor	Products/Services	Price ($ Millions)
5/87	Auxton Computer Enterprises (Maitland, FL)	Telecommunications software and consulting	86
7/88	Vanguard Technologies International (Fairfax, VA)	Professional services for federal government	75

EXHIBIT V-30

Professional Services Acquisitions by Computer Horizons Corporation

Acquisitions	Specialty
Computer Consulting Services Div	Software development, consulting
Comptech (Hartford, CT)	RDBMS professional services
Technical Resources Group, Inc. (Plymouth Meeting, PA)	Software development, consulting

EXHIBIT V-31

Professional Services Acquisitions by "Big 6" Public Accounting Firms

Accounting Firm	Acquired Firm
Ernst & Young	Network Strategies, Inc. (Fairfax, VA)
Coopers & Lybrand	Computer Assistance (West Hartford, CT)

EXHIBIT V-32

Joint Ventures and Marketing Alliances in Professional Services, 1989

Type	Professional Services Vendor	Other Vendor	Product/ Service
Alliance	IBM	Computer Task Group	AD/Cycle
Alliance	IBM	CAP Gemini America	AD/Cycle
Alliance	IBM	G.E. Consulting	AD/Cycle
Alliance	IBM	Computer Power Group	AD/Cycle
Alliance	IBM	Andersen Consulting	Marketing
Alliance	IBM	Keane, Inc.	Marketing
Alliance	IBM	Planning Research Corp.	Marketing
Alliance	IBM	SAGE Federal Systems	Marketing
Alliance	IBM	KnowledgeWare	CASE
Alliance	IBM	Bachman Information Systems	CASE
Alliance	IBM	Index Technology	CASE
Joint Venture	IBM	Baxter-Travenol	Marketing
Joint Venture	Computer Task Group	A.T. Kearney	Professional Services
Joint Venture	Bell Atlantic	American Management Systems	Network Services

D

Joint Ventures and Marketing Alliances in Professional Services

Exhibit V-33 summarizes joint ventures and marketing alliances related to computer systems and software. IBM has created marketing and implementation alliances as a backup for internal capabilities.

EXHIBIT V-33

Summary of Software Alliances of "Big 6" Public Accounting Firms

"Big 6" Vendor	Software Vendor	Software Product(s)
Andersen Consulting	Aetna (& DEC)	Insurance
	MSA	Accounting
	McCormack & Dodge	Accounting
Cooper & Lybrand	McCormack & Dodge	Accounting
	MSA	Accounting
	AMS	Accounting
Deloitte, Haskins & Sells	Holland Systems	CASE
	Index Technology	CASE
Ernst & Young	MSA	Accounting
	McCormack & Dodge	Accounting
	Integral Systems	Accounting; human resources
Price Waterhouse	Qronos	Manufacturing

Software alliances by Big 6 public accounting firms listed in Exhibit V-34, based on publicly available information, indicate the breadth and depth of alliances. Vendors focus on cross-industry sectors accounting and systems software or the manufacturing and insurance vertical sectors.

IBM's investments in software and professional services vendors represent a very strong alliance. Exhibit V-34 lists those investments announced by IBM. Many investments in Western Europe and a few in the United States were not announced.

EXHIBIT V-34

Vendor Investments by IBM

Vendor	Current Stake (Percent)	Amount of Investment ($ Millions)	Maximum* Stake (Percent)
Computer Task Group	15.3	21	19.9
American Management System	10	18	20
Image Business System	-	6	-
Metaphor Computer System	9	10	-
Interactive Images	10	15	-
Polygen Corporation	-	5	-
Transarc Corporation	>50	-	-
Interact Inc.	N/A	N/A	N/A
I/Net	-	4.3	-
MSA	5	10	-
Bachman Information Systems	-	-	-
Index Technology Corporation	5	2.5	-
KnowledgeWare Inc.	10.2	-	-
PCO	25	-	-
Policy Management Systems	20	114	-
Baxter Healthcare Corporation	50	(partnership)	
Geographic Systems Corporation (Also owned by Wisc. Pub. Svcs. Corp)	-	-	-
Thomson Digital Image (France)	49	-	-
Paxus (Australia)	15	20	20

* If applicable

VI

Vendor Profiles

VI

Vendor Profiles

Sixteen professional services vendors, representing diverse vendor categories, are profiled in this chapter.

Vendors profiled include:

- Analysts International Corporation
- Analytic Technologies, Inc.
- Andersen Consulting
- Applied Information Development
- BDM International
- Boeing Computer Services
- CAP Gemini America
- Comp-U-Staff
- Computer Horizons
- Computer Sciences Corporation
- Computer Task Group
- Cornell Computer Corporation
- Cutler-Williams
- Electronic Data Systems Corporation
- Keane, Inc.
- Systems and Computer Technology

Each vendor profile contains the following information:

- Company description and background
- Key products and services
- Industry markets
- Geographic markets
- Computer hardware

ANALYSTS INTERNATIONAL CORPORATION
7615 Metro Boulevard
Minneapolis, MN 55435
(612) 835-2330

Frederick W. Lang, Chairman and CEO
Victor C. Benda, President and COO
Public Corporation, NASDAQ
Total Employees: 1,498
Total Revenue, Fiscal Year End
6/30/89: $89,852,000

The Company

Analysts International Corporation (AiC) was formed in 1966 as a publicly held corporation to provide professional services to a wide variety of industries. The company also offers three financial application software products.

Fiscal 1989 revenue reached $89.9 million, a 28% increase over fiscal 1988 revenue of $70.1 million. Net income rose 60%, from $3.1 million in fiscal 1988 to nearly $5 million in fiscal 1989. A five-year financial summary follows:

ANALYSTS INTERNATIONAL CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	6/89	6/88	6/87	6/86	6/85
Revenue	$89,852	$70,083	$56,701	$46,732	$44,291
• Percent increase from previous year	28%	24%	21%	6%	44%
Income (loss) before taxes	$8,404	$5,113	$1,710	$(954)	$1,039
• Percent increase (decrease) from previous year	64%	199%	279%	(192%)	167%
Net income (loss)	$4,954	$3,088	$1,440	$(954)	$929
• Percent increase (decrease) from previous year	60%	114%	251%	(203%)	187%
Earnings (loss) per share (a)	$1.09	$0.69	$0.33	$(0.22)	$0.22
• Percent increase (decrease) from previous year	58%	109%	250%	(200%)	181%

(a) Restated to reflect a 5-for-4 common stock split in the form of a 25% stock dividend paid August 14, 1989.

AiC management attributes the company's growth during the past two years primarily to a greater volume of business, as evidenced by a 30% increase in technical personnel from fiscal 1988 to fiscal 1989, and to increases in hourly rates billable to clients. Contracts with various units of IBM also have contributed to revenue growth.

Revenue for the three months ending September 30, 1989 was $24.7 million, a 22% increase over $20.2 million for the same period in 1988. Net income for the period rose 23%, from $1.1 million to over $1.3 million.

AiC is organized into four geographic regions, each managed by a regional vice president. Regions include Eastern, Central, Midwest, and Western.

As of June 30, 1989, AiC employed 1,498 persons, of which 49 are sales staff, 29 are recruiting staff, and approximately 1,250 are systems analysts, computer programmers, and other technical personnel whose services are billable to clients. The company

currently has over 1,550 employees.

National competitors include professional services divisions of large companies such as IBM, Control Data Corporation, and DEC, and other national software services companies such as Computer Task Group, CGA, and the AGS division of NYNEX. AiC branch locations compete with various local professional services firms.

Key Products and Services

Over 98% ($88 million) of AiC's fiscal 1989 revenue was derived from professional services. The remainder of revenue was derived from application software product and hardware sales.

AiC has extensive experience in designing and implementing systems on a variety of large- and small-scale computer systems. Areas of specialization include:

- Banking and insurance
- Manufacturing and inventory control
- Business and accounting
- Systems software, including data base management systems, compilers, and operating systems
- Scientific, specialized control, and related applications
- Communications systems for the private sector

Professional services are provided in the following functional areas:

- Generation of functional and detailed design specifications
- Systems software design and development
- Programming, implementation, maintenance, testing, and documentation
- Special purpose systems design and/or modifications, timeshare, process control, and medical systems
- Systems orientation and training seminars
- Technical audits

- Equipment evaluation and requirements analysis

- Systems resource analysis

Examples of types of projects AiC was involved in during fiscal 1989 include the following:

- AiC participated in the design and development of testing programs for use by Motorola in its development and manufacture of analog integrated circuits. In addition to this project, AiC has carried out work for Motorola in connection with over 40 projects since 1980.

- AiC participated in the design and development of applications programs for MasterCard International's Banknet communications system. AiC has worked on more than 40 individual projects for MasterCard since 1977 and has provided ongoing support to Banknet and related projects, including MAPP (MasterCard Automated Point-of-Sale Program).

- AiC designed and developed the Quota Compensation System for Eastman Kodak's Clinical Products Division to assist in the monitoring and managing of its sales activities. AiC continues to be involved with ongoing enhancements to the Quota Compensation System. During 1989, AiC assisted in upgrading and installing the system from an IBM System/38 to an AS/400. AiC has worked with Kodak for seven years, and during that time has participated in about 150 separate projects for various Kodak units.

Examples of types of projects AiC has worked on in previous years include the following:

- The design and development of applications programs to assist Burlington Northern Railroad in managing its scheduling and usage of rail cars

- The creation of data structures and related programming for chemical analysis for Rohm and Haas Co.

- The development of applications programs to support a ticket ordering system for the New Jersey Transit Corporation

- The design and development of applications programs to assist an electric generating utility in managing its fuel resources

- Maintenance and enhancement of applications programs supporting a health maintenance organization's (HMO's) health

claims processing

- Maintenance and enhancement of application programs to perform sales, history, and analysis for a food processing company

- The design and development of assembler language programs used in microprocessor-based control units for computer manufacturers

During fiscal 1989, AiC provided professional services to approximately 520 clients, of which approximately 220 were new clients. The company worked on a total of 1,914 different projects during fiscal 1989.

AiC, through its branch offices, markets application software products and offers training seminars.

- Software products include the following:

  - The Credit Collection Accounting System (CCAS), originally developed under a professional services contract for a collection agency client, provides data gathering, control, and reporting functions for the collection of retail and commercial credit accounts.

    - CCAS operates on IBM System 36, 38, and AS/400 computers and is available to clients for license as a software product and as a turnkey system.

    - CCAS software ranges in price from $20,000 to $60,000.

  - The Delinquent Loan Recovery System (DLR$), introduced in March 1986, is designed for credit unions, savings and loans, banks, and other financial institutions.

    - Capabilities are similar to those offered with CCAS. DLR$ runs on Data General MV Series minicomputers and IBM PCs. The software ranges in price from $10,000 to $20,000.

  - The Charge-Off Tracking System (CTS), introduced in January 1989, is targeted to organizations using third-party collection firms to track their collection efforts. CTS runs on Data General MV series minicomputers and IBM PCs. The software ranges in price from $3,000 to $5,000.

- Available training seminars include the following:

- AiC's CICS/VS Command Level training for applications programmers is a one-week class/computer workshop conducted at the client's site. Experienced batch programmers are trained to design, code, test, debug, and execute on-line programs.

- ProFile, a three-day seminary, presents AiC-developed project control procedures that address common data processing management problems in the areas of planning, control, and documentation.

- Advanced CICS/VS training provides additional insight for experienced batch programmers who have attended the CICS/VS Command Level course.

Industry Markets

AiC derives its revenue from a range of commercial industry clients. A three-year summary of revenue sources by industry served, as provided by AiC, follows:

ANALYSTS INTERNATIONAL CORPORATION
THREE-YEAR SOURCE OF REVENUE SUMMARY

	FISCAL YEAR		
INDUSTRY	6/89	6/88	6/87
Electronics	31%	30%	17%
Manufacturing	19%	25%	28%
Telecommunications	13%	13%	18%
Banking	8%	9%	12%
Insurance/Health Care	5%	6%	7%
Oil and Chemical	5%	--	--
Food	4%	5%	7%
Merchandising	4%	5%	3%
Power and Utility	1%	2%	7%
Transportation	4%	2%	--
Government	1%	1%	1%
Other	5%	2%	--
TOTAL	100%	100%	100%

AiC derived approximately 22% ($19.8 million) of fiscal 1989 revenue, 25% ($17.5 million) of fiscal 1988 revenue, and 18% ($10.2 million) of fiscal 1987 revenue from various operating units and divisions of IBM.

Geographic Markets

One hundred percent of AiC's revenue is derived from the U.S.

Regional and branch offices are located in Atlanta (GA), Columbus and Independence (OH), Concord and Los Angeles (CA), Denver (CO), Fairport (NY), Fort Washington (PA), Houston and Irving (TX), Indianapolis (IN), Kansas City (MO), Livingston (NJ), Minneapolis (MN), New York (NY), Phoenix (AZ), Rochester (MN), Rochester (NY), Schaumburg (IL), Southfield (MI), and St. Louis (MO).

AiC also has field offices in Austin (TX), Boca Raton and Tampa (FL), Boulder (CO), Louisville (KY), Memphis (TN), Omaha (NE), Philadelphia (PA), Raleigh and Durham (NC), San Jose (CA), Seattle (WA), and Tulsa (OK).

Computer Hardware

AiC has Data General and IBM computers installed at its corporate offices.

ANALYTICAL TECHNOLOGIES, INC. (ANATEC[R])
30300 Telegraph Road
Suite 200
Birmingham, MI 48010
(313) 540-4440

Al Schornberg, President and CEO
Private Corporation
Total Employees: 165 (6/89)
Total Revenue, Fiscal Year End
12/31/88: $8,200,000

The Company

Analytical Technologies, Inc. (ANATEC[R]), was incorporated in 1980 to provide consulting and programming services to the MIS departments of Fortune 500 corporations and government agencies.

ANATEC was recognized by *INC.* Magazine as one of America's 500 fastest growing privately held companies.

Total 1988 revenue reached $8.2 million, an 11% increase over 1987 revenue of $7.4 million. A five-year revenue summary follows:

ANALYTICAL TECHNOLOGIES, INC.
FIVE-YEAR REVENUE SUMMARY
($ millions)

	FISCAL YEAR				
ITEM	12/88	12/87	12/86	12/85	12/84
Revenue	$8.2	$7.4	$5.3	$4.4	$4.4
• Percent increase (decrease) from previous year	11%	40%	31%	--	88%

Revenue for the five months ending May 31, 1989 was approximately $3.8 million, a 9% increase over $3.5 million for the same period in 1988.

ANATEC has three divisions, headquartered in Birmingham:

- The Government Services Division provides professional services to the federal government.

- The Manufacturing/Engineering Division (M/E) specializes in the manufacturing industry.

- The Relational Database Services Division provides relational data base, consulting, and software development services to various businesses.

Major competitors by markets served include the following:

- Government agencies: Computer Sciences Corporation (CDC) and Electronic Data Systems (EDS).

- Manufacturing and other private sectors: Computer Task Group and the major accounting firms.

Key Products and Services

Approximately 40% of ANATEC's 1988 revenue was derived from systems integration, 31% from software development, 10% from custom turnkey systems, and 19% from consulting/education.

ANATEC provides professional services to approximately twenty Fortune 500 clients. ANATEC's current engagements are broken down into 40% project management, 40% time and materials, and 20% fixed price. A partial list of ANATEC's hardware, software, and language capabilities is shown in Exhibit A. ANATEC's professional services include:

- Application programming and development
- Artificial intelligence systems
- Capacity planning
- Contract programming
- Data administration
- Data integrity management
- Decision support systems
- Documentation
- Education and training
- Engineering services
- Facilities management
- Feasibility studies
- Information resource management planning
- Information needs analysis
- Information engineering
- Management consulting
- Manufacturing systems
- Management information systems
- Micro, mini, and mainframe systems

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EXHIBIT A

ANALYTICAL TECHNOLOGIES, INC.
PROFESSIONAL SERVICES CAPABILITIES

Hardware	Languages/Software
• Honeywell	• FOCUS
• Harris	• INGRES
• Sperry	• DB2
• IBM PC	• MARK IV, V
• Data General	• ALC
• Novell LANs	• CICS/MACRO
• IBM 308X, 303X	• APL, APL *PLUS
• IBM 43XX	• TAL
• IBM Series 1	• ICCF
• IBM 370	• DYNAM/T/D
• UNIVAC	• VSAM
• HP 1000	• Graphics
• Tandem	• ALGOL
• Burroughs	• EXEC
• Amdahl	• EASYTRIEVE
• DEC PDP	• COM-PLETE
• DEC VAX	• SYBASE
• HP 3000	• DBASE III +
• Sun	• FORTRAN
• Apollo	• ORACLE
	• IMS/DB/DC
Operating Systems	• DATA DICTIONARY
• GCOS 8	• DATATRIEVE
• GCOS 6	• BASIC
• UNIX	• ADRS
• MS DOS	• DECNET
• RSX	• LIBRARIAN
• PC DOS	• Spreadsheets
• MVS/XA	• COBOL
• TOPS-10	• PREDICT
• TOPS-20	• UFO
• DOS/VX	• RPG
• RT-11	• BAL
• RSTS	• POWERHOUSE
• VMS	• ADABASE/NATURAL
• AOS/VS	• PL/1
• VM/CMS	• DL/1
• EDX	• CICS/COMMAND
• OS	• ADL
• VS	• PANVALET
• CP/M	• FPS
• MVS	• SNA
	• DMS
	• C
	• TSO
	• ASSEMBLER

- Project management
- Security and security systems
- Systems software development
- Systems tuning
- Systems integration

ANATEC provides custom software for a variety of industry applications. Exhibit B is a brief overview of those applications:

EXHIBIT B

ANALYTICAL TECHNOLOGIES, INC.
INDUSTRY/APPLICATION CAPABILITIES AND EXPERIENCE

Manufacturing
- Robotics
- Process Control
- Inventory Control
- Order Processing
- Production Control
- Bill of Material
- Integrated Purch/Expedit/Rec'ng
- Parts Control
- Material Handling
- Sales Analysis
- Manufacturing Control Production
- Cost Accounting
- Service Parts Scheduling

Software
- Data Communications
- File Conversions
- Program Development Aids
- Test Data Generators
- Database Management
- Hardware Analysis
- Feasibility Studies
- Systems Programming

Financial
- Payroll
- General Ledger
- Accounts Payable
- Accounts Receivable
- Mortgage
- Direct Deposit
- Automatic Teller
- Trading

Hospital
- On-line Admissions
- Physician and Clinic Billing
- Shared Medical System
- Insurance Log Reporting

Government
- Electromagnetic Research
- Force Accounting
- Circuit Court
- District Court
- Case Information and Control
- Central Pay and Leave
- Regulatory Information Management
- Finance and Accounting
- Real Estate
- Library Map Tracking
- Reprographics

Oil and Gas
- Gas Well Accounting
- Gas Contracts
- Gas Tax Planning
- Lease Support System
- Crude Oil Accounting

Insurance
- Insurance Consolidation System
- Insurance Reporting
- Claim System
- On-line Membership
- Home-Owners/Boat Owners
- Membership and Billing

Merchandising
- Distributed Processing
- Sales System
- Shop Scheduling and Reporting
- Inventory
- Advertising Accounting
- Point of Sale

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Professional services contracts include:

- Developing a system map of applications, programs, and data on the Novell s-Net LAN for the Resource Management Officer, Corps of Engineers. ANATEC developed programming specifications for data input, data protection upon certification, printing of paper checks, and verification of the commercial accounts payment operations on this same system. Procedures and programs for interfacing this operation with the Honeywell DPS8 mainframe system called COEMIS FA were also developed.

- System development and maintenance support for the Engineering Financial Systems of a major automotive manufacturer, involving conversion of existing COBOL systems to FOCUS. ANATEC consultants are providing all project management and technical support, including staffing, status reporting, and end user training to deliver the functional systems.

- Developing the Hermosillo Material Control system for a stamping and assembly plant in Hermosillo, Mexico. Applications include bill of material, parts file, preventive maintenance, customer data, metals records, parts history, contract tracking, and financial.

- Developing a mechanical sketch system which mechanically generates usage condition codes and assigns file control numbers to driveline, coupling shaft, and support bracket parts that have been selected by a drafting design run.

- Customizing a personnel software package (IDS) to meet the needs of the client. Applications include Hourly Payroll, Salary, Retirement, and Pension.

- Developing cost tracking system for long term BC/BS-covered patients. ANATEC provided the general design and wrote the programs for each of the three departments involved with the system (Discharge Planning, Case Management, and BC/BS accounts using case management). ANATEC also provided a user manual and initial user training.

Industry Markets

Approximately 50% of ANATEC's 1988 revenue was derived from the automotive industry, 15% from the federal government, 13% from insurance and healthcare, 10% from petrochemical, and 10% from food and beverage, financial, and other manufacturing industries.

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Clients include Ford Motor Company, Continental Bank, Burlington Northern, Chrysler Corporation, 3M Company, U.S. Army Corps of Engineers, and Blue Cross/Blue Shield of Michigan.

ANATEC has strategic partnerships with Sybase and Relational Technologies, Inc. ANATEC is providing consulting services for product development.

Geographic Markets

Approximately 97% of ANATEC's 1988 revenue was derived from the U.S and the remaining 3% was from England.

ANATEC is headquartered in Birmingham (MI), and has branch offices in Omaha (NE), Clearwater (FL), and St. Paul (MN).

ANATEC has field service personnel located in Dallas (TX), North Haven (CT), Milwaukee (WI), and Atlanta (GA).

Computer Hardware and Software

The company currently has one DEC MicroVAX II operating under VMS installed at its headquarters in Birmingham. INGRES and SYBASE are currently supported.

ANDERSEN CONSULTING
69 West Washington Street
Chicago, IL 60602
(312) 550-0069

Stanley L. Cornelison, Managing Partner
Unit of Arthur Andersen & Co.
Total Employees: 14,000
Total Revenue, Fiscal Year End
8/31/88: $1.11 billion

The Company

Andersen Consulting helps clients use information in all phases of their management activities--strategic, operations, and financial. The group assists in the planning, design, and installation of computer-based information systems of all types and sizes for clients in almost every professional, business, and government sector.

- Andersen Consulting is part of The Arthur Andersen Worldwide Organization, which provides professional services in accounting and audit, tax, professional education, and management information consulting to clients through 231 offices in 49 countries. The firm achieved revenue of $2.82 billion in fiscal 1988 and employs more than 45,000 professionals worldwide.

- In October 1988, Arthur Andersen & Co. announced its Management Information Consulting practice had been renamed Andersen Consulting in order to create a clear, separate identity for the firm's consulting services.

- Andersen Consulting provides services in systems design and installation, systems integration, systems productivity consulting, information planning, strategic consulting, change management, and facility/network management. The firm also offers application software products that support manufacturing resource planning and control and distribution control/warehouse management and markets and supports the FOUNDATION™ computer-aided software engineering (CASE) software product.

Andersen Consulting's fiscal 1988 revenue reached $1.1 billion, a 32% increase over fiscal 1987 revenue of $838.4 million. A five-year revenue summary follows:

ANDERSEN CONSULTING
FIVE-YEAR REVENUE SUMMARY
($ millions)

	FISCAL YEAR				
ITEM	8/88	8/87	8/86	8/85	8/84
Revenue	$1,112.0	$838.4	$635.9	$477.3	$391.8
• Percent increase from previous year	32%	32%	33%	22%	19%

Management attributes the company's growth to an expansion in the information technology and systems integration marketplace and an increasing need for companies to capture and sustain a competitive advantage in their industries. Andersen also attributes growth to the company's increased participation in the application software and CASE tools arenas.

Acquisitions include the following:

- In January 1989, Andersen Consulting acquired McCormack & Dodge's PIOS manufacturing resource planning system. McCormack & Dodge employees who had worked on PIOS development and marketing will be offered positions with Andersen Consulting. Terms of the purchase were not disclosed.

  - With an installed base of 75 sites, PIOS is used by a number of large defense contractors.

  - The transaction is part of an agreement between McCormack & Dodge and Andersen Consulting under which the two firms will jointly sell McCormack & Dodge's Millenium financial and human resources software and Andersen Consulting's MAC-PAC family of manufacturing software products.

- In May 1988, Arthur Andersen and Co. acquired direct/data base marketing specialist, Kestnbaum & Company.

  - This association focuses in four areas: strategic, advanced marketing analysis, quantitative analysis, and high-level data base design and system functional specification.

  - Kestnbaum will provide selected Andersen offices with proposal development and quality assurance; develop and

implement training for Andersen partners, managers, and Kestnbaum consultants; and monitor and increase productivity.

Andersen Consulting's major competitors include the Big 8 accounting firms' professional services units, as well as the leading systems integrators and professional services vendors such as IBM, Computer Sciences Corporation, Electronic Data Systems, Computer Task Group, AGS/NYNEX, and DEC. In the strategic services arena, Andersen Consulting's major competitors include McKinsey & Co., Booz-Allen, and Bain & Co.

Key Products and Services

Approximately 55% of Andersen Consulting's fiscal 1988 revenue was derived from professional services, 40% from systems integration, 3% from application software products, and 2% from systems software products.

- Areas of expertise include the following:

  - Strategic services
  - Information planning
  - Systems design and installation
  - Software products and services
  - Change management
  - Facilities/network management

Andersen Consulting's professional services include software development (70%), consulting (15%), and education and training (15%).

- Andersen Consulting operates five Advanced Systems Centers, which are large IBM computer facilities staffed with technical experts and project managers. Project teams use workstations connected to these centers for the automation of the application development process for each client.

- Associated with the Advanced Systems Centers are Advanced Technology Centers. These centers specialize in industry- and function-specific technology, and each has a working demonstration of the technology (e.g. a factory floor or engineering design department).

  - At one Advanced Technology Center, Andersen Consulting has designed a minifactory (located in Evanston, IL) that displays CIM techniques. The minifactory integrates the products from 35 different companies and produces an

aluminum casting that holds a printed circuit board and plastic connectors. Other centers are located near Dallas and Los Angeles.

- Other technologies include expert systems, voice recognition, vision systems, Ethernet and MAP 2.1, personal workstations, touch screeens, computer-aided design, computer-aided manufacturing, MRP II, group technology, robotics, material handling, cell control, computer numerical control, and bar code data collection.

- Additional Advanced Technology Centers are planned for the capital markets, insurance, and health care industries.

- A central Technical Services Organization (TSO) markets and supports the firm's software products, coordinates artificial intelligence and telecommunications centers of expertise in support of client projects, and operates a software intelligence group.

  - Responsibilities include gathering, evaluating, and disseminating information on application software products and vendors; working closely with software vendors to enhance their existing products; informing firm personnel of new application software products, enhancements to existing products, and software industry trends; helping clients benefit from most current knowledge and most recent hands-on experiences of firm personnel who have worked with packaged software products; supporting firm professionals on client projects; and developing methodologies and tools to help ensure successful implementation of application software-based systems.

  - The software intelligence group has implemented a number of relationships with software products companies through the OASIS program. This program provides Andersen Consulting with in-depth knowledge of the products of key software companies such as Management Science America, SAP, IBM, American Software, Cullinet, and McCormack & Dodge. Andersen Consulting works on major projects implementing these companies' software products.

Andersen Consulting's systems integration staff offers professional services (57% of SI revenue), hardware equipment (30% of SI revenue), packaged software (8% of SI revenue), and customized software (5% of SI revenue).

- Contract examples include the following:

  - A computer-aided layout and fabrications system for Lockheed. The project was completed in October 1987, having lasted ten months and cost $3.0 million.

  - An order entry and inventory control system designed and implemented for Ashland Chemical. The project is expected to be completed in 1989 at a cost of $5.5 million.

  - A cost recovery system for the California Department of Developmental Services. The project is expected to be completed in October 1989, having lasted 17 months at a cost of $3.6 million.

  - An integrated financial and administrative system for the Social Security Administration. The project is expected to be completed some time in 1993, having lasted 60 months at a cost of $12.0 million.

Andersen Consulting offers the following application software products:

- MAC-PAC^{R}/CIM is a manufacturing resource planning (MRP II) system that links manufacturing software systems with automation equipment.

  - MAC-PAC/CIM components include MAC-PAC/D and MAC-PAC/JIT.

    - MAC-PAC/D, introduced in 1983, is an integrated, on-line MRP II and control system for aerospace and defense contractors. MAC-PAC/D supports major DOD information requirements, including configuration management, contract material planning and control, and contract cost accounting. MAC-PAC/D's architecture supports real-time communication with a CIM network. There are currently 30 installations.

    - MAC-PAC/JIT, released in 1986, provides single-system control of MRP II and Just-in-Time (JIT) systems. MAC-PAC/JIT features include rate planning; automatic rescheduling; cell schedules; electronic communication with suppliers; point-of-use allocation; card order notice, bring out notice (CONBON^{R}); bar coded part reporting; cost accounting; and deduct point relief. There are currently 115 installations.

- The MAC-PAC software systems are marketed for the IBM AS/400, System 38, 360, 370, 9370, 30XX, and 43XX/DOS/VSE/AF, and MVS/370 and MVS/XA compatibles. There are currently over 600 installations.

- PIOS (Production and Inventory Optimization System), acquired from McCormack & Dodge earlier this year, is an on-line manufacturing control system that runs on IBM mainframes under OS, DOS, MVS and DEC VAX-11/780 and larger systems under VMS.

- DCS™/Logistics manages customer service and logistics functions. It consists of modules for order processing, inventory and warehouse management, outbound logistics, DRP (distribution requirements planning), accounts receivable, and replenishment.

  - The product runs on IBM 9370, 43XX, and 30XX systems. An IBM DB2 version is also available. There are currently 150 DCS/Logistics installations.

  - DCS/Logistics is marketed to clients in a range of industries.

  - In October 1988, Andersen Consulting and Telxon announced a cooperative marketing agreement allowing the marketing of DCS/Logistics with Telxon's family of radio frequency handheld communication devices to clients in the consumer products/distribution industries.

    - Andersen Consulting has integrated DCS/Logistics with Telxon's portable workstations, which combine on-line, radio-linked computer systems and handheld units for real-time use in factories and warehouses.

    - It will also include Telxon's in-store software systems for point-of-sale connectivity, labor management, inventory management, direct store delivery, receiving, and store management.

- CQMS™, Cost Quality Management System, is a DEC MicroVAX-based management system for hospitals that integrates clinical and financial data for planning and decision making.

  - The Information Integrator module combines a hospital's clinical data with the financial data merged with information from other hospitals. Internal cost and quality analyses can be made and compared to other healthcare institutions.

- Cost Advantage provides tools for cost standards development, department performance monitoring, budgeting, and product line management.

- The prices of Andersen Consluting's software products vary by application modules and hardware selected.

In March 1988, Arthur Andersen & Co. announced the availability of FOUNDATION, an integrated software development environment designed to support and automate the entire life cycle of application software development. FOUNDATION supports the planning, design, installation, and maintenance of mission critical applications for IBM DB2 systems.

- FOUNDATION's components include the following:

  - METHOD/1™ is the PC-based, on-line, life cycle methodology that supports information planning, custom and iterative development, packaged systems implementation, and product systems support. METHOD/1 can be tailored to meet an organization's requirements for project management, work planning, estimating, scheduling, and change management.

    - METHOD/1 requires at least an IBM PC, XT, or AT with 20 mbyte hard disk, 512K of main memory, a system printer, and DOS Version 2.1 or later.

    - METHOD/1 is priced at $50,000 for a single site. There are currently 535 installations.

  - DESIGN/1™ is a PC-LAN-based set of software tools that automates systems design tasks and techniques to improve productivity and design quality. DESIGN/1 is used by analysts and designers to develop data flow diagrams, paint screens and reports, and for conversational prototyping. The product is mouse-driven, provides an easily followed menu-driven structure, and facilitates the sharing of design data. DESIGN/1 supports the activities of METHOD/1 and can be customized to support other methodologies.

    - DESIGN/1 requires at least an IBM PC with two 360K disk drives, IBM XT or AT, or compatibles, 512K of main memory, and DOS Version 2.1 or later.

    - DESIGN/1 is priced at $7,000 for the first site and $43,000 for a site with 40 users.

- There are currently 5,000 DESIGN/1 installations.

- INSTALL/1™ is the mainframe environment for implementation and support of applications based on CICS, COBOL II, and DB2. It contains an extensible, active data repository built on IBM's DB2 relational data base system. INSTALL/1 provides facilities that assist in screen and dialogue design, program generation, test data management, data and data base administration, and support of production systems. Design data can be uploaded from DESIGN/1 to INSTALL/1's data repository.

  - INSTALL/1 runs on IBM and compatible mainframes under MVS/XA, DB2, CICS, TSO/ISPE, COBOL II, or OS COBOL.

  - INSTALL/1 is priced at $200,000 for a single site. There are currently 15 installations.

- There are currently over 650 FOUNDATION clients.

- The firm estimates that worldwide revenues from FOUNDATION reached approximately $28 million in fiscal 1988 and anticipates that fiscal 1989 revenue from FOUNDATION will reach $57 million.

ASSIST (A Shared Solution In Software Technology) is a user's group that combines the four previous user's groups-- MAC-PAC, METHOD/1, DCS, and System/38 users--into one.

- The purpose of this organization is to provide feedback to Andersen Consulting in an effort to guide future development activities.

- Assist membership is open to any licensed user of Andersen Consulting software products worldwide.

Industry Markets

Andersen Consulting's fiscal 1988 revenue was derived approximately as follows:

Manufacturing and industrial products	22%
Consumer products	19%
Federal government	14%
Banking	13%
Insurance	6%
Capital markets	6%
Health care	5%
Utilities	5%
State and local government	5%
Telecommunications	1%
Energy and gas	1%
Other	3%
	100%

Geographic Markets

Approximately 57% of Andersen Consulting's fiscal 1988 revenue was derived from the U.S.; 32% from Europe; 7% from Japan, Australia, and the Pacific Basin; 2% from Mexico and Central and South America; 1% from Canada and Bermuda; and 1% from the Middle East, Africa, and India.

Andersen Consulting has 41 offices in the U.S. and Puerto Rico.

Andersen Consulting has 61 international offices.

Computer Hardware and Software

Andersen Consulting has the following computers installed in support of its professional staff:

- IBM 3090, 3081, 4381, 9370, System/38, and AS/400 systems.
- DEC VAX 6220, 6310, and MicroVAX systems.
- Symbolics systems.
- Wang systems.
- A variety of microcomputers from IBM, Compaq, Sun Microsystems, Apple, GRID, Toshiba, and Zenith.

APPLIED INFORMATION DEVELOPMENT, INC.
823 Commerce Drive
Oak Brook, IL 60521
(312) 654-3030

Lee Munder, Chairman
Steve Holland, President
Member of the Computer Power Group
Total Employees: 350
Total Revenue, Fiscal Year End 12/31/88: $29,000,000*
Information Services Revenue: $27,550,000*

*INPUT estimate

The Company

Applied Information Development, Inc., incorporated in 1968, is a wholly owned subsidiary of the Computer Power Group Americas. It offers a range of professional services, software products, and customized turnkey systems to both cross-industry and industry-specific markets, specializing in the manufacturing, distribution, retail, insurance, and banking industries.

INPUT estimates that Applied Information's 1988 revenues reached $29 million, a 12% increase over 1987 revenue of $26 million.

Applied Information considers its major competitors to include the major accounting firms, Computer Task Group, and CAP-Gemini America (CGA).

Key Products and Services

INPUT estimates that approximately 95% of Applied Information's 1988 revenue was from professional services. The remaining 5% of revenue was from customized turnkey and hardware product sales, including an automated ink jet control system for the printing industry, developed by Applied Information's Digital Engineering Group.

Applied Information offers the following professional services:

- Project management responsibilities are assumed for full management of the entire project or parts of a project. Applied Information's Project Manager's Handbook provides guidelines for project planning and estimating, project control and management reporting, and software quality assurance.

- Training in project management and testing for both users and MIS. Customized user application training for both internally developed systems and purchased packages is also provided.

- Software testing is provided for unit, integrations, and acceptance testing using the methods defined in Applied Information's Testing Management Handbook.

- Applied Information develops, implements, and supports software Quality programs. The support staff provides requirements and design reviews, code walk-throughs, standards development, and test plan inspections.

- Metrics analysis is provided to quantify the overall quality and productivity of the MIS organization. Applied Information can also determine the Critical Metric Set, a composite set of measurements critical to the effective management of the MIS function.

- Applied Information offers specialty consulting in the areas of 4GLs, CASE, RDBMS, and AS/400 systems.

- The User Services specialty promotes user involvement throughout the project life cycle. Specific areas include requirements definition, package selection and installation, acceptance testing, documentation, installation, and project management.

- Using the Conversion Manager's Handbook, the Applied Information staff offers migration and conversion assistance.

- Other consulting services include package selection/installation, maintenance management, technical consulting, and contract services.

- Mini/microcomputer services consist of:

  - Applied Information's Digital Engineering Group provides a wide range of services related to mini/microcomputer data acquisition and control systems. Services supplied involve conceptual and detailed design of real-time systems including hardware selection, systems and applications software development, and complete system integration and testing.

- Customized turnkey systems services including engineering of boards, controllers, computers, and software to meet special application needs, on either a prototyping or production basis.

A set of coordinated handbooks and manuals addressing productivity improvement are available, including a Project Manager's Handbook, Testing Management Handbook, Project Progress Reporting System, Conversion Manager's Handbook, Personnel Evaluation Package, Program Design, and COBOL Programming Guidelines.

Applied Information markets and supports the MCS[R] (Manufacturing Control System).

- MCS modules include Distribution Requirements Planning, Resource Requirements Planning, and Capacity Requirements Planning.
- MCS runs on IBM 43xx, 308x, and compatibles under DOS/MVS.

Applied Information's JCLWTR storage and retrieval package was sold to Mobius Management Systems in 1987.

Industry Markets

Applied Information clients include Fortune 1000 and smaller firms in all industry sectors. Industries served include manufacturing, distribution, retail, banking, brokerage, insurance, utilities, communications, publishing, printing, transportation, government, and associations.

Geographic Markets

One hundred percent of Applied Information's 1988 revenue was derived from across the U.S., primarily from the Midwest.

Branch offices are located in Appleton and Milwaukee (WI), Detroit (MI), Houston (TX), Indianapolis (IN), Minneapolis/St. Paul (MN), Seattle (WA), St Louis (MO), and Cincinnati (OH).

Computer Hardware and Software

Applied Information maintains an IBM AS/400 and numerous microcomputers at its Oak Brook headquarters for internal use.

BDM INTERNATIONAL, INC.
7915 Jones Branch Drive
McLean, VA 22102
(703) 848-5000

Earle C. Williams, President
Subsidiary of Ford Aerospace
Total Employees: 3,500
Total Revenue, Fiscal Year End
12/31/88: $330,000,000*

*INPUT estimate

The Company

BDM International, Inc., established in 1960, provides professional and technical services, including a range of information systems and systems services (integration, engineeering, and design) to clients in defense, civil government, manufacturing, business and finance, and other public and private sector organizations in the U.S. and abroad.

Through July 1988, BDM operated as a public corporation. In July 1988, BDM was acquired by Ford Aerospace Corporation/Ford Motor Corporation. BDM now operates as a subsidiary of Ford Aerospace.

BDM won contracts valued at $486 million in 1988. Although BDM's revenues are no longer reported separately, INPUT estimates that BDM's 1988 revenue reached $330 million, a 5% increase over reported 1987 revenue of $314 million. A five-year revenue summary follows:

BDM INTERNATIONAL, INC.
FIVE-YEAR REVENUE SUMMARY
($ millions)

	FISCAL YEAR				
ITEM	1988*	1987	1986	1985	1984
Revenue	$330.0	$314.0	$322.2	$250.3	$191.4
• Percent increase (decrease) from previous year	5%	(3%)	29%	31%	27%

* *INPUT estimate.*

Prior to its acquisition by Ford Aerospace, BDM grew solely by self-generated business development and diversification.

BDM is a matrix management organization. Each professional staff member (which includes approximately 2,600 of the company's 3,500 employees) may play several roles, including an implicit marketing role. There is no separate marketing department.

Key Products and Services

BDM's services address client requirements in a range of application areas, including communications, information management, national security and defense, logistics, space, manufacturing modernization, energy and environment, transportation, training, and advanced technology.

- Customers typically use BDM's services to evaluate existing programs, to provide the analytical basis for policy development and decisions, to help determine requirements for new systems to meet future objectives, to test and evaluate hardware prototypes, and for other related purposes.

- BDM typically addresses client requirements by forming multidisciplinary teams having capabilities appropriate to the issues and problems involved. Capabilities in such areas as tests, experiments, designs, analyses, research, and systems integration are combined and applied as necessary to meet specific client requirements.

BDM also provides a range of information systems and services in the manufacturing industry, including the architecture, design, integration, and implementation of complex systems and networks.

Large-scale software development plays a major part in BDM's information systems and systems integration services. BDM's Software Productivity Enhancement Center (SPEC™) concept incorporates and combines computer-aided software engineering, artificial intelligence, and desktop publishing tools and techniques, enabling the company to produce large quantities of software rapidly.

Contract awards include the following:

- During 1988, BDM was awarded a $10 million contract with NASA to support the space agency's Astrophysics Division.

- Also during 1988, BDM was awarded a contract to provide scientific, engineering, and technical assistance (SETA) support to the Strategic Defense Initiative Organization. The potential value of the contract is $47.8 million.

- In early 1989, BDM was awarded a $52 million, eight-year contract from the Securities and Exchange Commission (SEC) to build an electronic disclosure system that will computerize the receipt, processing, and dissemination of SEC information. BDM is acting as the prime contractor, with a team of three other firms, for the new automation program, called Electronic Data Gathering, Analysis, and Retrieval (EDGAR).

Industry Markets

The majority of BDM's revenue is derived from contracts with the federal government.

- In recent years, the fastest-growing sector of the company's operations has been systems integration and advanced manufacturing, applied to the needs of both commercial manufacturers and the defense industry.

- For 1987, over 87% of revenue was derived from the Department of Defense, 6% from other government agencies, 5% from commercial clients, and 2% from international sources.

- For 1986, 88% of revenue was derived from the Department of Defense, 6% from other government agencies, 3% from commercial clients, and 3% from international sources.

BDM's current clients include the Departments of Defense, Energy, and State (and their agencies and other elements); the Securities and Exchange Commission; the National Aeronautics and Space Administration; aerospace and electronics firms; automotive and heavy equipment manufacturers; overseas governments and businesses; and the financial services industry.

Geographic Markets

BDM's markets, which are largely in the continental U.S., are served through a network of Technology Centers, site facilities within or near client operations, and other offices supporting regional and local client bases.

- The largest BDM Technology Center operations are located in McLean (VA) (also the corporate headquarters site), Albuquerque (NM), Dayton (OH), Huntsville (AL), and Columbia (MD). Other Technology Centers are located in Seattle (WA), Los Angeles and Monterey (CA), Boulder (CO), and Rosslyn (Arlington) and Norfolk (VA).

- In all, there are more than 50 BDM offices worldwide.

Computer Hardware and Software

A range of mainframe, minicomputer, and microcomputer systems, networks, and workstations assist BDM in providing professional services and support to its clients.

- Fourteen large-scale DEC VAX and IBM systems are located at seven major BDM sites, networked and accessed through a variety of leased line and dial-up links. Remote access is provided via terminal or microcomputer.
- All IBM and VAX software systems and communications are supported by BDM systems analysts and communications specialists.
- Augmenting the capabilities of the interconnected corporate network are numerous specialized processors (including Sun, Artemis, Symbolics, Intellimac, and others) and peripherals, supported by comprehensive software tools, languages, packages, and systems.

BOEING COMPUTER SERVICES
2810 160th Avenue, S.E.
Bellevue, WA 98008
(206) 865-5166

Michael R. Hallman, President
Division of The Boeing Company
Total Noncaptive Employees: 3,000
Total Revenue, Fiscal Year End
12/31/88: $1.2 billion
Noncaptive Revenue: $300 million

The Company

Boeing Computer Services (BCS), a division of the Boeing Company, supplies computing resources and information services to all Boeing operating divisions, and to more than 1,500 government and commercial customers worldwide. During 1988 BCS was realigned to emphasize systems integration of government telecommunications and computer programs.

- BCS was established in May 1970 to consolidate 13 separate computing organizations within Boeing. The division began with about $250 million of computing equipment and a staff of 2,700.

- Today, BCS employs more than 11,000 people located throughout the U.S. and other countries, and manages approximately $1 billion worth of company-owned computing equipment.

BCS is currently divided into two major groups as follows:

- Information Services: BCS' current noncaptive business focuses on providing systems development and integration services to government and commercial clients. The division also provides remote computing (including supercomputing), network services, distributed processing services, facilities management services, consulting services, education and training services, and packaged software products.

- Boeing Support Group meets the information processing requirements of the Boeing Company and its operating divisions.

BCS' 1988 noncaptive revenue is estimated at approximately $300 million, a 13% increase over estimated 1987 noncaptive revenue of $266.3 million.

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Divestitures made by BCS include the following:

- In October 1988, BCS sold its Axxyz mechanical CAE/CAD/CAM software product to General Motors. Terms of the sale were not disclosed.

Of BCS' 11,000 employees, INPUT estimates that approximately 3,000 are involved in noncaptive information services activities.

BCS is a full-service vendor and thus competes with a variety of firms. However, its major competitors are:

- Computer Sciences Corporation, Electronic Data Systems, Martin Marietta Data Systems, and Unisys for government systems integration and other professional services.

- Computer Sciences Corporation, Control Data, GE Information Services, and McDonnell Douglas Information Systems Company for remote computing services.

Key Products and Services

INPUT estimates BCS' 1988 noncaptive information services revenue was derived as follows:

BOEING COMPUTER SERVICES
SOURCE OF REVENUE SUMMARY
($ millions)

SERVICE MODE	REVENUE $	PERCENT OF TOTAL
Professional services	$250.0	84%
Processing services	40.0	13%
Software products	10.0	3%
TOTAL	**$300.0**	**100%**

Professional services, contributing an estimated $250 million to BCS' 1988 noncaptive information services revenue, include systems design, development, and integration; network design and management; consulting; education and training; and facilities management.

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- During 1988, BCS was awarded the following contracts:
  - In December 1988, it was announced that BCS and AT&T Federal Systems Division won a ten-year Federal Telecommunications System (FTS2000) contract for the General Services Administration (GSA) to upgrade the entire federal government telephone system to a digital voice, data, and video communication network. The new system will serve about 1.3 million federal government employees in about 3,500 locations throughout the U.S., Puerto Rico, and the U.S. Virgin Islands.
  - BCS won a contract to design and implement a data communications network for New York City. The network will streamline and reduce the costs of the city's information services. BCS will install, test, and maintain the network, as well as provide network management training to users.
  - In July 1988, BCS was awarded a five-year contract from the Department of Labor's Bureau of Labor Statistics to provide networking, remote computing services, technical support, and training.
  - In June 1988, BCS was awarded a contract by the Internal Revenue Service to provide remote computing and technical support for several computer-based systems, including the Budget Preparation System and the Inventory Control and Distribution System used to design, print, distribute, and stock all federal income tax forms.
  - BCS, teamed with Booz-Allen & Hamilton, was selected to provide the U.S. Army Intelligence Agency with supercomputing architecture support. The BCS team will install additional computing equipment, networking, and provide systems support. The team also will develop intelligence modeling tools and application software for the Army.
- Other contracts include the following:
  - During 1987, BCS was selected to install and support supercomputer facilities for the State of Alabama and for the Western Interstate Commission for Higher Education.
  - During 1987, BCS was selected to provide the Technical and Management Information System for NASA's Space Station program.

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- Also during 1987, BCS was awarded an eight-year contract from the U.S. Air Forces Command to design and install a management information system for its headquarters operations at Fort McPherson near Atlanta (GA). BCS will integrate the new system with existing Army computer systems, and provide local area networks, 1,200 workstations, and training services.

- BCS has designed, installed, and is operating a nationwide telecommunications network for NASA. This integrated network provides voice, data, facsimile, and full motion video capabilities.

- The Westinghouse Hanford Company and BCS have a $800 million per year Operations and Engineering contract with the Department of Energy (DOEA) at the Hanford nuclear power facilities.

  - As prime contractor, Westinghouse is responsible for nuclear engineering and reactor management. BCS, as a subcontractor to Westinghouse, is providing data processing, telecommunications, and information services support for Hanford operations.

  - BCS at Richland (WA) (BCSR) has been providing services to the DOE at Hanford since 1976. Headquartered in the Richland Federal Building, BCSR employs nearly 800 people experienced in computer operations, business and scientific software development, and information services.

- Professional services facilities management (client-owned hardware) contracts accounted for an estimated $70 million in revenue during 1988.

  - During 1988, the Department of Education awarded BCS a contract to operate the central Information Technology Services facility. The facility provides data processing services to the department's 11 operating organizations. BCS will provide the computing, telecommunications, and ancillary services needed to operate the central facility.

  - Other clients include the DOE and NASA.

- Education and training services, which generated an estimated $8-10 million in 1988, include the following:

- BCS offers a catalog of over 250 computer training and management/communications courses. The courses cover a range of topics for managers, analysts, programmers, beginners, and users. Classes are regularly scheduled in Seattle, Philadelphia, and Wichita. Course videotapes can be purchased for in-house use.

- Customized training services are also available. BCS can provide complete computer training program management, including course development, on-site instruction, scheduling, and training record maintenance.

BCS' MAINSTREAM[R] processing/network services are offered from four different processing environments: interactive, remote batch, inquiry/response, and batch services. A sample of network offerings is shown in the exhibit. The four access modes of MAINSTREAM processing/network services are as follows:

- MAINSTREAM-CTS is used primarily for interactive program development, execution of interactive programs, business, decision support, and data base applications. MAINSTREAM-CTS operates on large-scale IBM hardware under the control of a BCS-enhanced version of IBM VM/370.

- MAINSTREAM-TSO is used for large volume batch processing and interactive program development. Among its many applications are data base management and reporting, financial systems, and statistical analysis. MAINSTREAM-TSO operates on large-scale IBM hardware under the control of IBM OS/MVS.

- MAINSTREAM-EKS is used primarily, but not exclusively, by the scientist, researcher, statistician, or engineer. Its batch and interactive processing modes are completely compatible, sharing the same command-based operating system and supporting utilities. MAINSTREAM-EKS operates on CDC CYBER large-scale computers under a BCS-enhanced version of NOS.

- MAINSTREAM-VSP provides specialized, high-speed computing for vector and scalar processing used in engineering, scientific, and other applications requiring the power of a supercomputer. MAINSTREAM-VSP is offered on a Cray X-MP and is accessed through the job submission and interactive facilities of the CDC environment, MAINSTREAM-EKS.

EXHIBIT

BCS NETWORK PROFILE

APPLICATION AREA/PRODUCT NAME	APPLICATION AREA/PRODUCT NAME
OPERATING ENVIRONMENT - MAINSTREAM-CTS: IBM 3081, VM - MAINSTREAM-EKS: CDC CYBER 730, 760, 825, NOS - MAINSTREAM-TSO: IBM 3084Q, OS/MVS - MAINSTREAM-VSP: CRAY XMP, COS	**CIVIL ENGINEERING** - SLOPE 2
PROGRAMMING LANGUAGES - APL - ASSEMBLER - BASIC - COBOL - COMPASS - FORTRAN - PASCAL - PL/1	**COMPUTER-BASED INSTRUCTION** - LEARN - SCHOLAR/TEACH 3
INFORMATION/DATA BASE MANAGEMENT - CICS - CREATABASE - EASYTRIEVE - FOCUS - IDMS - IMS/VS DB - INQUIRE - MODEL 204 - RAMIS II - SIR - SYSTEM 2000 - S2KDE - S2KUI	**MATHEMATICS/STATISTICS** - BCSLIB - BMDP - EISPACK - FUNPACK - LEVELTWO - LINPACK - MINOS - MINPACK - MPLIB - PDELIB - PDS-MAGEN - SAS - SIGLIB - SIGPRG - SIR - SPARSPAK - SPSS - SOL-NPSOL - VECTORPAK
BUSINESS AND FINANCE - EIS (DECISION SUPPORT)	**MECHANICAL DESIGN** - ADL PIPE - AIRBEAR - CSPICE - DYNAFLEX - NUPIPE - PHOENICS - TPIPE
ENERGY SERVICES - CREAS - EPRI - NUCLIB - PDQ7 - PROCESS - TERRALOG - VIP	**MODELING/SIMULATION** - ADINA - ANSYS - ATLAS - DYNA2D - DYNA3D - EASE2 - E3SAP - GTSTRUDL - MARC - NASTRAN - SASSI - STARDYNE - STNDA - STRUBASE
LIBRARY MANAGEMENT - SHOWCASE (AUTHOR LIBRARY) - PANVALET	**GRAPHICS/PLOTTING** - AGII/TCS - BIGS - CALCOMP - CPS-1 - DISSPLA - DI-3000 - EIS GRAPHICS - GDDM/PGF - GRAPHICS EMPORIUM - PLOTBCS - PLOTLIB - TELL-A-GRAF
COMPUTATIONAL FLUID DYNAMICS - AGPS - A488 - A502 - COSAL - FIDAP - FLUENT - PHOENICS - SALLY	

Software products offered by BCS include the following:

- BCSLIB is a general purpose mathematics and utility subprogram library that contains several hundred routines for Fortran applications. The routines cover all major areas of numerical mathematics. BCSLIB runs on Cray, IBM, CDC, DEC VAX, Apollo, SCS, NAS, and Data General mainframes and with IBM PC/XT/AT microcomputers.

- EASY5 Engineering Analysis System provides a modular approach to dynamic system model building and analysis. EASY5 runs on CDC, IBM, DEC VAX and MicroVAX, Cray, Apollo, and Floating Point Systems computers and ranges in price from $17,000 to $75,000.

- EIS[R] Executive Information Services is a fully integrated decision support system for solving complex business planning and control problems. EIS runs on IBM systems and ranges in price from $5,000 to $125,000, depending on the size of the machine.

- BOEING[R] Proposal Pricing System (PPS) is designed to help government contractors to respond quickly and competitively to the cost proposal portion of a government Request for Proposal (RFP). PPS applies rates and factors to price the resource estimates and produces the cost bid in government-specified formats. PPS runs on IBM computers and ranges in price from $7,500 to $90,000.

- Scholar/Teach[R] allows users to develop and modify computer-based instruction courses, presents the courses to students, and administers the training program. Scholar/Teach is priced at $95 (presentation only) and $1,500 (author/presentation) for IBM microcomputers and $39,500 for IBM mainframes (or $45,000 for IBM-ACP systems).

- VectorPak[TM] Subroutine Library is a set of over 150 Fortran-callable mathematical subprograms that function as program building blocks. The library offers scientific and engineering programmers the use of supercomputer assembly language, without having to resort to direct assembly language coding. VectorPak is available for Cray and SCS computers.

Industry Markets

Approximately 90% of BCS' 1988 noncaptive revenue was derived from the federal government and 10% was derived from commercial clients.

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- Government revenue is derived from various federal agencies.
- Commercial revenue is derived primarily from the manufacturing and energy industries, and from cross-industry applications.

Geographic Markets

An estimated 99% of BCS' 1988 noncaptive revenue was derived from the U.S. and 1% from international sources.

BCS has field sales offices in 12 U.S. cities - Boston, Dallas, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburg, San Francisco, Seattle, and Washington, D.C.

Computer Hardware and Software

BCS offers remote computing services on a variety of Cray, IBM, and CDC CYBER equipment. Major data centers for commercial clients are located in Vienna (VA) and Bellevue (WA).

- Vienna (VA).
  - IBM 3081, MVS, VM CMS.
  - IBM 3084, MVS.
- Bellevue (WA).
  - IBM 3081, MVS, VM.
  - CDC CYBER 730, 760 (2), 825, NOS 2.3.
  - Cray X-MP 2x4 with Solid State Disks (SSD), COS, 1.14.

Other major data centers (generally support parent operations) are located in Kent (WA), Wichita (KS), Huntsville (AL), and Philadephia (PA).

BCS operates a private telecommunications network which is available to virtually every major U.S. city and multiple international locations.

CAP GEMINI AMERICA
1133 Avenue of the Americas
12th Floor
New York, NY 10036-6710
(212) 221-7270

Robert J. Sywolski, President
and CEO
Subsidiary of CAP Gemini Sogeti
Total Employees: 2500
Total Revenue, Fiscal Year End
12/31/88: $165,000,000

The Company

CAP Gemini America (CGA) represents the U.S. division of CAP Gemini Sogeti, an international group of professional services companies.

- CAP Gemini Sogeti was formed in 1975 by joining three independent computer consulting firms: CAP, a Paris-based software and consulting firm; Gemini, an American firm founded in 1969 as Gemini Computer Systems, Inc. for supporting the establishment of software houses in Europe and the U.S.; and Sogeti, formed in 1969 to provide consulting in the design and implementation of software applications.

- Headquartered in Paris, CAP Gemini Sogeti has approximately 12,000 employees worldwide and is organized into three operational groups: CAP Sogeti France, CAP Gemini Europe, and CAP Gemini America. Combined operating revenues of the three groups reached $970 million in 1988.

CAP Gemini America was formed in January 1986 through the acquisition of the consulting division of CGA Computer, Inc., and the merger of its operations with CAP Gemini DASD.

- DASD Corporation, acquired by CAP Gemini Sogeti in January 1981, was founded in 1974 in Milwaukee (WI) as a contract programming house.

- CGA Computer, Inc., acquired in 1986, was founded in 1968 to provide consulting services for design and implementation efforts.

CGA now operates 48 branch offices in cities across the U.S.

CGA reported having $165 million in revenue during 1988, a 25% increase over 1987 revenue of $132 million. A five-year revenue summary follows:

CAP GEMINI AMERICA
FIVE-YEAR REVENUE SUMMARY
($ millions)

	FISCAL YEAR				
ITEM	1988	1987	1986	1985	1984
Revenue	$165.0	$132.0	$93.0	$69.0	$50.0
• Percent increase from previous year	25%	42%	35%	38%	16%

Recent acquisitions made by CGA include the following:

- In January of 1989, CGA acquired CompAct Data Systems of Canoga Park (CA).
  - CompAct Data Systems is a leader in DOS to MVS system conversions. CompAct Data Systems provides a range of conversion services, from determining analysis requirements to implementation and training.
  - INPUT estimates CompAct Data Systems employed 100 people at the time of the acquisition.
- In December 1986, CGA acquired Sycomm Systems Corp., a New Jersey-based consulting and computer services firm.
  - In 1986, Sycomm Systems Corp. reported that it employed 300 people who generated $18 million in revenue that year.

CGA reports that as of December 31, 1988 the company had 2,571 employees. CGA further states that 2,134 of its employees, or approximately 83%, are consultants.

CGA competes with professional services companies throughout the U.S.

Key Products and Services

CGA considers its specialty to be system conversion and applications development.

One hundred percent of CGA's revenue is derived from Professional and Systems integration services. CGA services and their percent revenue contributions are as follows:

Contract programming	55%
System conversion	10%
System development	10%
Information technology consulting	10%
Systems integration	5%
Training/education	5%
Documentation	5%
	100%

Some recent contracts completed by CGA include:

- System conversion from HP-3000 to MVS for a health insurance company located in the Southwest.
- System conversion from an IBM 3081 & 4381 to an IBM System/38 for a midwestern chemical manufacturer.
- System conversion from a DEC 10 to an IBM 3090 XA for a midwestern insurance company.
- System conversion from a Honeywell L/66 to an IBM 3090 for an insurance company located in the South.

Industry Markets

CGA derived its 1988 revenue from the following industry sectors:

Services	25%
Communications	22%
Finance	19%
Insurance	12%
Manufacturing	11%
Government	7%
Other	4%
	100%

Geographic Markets

CGA derived 100% of its 1988 revenue from the U.S.

CGA is organized into two areas with 11 regions and 48 branch offices.

- The North Area has the following regions serving the northern U.S.:

- Midstates Region serving Denver to St. Louis
- Midwest Region serving Chicago to Kansas City
- Northcentral Region serving the north-central U.S., with its main offices in Minneapolis and Milwaukee.
- Northeast Commercial Region serving the New York and New Jersey commercial interests.
- Northeast Communications Region serving the New York and New Jersey communications interests.
- Northeast Financial Region serving the financial interests of New York and New Jersey.

• The South Area has the following regions serving the southern U.S.:

- Central Region serving the south-central U.S. with offices in Dayton and Cleveland (OH).
- Mid-Atlantic Region serving the coastal states from Philadelphia to Wilmington.
- South Region serving the southern U.S. with offices from Orlando to Atlanta.
- Southwest Region serving the southwestern U.S. with offices in Dallas and Houston.
- West Region serving the western U.S. with offices from Seattle to Los Angeles.

Computer Hardware and Software

CGA has IBM personal computers installed at all offices for internal use.

COMP-U-STAFF, INC.
One Investment Place
Towson, MD 21204
(301) 828-0788

Kathleen Cornell, President and CEO
Wholly Owned Subsidiary of
ADIA Services, Inc.
Total Employees: 600
Total Revenue, Fiscal Year End
12/31/88: $34,000,000

The Company

Comp-u-Staff, Inc., established in 1978, provides professional services to Fortune 1000 companies.

- On January 12, 1988, Comp-u-Staff was acquired by ADIA Services, Inc. ADIA Services supplies temporary office, word processing, accounting, financial, and health personnel nationwide.

- On October 12, 1988, ADIA Services purchased Computer Dynamics, a professional services firm based in Detroit (MI). Computer Dynamics had revenue of approximately $15 million in 1988. It now operates as a division of Comp-u-Staff.

Total 1988 revenue reached $34 million, a 113% increase over 1987 revenue of $16 million. Of the $34 million in 1988 revenue, $15 million was derived from Computer Dynamics.

As of January 1989, Comp-u-Staff had approximately 600 employees.

Comp-u-Staff's major competitors include Computer Task Group, CAP Gemini America, and Analysts International.

Key Products and Services

One hundred percent of Comp-u-Staff's 1988 revenue was derived from professional services.

Comp-u-Staff's professional services include:

- Management consulting
- Custom application and systems software development
- Training and documentation

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Comp-u-Staff provides the following types of information management systems:

- Accounting and financial reporting
- Banking and insurance applications
- Manufacturing and distribution

Industry Markets

Comp-u-Staff targets its professional services to the Fortune 1000 companies, including firms in the banking, insurance, manufacturing, and retail industries.

Clients include Hershey Foods, SUN, National Liberty, Blue Cross of Washington and Alaska, USF&G Insurance, MNC Financial, Weyerhaeuser, Airborne Express, Northwest Airlines, Blue Cross/Blue Shield of Maryland, McCrory Stores, Mellon Bank, and USX.

Geographic Markets

One hundred percent of Comp-u-Staff's 1988 revenue was derived from the U.S.

Comp-u-Staff has 17 offices nationwide located in Atlanta (GA); Baltimore (MD); Central Pennsylvania; Cleveland (OH); Minneapolis (MN); Philadelphia and Pittsburgh (PA); Portland (OR); St. Louis (MO); Seattle (WA); Washington DC; Wilmington (DE); Dallas and Houston (TX); Detroit (MI); and Ft. Lauderdale and Tampa (FL).

Computer Hardware and Software

Comp-u-Staff has an HP 3000 installed for internal use.

COMPUTER HORIZONS CORPORATION
747 Third Avenue
New York, NY 10017
(212) 371-9600

John J. Cassese, Chairman and President
Public Corporation, OTC
Total Employees: 1,185
Total Revenue, Fiscal Year End
12/31/88: $79,150,000

The Company

Computer Horizons Corporation, incorporated in New York in 1969, provides professional and systems integration services primarily to Fortune 500 firms in the industrial/manufacturing, communications, and financial services industries. Computer Horizons also offers several systems software products for DB2 users and a trust processing and accounting product.

During early 1989, Computer Horizons reorganized its operations into three divisions as follows:

- The Professional Services Division provides Computer Horizons' systems development, contract programming, and education and training business.
- The Relational Strategies Division markets various DB2 systems software products and application software for trust accounting.
- The Systems Integration Division teams with other information services firms to provide integration support services.

Effective February 1988, Computer Horizons changed its fiscal year end from February 28 to December 31, bringing the company's fiscal year in line with other computer professional services firms.

Computer Horizon's calendar 1988 revenue reached $79.1 million, a 12% increase over calendar 1987 revenue of $70.6 million. Income before the cumulative effect of a change in accounting for employee recruitment costs reached nearly $2.3 million or $0.85 per share. A five-year financial summary follows:

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COMPUTER HORIZONS CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	12/88	12/87	2/87	2/86	2/85
Revenue (a)	$79,150	$70,606	$58,034	$50,303	$44,096
• Percent increase from previous year	12%	22%	15%	14%	29%
Income before taxes	$4,009	$4,401	$4,523	$4,550	$4,108
• Percent increase (decrease) from previous year	(9%)	(3%)	(1%)	11%	(9%)
Net income	$2,273 (b)	$2,244	$2,186	$2,211	$2,019
• Percent increase (decrease) from previous year	--	3%	(1%)	10%	(10%)
Earnings per share	$0.85 (b)	$0.84	$0.83	$0.86	$0.78
• Percent increase (decrease) from previous year	--	1%	(3%)	10%	(14%)

(a) Certain results prior to calendar 1987 have been reclassified to conform with current presentations.

(b) Before a charge of $961,000 ($0.36 per share) from the cumulative effect of a change in accounting principals associated with employee recruitment costs.

Operating results for 1988 were less than anticipated, primarily because of the premature termination of two sizable consulting projects early in the third quarter.

Revenue for the six months ending June 30, 1989 reached nearly $40.5 million, a 4% increase over $38.9 million for the same period in 1988. Net income totaled $513,000, compared to $1.4 million for the same period a year ago.

- Computer Horizons experienced reduced revenue from the communications sector, though financial services and industrial revenues grew.

- Although revenue from the Midwest region grew, revenue from the Mid-Atlantic and Southern regions experienced weakness.

Acquisitions made by Computer Horizons include the following:

- In May 1989, Computer Horizons acquired the Professional

Computer Consulting Services Division of Kearns & Melloy Associates, Inc.

- The division, with approximately 50 employees, provides software development and consulting professional services to the brokerage industry and other financial services firms.

- In October 1988, Computer Horizons acquired CompTech of Hartford (CT).

  - CompTech, with approximately 35 employees at the time of the acquisition, is a professional services firm specializing in relational data base management.

  - The operations of CompTech have been merged into Computer Horizons.

- In June 1988, Computer Horizons completed the acquisition of Technical Resources Group Inc. (TRG) of Plymouth Meeting (PA).

  - TRG, with approximately 25 employees at the time of the acquisition, is a software development and consulting professional services firm. Its work has been primarily performed in IBM and DEC environments and in markets consisting of major chemical, financial services, and pharmaceutical companies.

  - The operations of TRG have been merged into Computer Horizons and have expanded the company's services in its Mid-Atlantic Region.

As of December 1988, Computer Horizons had 1,185 employees, segmented as follows:

Sales and technical client support	87
Consultants	982
Recruiters	37
General and administrative	66
Executives	13
	1,185

The company currently has 1,250 employees.

Major competitors include AGS Computers (NYNEX), Computer Task Group, Keane, and Analysts International.

Key Products and Services

Approximately 90% of Computer Horizons' 1988 revenue was derived from its various professional services and 10% from systems integration activities. During 1988, Computer Horizons provided its services to 435 clients.

A further breakdown of 1988 revenue follows:

Professional services	
- Software development	67%
- Network development	9%
- Consulting	9%
- Education and training	5%
	90%
Systems integration	10%
	100%

Computer Horizon's core services include systems analysis, design, programming, and implementation. These services are supplemented by consulting and education and training.

- The company's consulting skills have been used to perform such tasks as business planning and management, data base audit, data communications and network planning, and design review and system assurance. Computer Horizons also makes recommendations with respect to the selection and use of data processing equipment and personnel to meet the client's objectives.

- Computer Horizons has designed major systems for, among other functions, cash management, insurance claim processing, demand deposit accounting, and electronic switching.

- Computer Horizons' programming and implementation services may range from coding, testing, and documentation of specific programs within a project, to total responsibility for a project, or management of a client's programmers. The company is also actively involved in data base management and communications and networking.

- Computer Horizons designs custom courses and seminars for clients' internal staffs, addressing subjects such as techniques of analysis, design, programming, and implementation; documentation; management techniques and supervisory skills; an introduction to data processing and various computer languages; as well as advanced training on a continuing education basis. Services are provided to clients in both microcomputer and mainframe environments.

- ComputerKnowledge, acquired by Computer Horizons in 1987, is a software training and education services firm based in Dallas.

Projects performed by Computer Horizons include the following:

- Computer Horizons particpated in the production of an image and document distribution system for intracompany information handling for AT&T. The system uses network technology to transfer data between various computers and image processing nodes. The UNIX- and C-based system is configured with Sun, DEC/VAX, and AT&T hardware.

- Computer Horizons assumed total project responsibility for the development of an integrated processing environment for National Cleaning Contractors (NCC), one of the largest commercial building maintenance firms in the U.S.

  - An IBM AS/400 is replacing a System/38 to link NCC human resource systems, budgets, billing, building profiles, escalation variances, and system security.

  - Tasks being performed by Computer Horizons at NCC regional centers include requirements definition, functional analysis, detail program specifications, programming, implementation, documentation, user manuals, and user training.

- Computer Horizons assumed total responsibility for the evaluation and selection of a Broadband LAN to connect over 500 microcomputers and several processors for a major Ford Motors assembly plant.

  - Computer Horizons supervised the hardware implementation, support of all peripheral devices, user training, and network perfomance testing.

  - The system, with video capability and Ethernet via LAN bridges, runs on IBM PCNET with ASCII gateways to DEC, Burroughs, and Prime processors.

- In support of Chrysler's Service Bay Systems Project, Computer Horizons developed a 10,000-line C program (which runs under Microsoft Windows and displays text and icon outlines) that assists service car repair technicians by producing visual flow charts of the specific job to be done.

- In support of TIME's plans to build several critical DB2-based

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systems, Computer Horizons managed the conceptual and logical data modeling and development of an enterprise data model. The systems were implemented on an IBM 3090 under MVS/EAS.

- Computer Horizons provided training to TIME staff and provided a team to effect the physical implementation of DB2 data bases and performance tuning of DB2.

Computer Horizons also provides systems integration services and has alliances with various vendors, including Ernst and Young, IBM, and Hoskyns Group.

Computer Horizons' Relational Strategies Division was created to help clients use strategic data planning as part of a corporate planning process. Products/services available include the following:

- Enterprise architecture planning
- High-level relational consulting
- Data interpretation systems
- Imaging
- Systems integration

Industry Markets

Computer Horizons' business mix has changed significantly since 1986. A three-year summary of source of revenue follows:

COMPUTER HORIZONS CORPORATION
THREE-YEAR SOURCE OF REVENUE SUMMARY
($ millions)

	FISCAL YEAR					
	12/88		12/87		2/87	
MARKET	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
Industrial/manufacturing	$40.3	51%	$31.1	44%	$22.8	39%
Communications	26.6	34%	24.4	35%	19.0	33%
Financial services	12.3	15%	15.1	21%	16.2	28%
TOTAL	**$79.2**	**100%**	**$70.6**	**100%**	**$58.0**	**100%**

- The improved performance of the industrial/manufacturing market segment has been particularly impacted by the

company's strength in the Midwest.

- The communications market segment includes approximately $19.6 million, $17.7 million, and $13.2 million from AT&T for calendar 1988, 1987, and fiscal 1987, respectively.

  - Revenues from AT&T, which contributed approximately 25% to Computer Horizons' total 1988 revenue, are generated through approximately 75 different contracts and engagements in 16 different locations, with 12 different AT&T divisions and subdivisions. AT&T will only contribute an estimate 15% to 1989 revenue.

- Financial services revenues have declined due to the difficulties experienced by the brokerage/banking industry in the aftermath of the late 1987 crash. It is anticipated that Computer Horizons will see a material improvement in that market during 1989.

Geographic Markets

One hundred percent of Computer Horizons' 1988 revenue was derived from the U.S.

Computer Horizons has a total of 31 offices in the following cities: Albany and New York (NY); Arlington (VA); Atlanta (GA); Boston (MA); Charlotte and Raleigh (NC); Chicago (IL); Cincinnati, Cleveland, and Columbus (OH); Dallas and Houston (TX); Detroit (MI); Denver (CO); Hartford and Norwalk (CT); Los Angeles and San Francisco (CA); Louisville (KY); Miami, Orlando, and Tampa (FL); Minneapolis (MN); Parsippany (NJ); Philadelphia (PA); and Phoenix (AZ).

Software instruction/training centers are located in Dallas and Chicago.

COMPUTER SCIENCES CORPORATION
2100 East Grand Avenue
El Segundo, CA 90245
(213) 615-0311

William R. Hoover, Chairman and President
Public Corporation, NYSE, PSE
Total Employees: 20,500
Total Revenue, Fiscal Year End
3/31/89: $1,304,414,000

The Company

Computer Sciences Corporation (CSC), founded in 1959, is the largest independent professional services company in the industry. Serving government and commercial clients, CSC provides management consulting in information technology, requirements analysis, software development, systems engineering and integration, turnkey computer-communications systems, and facilities management services. The company also provides industry-specific proprietary products and services for credit reporting, claims processing, health maintenance organizations, and income tax preparation.

CSC management has set the objective of becoming one of the top two or three companies in the commercial markets for consulting, systems integration, and related professional services in the U.S. and Europe in the next five years.

- Its strategies are to maintain its dominant position in the U.S. federal marketplace (which contributed 71% to fiscal 1989 revenue), while expanding its market share in non-federal markets through internal growth and acquisitions.

- To position itself for a leading role in the commercial marketplace, CSC has expanded its consulting and implementation capabilities, established a branch-office structure, begun the transfer of technology gained in large federal system projects to its commercial organization, and earmarked $500 million for investment in acquisitions.

Fiscal 1989 revenue reached $1.304.4 million, a 13% increase over fiscal 1986 revenue of $1,152.4 million. Net income for fiscal 1989 was nearly $52.5 million, a 21% increase over net income of $43.5 million for fiscal 1988. In the five-year summary that follows, financials include results of businesses acquired from their respective dates of acquisition as well as the results of businesses sold up to the date of their divestiture:

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COMPUTER SCIENCES CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	3/31/89	4/1/88	4/3/87	3/28/86	3/29/85
Revenue	$1,304,414	$1,152,351	$1,031,459	$838,587	$723,492
• Percent increase from previous year	13%	12%	23%	16%	2%
Income before taxes	$84,464	$71,351	$58,096	$42,764	$41,057
• Percent increase from previous year	18%	23%	36%	4%	35%
Net income	$52,482	$43,524	$32,243	$23,948	$27,718
• Percent increase (decrease) from previous year	21%	35%	35%	(14%)	52%
Primary earnings per share	$3.28	$2.73	$2.08	$1.69	$2.02
• Percent increase (decrease) from previous year	20%	31%	23%	(16%)	53%

Recent acquisitions made by CSC include the following:

- In June 1989, CSC completed the acquisition of CIG-Intersys Group and its subsidiaries from Societe Generale de Belgique, S.A. and Generale de Banque, S.A. Terms of the cash transaction were not disclosed.

  - Based in Brussels, CIG is the largest information services company in Belgium, with 1988 revenues of approximately $85 million, exclusive of an electronic banking network service not included in the acquisition.

  - CIG, with approximately 1,000 employees at the time of the acquisition, provides consulting, systems integration, software, computer facilities management, and related services. Its major markets include the banking, insurance, transportation, and distribution industries.

  - The acquisition, which more than doubles the volume of CSC's European revenues, is viewed by CSC management as key to achieving a dominant position in European markets for information technology.

- CSC will consolidate its Belgian operations with those of CIG.

- In April 1989, CSC acquired Seako, Inc. of Birmingham (AL). Terms of the acquisition were not disclosed.

  - Seako specializes in IBM-based software products for medical groups, managed health care organizations and private practices and is a value-added reseller of IBM equipment.

  - Seako has annual revenues of approximately $7 million.

  - Seako now operates as a wholly owned subsidiary of CSC in close connection with CSC Comtec, which provides similar services.

- In October 1988, CSC acquired Index Group, Inc. of Cambridge (MA). Terms of the purchase were not disclosed.

  - Index Group provides strategic planning, consulting, education, and research services in the use and management of information technology to large corporations.

  - At the time of the acquisition, Index Group had annual revenues of about $30 million and approximately 140 employees at its Cambridge headquarters and offices in Los Angeles and London.

  - Index Group now operates as a wholly owned subsidiary of CSC within CSC's Consulting Group.

Divestitures announced by CSC include the following:

- In March 1989, CSC sold its CSC Compufact subsidiary to Madic Corporation of Santa Clara (CA). Terms of the sale were not disclosed.

  - Based in Garden Grove (CA), CSC Compufact provides turnkey systems and professional services to manufacturers.

  - The sale of CSC Compufact resulted from CSC management's decision to serve the manufacturing market on a hardware-independent basis through its Consulting Group.

- In January 1989, CSC sold a majority interest in its INFONET subsidiary (Network Services business unit) to a group of

European and Pacific Basin telecommunications administrations to strengthen INFONET's position as a leading international communications service for the interconnection of national public data networks around the world.

- CSC will remain the largest single shareholder of INFONET and will continue to build on INFONET's network capabilities in its systems integration activities.

- As a result of the sale, beginning in the fourth quarter of fiscal 1989, CSC accounts for its share of INFONET earnings on an equity basis.

In August 1988, CSC signed an agreement with Equifax, Inc. under which Credit Bureau Incorporated of Georgia (CBI), a wholly owned subsidiary of Equifax, will supply data processing for CSC Credit Services' credit reporting operation.

- CSC has converted its more than 110 million consumer credit files to CBI's computer system to create a joint national consumer credit file from which both companies can sell reports to credit grantors, with CBI performing the processing.

- CSC Credit Services continues to own its credit files and receives all revenues from the sale of the credit information they contain. CSC pays CBI a processing fee for each report supplied to a credit grantor.

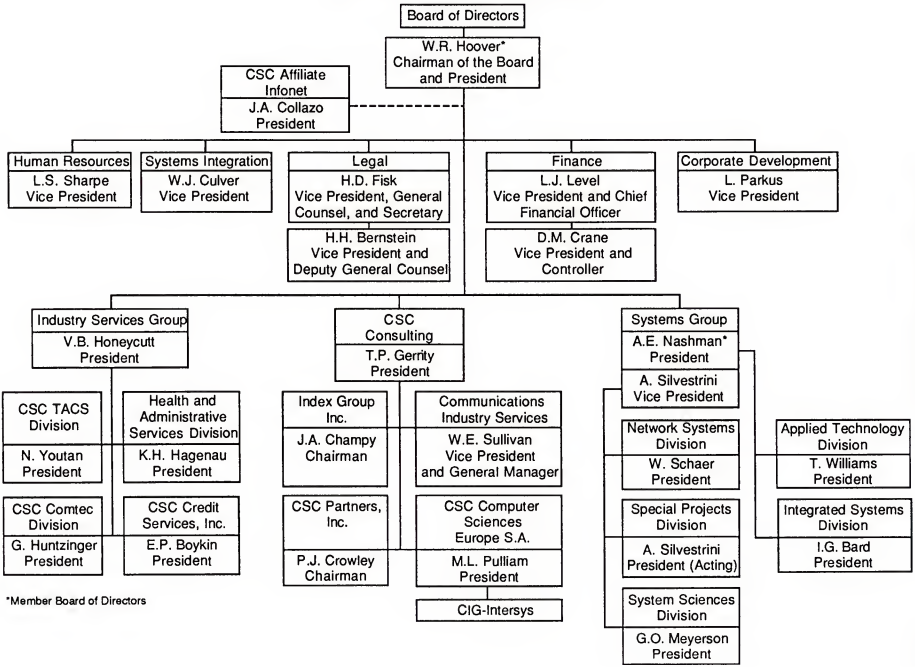
- CSC continues to own and operate its credit bureaus and collection agencies and provides all processing services for the collection agencies.

- The agreement also gives CSC a 25-year option, exercisable on March 25, 1991, to sell CSC Credit Services to Equifax at a price based on certain terms, but for not less than $365 million during the first seven years.

- CSC management's current objective it to continue building its CSC Credit Services business. The agreement with Equifax offers expanded market potential, cost benefits, and improved profit performance.

CSC's organization structure is shown in the exhibit. The company currently provides its products and services through three operating groups:

EXHIBIT
Computer Sciences Corporation



*Member Board of Directors

- The Systems Group, headquartered in Falls Church (VA), is the company's primary resource for computer and communications technology. Its five divisions, which primarily serve the U.S. government, include the following:

  - The Integrated Systems Division
  - The System Sciences Division
  - The Network Systems Division
  - The Special Projects Division
  - The Applied Technology Division

- CSC Consulting, headquartered in Cambridge (MA), is the counterpart of the Systems Group in the commercial marketplace. This unit consists of the following units:

  - Index Group, Inc.
  - CSC Partners, Inc.
  - Communications Industry Services
  - CSC Computer Sciences Europe S.A.

- The Industry Services Group, headquartered in El Segundo (CA), provides specialized services to specific industries and markets through several divisions and wholly owned subsidiaries. This group combines three former "business units" as follows:

  - "Health and Insurance Systems"

    - Health and Administrative Services Division
    - CSC Comtec Division
    - Seako, Inc.

  - "Credit Services"

    - CSC Credit Services, Inc.

  - "Complementary Services"

    - CSC TACS Division

- In addition, CSC maintains close ties to INFONET Services Corporation, an affiliated company that provides communications and computer services worldwide. INFONET is jointly owned by CSC and the telecommunications administrations of several European and Australasian countries.

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A three-year summary of source of revenue follows:

CSC SOURCES OF REVENUE
($ millions)

	FISCAL YEAR		
ITEM	3/31/89	4/1/88	4/3/87
Systems Group			
- Federal government	$863.9	$694.2	$617.1
- Commercial	9.6	14.5	8.7
- State & local government	3.9	4.7	5.8
- International	3.7	12.6	15.0
Subtotal	**$881.1**	**$726.0**	**$646.6**
CSC Consulting			
- Federal government	$2.4	--	--
- Commercial	80.9	51.7	31.8
- State & local government	1.8	3.8	9.6
- International	58.7	60.9	41.2
Subtotal	**$143.8**	**$116.4**	**$82.6**
Health and Insurance Systems (a)			
- Federal government	$29.2	$33.0	$34.2
- Commercial	18.9	16.4	13.9
- State & local government	31.3	51.6	65.7
Subtotal	**$79.4**	**$101.0**	**$113.8**
Credit Services (a)			
- Federal government	$0.7	--	--
- Commercial	110.2	101.8	86.6
Subtotal	$110.9	$101.8	$86.6
Complementary Services (a)(b)			
- Commercial	$25.5	$26.2	$21.2
Network Services (c)			
- Federal government	$25.2	$39.3	$43.0
- Commercial	22.4	23.6	22.0
- State & local government	0.1	0.2	0.5
- International	16.0	17.9	15.2
Subtotal	**$63.7**	**$81.0**	**$80.7**
Total Revenue	**$1,304.4**	**$1.152.4**	**$1,031.5**

(a) These units are now part of the Industry Services Group. Beginning in fiscal 1990, the results of these businesses will be reported by group only.

(b) Includes the results of CSC Compufact, which was sold in March 1989.

(c) Includes the results of INFONET only for the first three quarters of fiscal 1989. Future earnings from this business will be accounted for under the equity method.

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In terms of absolute dollars, the principal revenue growth area of CSC over the last three years has been in the Systems Group, which increased 21% to $881.1 million in fiscal 1989, 12% to $726 million in fiscal 1988, and 17% to $646.6 million in fiscal 1987. Federal government revenue growth during fiscal 1989 reflected the award of several large service contracts. Revenue growth during fiscal 1988 resulted principally from increased business with civil and scientific agencies.

- CSC Consulting is experiencing the fastest rate of growth, with a 24% increase in revenue during fiscal 1989. This growth reflects the continued expansion of domestic operations and six months of operations of Index Group, Inc., which was acquired in September 1988. During fiscal 1988, revenue increased 41% due to growth in both European and domestic markets.

- Industry Service Group revenue declined 6%, from $229 million in fiscal 1988 to $215.8 million in fiscal 1989. Results were attributed to the following:

  - Credit Services revenue rose 9% during fiscal 1989 to $110.9 million, 18% during fiscal 1988 to $101.8 million, and 49% during fiscal 1987 to $58.1 million. The growth in the three-year period reflects increases in ongoing consumer credit services together with acquisitions.

  - Health and Insurance Systems revenue of $79.4 million in fiscal 1989 reflects a decrease of 21% from the prior year, due primarily to completion of a major Medicaid contract with the state of California in early fiscal 1989. Revenue in fiscal 1988 declined 11% from fiscal 1987 due to reductions in Medicaid business. Health and Insurance Systems' revenue is expected to increase during fiscal 1990, due primarily to work recently begun on a large contract with the state of New Jersey in the area of automobile insurance.

  - In the Complementary Services area, revenue was unchanged from fiscal 1988 to 1989. Results include CSC Compufact, which was sold by CSC in March 1989.

- Network Services revenue of $63.7 million for fiscal 1989 represents only nine months of operations due to the sale of a majority interest in INFONET in January 1989, as compared with approximately $81 million from full-year operations in both fiscal 1988 and 1987. INFONET revenue for the fourth quarter of fiscal 1989 is not included in CSC's total revenue and future INFONET revenue will be accounted for under the equity method.

As of August 1989, CSC had approximately 20,500 employees segmented as follows:

Systems Group	71%
CSC Consulting	13%
Industry Services Group	15%
Other	1%
	100%

Major competitors by primary service/product area, include the following:

- Federal government professional services: TRW, Hughes Aircraft, IBM, Planning Research Corporation (PRC), General Electric, AT&T, Unisys and Ford Aerospace & Communications Co.
- Commercial professional services: Andersen Consulting, Electronic Data Systems (EDS), and IBM.
- Medicaid claims processing: Blue Cross/Blue Shield and EDS
- Credit reporting service: TRW Information Services and TransUnion
- Health care systems: Jergovan and Blair, Inc.

Key Products and Services

The Systems Group is the company's primary provider of technical services to the federal government. Services provided include systems engineering and integration, the development of custom-designed computer-based systems and communications systems, operational support of clients' technical activities, clients' computer facilities management, and turnkey system development.

- The Systems Group consists of five units:
  - The Integrated Systems Division, based in Moorestown (NJ), designs, implements, and integrates systems for office automation, digital imaging, administrative and engineering support, and for military uses such as weapons control, logistics, wargaming, and command, control, and communications (C^3I). The division was formed by consolidating CSC's former Defense Systems, Systems, and Systems International divisions.
  - The System Sciences Division, headquartered in Calvert (MD), provides systems engineering, analysis, software

development, and end-to-end integrated data systems and services primarily to aerospace clients such as NASA and the FAA.

- The Network Systems Division, headquartered in Falls Church (VA), designs and builds communications networks and real-time telemetry systems for military and civil agencies of the government.

- The Special Projects Division, headquartered in Falls Church (VA), performs high-level technical management projects, known as systems engineering and technical assistance (SETA), for the government. The division also performs research and development in systems and software technologies, and special activities in signal processing, communications systems, and information processing.

- The Applied Technology Division, headquartered in Fall Church (VA), provides facilities management services, primarily for NASA; provides operations and maintenance services to aircraft and weapons test centers; and provides software development support to federal agencies.

• Recent system integration contract awards include the following:

- In August 1989, the Navy's Pacific Missile Test Center awarded CSC a $14.1 million contract to provide four real-time telemetry processing systems for in-flight engineering analyses of aircraft and weapon systems.

- In March 1989, CSC was awarded a $22.7 million, five-year contract from the Defense Communications Agency to assist in upgrading the command, control, and communications systems of the U.S. Transportation Command, which is responsible for providing global land, sea, and air transport to the Defense Department. CSC will provide a master plan and system architectures, and perform systems integration and other activities.

- In December 1988, CSC was awarded a $106 million, eight-year contract from the U.S. Marine Corps to provide integration support services for Marine Corps headquarters and three other sites. Tasks include requirements definition, systems analysis and design, programming and test of new application software, and maintenance of existing software.

- In December 1988, CSC was awarded a $111 million, seven-year contract from the U.S. Air Force Military Airlift Command to supply an integrated command and control information processing system. CSC will supply the hardware and software, and install the system at the Air Force command's worldwide facilities.

- Under a $140 million contract awarded in June 1986, CSC is currently developing a stock control and distribution system for the Air Force Logistics Command.

- Under a $300 million contract awarded in August 1985, CSC is currently developing a large, secure, packet-switch network for the U.S. Treasury Department. Known as the Consolidated Data Network, the network serves thousands of users in the U.S. Customs Service, Internal Revenue Service, Bureau of Alcohol, Tobacco and Firearms, and other Treasury operations. The contract calls for CSC to develop and operate the network over an eight-year period.

• Other recent contract awards include the following:

- In April 1989, CSC won a $62 million, five-year contract from the Naval Surface Warfare Center (Dalgren, VA) to provide technical and engineering services to support the Aegis weapon system. CSC has been the software engineering contractor for Aegis throughout its development and production.

- In January 1989, CSC won a $47 million, five-year recompete (of work performed since 1976) from the Federal Aviation Administration (FAA), Pomona (NJ), for the production of software for the current en-route air traffic control system. CSC will also develop new capabilities for the system, including automated advisories to assist air traffic controllers to prevent accidents.

- CSC is a member of the AT&T team selected in December 1988 to replace the federal government's current telecommunications system. Known as FTS2000, the program will provide government agencies with an integrated system for voice, data, and video services. CSC will provide a billing system and other software services for FTS2000. Both CSC's Systems Group and its Communications Industries Services unit are engaged in the FTS2000 program.

- In December 1988, CSC won a $52 million, seven-year contract from NASA Ames Research Center for operation, planning, and development services in support of NASA's supercomputer facilities. The work involves the Numerical Aerodynamic Simulation (NAS) system.

- In July 1988, CSC-Pan Am Kauai--a joint venture of CSC (managing partner), Pan American World Services, and EC Corp.-- was awarded at $93 million, five-year contract from the U.S. Navy Pacific Missile Range Facility (Kauai) to provide operations and maintenance of the Pacific Missile Range Facility, used for evaluation and test of air, surface, and subsurface weapons.

- In July 1988, CSC, teamed with IBM, was selected by the FAA to develop the Advanced Automation System, which will completely modernize the current air traffic control system. In work estimated at several hundred millions of dollars in value, CSC will develop and integrate software for a wide range of applications.

- In June 1988, CSR--a joint venture of CSC (managing partner) and Raytheon--was awarded a $350 million, five-year contract by the U.S. Air Force Eastern Space and Missile Center (Florida) to provide technical services to the Eastern Test Range. CSC is responsible for all of the range telemetry, radar, communications, instrumentation, data processing, and downrange base support for spacecraft and missiles launched from Kennedy Space Center and Canaveral Air Force Station.

- In January 1987, CSC was awarded a $100 million, ten-year contract to provide complete facilities management services to NASA's Slidell (LA) Computer Facility.

CSC Consulting provides management consulting, requirements analysis, system design, software development, system engineering and integration, communications systems engineering, and facilities management for non-federal organizations worldwide.

- These activities are performed by the following units:

  - CSC Partners Inc. (formerly Computer Partners, Inc.) is a wholly owned subsidiary based in Waltham (MA).

  - Communications Industry Services, based in Piscataway (NJ), specializes in services to telephone companies.

- Index Group, Inc., based in Cambridge (MA), specializes in consulting and management educational services.

- CSC Computer Sciences Europe S.A., headquartered in Brussels, manages CSC Consulting's activities in Belgium, the Netherlands, the U.K., and West Germany. These activities include CIG-Intersys, which was acquired by CSC in June 1989.

• The acquisition of Index Group expanded CSC's range of management and technical services in the commercial area.

- Index Group's management consulting services include redesigning management and operational processes; assessing the information systems function and management; strategically planning and implementing information technology; building management planning, control, and communications systems; developing competitive application of information technology for sales and marketing; spurring development and implementation of "mission critical" systems; cutting information technology costs; and creating technology architectures.

- In addition to consulting, Index Group conducts executive education programs and corporate-sponsored research for more than 200 major companies.

- Index Group works primarily for the Fortune 500 manufacturing and service companies in the U.S. and the Financial Times 500 in Europe. The firm has assisted 19 of the 25 largest U.S. corporations.

- In March 1989, CSC was awarded a five-year contract from Weirton Steel Co. (Weirton, WV) to assist in developing an advanced, integrated manufacturing information system to expedite customer delivery service, and reduce costs through improved inventory control and production scheduling. The contract involves a four-phase program, of which the first phase is valued at $5 million.

- Under a four-year, multimillion dollar contract awarded in June 1989, Index will assist a leading financial services firm to manage the organizational and business changes associated with the implementation of new company-wide computer systems. Index will develop management initiatives and new organizational structures to transition the client into a market-driven company, and ensure that the new computer systems support the client's business goals.

- CSC Partners provides custom programming, systems consulting, design, integration, and implementation services, and education and training to Fortune 1000 corporations and other large computer users.

  - Services are targeted to communications and energy utilities; state and local government; and the financial services, retail, and distribution industries.

  - CSC Partner's revenue profit contribution, and order volume rose to record levels during fiscal 1989. CSC Partners has doubled its annual revenue volume in less than three years to approximately $40 million.

  - In March 1989, CSC Partners was awarded a $16 million, three-year contract from the Massachusetts Water Resources Authority (MWRA) to develop, integrate, and install an information system that will enable MWRA to monitor and control its capital projects to improve water and sewer systems in 60 communities. CSC Partners will also provide related operational procedures, office automation, and computer networking systems.

  - In April 1989, CSC was awarded a one-year contract from Matson Navigation Co. (San Francisco, CA) to manage and implement the upgrade of Matson's freight management system.

  - Other CSC Partner clients include E.I. DuPont, Motorola, Sterling Drug, Panasonic, Boise Cascade, State Street Bank, Allied-Signal, and The Boston Company.

- Communications Industry Services primarily supports AT&T with software development and network-related services.

  - CSC has had a continuous contractual relationship with AT&T for 20 years.

  - In 1989, this CSC unit also began the development of a customer service system for Cincinnati Gas & Electric Co. under a multi-year contract.

- European activities of CSC Consulting include:

  - Management of all computer services for the Mersey Regional Health Authority in England under a $16.2 million facilities management contract.

- Expanding assistance to the German national railway in the development of strategic electronic data interchange systems that link the railway with some of its major customers

- Developing a similar electronic data interchange system for the Australian railway

- Developing gateways for Spanish rail and major shipping companies in Spain and Italy

- Developing a national system for patents and trademark registration in the U.K.

- Providing ongoing support of a command and control system developed by CSC for the German navy's northern maritime headquarters

- Modernizing administrative systems for government agencies in Belgium and the Netherlands

The Industry Services Group provides specialized services to the casualty/health insurance markets, credit grantors, and to CPAs for income tax return processing through the following units:

- The Health and Administrative Services Division provides large-scale medical claims processing and related services for state and federal agencies.

  - In October 1988, the division was awarded a $560 million-plus, seven-year contract (including options) from the New Jersey Joint Underwriting Association (JUA) to act as servicing carrier for 425,000 auto insurance policy holders, commencing March 1, 1989.

    - CSC performs virtually all of the functions of a private insurer, with the underwriting risk borne by the JUA. The JUA insures assigned-risk motorists unable to obtain damage and liability insurance in the standard market.

    - The contract is expected to generate annual revenue of about $75 million by fiscal 1991, and total revenue of abut $240 million over four years.

  - The division acts as servicing agent for the federal government's National Flood Insurance Program, operating one of the largest property insurance programs in the nation at its Lanham (MD) facility.

- The unit performs all of the policy, claims, marketing, and administrative functions of an insurance company, with the government assuming the underwriting risk.

- In June 1988, the division successfully recompeted for this contract with the Federal Emergency Management Agency and was awarded a $94.2 million, five-year contract.

- The division also processes claims from providers of health services for the state of New York's Medicaid program and medical claims from coal miners for the U.S. Department of Labor's black-lung program (a new four-year contract was awarded to CSC in June 1989).

- CSC Comtec provides turnkey systems and associated support services to managed-health care companies.

  - ComCare is a Prime-based turnkey system for health maintenance organizations, preferred provider organizations, third-party administrators, and traditional indemnity carriers. ComCare includes modules for membership and billing, claims processing, utilization review, finance and accounting, and ancillary clinical functions. There are over 150 systems installed in 30 states.

- Seako, Inc., acquired in April 1989, provides application software and turnkey systems for medical groups, managed-health care organizations, and private practices nationwide.

  - The products run on IBM AS/400 and 3090 computers and support various medical office functions, including utilization management, benefits coordination, claims adjudication, premium and fee-for-service billing, membership, and general financial functions.

  - Seako's products are installed in over 800 physicians' offices and at more than 60 health maintenance organizations (HMOs).

- CSC Credit Services, formerly Associated Credit Services, Inc. (ACS), is one of CSC's most profitable, high-growth operating units. Since CSC acquired ACS in 1982, Credit Services' annual revenue has increased from $25 million to $110.9 million in fiscal 1989.

  - As previously mentioned, as the result of an agreement formed with Equifax during 1988, credit reporting processing

is furnished through Equifax's wholly owned subsidiary, Credit Bureau Incorporated of Georgia (CBI).

- CSC has converted its more than 110 million consumer credit files to CBI's computer system to create a joint national consumer credit file from which both companies can sell reports from each other's files to credit grantors, with CBI performing the processing. This joint credit file provides nationwide credit grantors with a single source of credit information, instead of having to deal with multiple sources on a local or regional basis.

- CSC Credit Services continues to own its credit files and receives all revenues from the sale of the credit information they contain. CSC pays CBI a processing fee for each report supplied to a credit grantor.

- CSC continues to own and operate 31 credit bureaus and provides services to another 35 associate, non-owned bureaus. CSC Credit Services also owns 31 collection agencies and provides all processing services for the collection agencies.

- In December 1987, CSC entered a major new market with the receipt of a contract, valued at more than $30 million over five years, from the General Services Administration. CSC Credit Services will collect delinquent loans and other debt owed to various federal agencies. The award is the unit's first federal contract.

- CSC TACS provides income tax return processing services to professional tax preparers located in 15 Western and Midwestern states.

  - Services are provided on a batch basis from a data center in Los Angeles with direct access available via communications links.

  - CSC TACS achieved a high profit margin and record revenue volume during fiscal 1989.

CSC maintains close business ties with its former subsidiary, INFONET, whose Network Services contributed 5% to total fiscal 1989 revenue. CSC remains the largest single shareholder of INFONET. As a result of the ownership sale, however, beginning with the fourth quarter of fiscal 1989, CSC no longer consolidates INFONET revenue and costs in its financial statements.

- Established in 1970, INFONET operates a worldwide communications network, providing and computer and communications services to commercial companies and government agencies.

- The network offers direct access and end-to-end management capabilities in 21 countries, and local access from 105 countries. INFONET provides local support in 34 countries.

- INFONET shareholders are: CSC and the telecommunications administrations of eight countries: TRANSPAC on behalf of France Telecom; Germany's Deutsche Bundespost; Sweden's Teleinvest AB; Telefonica of Spain; Telecom Australia; Singapore Telecom International; PTT Telecom Netherlands; and Belgium's Regie des Telegraphes et des Telephones.

Industry Markets A three-year summary of source of revenue follows ($ millions):

	FISCAL YEAR					
	3/31/89		4/1/88		4/3/87	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
Federal Government						
- Department of Defense	$479.8	37%	$430.0	37%	$400.0	39%
- Civil Agencies	303.6	23%	199.8	18%	172.3	16%
- NASA	138.0	11%	136.7	12%	122.0	12%
Subtotal	$921.4	71%	$766.5	67%	$694.3	67%
Commercial	$267.5	20%	$234.2	20%	$184.2	18%
State & Local Government	$37.1	3%	$60.3	5%	$81.6	8%
International	$78.4	6%	$91.4	8%	$71.4	7%
TOTAL	**$1,304.4**	**100%**	**$1,152.4**	**100%**	**$1,031.5**	**100%**

Commercial revenue is derived from telephone companies; Fortune 500 companies in manufacturing, insurance, banking and finance; and the retail, wholesale/distribution, medical, and services (primarily accountants) industries.

International revenue is derived from foreign governments, financial institutions, transportation companies, and manufacturers.

Geographic Markets

CSC's revenue and operating income by geographic region for the last three years has been as follows ($ millions):

	FISCAL YEAR					
	3/31/89		4/1/88		4/3/87	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
Revenue						
- U.S.	$1,226.0	94%	$1,061.0	92%	$960.1	93%
- International	78.4	6%	91.4	8%	71.4	7%
	$1,304.4	100%	$1,152.4	100%	$1,031.5	100%
Operating income						
- U.S.	$105.1	98%	$85.0	91%	$73.3	95%
- International	2.2	2%	8.9	9%	4.1	5%
	$107.3	100%	$93.9	100%	$77.4	100%

CSC maintains offices in more than 200 locations throughout the U.S. Operations in the U.K., Belgium, Germany, and the Netherlands are through subsidiary companies.

Computer Hardware

Data centers operated by CSC include the following:

- CSC Credit Services' data center in Houston uses an IBM 4381, DEC VAX 8650, and DEC VAX-II/785 systems.
- The Health and Administrative Services Division has an Amdahl 5870 installed in Lanham (MD) for claims processing and related insurance functions.
- CSC TACS has an IBM 4081 installed in Los Angeles.
- In support of its research and development efforts in software engineering, supercomputing, and other fields, CSC's Systems Group at Falls Church (VA) operates several laboratories which evaluate equipment lent by manufacturers. Company-owned equipment at this location includes a Relational 1000 and a DEC MicroVAX II.

COMPUTER TASK GROUP, INC.
800 Delaware Avenue
Buffalo, NY 14209
(716) 882-8000

David N. Campbell, Chairman and CEO
John P. Courtney, President
Public Corporation, NYSE
Total Employees: 3,800
Total Revenue, Fiscal Year End
12/31/88: $218,732,000

The Company

Computer Task Group, Inc. (CTG), founded in 1966, is one of the largest providers of computer-related consulting, systems integration, and professional services to the commercial market in the U.S. Services available through CTG include consulting, systems analysis and design, programming, software conversions, education and training, and facilities management (systems operations).

CTG's strategy is to market its professional and systems integration services primarily to large manufacturing/industrial automation, financial services, and telecommunications firms with large hardware installations and data processing operations.

- In terms of growth, CTG historically has opened two to four new branch offices a year. During 1986 the company expanded into international markets with acquisitions in Canada and the U.K. Over the next several years CTG will continue to concentrate its expansion in the U.S., as well as grow in Canada, the U.K., and Western Europe.

- CTG is expanding its specialty services in other industries, such as health care, utilities, and insurance.

- CTG will pursue larger and more complex projects in the $5 to $20 million range.

In June 1989, IBM announced plans to pay $21 million for a 15.3% interest in CTG.

CTG's 1988 revenue reached $218.7 million, a 29% increase over 1987 revenue of $170.1 million. Net income rose 26%, from $5.1 million in 1987 to over $6.4 million in 1988. A five-year financial summary follows:

COMPUTER TASK GROUP, INC.
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	1988	1987	1986	1985	1984
Revenue	$218,732	$170,052	$143,366	$115,711	$82,693
• Percent increase from previous year	29%	19%	24%	40%	54%
Income before taxes	$10,837	$8,495	$9,277	$7,447	$4,054
• Percent increase (decrease) from previous year	28%	(8%)	25%	84%	58%
Net income	$6,420	$5,110	$5,081	$4,021	$2,108
• Percent increase from previous year	26%	--	26%	91%	45%
Earnings per share (a)	$0.80	$0.66	$0.68	$0.68	$0.45
• Percent increase (decrease) from previous year	21%	(3%)	--	51%	36%

(a) Restated to reflect a three-for-two stock split declared on April 30, 1986.

CTG management attributes increases in 1988 revenue to the following:

- Approximately 49% ($24 million) of the increase was due to increase revenues from field branch operations.
- Approximately 39% ($19 million) of the increase was due to acquisitions made during 1988.
- The remaining 12% of the increase was due to international operations (6% or $3 million) and specialty services(6% or $3 million).
- Professional services, delivered through field branch operations, grew approximately 20% and gross margins, as a percent of revenue, improved by 1%.

Offsetting the improvements shown in overall operations were problems encountered in the conversions and major projects businesses.

- Conversions sales dropped 70% compared to 1987. Conversions operations have been restructured and included in

field operations where management believes it will be able to more directly market its services to the current client base served by field operations.

- Major projects business did not perform to budgeted expectations nor to prior year profit and margin levels because CTG experienced delays in the application development phase of a $25 million systems integration project for USS-POSCO Industries.

During 1987, though revenues increased 19%, net income remained constant compared to 1986.

- International operations generated substantial revenue increases ($4 million), but operated at breakeven for the year due to high non-billable time for the professional staff. CTG also invested $400,000 in new branch operations in the U.K. during 1987.

- During 1987, CTG also invested an additional $500,000 to market the conversion services business.

- CTG continued to experience pricing pressures during 1987. Clients pushing for lower pricing due to competition resulted in lower margins. In October 1987, CTG had a company-wide price increase.

Acquisitions made by CTG include the following:

- During 1988, CTG acquired three professional services firms for a total of $15.6 million.

  - In December 1988, CTG acquired Telecommunications Management Corporation (TMC) of Boston (MA). TMC, with approximately 20 employees and revenue of $2 million, specializes in voice communications and network management services. TMC has provided its services to over 500 end user organizations, including telephone companies, colleges and universities, financial institutions, hospitals, government agencies, and utility companies.

  - In August 1988, CTG acquired Applied Management Systems, Inc. (AMS) of Charlotte (NC), a professional services firm with branch offices in Winston-Salem and Raleigh (NC) and Greenville and Columbia (SC). AMS, with revenues of about $7 million, competed with CTG in the southeastern U.S. The acquisition increases CTG's presence in the Carolinas area.

- In February 1988, CTG acquired Scientific Systems Services, Inc. (SSS) of Melbourne (FL) for $10.5 million. The acquisition included SSS' subsidiary, Profimatics, which targets its services to oil companies.

  - SSS provides systems integration services to the manufacturing, power, and process industries. Applications provided include computer-integrated manufacturing systems for factory automation, plant-monitoring systems for electric power generation, and monitoring and control systems for metals processing and petroleum refining.

  - SSS and Profimatics, with estimated 1988 revenue of $15 million and approximately 190 employees, now operate as subsidiaries of CTG.

- During 1986, CTG acquired five professional services companies for a total of $7.2 million in cash, plus certain contingent payments based on future performance.

  - In October 1986, CTG acquired maxima Computer Management Consultants, Ltd. of Ottawa. Maxima now operates as maxima/Computer Task Group, Limited, a wholly owned subsidiary of CTG.

  - In August 1986, CTG acquired Creative Computing Company, a Cleveland professional services firm.

  - In June 1986, CTG acquired Shubrooks International, Ltd., a software consulting firm headquartered in Chertsey (UK).

  - In April 1986, CTG acquired Quadra Systems, Inc., an information services consulting firm headquartered in San Antonio (TX).

- During 1985, CTG acquired five information services companies, including Documentation Resources, Inc. of Phoenix; Data Force, Inc. of Seattle (WA); Central Computer Systems, Inc. of San Francisco (CA); Dataware, Inc. of Buffalo (NY); and Berger Vernay & Company of Houston (TX).

Divestitures made by CTG include the following:

- During the first quarter of 1989, CTG sold its investment in Analysts International for $4.6 million, realizing a gain of $2.1 million. CTG originally acquired a 19.13% interest in Analysts International in January 1987.

- In December 1988, CTG sold its direct marketing business unit, CTG Direct Marketing Services to DMT Intercorp, Inc., a diversified direct marketing company located in Buffalo.

Revenue for the three months ending March 31, 1989 reached $58.6 million, a 16% increase over $50.4 million for the same period a year ago. Net income was $1.5 million, compared to $1.7 million for the same period in 1988.

As of December 31, 1988, CTG had 3,785 employees, segmented as follows:

Marketing/sales	191
Professional staff	3,068
Field management and administration	383
Corporate	143
	3,785

- CTG currently employs approximately 4,000 employees through 71 offices and 20 project development centers in the U.S., Canada, and the U.K.

- The CTG Institute for Technical and Management Training in Buffalo provides in-depth training for CTG staff. Some 30 technical and 20 marketing and management courses are offered. INPUT estimates that over 1,500 employees attend these classes on an annual basis.

CTG professional services competitors include AGS Computers, Inc. (NYNEX), Computer Horizons, Keane, and the Big 8 accounting firms. Systems integration competitors include Andersen Consulting, Electronic Data Systems, DEC, and Computer Sciences Corporation.

Key Products and Services

Approximately 80% ($175 million) of CTG's 1988 revenue was derived from its various professional services and 16% ($35 million) from commercial systems integration activities. Less than 5% ($8 million) of revenue was derived from the direct mail marketing services business that was divested at the end of 1988.

The scope of professional services work performed by CTG ranges from specific, minor tasks of short duration, to large complex tasks that require multiple systems engineers for a long period of time. CTG offers consultants who are experienced in an industry application or technology; total project systems integration (often on a fixed-fee basis); and per diem services.

- Typically, CTG's professional staff augments and becomes part of the client's on-site software development team on a specific application or project.

- A majority of CTG's clients are large companies with multiple locations and substantial data processing operations. CTG currently has approximately 1,400 clients worldwide, including 85 of the Fortune 100 companies.

CTG classifies its services into three areas:

- Professional Services. The company's major source of revenue is derived from this type of service. CTG staff provides programming, systems analysis and design, and other services in support of the client's data processing applications. These services are provided to clients on a contract basis, usually on a per diem rate.

  - Services are generally performed on the client's site. CTG has also established 20 project development centers throughout its branch office network system. These sites allow CTG to handle a project entirely off-site, using either CTG computers or using communications links to the client's equipment.

  - CTG has strategic alliances with various software vendors to provide installation and application support for their products. CTG is providing integration and application development services in support of software products from vendors such as IBM, Software AG Systems, Inc., Management Science America, and Cullinet.

- Consulting. Many CTG professionals are consultants who are experienced in an industry application or technology. Examples of specialty areas in which CTG has experience include industrial automation, data base consulting, telecommunications, conversions, and documentation services.

  - Industrial automation involves using technology to increase efficiency and expand capabilities on the shop floor from the design and engineering phases through material requirements planning and scheduling activities.

  - Data base consulting is in demand as clients upgrade to newer and more powerful hardware which uses fourth generation languages and relational technology.

- The telecommunications area encompasses data communication, voice communication, and network management.

- CTG provides DOS-to-MVS conversion services using CORTEX, a conversion process developed by SISROM. CTG/ Dataware, formed with the acquisition of Dataware, Inc. in 1985, assists clients in migrating their application software to run or new or upgraded hardware.

- Commercial Systems Integration Services: These services are provided to the manufacturing and financial services sectors and extend from the large corporate information system through the departmental and plant system, to mission critical real-time automation solutions. Services provided include management consulting; concept and applications planning studies; Control-Spec™ functional specification and scope-of-work contracts; systems architecture services, including hardware selection, systems software evaluation and selection, application software, and communications; and project implementation.

Examples of specific services provided by CTG for certain target markets/applications follows:

Industrial Automation/Manufacturing:

- CTG staff has expertise in the following functional service areas:

  - Manufacturing consulting
  - Strategic business planning
  - Methodology evaluation
  - Systems analysis and design
  - Hardware/software evaluation
  - Project management
  - Software engineering
  - Interface engineering
  - Turnkey project management
  - Detail design and coding
  - Installation
  - Implementation
  - Documentation
  - Training

- Applications supported include:

  - Real-time systems
  - Data acquisition systems
  - Graphics and operator/interfacing
  - Process control
  - Hardware/software integration
  - Communications
  - Simulation and modeling
  - Robotics
  - Signal conditioning
  - Logical sequencing and machine control
  - Microprocessor-based systems development
  - Computer-aided design and engineering
  - Biomedical applications
  - Research and development
  - Statistical analysis
  - Scheduling (CPM/PERT)
  - Linear programming
  - Computer-integrated manufacturing (CIM)
  - Materials requirements planning
  - Just-in-time inventory control
  - Shop floor control
  - Multivendor computer integration

- CTG has experience with various hardware environments, including IBM; DEC PDP-11, VAX-730, 750, 780, DEC 10; Gould-SEL; GE; Harris; HP 1000, 3000; Honeywell Level 6; CDC Cyber; Data General Nova, ECLIPSE; Modcomp Classic; Prime; Texas Instruments; Gould Modicon; Westinghouse 2500; Intel 8080-8088; Motorola 6800 and 68000.

- Scientific Systems Services (SSS) has expanded CTG's systems integration activities, providing expertise in developing systems for factory and process supervision, inventory control, and materials handling to manufacturers and distributors.

  - SSS has performed projects for North Star Steel Co. (an automated process control system), Public Service of New Mexico (a coal-fed generating plant monitoring system), Baxter Healthcare Corporation (a warehouse control system), and National Steel Corporation (a caster control system).

  - In April 1989, SSS acquired exclusive U.S. marketing rights to 3100 GPC™ Greenway Protocol Converter, a UNIX-based communications and integration software platform developed by Kilpatrick Green Systems Engineering, Ltd. of

Australia. The product is designed to facilitate exchange of information between otherwise incompatible systems, to provide a platform for the integration of application functions, and to support communications from process control computers and other factory floor equipment to mainframe computers at the corporate level.

- Contract examples include the following:

  - In January 1989, CTG was awarded a $4 million facilities management contract with Geneva Steel of Orem (UT). CTG will plan and execute a migration of Geneva's applications from Service Centers in Chicago and Pittsburgh owned by the USX Corporation to CTG Service Centers in Orchard Park (NY) and Pittsburg (CA). CTG will manage Geneva's application processing through the spring of 1990.

  - In November 1988, CTG's Industrial Automation Branch was awarded a $3.5 million contract from the Defense System unit of UNISYS Corporation to rehost and develop software on the Advanced Weather Distribution System for the U.S. Air Force Systems Command.

  - In March 1987, CTG was awarded a $25 million, multi-year systems integration project for USS Posco Industries (UPI), a joint venture company of USX Corporation and Korea-based Pohang Steel Company.

    - CTG responsibilities included building a data center, creating a computer environment, migrating systems and data, and developing new application software to support major shop floor control enhancements.

    - CTG has completed the first three phases. However, the application development project has experienced delays. CTG is working with UPI management to complete the project.

- CTG's Amtec subsidiary, located in Los Angeles, supports aerospace business. Clients include Rockwell and the Jet Propulsion Laboratory.

- In February 1989, CTG announced the formation of Tailored Applications Solutions (TAS), a specialty group targeting the CIM marketplace. The TAS group is based in Milwaukee (WI).

  - TAS provides consulting, planning, and programming services to manufacturers and distributors and offers

tailorable, baseline software products for Master Production Scheduling, Process Industries Manufacturing, Manufacturing Planning and Control, Sales Order Management, and Purchasing.

- The TAS group is currently working on a logistics management, order processing, distribution, and master scheduling integrated system for a European manufacturer.

Financial Services:

- CTG staff has expertise in the following applications:

  - Retail banking
  - Wholesale banking
  - Bank/branch automation
  - Corporate support systems
  - International banking
  - Trust/asset-based systems
  - ATM/POS networking
  - Insurance systems
  - Brokerage systems

- CTG provides consulting services in the following areas:

  - Banking operations
  - Hardware/software evaluation
  - Project management
  - Backup/recovery
  - Quality assurance
  - Implementation methodology
  - Planning
  - Testing

- CTG has project development experience in the following service areas:

  - Entire project teams
  - Conversion teams
  - Package/product support services
  - IMS DB/DC IDMS support
  - Application support
  - Installation/maintenance support

Telecommunications:

- Functional services provided include:

- Strategic planning
- Project management
- Data administration
- Analysis and design
- Performance tuning
- Automated conversions training
- Information center review and design
- Software package modification and installation
- Local and wide area network design

- Applications supported include:

  - Customer services: Order entry, order distribution, order tracking, message processing, billing, collections, customer inquiry.

  - Network services: Plant inventories, technical work scheduling, facility assignments and maintenance, networking software, LAN design.

  - Operator services: Directory, directory assistance, and intercept.

  - Marketing services: Market analysis, product analysis, and sales office support.

- Projects in this area include the following:

  - CTG developed a strategic plan to enhance the bundling and cross-selling of the products and services of a major New York City-based financial services and credit card company. The plan included architectural specifications for the deployment of a distributed voice/data communications and integrated data base network.

  - CTG designed and implemented an LU-6.2 network to serve over 800 agents for a Fortune 100 New York City insurance company.

  - CTG designed and installed a custom hybrid local area network for the New York City headquarters of a large bank. The network integrated six data centers and linked hundreds of users with gateway technologies.

CTG has expanded its services to other industries, including health care.

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- CTG is currently developing an integrated medical management system for the Cleveland Clinic. The project is in the range of $25 million and will use specially licensed or acquired state-of-the-art estimating, planning, and development tools to reduce the overall project risk.

The CTG Technology Center, formed in 1985, markets CTG's conversion services; houses the company's Corporate Projects Office, which manages major software development projects in excess of $5 million; and functions as the technical resource for CTG, supporting ongoing requirements for training and administration services.

Industry Markets

CTG's target markets include large organizations in discrete and process manufacturing, financial services, telecommunications, and utilities. Eighty-five of the Fortune 100 companies are CTG clients.

CTG's client base is segmented approximately as follows:

Manufacturing	
- Machinery and electronic equipment	19%
- Chemical and petroleum	12%
- Metals	9%
- Other	18%
	58%
Services	19%
Banking and finance	12%
Distribution	4%
Other	7%
	100%

Geographic Markets

Approximately 96% of CTG's 1988 revenue was derived from the U.S., 2% from Canada, and 2% from the U.K.

A three-year geographic source of revenue summary follows:

COMPUTER TASK GROUP, INC.
THREE-YEAR GEOGRAPHIC SOURCE OF REVENUE SUMMARY
($ millions)

	FISCAL YEAR					
	1988		1987		1986	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
U.S.	$209.5	96%	$164.0	96%	$141.4	99%
Canada	4.0	2%	2.9	2%	0.5	--
U.K.	4.8	2%	3.2	2%	1.4	1%
Germany	0.4	--	--	--	--	--
TOTAL	**$218.7**	**100%**	**$170.1**	**100%**	**$143.3**	**100%**

CTG has 71 offices and 20 project development centers in the U.S., Canada, and the U.K.

Computer Hardware and Software

CTG has various computers installed at its Technology Center in Orchard Park (NY), including the following:

- 1 IBM 3090
- 1 IBM 4381-2, MVS, VM, CMS, DOS/VSE
- 1 IBM 4341-12, MVS, CMS, DOS/VSE
- 1 DEC VAX-11/750, VMS

CORNELL COMPUTER CORPORATION
125 East Bethpage Road
Plainview, NY 11803
(516) 420-5900

John Tutunjian, Chairman and Co-CEO
Jerome Gilbert, President and Co-CEO
Division of the Computer Power Group, Ltd.
Total Employees: 453
Total Revenues, Fiscal Year End
9/30/88: $35,000,000

The Company

Cornell Computer Corporation, founded in 1971, provides various professional and systems integration services to Fortune 1000 companies.

In August 1987, Cornell was acquired by the Computer Power Group, an Australian-based computer consulting firm.

Cornell is organized into two major groupings, as follows:

- Cornell Computer, with 14 offices located in ten states throughout the U.S., provides professional and support services.
- The Telecomm Division, based in Edison (NJ), provides professional services to AT&T and the Regional Bell Operating Companies.

Total fiscal 1988 revenue reached $35 million, a 6% increase over fiscal 1987 revenue of $33 million. A five-year revenue summary follows:

CORNELL COMPUTER CORPORATION
FIVE-YEAR REVENUE SUMMARY
($ millions)

	FISCAL YEAR				
ITEM	9/88	9/87	9/86	9/85	9/84
Revenue	$35.0	$33.0	$28.4	$21.0	$16.0
• Percent increase (decrease) from previous year	6%	16%	35%	31%	37%

Cornell has sold its Software Products Division for an undisclosed sum. The division marketed two application software products as follows:

- Carepak, introduced in 1985, is used for billing and payroll for home healthcare services by hospitals and healthcare agencies providing home healthcare services.
- The LAWTRAC series of software for legal departments of corporations offered applications for litigation tracking, lease tracking, and secretarial functions.

As of January 1989, Cornell had approximately 450 employees, segmented as follows:

Marketing and sales	30
Customer support and research and development	400
Computer operations	3
General and administrative	20
	453

- Cornell also subcontracts as needed.

Key Products and Services

Approximately 96% of Cornell's fiscal 1988 revenue was derived from its various professional services, 3% from systems integration, and 1% from software products. A further breakdown of fiscal 1988 revenue according to categories of service identified by Cornell follows:

Professional and technical resources	75%
Software maintenance services	10%
Professional services	5%
Education and training	5%
Systems integration	3%
Operations management	1%
Application software	1%
	100%

Cornell provides professional services to approximately 250 Fortune 1000 clients. Cornell's professional services are either on a fixed price or a time and materials basis. In addition to custom development of software, Cornell can provide EDP audits and other services as follows:

- Professional and technical resources:

  - Feasibility studies
  - Systems analysis and design
  - Programming
  - Testing
  - Package installation and modification
  - Hardware and software conversion/migration
  - Implementation services to AS/400 and DB2 customers (Cornell is an IBM Business Partner)

- Software maintenance services:

  - Systems enhancements
  - Statutory programming changes
  - Emergency maintenance
  - PC software insurance
  - Documentation support

- Professional services:

  - Business problem definition.
  - Cause analysis
  - Solution implementation

- Education and training:

  - Customized and prepackaged courses
  - On-the-job training programs
  - Programming languages, operating systems, PC utilization
  - User training

A partial list of projects performed by Cornell over the past two years includes the following:

- Major banking organizations:

  - Cornell designed, developed, and programmed Commercial Loan Data Systems. The company converted batch data entry to on-line data entry, including automatic general ledger entries and report generation on CICS printers in user areas with batch and on-line systems interfaces.

  - Cornell designed, developed, implemented, and maintained Commodity Pricing Systems which maintain current commodity prices and current values of loan customers' collateral.

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- Cornell designed, developed, documented, implemented, and maintained Credit Card Protection/"Protection Plus" Systems.

- The company studied the feasibility, redesigned, programmed, implemented, documented, and maintained Demand Deposit Accounting Systems for a combination of Domestic Commercial Deposit Systems and foreign Vostro Systems.

- Cornell has developed and implemented various Stocks and Bonds Brokerage applications, including International Book Entry, Multiple Offerings, Cross Account Referencing, Economic Trading P&L, Security Inventory, Account Profitability, and customer on-line access.

• Municipal government: Cornell has designed, developed, implemented, and maintained a variety of systems including:

- Probation and Family Court Tracking (Justice Department)
- Medical Records (Hospital)
- Restitution Accounting (Criminal Justice)
- Police Case Offense Monitoring (Police Department)
- Admissions Registration (Health Department)
- Tax Delinquency and Cash Receipts (Tax Collector)
- Property Tax (Assessment Department)
- Fire Marshal Monitoring (Fire Department)
- Personnel Time and Leave (Police Department)
- Hazardous Waste (Environmental Affairs)
- Welfare Management (Department of Social Services)
- Budget Compliance (Executive Department)
- Capital Projects (Public Works Department)
- Payroll/Personnel (Comptroller)
- Public Assistance Tracking (Department of Welfare Services)
- Food Stamp Utilization (Department of Social Services)
- Fair Labor Standards Act (Department of Labor)
- DWI Monitoring (Police Department)
- Case Tracking (District Attorney)
- Court Docket (Justice Department)

• Miscellaneous:

- Cornell redesigned a complete financial operating system, from international data entry to on-line inquiry and field reporting, for a major pharmaceutical firm.

- Cornell implemented a Vehicle Invoicing System for all cars and trucks built in North America for a major automotive manufacturer.

- Cornell designed and implemented a worldwide electronic mail and order entry system for a major communications company.

- Cornell designed and implemented an International Office Automation System for an international software services firm.

- Cornell designed, implemented, and continues to maintain a U.S. Distribution and Billing System for a major pharmaceutical firm.

- Cornell designed and implemented an on-line Family Service and Child Abuse Tracking System for a large state government.

- Cornell designed, implemented, and provides systems operation services for a major health care provider.

- Cornell designed and implemented an entry-level Information Systems Training Program for a major pharmaceutical manufacturer.

Industry Markets

Approximately 20% of fiscal 1988 revenue was derived from the telecommunications industry. The remaining 80% was derived from various industries including banking and finance, manufacturing, health care, and state and local government.

Geographic Markets

Cornell derives 100% of its revenue from the U.S.

Cornell maintains offices located in Phoenix (AZ); Torrance, Irvine, and San Francisco (CA); Hartford (CT); Fort Lauderdale and Orlando (FL); Towson (MD); Boston (MA); Edison (NJ); Albuquerque (NM); New York and Plainview (NY); and Philadelphia (PA).

Computer Hardware and Software

Cornell has the following computers installed in support of its professional services:

- 15 IBM PC/XT/ATs, running under PC-DOS
- 7 Toshiba 1200 laptops

CUTLER-WILLIAMS, INC.
2655 Villa Creek Drive
Suite 205
Dallas, TX 75234
(214) 960-7053

George Enochs, President
Private Corporation
Total Employees: 325
Total Revenue, Fiscal Year End
12/31/88: $17,000,000*

*INPUT estimate

The Company

Cutler-Williams, Inc., founded in 1969, provides professional and systems integration services to clients in a range of industries.

INPUT estimates Cutler-Williams' 1988 revenue at $17 million, a 13% increase over 1987 revenue of $15 million.

Cutler-Williams discontinued the operations of its Energy Systems Division in order to better concentrate on its professional services and systems integration business.

As of January 1989, Cutler-Williams had approximately 325 employees, segmented as follows:

Marketing and sales	25
Customer support	275
General and administrative	25
	325

Key Products and Services

One hundred percent of Cutler-Williams' 1988 revenue was derived from professional services and systems integration.

Cutler-Williams specializes in developing software for use with IBM teleprocessing, data base management, and operating systems software.

- Additional capabilities include:
  - Applications and system software development and installation.
  - Data base management, distributed network, and telecommunications design/implementation.
  - Custom turnkey systems.

- Data center design, planning, and installation.
- Hardware and software conversions.
- Analysis of organizational structure, personnel, and data processing costs.

• Cutler-Williams offers training seminars at clients' facilities. Topics include:

- CICS applications programming.
- CICS internals debugging.
- CICS macro-level.
- IMS data base and data communications basic and advanced applications programming.
- IDMS, DATACOM, ADABAS, and DB2 applications development.
- MVS internals.
- Telon.
- Tuning, debugging, and managing EDP projects.

Cutler-Williams offers complete systems integration services, from project conception and project management through to installation, software conversion, and user training.

Cutler-Williams no longer markets the Advanced Debugging System (ADS) or 3D/One.

Industry Markets

Cutler-Williams offers its services to a variety of industries, with the majority of its clients in the banking and finance, utilities, and health care industries.

Geographic Markets

One hundred percent of Cutler-Williams' 1988 revenue was derived from the U.S.

Branch offices are located in Chicago and Springfield (IL); Cleveland (OH); Detroit (MI); Houston and Dallas (TX); Los Angeles (CA); St. Louis (MO); and Tulsa (OK).

Computer Hardware

Cutler-Williams maintains no hardware on its premises. All work is done at the client site. When equipment other than the client's is necessary, hardware is obtained on a lease basis.

ELECTRONIC DATA SYSTEMS CORPORATION
7171 Forest Lane
Dallas, TX 75230
(214) 604-6000

Lester M. Alberthal, Jr., Chairman, President, and CEO
Wholly Owned Subsidiary of General Motors Corporation, GM Class E Stock, NYSE
Total Employees: 52,000
Total Revenue, Fiscal Year End 12/31/88: $4,844,100,000
Non-GM Information Services Revenue: $1,907,600,000

The Company

Electronic Data Systems Corporation (EDS), founded in 1962, is a leading information and communications services company providing information processing, systems management, and communications services to the financial, insurance, commercial, and communications industries domestically and internationally and to state and federal government. These markets include banking; credit unions; property, life, health, and casualty insurance; distribution; manufacturing; transportation; retail; and energy.

- EDS currently has more than 6,000 clients in all 50 states and 26 countries worldwide.

- EDS' largest client is General Motors Corporation (GM) and its subsidiaries, which contributed approximately 59% ($2.8 billion) to EDS' 1988 revenue.

EDS and its subsidiaries were acquired by GM in October 1984 for approximately $2.5 billion.

- The acquisition was consummated through an offer to exchange EDS common stock for either $44 in cash or $35.20 in cash plus two-tenths of a share of Class E common stock, plus a nontransferable contingent promissory note issued by GM.

- EDS operates as an independent subsidiary of GM. EDS' performance forms the base from which any dividend on the GM Class E common stock will be declared. These earnings include income earned from services provided to GM and its other subsidiaries.

- Through its work for GM, EDS has gained expertise in factory automation, strengthened its international presence, and enhanced its communications expertise.

EDS' total 1988 revenue reached $4.8 billion, a 9% increase over 1987 revenue of $4.4 billion. Net income rose 19%, from $323 million in 1987 to $384 million in 1988. A five-year financial summary follows:

ELECTRONIC DATA SYSTEMS CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ millions, except per share data)

	FISCAL YEAR				
ITEM	1988	1987	1986	1985	1984
Revenue	$4,844.1	$4,427.7	$4,366.0	$3,443.3	$947.5
• Percent increase from previous year	9%	1%	27%	264%	295%
Income before taxes	$589.4	$524.3	$464.0	$362.1	$138.7
• Percent increase from previous year	12%	13%	28%	161%	19%
Net income	$384.1	$323.1	$260.9	$189.8	$80.7
• Percent increase from previous year	19%	24%	37%	135%	24%
Earnings per share	$3.15	$2.65	$2.13	$1.57	$0.67
• Percent increase from previous year	19%	24%	36%	134%	24%

A further breakdown of 1988, 1987, and 1986 revenue follows ($ millions):

	FISCAL YEAR		
REVENUE SOURCE	1988	1987	1986
Systems and contracts			
• Outside customers	$1,907.6	$1,444.8	$1,127.7
• GM and subsidiaries	2,837.0	2,883.3	3,195.1
	$4,744.6	$4,328.1	$4,322.8
Interest and other	$99.5	$99.6	$43.2
TOTAL	**$4,844.1**	**$4,427.7**	**$4,366.0**

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EDS management attributes 1988 revenue increases to the following:

- The acquisition of MTech Corp in April 1988;
- Winning more than half of all the business bid for while sustaining its historic 80% renewal rate;
- Strong performance in existing markets and success in new markets, i.e. energy.

Revenue for the three months ending March 31, 1989 reached $1.29 billion, an increase of $165.8 million (15%) over revenue of $1.12 billion for the same period in 1988. Net income for the period rose $10.9 million (12%), from $89.1 million to $100.0 million.

Recent acquisitions made by EDS include the following:

- In May 1989, EDS and Hitachi Ltd. announced the completion of their acquisition of National Advanced Systems Corporation (NAS) from National Semiconductor Corporation. EDS and Hitachi have formed a new, independently operated, joint venture company, Hitachi Data Systems Corp., which will market and distribute Hitachi PCM mainframe and peripheral equipment. EDS holds a 20% equity in the new venture.
- In April 1989, EDS acquired BancSystems Association, Inc. (Westlake, OH), a subsidiary of Society Corporation that provides credit card transaction processing services to the financial services industry. Terms of the purchase were not disclosed.
    - BancSystems, founded in 1969 as a not-for-profit association owned by the member institutions that used its services, was acquired by Society Corporation in 1984.
    - BancSystems provides MasterCard and Visa credit and debit processing and related services to more than 180 financial institutions in Ohio and seven other states with more than 2.4 million cardholders and 38,000 merchants.
    - BancSystems had approximately 300 employees at the time of the acquisition. Its operations have been merged into EDS' Financial Industry Group.
    - EDS will continue to operate out of BancSystems' Westlake offices, where it will continue to perform credit card

processing for Society Corporation's affiliate banks, other BancSystems customers, and the expanded national business it expects to obtain.

- In April 1989, EDS acquired the electronic funds transfer (EFT) business of Automatic Data Processing, Inc. (ADP). Terms of the acquisition were not disclosed.
  - ADP's EFT business includes a range of services for automatic teller machines and point-of-sale applications for the banking industry.
  - Headquartered in Clifton (NJ), ADP's EFT operations employ nearly 300 people and supply one of the largest networks in the industry.
- EDS' most significant acquisition during 1988 was made in April when the company acquired MTech Corp of Dallas (TX) for approximately $347 million. The acquisition was accounted for as a purchase.
  - MTech stockholders had the option to receive $30 in cash or $13 in cash plus one-third share of GM Class E common stock with a Limited Guarantee for each share of MTech stock.
  - MTech operates the third-largest ATM network in the U.S. and handles the data processing for more than 1,100 financial customers nationwide.
  - MTech had approximately 3,300 employees at the time of the acquisition and 1987 revenue of $232.1 million. EDS expected MTech's business to generate $190 million in revenue for 1988.
  - The operations of MTech have been merged into EDS' Financial Industry Group.
- In November 1988, EDS acquired VideoStar Connections, Inc., an Atlanta-based company specializing in private satellite broadcasting services and special-event videoconferencing, and VideoStar's staging services subsidiary, Staging Connections. Terms of the purchase were not disclosed.
  - VideoStar operates 17 private television networks and 1,800 downlinks. The networks are ideal for businesses or institutions that need to distribute product announcements, company or industry news, policy or procedure changes,

maintenance updates or other news to a widely dispersed audience. Some of its customers are Eastman Kodak, Hewlett-Packard, DEC, Xerox, and Merrill Lynch.

- VideoStar, which now operates as an independent subsidiary of EDS, complements the video production capabilities of EDS' affiliate, Automotive Satellite Television Network, Inc. VideoStar will also make it possible for EDS to offer its line of training and educational programs now available on its internal network to customers of both EDS and VideoStar.

- In November 1988, EDS acquired the data processing operations of Texas Commerce Bancshare's 27 correspondent banks.

- In November 1988, EDS acquired the data processing operations of Cullen/Frost Bankers' 54 correspondent banks.

- In September 1988, EDS acquired a 50% interest in and assumed management control of China Management System (CMS), the largest information services company in Taiwan.

  - CMS, with 1987 revenue of $10 million, specializes in systems integration, systems development, on-line processing, packaged software, and management consulting. Its customers include government agencies, financial institutions, manufacturers, and trading companies.

  - The agreement enables both organizations to extend their international links as well as compete more strongly for focal information processing contracts.

- In September 1988, EDS acquired General Data Systems, Ltd. (GDS) of Philadelphia. Terms of the purchase were not disclosed.

  - GDS specializes in systems and services for the property and casualty insurance industry.

  - GDS had approximately 100 employees at the time of the acquisition. Since 1983, GDS' revenues have increased annually at a compound rate of 38%.

  - The operations of GDS have been merged into EDS' Commercial Insurance Division.

In March 1989, EDS and Hewlett-Packard signed an agreement that formally establishes the framework for cooperation on

systems integration projects. Under the terms of the agreement, HP and EDS will submit joint proposals to customers for the development, design, management, and support of projects requiring the integration of hardware, software, and project management services.

EDS is currently organized into the following business units:

- The Government Systems Group provides systems integration and systems management/facilities management (FM) services, including support of state-controlled health care (or Medicaid) programs and federal, state, and civilian government customers.
  - The State Operations Division of the Government Systems Group focuses on FM services provided to state governments for the management of various applications, including health care and automobile insurance.
- The Financial Industry Group provides processing/network services, facilities management, and software products to banks, savings and loans, and credit unions.
- The Insurance Industry Group combines EDS' FM insurance business (including Blue Cross/Blue Shield, where state money is not involved), its work in GM's benefits administration, and its work for GMAC.
  - The Commercial Insurance Division provides processing services and software products to insurance companies.
- The Commercial, Communications, and International Services Group supports the following businesses:
  - North American Commercial--non-GM FM and systems automation for the manufacturing, distribution, retail, and energy industries.
  - Communications Services--all communications projects.
  - International--all activities outside North America.
- EDS' General Motors Business Operations Group provides information services in support of most of GM's internal organization, primarily in North America.

Major competitors of EDS by product/service area include the following:

- Insurance claims processing: Computer Sciences Corporation (CSC), The Computer Company, McDonnell Douglas Information Systems Company, and Unisys.
- Government systems: CSC, Unisys, Planning Research (Black & Decker), and Boeing Computer Services.
- Credit unions: Control Data Business Information Services and Citicorp Information Resources.
- Remote computing services: Boeing Computer Services, Martin Marietta, CSC, and GE Information Services.
- Systems integration: Scientific Applications International, BDM International, Unisys, and IBM.
- Systems operations/facilities management: CSC and Systematics.

Key Products and Services

A three-year summary of source of revenue by operating group is estimated by EDS as follows:

ELECTRONIC DATA SYSTEMS CORPORATION
ESTIMATED SOURCE OF REVENUE SUMMARY
($ millions)

	FISCAL YEAR		
ITEM	1988	1987	1986
Financial and Insurance	22%	18%	15%
Commercial, Communications, and International Services	17%	16%	13%
Government Systems	14%	14%	12%
Subtotal (a)	53%	48%	40%
GM	47%	52%	60%
TOTAL	**100%**	**100%**	**100%**

(a) These estimates include certain revenue from GM that has been reported in the Commercial, Communications, and International Services and Financial and Insurance Groups.

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EDS services are offered as follows:

- Facilities Management (FM): EDS assumes virtually all of the data processing and communications requirements for the customer over a multiyear term. Responsibilities include the design and implementation of business information systems, the staffing of the data processing functions, the development and maintenance of necessary software, and the operation of all computer activities.

- Systems Integration: EDS designs, implements, and installs the appropriate combination of hardware and software integrated into a total system designed to fulfill the customer's processing and communications requirements.

- Fiscal Agent: EDS is responsible for all data processing functions as well as other administrative duties. These may include processing and paying claims as well as ensuring proper coordination of benefits.

- Professional Services: EDS provides system design, custom/contract programming, consulting, engineering services, education, and training.

- Processing Services: EDS provides data processing services from an EDS data center billed on a predetermined minimum monthly basis, usually based on the number of transactions.

The Government Systems Group provides FM and systems integration services to federal, state, and local government customers. Contract examples include the following:

- In May 1989, EDS was awarded a three-year, $100 million contract (with options for two one-year extensions) with the state of Florida Department of Health and Rehabilitative Services. EDS will transfer, implement, and operate the Florida On-Line Recipient Integrated Data Access System, which will be used to determine program eligibility and to issue benefits for several major state human-service programs. EDS will supply all training, conversion, and maintenance services.

- During the first quarter of 1989, EDS signed an agreement with the U.S. General Services Administration to assist federal agencies that need immediate system-conversion support services, and won a contract with the Foundation Health Corp. (FHC) to help the FHC with managing the CHAMPUS health care program.

- In October 1988, EDS signed a six-year contract to implement Unified Local Area Network Architecture for the Air Force. EDS, Bridge Communications, and over 20 other suppliers will deliver and install bridges, gateways, and host attachments on existing local area network cabling for over 200 Air Force bases nationwide. EDS will also provide engineering services and maintenance and training for those Air Force installations implementing local area networks.

- During 1988, EDS received a five-year contract to continue to provide technical, analytical, development, and program management support for the Marine Corps Standard Supply System. The system automates the procurement, distribution, and management of essential supplies for the Marines worldwide.

- In August 1988, EDS won an eight-year contract with the Navy to convert the application support system for the Stock Point ADP Replacement Conversion project at 33 sites worldwide. EDS will implement and maintain the new system, design a data base, and conduct training.

- In October 1988, EDS signed a one-year contract (with four one-year extensions) with the U.S. Immigration and Naturalization Service to implement a turnkey solution for the manufacture of identification cards and management of alien records.

- In August 1987, EDS announced a major systems integration contract with the U.S. Army to implement and operate Project 80X. Under the nine-and-one-half-year agreement, EDS is standardizing and integrating all hardware systems, data base software, and communications components for the U.S. Army's worldwide personnel management system.

- Medicaid contract awards include the following:

  - In February 1989, EDS signed an eight-year contract to provide full fiscal agent services for the North Carolina Division of Medical Assistance (DMA). EDS will provide claims processing as well as management and utilization review reporting for DMA as it has done since 1977.

  - During the first quarter of 1989, EDS also won a new five-year contract with Wyoming to perform claims processing and other fiscal agent functions for the state's Medicaid program.

- In December 1988, EDS signed a four-year contract to continue providing program management and data processing services for the Texas Medicaid program. EDS has administered this program since 1977.

- During 1988, EDS also signed new Medicaid contracts with Idaho and Alabama, and extended contracts in Arkansas, Georgia, and Kansas.

- Other state government contracts awarded during 1988 included the Florida Student Loan Program, the New York Commercial Drivers License System, the Recipient Eligibility Verification System for Medicaid recipients in the Commonwealth of Massachusetts, and California In-Home Support Services.

- In October 1988, the Government Systems and Financial and Insurance Groups joined together to win a seven-year contract valued at over half a billion dollars. Under one of the company's largest contracts ever, EDS will provide the New Jersey Automobile Full Insurance Underwriting Association with full program management services to 425,000 policy holders.

The Financial Industry Group provides processing/network services, FM services, and application software products to the financial services industry.

- Recent contract awards from financial customers include the following:

  - In March 1989, EDS signed a ten-year FM agreement under which EDS will assume all data processing responsibilities, as well as all voice and data communications for the Meritor Savings Bank of Philadelphia. EDS will install its Integrated Financial System, which provides integrated back-office services for financial institutions.

  - During the first quarter of 1989, EDS also won a new contract with the Dallas-based Deposit Guaranty Bank to assume responsibility for all of that bank's data processing for the next five years.

  - Under another five-year agreement, EDS will handle all data processing in New York City for Banco de Ponce, which is headquartered in San Juan (Puerto Rico) and has 14 branches in New York.

- In April 1988, EDS won a 10-year FM agreement with Houston-based First City Bancorporation of Texas, Inc. EDS is consolidating and managing the information of First City's 28 member banks operating in 62 locations.

- Sooner Federal Savings and Loan of Tulsa (OK) signed a five-year agreement for EDS to provide its Integrated Financial System.

- During 1988, EDS also signed new or extended existing contracts with Arizona State Savings and Credit Union (Phoenix), Cullen Frost Bank, First Colonial Bankshares (Chicago), Farm Credit Bank (St. Louis), Gulfbanks, Inc. (Corpus Christi), Republic Federal Savings in California, and Virginia Federal Savings & Loan Association.

- Presently, EDS processes information for more than 12 million credit union members and more than 3,000 credit unions through its CUNADATA division.

  - During 1988, EDS signed 633 credit union contracts.

  - FLAGSHIP[R] is EDS' credit union processing system that provides comprehensive support options to meet the needs of credit unions, regardless of size.

- Major bank processing applications offered include the following:

  - The Deposit System allows a financial institution to offer a variety of deposit products to both commercial and individual customers. These products include checking accounts, savings accounts, certificates of deposit, tiered interest rate money market accounts, and IRA and Keogh accounts. Cash management functions available include account analysis and balance reporting.

  - The Loan System processes the financial institution's consumer, commercial, and mortgage loan portfolios. Consumer loan processing services include automatic coupon book ordering, officer performance reporting, delinquency reporting, credit bureau interfaces, variable loan rate adjustment, credit life insurance calculation, and processing of automatic drafts from deposit accounts. Commercial loan processing services include additional capabilities such as complete commitment accounting, collateral tracking, and participant account reporting. Mortgage loan services include processing for adjustable rate

loans, investor reporting, loan warehousing, and escrow accounts and analysis.

- The Financial Accounting and Reporting System provides general ledger, budgeting, financial accounting, and cost accounting capabilities for financial institutions. Asset and liability management systems, planning and forecasting systems, and other financial management services are also provided.

- The Customer Information System integrates all of a financial institution's banking applications into a single system and provides an information data base and the accounting and audit controls necessary to maintain the data base. All banking transactions are posted to an on-line general ledger, and customized internal reports detailing customer profitability, budget variances, and cost/profit center performance are generated.

- Back office services include proofing and encoding, bulk statement filing, statement mailing, and truncation in order to accommodate additional check processing needs of its customers. Other services include account reconciliation processing, document storage, filming, stamping, archival storage, and statement rendering.

- Microcomputer software and related products permit access to EDS' mainframes on a remote basis. Products are available for Asset/Liability Management, Financial Management Information, Loan Origination and Document Printing, Loan Loss Control, Safe Deposit Box, Call Reporting, Back-Up Withholding (1099s), General Ledger, Fixed Asset Accounting, and Planning & Budgeting.

- Through the acquisition of MTech, EDS complemented its activities in the financial marketplace.

  - EFT services are provided to financial institutions and retailers through the MPACT Network.

    - The MPACT Network, established in 1979, includes approximately 1,300 MPACT ATMs and approximately 2.5 million MPACT debit cards issued to customers of member financial institutions located primarily in Texas, Louisiana, Arkansas, New Mexico, Oklahoma, West Virginia, and Massachusetts.

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- MPACT has interface relationships with 24 other regional and national networks such as CIRRUS, PULSE, American Express, HONOR and DISCOVER, which allow approximately 50 million additional holders of debit cards access to the MPACT Network and make over 15,000 additional ATMs available to MPACT cardholders.

- Financial transaction processing software products, generally available both domestically and internationally, include the following:

  - The Card Management System performs daily limit tracking on the use of a customer's debit or credit card. The system is designed primarily for financial institutions that issue debit/credit cards. GTE also uses the system for its FON debit cards.

  - The Card Authorization System provides electronic or voice authorization/denial of debit and credit card transactions. The system is designed for any financial institution that issues debit and credit cards.

  - The Card Processing System is an integrated debit and credit card processing system for large financial institutions with large debit and credit card portfolios. The system processes transactions for national credit cards as well as private-label cards.

  - The Merchant Accounting System supports a financial institution's accounting function as it relates to merchants and their revolving credit relationship with an institution. The system performs accounting for merchant deposits, discounting, fee billing, invoicing, and profitability.

The Insurance Industry Group provides FM and processing services and turnkey systems to commercial insurance companies and Blue Cross/Blue Shield organizations (where state money is not involved).

- During 1988, EDS processed over 330 million life, health, and casualty insurance claims, impacting over 50 million people.

- EDS provides centralized processing and communications services to a major insurance industry consortium that serves 70% of all Fortune 500 companies. In 1988, one in five Americans in 40 states participated in this program. More than 23 million claims were processed.

- During the first quarter of 1989, EDS signed a 12-year FM agreement with Whitehall Insurance Holdings, Ltd. to convert the life and group business of one of Whitehall's subsidiaries (Bradford National Life Insurance Co.) to the Equity Plus and Group Management Systems at another Whitehall subsidiary (Lamar Life Insurance Co.).

- During 1988, EDS was awarded the following insurance processing/FM contracts:

  - EDS was awarded a contract with Blue Cross/Blue Shield of Illinois to implement a multi-carrier system in several of its offices and link them using EDS*NET and EDS information processing centers.

  - In January 1988, EDS received a twelve-year FM contract extension from Security Mutual Life Insurance Company. EDS will install The Insurance Machine[R], a life insurance administration system. Other Insurance Machine clients include Allstate, Union Central Life, Colonial Life and Accident, Motors Insurance Corporation, Chubb Life Insurance Co. of America, the Amfas Group of the Netherlands, and Confederation Life of Canada.

- During the fourth quarter of 1988, EDS, in cooperation with the Harvard Community Health Plan, formed Interpractice Systems. This separate company will develop and market an integrated clinical, administrative, and financial management system targeted to various health care organizations. The new system will automate medical records as well as provide diagnostic and patient self-education information.

- With the acquisition of General Data Systems, Ltd. (GDS) during 1988, EDS also offers turnkey systems for the automation of underwriting decisions, rating lines of insurance, and the processing of commercial policies for property and casualty insurance companies.

The Commercial, Communications, and International Services Group provides a range of FM, systems integration, and professional services to domestic and international clients. EDS was one of the world's first commercial systems integration specialists and has emerged as a major force in both government and commercial markets.

- Examples of recent domestic commercial contracts obtained by EDS include the following:

- In November 1988, EDS formed a ten-year enterprise management agreement with Enron Corp. (Houston), a leading U.S. gas company, to assume management responsibility for Enron's computing, software development, and telecommunications functions.

- During 1988, EDS was awarded FM contracts with several other oil and gas industry clients, including Placid Oil Co. of Dallas (five-year contract), Hunt Energy Corporation (five-year contract), Penrod Drilling Corporation (one-year contract), and Freeport-McMoRan of New Orleans.

- In the fourth quarter of 1988, EDS signed a contract with TELIC to provide computer and data processing resources. TELIC provides customized administrative and operations software systems to telephone, electric, and gas companies in North America.

- In February 1988, EDS signed a ten-year contract to provide systems integration, telecommunications, and FM services to the Loews Anatole Hotel in Dallas.

- During 1988, EDS won an eight-year FM contract with Riser Foods, Inc., a retail grocery and wholesale distributor in Ohio.

- During 1988, EDS was awarded an eight-year contract from jewelry manufacturer CJC Holdings to provide FM services, implement financial applications, and consolidate manufacturing systems.

- As a systems partner to Apple Computer, EDS will assist in upgrading Apple's corporate computer and communications capabilities.

- In August 1988, EDS signed a major plant automation agreement with Caterpillar to integrate manufacturing software packages being installed in Caterpillar's new plants in Aurora and East Peoria (IL).

- During the fourth quarter of 1988, EDS formed an agreement with Ryder System to define, develop, and implement a corporate-wide human resource management system.

- International contract awards include the following:

  - During the first quarter of 1989, EDS signed a three-and-one-half-year agreement with BASF (a West German chemical company) to provide an information technology infrastructure for the chemical company's storage and packaging department.

  - In Spain, EDS will develop and implement an automatic warehouse system for Danone, a large producer of dairy products.

  - Under contract with DANZAS-SATEM (France), EDS will operate and maintain the company's distribution systems.

  - EDS' seven-year contract extension with French manufacturer Gallay provides for administrative systems and manufacturing applications services.

  - Also during the quarter, EDS negotiated a 10-year contract with the International Bank of Asia (Hong Kong) to assume responsibility for its information-technology systems.

  - In December 1988, E.D.S. of Canada, Ltd. received a five-year contract to provide complete processing services for CAMI Automotive, Inc., a joint venture between GM of Canada and Suzuki.

  - In February 1988, EDS was awarded a seven-year agreement with the United Kingdom Civil Aviation Authority (CAA) to manage the CAA's administrative computer systems and headquarters data center. EDS is also participating in the development of improved communications between CAA's departments. The operation of 60 offices will be linked through minicomputer installations, which are to be integrated with a headquarters administrative system.

  - During 1988, EDS and Shearson Lehman Hutton finalized a five-year agreement for EDS to implement an extended application of TradePro for Shearson's international operations. This is in addition to EDS' work in support of Shearson's UK securities trading in capital markets and international equities.

  - EDS will assist France Telecom in the implementation of telecommunications capabilities that will allow France Telecom to provide integrated voice and data services to its customers.

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- During 1988, EDS won a contract extension with Unilever, the Anglo/Dutch consumer products company, to provide FM and systems integration services for ten Unilever operating companies.

- EDS signed a five-year contract with Sociaal Fonds Bouwijverheid, the social security administration for the Dutch construction industry, to install and operate a pension fund system.

- EDS finalized an eight-year contract with Netherlands shipbuilder Verolme Scheepswarf Heusden B.V. to develop and manage new financial and reporting, personnel, time registration, and production systems.

- EDS currently has more than 250 international contracts with clients in various industries.

EDS' GM revenue comes from designing, installing, and operating GM information systems and implementing the automaker's large private digital telecommunications network. Project examples include the following:

- During 1988, EDS signed a five-year, fixed-price agreement with GM's Automotive Components Group to provide computer, information processing, and communications services.

- EDS has a long-term, fixed-price agreement with Chevrolet-Pontiac-GM of Canada Group to provide development, ongoing support, IPC operations, plant floor automation services, and communications support.

- EDS and Buick-Oldsmobile-Cadillac Group (B-O-C) finalized a five-year contract for EDS to provide computer, information processing, and communications services to B-O-C's 26 manufacturing plants and business locations.

- During the fourth quarter of 1988, EDS signed a four-year contract extension with the GM Truck & Bus Group. This extension was made half-way through an existing five-year contract.

- In July 1988, EDS signed individual contracts with CADAM, Inc. and McDonnell Douglas Information Systems Company that call for the two firms to act as strategic partners in GM's CAD/CAM/CAE/CIM (C4) program. The program's goal is to build a C4 Data Pipeline, encompassing a data, computing,

and communications architecture based on open industry standards. CADAM and McDonnell Douglas software, combined with EDS' corporate graphics system software, will form the nucleus for the C4 program.

- EDS continues to support all other areas of General Motors, including GMAC and staff and administrative functions.

Industry Markets

Approximately 59% ($2.8 billion) of EDS' total 1988 revenue was derived from its parent company, GM, and 2% was derived from interest and other. The remaining 39% ($1.9 billion) of total revenue was derived from clients in various industries, including banking and finance, insurance, manufacturing, retail, distribution, transportation, and energy.

Geographic Markets

INPUT estimates approximately 90% EDS' total 1988 revenue was derived from North American operations. The remaining 10% was derived from international sources.

EDS has nearly 7,300 international employees.

Computer Hardware

EDS currently operates 21 Information Processing Centers (IPCs) worldwide.

- EDS has over 300 mainframes from various manufacturers installed at these centers, including IBM, National Advanced Systems (NAS), and Amdahl systems.

- IPC locations include Richardson, Dallas, and Plano (TX); Sacramento (CA); Camp Hill (PA); Auburn Hills and Warren (MI); Herndon (VA); and Paris.

In March 1989, EDS officially opened the world's first Information Management Center (IMC) in Plano (TX), a network command site responsible for managing EDS*NET, EDS' private digital network that will ultimately manage the telecommunications needs of EDS' Information Processing Centers.

- Through EDS*NET, over 730 million transactions are processed each month--nearly 17,000 transactions per minute.

Fig

KEANE, INC.
Ten City Square
Boston, MA 02129
(617) 241-9200

John F. Keane, President
Public Corporation, OTC
Total Employees: 950
Total Revenue, Fiscal Year End
12/31/88: $60,037,542

The Company

Keane, Inc., founded in 1965, provides professional services to Fortune 1000 manufacturers, major banks, financial services firms, and insurance companies, and application software products and facilities management services to hospitals.

Revenue for 1988 was $60 million, a 35% increase over 1987 revenue of $44.6 million. Net income rose 225%, from $883,302 in 1987 to nearly $2.9 million in 1988. In the five-year financial summary that follows revenues have been restated to reflect the reclassification of customer pass-through expenses:

KEANE, INC.
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	1988	1987	1986	1985	1984
Revenue	$60,038	$44,578	$41,056	$40,174	$34,145
• Percent increase from previous year	35%	9%	2%	18%	62%
Income before taxes	$4,832	$1,642	$8	$1,152	$906
• Percent increase (decrease) from previous year	194%	*	(99%)	27%	*
Net income	$2,866	$883	$283	$766	$619
• Percent increase (decrease) from previous year	225%	212%	(63%)	24%	167%
Earnings per share	$2.25	$0.64	$0.21	$0.55	$0.47
• Percent increase (decrease) from previous year	252%	205%	(62%)	17%	161%

* *Percent change exceeds 1,000%*

Keane is currently organized into two divisions as follows:

- The Information Services Division (ISD) provides custom software development, consulting, and education and training professional services primarily to the manufacturing, insurance, financial services, and banking industries and government clients.

- The KeaMed Hospital Systems Division provides application software products and facilities management services to small and medium hospitals.

Keane management attributes the company's financial results to the following:

- Professional services (ISD) revenue for 1988 reached $52.2 million, a 49% increase over 1987 revenue of $35.1 million. Approximately 30% of the 1988 revenue increase is attributed to acquisitions made during 1988 and 1987. The remaining 70% of growth is due to increased market share, particularly in the company's Midwest operations. ISD earnings increase by more than 200% during the year.

- Part of Keane's strategy is to expand its network of ISD branch offices in targeted cities through the acquisition of professional services firms. Acquisitions made by Keane include the following:

  - In March 1989, Keane acquired Computer Consultants, Inc., a professional services firm headquartered in Brooklyn Heights (OH).

  - In November 1988, Keane acquired Illation, Inc., a small professional services firm with expertise in artificial intelligence based in Bloomfield (CT). The operations of Illation have been combined with Keane's Meriden (CT) branch office.

  - In July 1988, Keane acquired Dataframe, a small professional services firm based in New Providence (NJ). The operations of Dataframe will be combined with Keane's New York Metro branch.

  - Effective January 1988, Keane acquired Trigon Group. Trigon is a professional services firm with offices in Philadelphia (PA) and Clinton (NJ).

- In September 1987 Keane acquired Prosystems for cash and stock. Prosystems is a professional services firm based in Columbia (MD). The acquisition was made in an attempt to strengthen Keane's Baltimore branch and to expand the company's business in the Washington/Baltimore corridor.

- In June 1986 the company acquired Reden Consultants to bolster its Chicago branch. Reden, a professional services firm with offices in Chicago (IL) and Minneapolis (MN), had 80 employees at the time of the acquisition and 1985 revenue of approximately $4.5 million.

• KeaMed Hospital Division revenue was $7.8 million in 1988, an 18% decrease from $9.5 million for 1987.

- Revenue declines were attributed to Keane's 1987 decision to eliminate the sales and marketing of the division's IBM System/38 and System/36 hospital application software and related services. KeaMed is now concentrating on its Wang VS-based applications.

- Despite the decline in sales, KeaMed increased earnings by more than 50% during 1988.

Research and development expenditures were approximately $854,000 in 1988 and were related to KeaMed software products for the Wang VS. Development costs in previous years, $1.2 million in 1987 and $1.7 million in 1986, were in support of software for the Wang VS and IBM System/36 and System/38.

Revenue for the three months ending March 31, 1989 reached $15.9 million, a 14% increase over $14.0 million for the same period in 1988. Net income for the period was $827,000, a 40% increase over $590,000 for the same period a year ago.

As of December 31, 1988, Keane had 950 employees, segmented as follows:

Marketing/sales	40
Professional staff	750
Other	160
	950

Major competitors include the following:

• Professional services: Computer Task Group, AGS Computers, Analysts International, Computer Horizons Corporation, CAP Gemini, and CGA Computer, Inc.

- Health care industry: Shared Medical Systems, HBO & Company, Baxter Travenol, and Systems Associates.

Key Products and Services

Approximately 87% of Keane's 1988 revenue was derived from professional services, 8% from facilities management services, and 3% from application software products. The remaining 2% was derived from hardware sales and other sources. A three-year summary of source of revenue follows:

KEANE, INC.
THREE-YEAR SOURCE OF REVENUE SUMMARY (a)
($ millions)

	FISCAL YEAR					
	1988		1987		1986	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
Professional services	$52.2	87%	$35.1	79%	$30.9	75%
Facilities management	4.7	8%	6.0	13%	6.5	16%
Software products	2.0	3%	2.2	5%	2.7	7%
Hardware and other	1.1	2%	1.3	3%	1.0	2%
TOTAL	**$60.0**	**100%**	**$44.6**	**100%**	**$41.1**	**100%**

(a) Revenue for 1987 and 1986 has been restated to reflect a reclassification of customer pass-through expenses.

The Information Services Division (ISD) provides professional services primarily in the manufacturing, banking, financial services, insurance, and utilities industries.

- More than 95% of ISD's revenue is derived from assignments from previous Keane clients.

- ISD provides project management, technical skills, and data base expertise, as well as contract programming services, to assist clients in the design, development, implementation, and modification of business applications software systems, data base management systems, and teleprocessing network systems.

  - Keane has experience in developing systems for most major large mainframe manufacturers, in addition to minicomputer

vendors such as Wang, HP, Data General, DEC, Prime, and IBM.

- Keane has experience in implementing a variety of data base systems, including IMS, TOTAL, System 2000, IDS, IDMS, and DB2.

- Teleprocessing systems experience includes CICS, IMS-TP, ENVIRON-1, and TASK MASTER.

- Typical products in the manufacturing area involve factory operations, materials management, quality assurance, warehousing, dispatching, and distribution. Keane has also supported manufacturing companies with other applications such as accounting, marketing, human resources, and general reporting systems.

- In the insurance area, Keane has experience with applications such as claims processing, agency management and commissions, coordination of benefits and subrogation, pension, premium and loss reporting, accounting, compensation, and benefits systems.

- Representative applications Keane has developed and/or enhanced in the banking and financial services area include marketing, mutual fund analysis, fund tracking, shareholder, stock transfer, deposit, consumer information, commercial and consumer loans, ATMs, direct deposit, charge offs, cash distribution, accounting, and human resource systems.

- Examples of projects that Keane has been involved in include the following:

  - Keane recently completed the design of a DB2 data base for a major regulated utility in the Northeast. The project is a work order processing system to coordinate the delivery and installation of the utility's distribution systems.

  - Keane managed a two-year project involving the development of a new standard costing system that would assist in pricing and decision making for a large specialty stainless steel manufacturer. Keane provided formal requirements definition, external design, internal design, coding, and testing for the system for an IBM 4381, using COBOL, WESTI, TOTAL, and DOS/VM.

- Keane developed and implemented a system to track and identify the warranty status of OEM components purchased by a major hardware company.

- Keane updated and modernized a distribution control system for an international computer company to assist with national shipping and equipment logistics.

- Keane rewrote and upgraded an Inventory Tracking System (adding Cost & Audit Trail capabilities) for a major manufacturer of jet engine replacement parts. Keane performed the systems analysis and design, data analysis and design of the data base, implementation of data base archival subsystems, wrote detailed program specifications, restructured the data base, coded the system, completed a systems test, parallel test, system documentation, and user documentation.

- For a major Midwest steel producer, Keane has implemented a new Employee Work Schedule System in ADABAS/NATURAL on a DEC VAX and designed, programmed, and implemented a Rail Car Tracking System.

- Keane managed the conversion of a pharmacy system for chain drug stores from a DPS-6 minicomputer to an IBM 4300 under OS/MVS and using CICS and VSAM for a Fortune 100 computer hardware, software, and process control equipment manufacturer.

- Keane is supplying senior programmer/analysts with experience in IMS DB/DC and/or ADF to a client with a government-related contract to develop and implement a total system to automate the Navy for two Middle Eastern allies. The applications include all aspects of materials management, finance, and weapons control.

- Keane is assisting in the conversion of Payroll and General Ledger Systems from DOS to OS/MVS for a major beauty products company.

- Keane has performed a variety of services for a major Midwest bank, including managing the conversion of the bank's current Burroughs software with their new Hogan system.

- Keane has assumed total management responsibility for the data processing operations of a large manufacturing

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company, including data entry, systems programming, and applications programming support.

- Keane assisted with the design, programming, and implementation of a $40 million consolidated claims processing system for a national insurance company.

- Keane assisted a leading insurance company with the design, development, and c of an agent/agency rating and profit sharing system.

- Keane provided implementation and training for a new Fiduciary Accounting System for a large insurance brokerage and services firm.

- Keane analyzed, coded, tested, and installed a voice response application for a telephone banking system for a financial services company.

- Keane recently completed the development and programming of a system that computerizes equipment leases and tracks revenue forecasts and receivables for a Fortune 500 leasing corporation based in Boston.

- Keane has worked with a major financial institution and two universities to develop system development life cycles appropriate to their environments.

• ISD provides methodologies, software, seminars, and workshops for project management and applications development as follows:

- Productivity Management (PM), a proprietary project management methodology, uses seven principles to help control the project environment.

- The Project Manager Development Program (PMDP™), introduced in 1985, isolates the skills used by superior project managers and provides a system for learning these skills. PMDP assists in recognizing, hiring, developing, and assigning project managers.

- During 1988, Keane trained over 3,100 client personnel in PMDP and PM.

- ISD has developed application development methodologies and advanced technical training that it uses to assist Keane

branch offices in internal projects and to support clients' development efforts.

Through the KeaMed Hospital Systems Division, Keane markets application software products and facilities management services to hospitals.

- Worry-Free Software™, targeted to small- to medium-sized hospitals (50 to 400 beds), is a modular and integrated hospital information system that includes financial, patient care, and clinical systems.

  - Financial Systems.

    - Inpatient billing.
    - Outpatient billing.
    - Payroll/personnel.
    - Materials management.
    - Accounts payable.
    - General ledger and budgeting.

  - Patient Care Systems.

    - ADT (Admission, Discharge, and Transfer).
    - Outpatient registration.
    - Medical records abstracting/DRG.
    - Chart deficiency.
    - Central index.
    - Order entry.
    - Results reporting.

  - Clinical Systems.

    - Radiology.
    - Pharmacy.
    - Laboratory.

- Keane is currently marketing Worry-Free Software for Wang VS minicomputers under Wang's Independent Sales Organization Agreement. Modules range in price from $10,000 to $150,000.

- In February 1989, Keane announced Pinnacle/5000, a family of hospital applications designed for the Wang VS 5000 and targeted to hospitals with 50 to 150 beds. Modules available include a full set of integrated financial applications, order communications/results reporting, inpatient and outpatient registration, operating room scheduling, medical records system

with abstracting, materials management, pharmacy, and laboratory.

- As previously discussed, Keane no longer actively marketing software products for IBM System 36 or System 38 computers.

- Keane provides customization and implementation for each system, including user training and documentation. A Software Protection Plan, available to users, incorporates changes by the hardware vendor, third-party insurers, and the government into the system and furnishes new releases and documentation. The annual fee for the plan is 12% of the system purchase price.

Through KeaMed Hospital Systems, the company also provides Extended Operations Support (EOS) facilities management services to hospitals. EOS includes the design, development, implementation, and management of client computer systems.

- Keane offers a line of both on-line and batch systems designed for interaction with each other, although each system can be purchased separately. Both the batch and on-line systems accommodate special client requirements such as microfiche, labels, or tape-to-tape output production and backup.

- Applications available to facilities management clients include:

  - Order Communications/Results Reporting.
  - Patient Admissions and Registration.
  - Patient Billing and Receivables.
  - General Ledger and Budgeting.
  - Accounts Payable.
  - Medical Records.
  - Payroll/Personnel.
  - Radiology Management System.
  - Pharmacy Management System.

- Facilities management contracts are usually for three to five years and are billed based on a monthly schedule. KeaMed currently provides facilities management services to 16 hospitals.

Industry Markets

Approximately 87% of Keane's 1988 revenue was derived from the manufacturing, banking, financial services, insurance, and utilities industries and government. The remaining 13% was derived from the health care industry (acute care hospitals).

Geographic Markets

One hundred percent of Keane's 1988 revenue was derived from the U.S.

Keane's target market for its professional services is corporations located in the Northeast, Mid-Atlantic, and Midwest.

The company is marketing its Worry-Free Software across the U.S.

ISD has offices in Boston and Lexington (MA), Bedford (NH), Brooklyn Heights (OH), Columbia (MD), New Providence (NJ), Meriden and Stamford (CT), Minnetonka and Rochester (MN), Portland (ME), Wayne (PA), and Westchester (IL).

KeaMed has offices in Melville (NY) and Lexington (MA).

Computer Hardware

Keane has an IBM System 38, a System 36, and a Wang VS 90 installed at its headquarters in Boston. A Wang VS is installed in Melville.

Systems installed at facilities management or client hospital sites include IBM System 34s, IBM System 38s, and Wang VS systems.

SYSTEMS & COMPUTER TECHNOLOGY CORPORATION
Great Valley Corporate Center
4 Country View Road
Malvern, PA 19355
(215) 647-5930

Michael J. Emmi, Chairman and CEO
Public Corporation, OTC
Total Employees: 729 (9/88)
Total Revenue, Fiscal Year End
9/30/88: $37,594,000

The Company

Systems & Computer Technology Corporation (SCT), founded in 1968, provides application software products and systems integration professional services, including custom software development, telecommunication consulting, information resources, and facilities management, to government agencies and educational institutions.

Fiscal 1988 revenue was $37.6 million, an 11% decrease from fiscal 1987 revenue of $42 million. Net losses for the year were $3.5 million, compared with net income of $100,000 for fiscal 1987. A five-year financial summary follows:

SYSTEMS & COMPUTER TECHNOLOGY CORPORATION
FIVE-YEAR FINANCIAL SUMMARY
($ thousands, except per share data)

	FISCAL YEAR				
ITEM	9/88	9/87	9/86	9/85	9/84
Revenue	$37,594	$42,037 (a)	$41,523	$47,368	$46,411
• Percent increase (decrease) from previous year	(11%)	1%	(12%)	2%	10%
Income (loss) before taxes	$(3,331)	$(1,460)	$(23,377) (b)	$(264)	$7,450
• Percent increase (decrease) from previous year	(128%)	94%	*	(104%)	(46%)
Net income (loss)	$(3,480)	$100	$(14,810)	$456	$4,441
• Percent increase (decrease) from previous year	*	101%	*	(90%)	(38%)
Earnings (loss) per share	$(0.26)	$0.01	$(1.08)	$0.03	$0.33
• Percent increase (decrease) from previous year	*	101%	*	(91%)	(39%)

* *Percent change exceeds 1,000%*

(a) *Includes $4.9 million (less a $1 million reserve), as a settlement of an insurance claim with former company officers..*

(b) *Includes a $15.4 million provision for the settlement of the class action and other litigation and related expenses.*

SCT management attributes the company's financial results to the following:

- Excluding interest, other income, and the $3.9 million net insurance settlement recorded in fiscal 1987, operating revenue in fiscal 1988 decreased 1% from fiscal 1987, and fiscal 1987 decreased 6.6% from fiscal 1986. These decreases are mainly the result of phase-outs of certain Information Resource Management contracts during the past two fiscal years.

- Software license and commission revenues from third-party software vendors increased 119% from fiscal 1987 to fiscal 1988 and 86% from fiscal 1986 to fiscal 1987. Since 1985, SCT has

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invested $8.9 million in research and development expenditures for its software products. During fiscal 1988 new applications were introduced to expand its BANNER Series product line.

- Net losses in fiscal 1988 were the result of lower revenues combined with continuing investments in product development ($3.1 million in fiscal 1988). Payroll costs were reduced in fiscal 1988 as the result of contract phasebacks and reductions in work force.

Revenue for the three months ending December 31, 1988 was $11.5 million and includes a net gain of approximately $1.9 million from the settlement of litigation with former officers of the company.

- Excluding this gain, first quarter revenue was $9.7 million -- essentially flat as compared to the same quarter a year ago -- and earnings before taxes were $317,000, an improvement of $903,000 from losses of $586,000 for the same period in 1987.

- Net income for the period reached nearly $2.2 million and includes $870,000 from utilization of available net operating loss carryforwards.

SCT is currently organized into two operating divisions as follows:

- The Information Resource Management (IRM) division provides systems integration services, including management and staffing operations for the information resources (computing, office automation, telecommunications) of educational institutions and governments. This division also includes SCT's custom software development and technical consulting services.

- The Software and Technology Services division incorporates SCT's packaged application software products and telecommunications consulting services for education and government.

Recent marketing agreements announced by SCT include the following:

- In March 1988, SCT signed as a systems integrator for the government and education markets with Hewlett-Packard. As an HP systems integrator, SCT will combine HP hardware and software with its custom programming services, market

expertise, and facilities management capabilites to create complete systems for state and local governments, schools, and other institutions.

- In November 1988, SCT announced it had signed a two-year joint marketing agreement with Sequent Computer Systems to offer SCT's BANNER™ Series software on Sequent's Symmetry computers.

As of September 30, 1988, SCT employed 729 persons. As Of December 1988, SCT had 707 employees.

Current SCT competitors, by product/service area, include:

- Professional services: Planning Research Corporation, Computer Sciences Corporation, Electronic Data Systems, and in-house data processing departments.

- Software products: American Management Systems, Management Science America, and Integral Systems, Inc.

Key Products and Services

Approximately 84% of SCT's fiscal 1988 revenue was derived from professional services and 12% was from application software product licenses and commissions. The remaining 4% was from interest and other sources. A three-year source of revenue summary, as provided by SCT, follows:

SYSTEMS & COMPUTER TECHNOLOGY CORPORATION
THREE-YEAR SOURCE OF REVENUE SUMMARY
($ millions)

	FISCAL YEAR					
	9/88		9/87		9/86	
ITEM	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL	REVENUE $	PERCENT OF TOTAL
Professional services	$31.4	84%	$34.2	81%	$37.8	91%
Software license fees	1.8	4%	1.1	3%	2.3	5%
Commissions	0.8	2%	0.2	1%	--	--
Insurance settlement	--	--	3.9	9%	--	--
Interest, primarily on short-term investments	1.6	4%	1.6	4%	2.7	6%
Other revenues	--	--	0.3	1%	--	--
TOTAL	**$37.6**	**100%**	**$42.0**	**100%**	**$41.6**	**100%**

SCT provides a range of professional services to educational institutions and local governments.

- Under Information Resource Management (IRM) contracts, SCT provides planning, management, staffing, and operating capabilities for its clients' information resources--the data processing center, management information systems, office automation systems, and telecommunications systems.

- SCT personnel are located at a client's site to manage and/or staff any combination of these functions. Responsibilities can include data center operations, administrative systems development, budgeting control, long-term planning, user liaisons, training, hardware procurement, technical and operations support, data center design and implementation, and integrated communications services.

- IRM contracts typically cover a three-to-five-year period, with an option to renew. As of September 30, 1988, SCT had 36 long-term contracts in effect for management and staffing services.

- Some of the highlights of SCT's IRM business in fiscal 1988 include the following:

  - During fiscal 1988, four new long-term clients for IRM services were added. In addition, eight of the eleven services clients scheduled for renewal in 1988 signed new contracts with SCT -- a 73% renewal rate.

  - The City of Ft. Wayne (IN) signed a six-year contract for SCT to manage and staff the City's data processing and telecommunications functions.

  - Byron Health Center contracted with SCT for a needs assessment, master plan, and user liaison/support. SCT will be evaluating the Center's administrative information requirements, preparing an information system master plan, and helping the Center select, implement, and support a new administrative system.

  - Dowling College, located in Oakdale (NY), signed a seven-year contract for the staffing and management of the college's computing facilities and other information systems. Dowling College is also an SCT software client.

  - Kent County (DE) signed a five-year contract for SCT to develop a long-range computing master plan, provide systems analysis and programming resources to support new system development, improve computer literacy and training for County employees, and manage the day-to-day operations of the County's computer center.

  - The following clients renewed their on-site services agreements during fiscal 1988: Delaware County Community College (PA), Cuyahoga Community College (Cleveland, OH), San Diego Community College District, New Jersey Institute of Technology, Puerto Rico Department of Health, Northampton County (PA), Lake County (IN), and the City of San Juan (PR) Municipal Hospital.

- SCT also provides custom applications software development services for government and education. An on-site development team assumes full responsibility for the software development project, including the feasibility study, design, coding, testing, and implementation, using tested methodologies for project management, software engineering, and quality assurance, such as automated project control, structured techniques, and process check points.

- In the area of systems integration services for court systems, SCT is supporting the 10th Judicial Circuit Criminal Justice Board of Florida and has provided consulting and design services for Florida's 8th and 20th Judicial Circuits.

SCT provides packaged software and telecommunications planning and implementation to higher education and government through the Software and Technology Services division. SCT's application software products automate the administrative functions of education and government to help control costs, increase productivity and improve the quality of services, and to provide decision support information for executives and administrators.

- The BANNER™ Series, introduced in September 1987, is designed for colleges, universities, and government jurisdictions. The product runs on DEC VAX and IBM mainframe computers, using the ORACLE® relational data base management system and SQL. The software ranges in price from $30,000 to $250,000.

  - The BANNER Student System for higher education provides a range of administrative functions, from recruiting and registration, to class schedules, records, and billing.

  - The BANNER Finance System for higher education and government, released in the first quarter of fiscal 1989, provides financial data and management information in the areas of fund accounting, accounts payable, cost accounting, purchasing, and budgeting.

  - The BANNER Alumni/Donor Development System, introduced in the fourth quarter of fiscal 1988, provides administrative support for fund-raising and development programs for colleges and universities.

  - A BANNER Human Resources System for education and government is currently under development.

- The SYMMETRY™ Series, introduced in February 1987, addresses the student, financial, human resource, and alumni administrative information needs of higher education, and the financial and human resource information requirements of government jurisdictions.

- The products operate in the IBM mainframe environment, using the SUPRA™ relational data base management system from Cincom Systems and range in price from $45,000 to $150,000.

- SYMMETRY-ISIS, the Integrated Student Information System, covers such administrative functions as registration, course catalog, class schedules, and student billing.

- SYMMETRY-IFIS, the Integrated Financial Information System, includes financial operations, accounts payable, and budgeting.

- SYMMETRY-HRIS, the Human Resources Information System, maintains personnel, time sheet, and payroll information for employees as well as job classification, budget, and control information for human resources management.

- SYMMETRY-ADD, the Alumni & Donor Development System, maintains a data base of alumni, corporations, foundations, donors, prospects, and other fund-raising sources and allows the user to create targeted mailings to prospects based on giving history, affiliations, and personal interest.

• The 4D Series of software products for higher education institutions run on IBM and compatible mainframes using Cullinet's IDMS/R relational data base management system.

  - In May 1988, SCT announced ISIS (Integrated Student Information System)-4D which tracks a range of integrated applicant and student administrative functions, such as recruiting, admissions, academic history and transcript processing, registration, catalog and course scheduling, grade reporting, financial aid, fee assessment and collection, student housing, and faculty assignments. ISIS-4D is installed at six universities, including five that assisted SCT in the development of the system.

  - SCT is currently developing FIMS-4D, a financial information management system.

• SCT provides additional administrative information systems as follows:

  - A student information system under the ADABAS data management system.

- Honeywell DM-IV administrative information systems for higher education and government.
- A Civil Court Information System.
- A Criminal Court Information System.
- Licenses for SCT's microcomputer-based application software products increased 107% during fiscal 1988. The products, which attracted more than 30 new clients during the year, include the following:
  - PCES™ is a student information system for smaller colleges, universities, and private career schools.
  - PELL+ is a system that enables educational institutions to access and exchange data with the U.S. Department of Education's computerized Pell Grant Electronic Data Exchange Program for financial aid processing.

Industry Markets

Approximately 60% of SCT's fiscal 1988 revenue was derived from educational institutions, and 40% was from government.

The markets for SCT's products and services include:

- Colleges, universities, and other educational institutions, including proprietary schools.
- State and local government, the federal government, and federal agencies.
- Educational, trade, and business associations.

Geographic Markets

One hundred percent of SCT's fiscal 1988 revenue was derived from the U.S. and Puerto Rico.

SCT maintains regional offices in Irvine (CA), Rockville (MD), and Hato Rey (Puerto Rico).

Computer Hardware

SCT maintains an IBM 4381 Model 2 mainframe and a DEC MicroVAX at its headquarters for software research and development.

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VII

Opportunities and Recommendations

VII

Opportunities and Recommendations

A

Opportunities in Professional Services

Professional services remains a solid, growing market in the information services business. Exhibit VII-1 lists four major opportunities in professional services.

EXHIBIT VII-1

Opportunities in Professional Services

- New technology-related services
- Telecommunications-related services
- Software development becoming software modification
- Software conversion
- Systems operations

More competition from large business enterprises will drive major upgrades to strategic systems. The formation of unique service enterprises, such as companies that review employee health care claims or audit bills for travelers, will play a growing role in the need for professional services. Finally, as more business is done internationally, the demand for telecommunications-related professional services will increase.

Front-end activities (such as consulting, planning, and design) represent those professional services with the highest added value. These activities are the key to maintaining solid margins and account control.

The constant stream of new technologies represents a major opportunity for professional services vendors. New software products such as distributed relational data base management, 4GLs, expert systems, microcomputer/workstation-based, and on-line transaction processing products will create opportunities for vendors. New generations of hardware products from IBM (AS/400, Summit); DEC (MicroVAX, 9000; and more RISC technology-based systems); Unisys; NCR; Wang; and other vendors will likely be the main source of professional services opportunities.

The explosion in telecommunications will create various opportunities. The business aspects of network integration and network design and implementation represent the starting points in professional services. Network management, a derivative of systems operations, may turn out to be a necessary service due to technological and operational requirements.

B

Recommendations to Vendors

The degree of success of professional services vendors, whether large or small, will depend on the degree to which vendors add value. Depending on the relative size of the vendor, adding value has different meanings.

Exhibit VII-2 shows five key points for consideration, including one for smaller and another for larger professional services vendors.

EXHIBIT VII-2

Recommendations to Professional Services Vendors

- Key: Add value
- Adding value through:
  - Specialization
  - Full-service supplier
  - Front-end services (e.g., consulting, planning, design)
  - Project management
- Control quality
- Marketing, marketing, marketing
- Know thyself

1. Relationship with Applications Software Products Business

At present the professional services and applicaitons software products sectors are largely separated. Yet they both are primarily concerned with providing applications solutions to customers' needs. As the industry develops they will increasingly overlap.

Applications products today on mainframes and minicomputers often require extensive modification. In the past this has led to relationships between professional services and software product companies, for example between Andersen Consulting and MSA, whereby implementation was performed by the professional services company. It has also caused applications software products companies to develop their own professional services groups. These are frequently the fastest growing components of these companies' revenues. In some cases, applications products vendors have gone further and formed full systems integration functions.

Professional services companies are trying to improve their profit margins by finding ways to leverage their resources and increase billing rates. One way to do this is to build or obtain a product business around which to offer professional services at high rates or on a packaged solution basis. In many cases the product can be "semi-finished" so that it can be easily modified to a customer's need. Merit Systems has successfully accomplished this in manufacturing; IMI Systems is following this course in warehousing, and Broadway and Seymour in banking. American Management Systems has also been successful with this approach.

As software development becomes automated there will be strong analogies to the development of manufacturing. Automobile manufacturing moved from hand-crafted, one-at-a-time production through standard mass production to "mill runs" (to use an Alvin Toffler expression) of customized finishes on standard frames assembled from standard components. Software solutions will follow a similar course to the eventual implementation of a solution from automated assembly of standard subassemblies guided by professional information systems engineers.

Smaller professional services vendors should add the most value through a strategy of specialization in:

- A vertical industry, with its need for specific software
- Cross industries through detailed knowledge of hardware platforms and systems software
- Leading-edge technology

With limited resources, smaller vendors must focus on one or, at most, combine either the vertical or horizontal market focus with understanding of certain leading-edge technologies. The obvious option of focusing on a given geographic area will not permit sufficient added value. Due to the proliferation of networks, "telecommuting" and facsimile machines, the value of local technical expertise will diminish.

Larger professional services vendors will add the most value by becoming full-line suppliers. Education and training capabilities will exist because these vendors will have made substantial investments to train their staff. Significant value can be offered through expertise in project management, software development, and implementing applications based on new technologies. Value can be added indirectly by establishing joint ventures and offering international capabilities and follow-on systems integration capabilities.

Vendors, large and small, will have to pay more attention to quality and service. Because professional services projects are as much a process as a product, both parties must ensure a solid understanding of the requirements. Once the needs are well understood, the implementation must be professional and of a high quality. The only way to ensure this is through good quality control procedures.

In the real estate business, the three key factors for buying a home or investment property are location, location, and location. Similarly, in professional services, the key factors will move quickly from technical expertise, opportunity selling, and project management to marketing, marketing, and marketing.

- Effective marketing includes a clear message—eliminate "techno-babble" and sell features and user benefits.
- Marketing should provide a clear focus—on industries, services, technologies, or geography.
- Marketing considers the next step in a process. Is systems integration the next logical step for professional services vendors?
- Marketing is an awareness of the competition—watch the RBOCs, the Japanese trading companies, and Western Europe-based computer manufacturers.

Given the proper emphasis, the current short-term sales focus will migrate to a long-term marketing focus.

The last piece of advice can be summarized as know thyself. A company must understand what its capabilities are and develop a matrix of internal

skills and market needs. Evaluate a firm's capabilities in people, technology, and business skills.

Invest in people by first attracting the right people with the right skills and work style. Provide training in the focus technologies and in management and basic business principles. Organize the company to best utilize the skills and people available.

Invest in technology through a project management methodology, one that is either acquired or developed internally. Be aware of new developments in related technologies such as telecommunications and data communications.

INPUT believes the most successful vendors will be those with:

- Well-defined target markets
- Matched internal capabilities and user needs
- Expertise in implementing a few leading-edge technologies

2. Summary

As the professional services delivery mode further matures, the primary differentiator will become the degree of added value, because all vendors will be adding value. Examples of professional services degrees of added value are as follows:

- *Low:* Experience with few hardware platforms, software development resources (i.e., people) in standard languages

- *Medium:* Provide customers with specific hardware or software expertise through temporary services; offer industry expertise or system/application software expertise

- *High:* Offer a combination of industry, platform, software, and management expertise

The challenge for vendors is to offer the highest levels of added value desired by customers that are consistent with revenue and profit targets.

A

Appendix: INPUT Definitions

A

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 connected 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 Systems Operations (formerly "Processing Facilities Management")*— Also referred to as "Resource Management," "Systems Management," or "COCO" (contractor-owned, contractor-operated). Processing systems operations is the management of all or part of a user's information systems department under a contract of not less than one year. To qualify as processing systems operations, the contractor must directly plan, control, operate, and own the computer and/or communication systems and facility. This service includes opera-

tion of remote computing and batch processing computing environments; the operations can be carried out either on-site, 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 systems operations 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.

- *Systems Operations (formerly "Facilities Management")* —Professional Services systems operations is the provision by a third-party vendor of only the staff needed to manage, operate, and maintain all or part of a user's information systems department. In this case, the computer and communication systems are owned or leased by the client, not the vendor.

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 computer hardware systems such as word processors, cash registers, or process control systems, nor does it include embedded computers used for military applications. Turnkey systems are available either as custom or packaged systems.

- Computer 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 computer 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

Computer Systems

Computer Systems —Includes all processors from microcomputers to supercomputers. 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-, 16-, or 32-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
  - Usually priced at less than $15,000

- *Minicomputer* —Usually a 12-, 16- or 32-bit computer that may represent a portion of a complete large system.

  - Business computer
  - Laboratory computer
  - Nodal computer in a distributed data network, remote data collection network, or connected network, or connected to remote microcomputers
  - Usually priced at less than $100,000

- *Mainframe*—Typically a 32- or 64-bit computer with extensive software and peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) and scientific applications.

D

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.

E

Industry Sector Definitions

INPUT's 15 vertical industry sectors, showing the 2-digit standard industrial classification (SIC) codes, are listed in Exhibit A-1.

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 nonmetallic 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 transportation
	46	Pipelines
	47	Transportation services

EXHIBIT A-1 (con't)

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-1 (con't)

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

F

Definition of Enterprise Size

Quantitative data for each industry sector are listed in Exhibits A-2 through A-16. The number of enterprises for each 2-digit Standard Industrial Classification (SIC) code in each sector is divided into small, medium, and large.

Categories were selected on:

- Logical divisions between size of enterprise for that business
- Similarities of information systems requirements

Sources for the total number of enterprises for each SIC are:

- County Business Patterns, 1985 (U.S. Government)
- *Sales and Marketing Management* magazine; Survey of Industrial and Commercial Buying Power (1988)
- Retail Sales Census, 1987 (U.S. Government)

EXHIBIT A-2

Banking and Finance

- Small
  - Commercial banks—Assets <$25 million (4,800)
  - Savings banks—Assets <$100 million
  - Finance companies & Credit Unions—Assets: <$25 million (25,000)
  - millionortgage bankers—Assets <$1 million (650)
  - Brokerage firms—Capital <$0.5 million (11,800)
  - Other (2,000)
- Medium
  - Commercial banks—Assets: $25 million to $500 million (8,800)
  - Savings banks—Assets: $100 million to $1 billion (1,200)
  - Finance companies & credit unions—Assets: $25 million to $500 million (2,500)
  - Mortgage Bankers—Assets: $1million to $10 million (250)
  - Other (300)
- Large
  - Commercial banks—Assets >$500 million (550)
  - Savings banks—Assets >$l billion (425)
  - Finance companies & credit unions—Assets >$500 million (500)
  - Mortgage bankers—Assets >$10 million (75)
  - Other (50)

EXHIBIT A-3

Discrete Manufacturing

- Includes: apparel, furniture, printing, leather, metal, machinery, electronics, transportation, scientific and control instruments, miscellaneous
- Small
  - Number of Employees: <20
  - Number of Firms: 184,150
- Medium
  - Number of Employees: 20 to 500
  - Number of Firms: 72,600
- Large
  - Number of Employees: >500
  - Number of Firms: 2,600

EXHIBIT A-4

Education

- Small
  - Elem/High School: <5,000 students in district (9,800)
  - 4-Year College (total enrollment): <8,000 students (1,160)
  - Jr. College/Vo.Tech (total enrollment): <4,000 students (638)
  - Library (college/university): <100,000 volumes (2,000)
  - Library (public): <6,000 volumes (54,000)
  - Library (school): <6,000 volumes (40,300)
- Medium
  - Elem/High School: 5,000-20,000 students in district (7,700)
  - 4-Year College (total enrollment): <8,000 students (1,045)
  - Jr. College/Vo.Tech (total enrollment): 4,000-10,000 students (488)
  - Library (college/university): 100,000 - 1 million volumes (1,500)
  - Library (public): 6,000 - 28,000 volumes (35,000)
  - Library (school): 6,000 - 28,000 volumes (31,350)
- Large
  - Elem/High School: >20,000 students in district (2,150)
  - 4-Year College (total enrollment): <8,000 students (275)
  - Jr. College/Vo. Tech (total enrollment): >10,000 students (125)
  - Library (college/university): >1 million volumes (650)
  - Library (public): >28,000 volumes (1,200)
  - Library (school): >28,000 volumes (17,900)

EXHIBIT A-5

Federal Government

- Small
  - Agencies with an annual budget of less than $1 billion
  - All agencies not listed below
- Medium
  - Agencies with an annual budget of $1-$8 billion
  - Education, Energy, HUD, Labor, Transportation, Interior, NASA, Railroad Retirement Board, SynFuels Corp., International Economic Development Corp., EPA, National Science Foundation, State Department
- Large
  - Agencies with an annual budget > $8 billion
  - Defense, Agriculture, Health & Human Services, Treasury, CIA, Office of Personnel Management, Postal Service, VA, National Security Agency (NSA)

EXHIBIT A-6

Insurance

- Small
  - Companies: assets < $0.5 billion (7,600)
  - Agents: < $1 million in revenues (135,000)
- Medium
  - Companies: assets $0.5-$10 billion (1,300)
  - Agents: $1 to $5 million revenues (24,000)
- Large
  - Companies: assets >$10 billion (120)
  - Agents: > $5 million revenues (1,100)

EXHIBIT A-7

Medical

- Small
  - Hospital: < 100 beds (3,100)
  - Doctor office: Solo practice (97,750)
  - Dentist office: Solo practice (34,600)
  - HMO: <15,000 members (315)
  - Nursing homes: <25 beds (13,000)
  - Laboratories: revenues < $100,000 (7,300)
  - Outpatient clinics: revenues < $500,000 (8,800)
  - Other practitioners: solo practice (38,700)
- Medium
  - Hospital: 100 - 500 beds (3, 550)
  - Doctor office: 2-10 physicians (77,600)
  - Dentist office: 2-10 dentists (66,500)
  - HMO: 15,000 - 100,000 members (233)
  - Nursing homes: 25 - 100 beds (2,400)
  - Laboratories: revenues $100,000 - $1 million (5,500)
  - Outpatient clinics: revenues $500,000 - $2 million (3,300)
  - Other practitioners: 2-10 practitioners (6,375)
- Large
  - Hospital: >500 beds (250)
  - Doctor office: > 10 physicians (5,600)
  - Dentist office: > 10 dentists (7, 000)
  - HMO: >100,000 members (47)
  - Nursing homes: > 100 beds (600)
  - Laboratories: revenues > $1 million (400)
  - Outpatient clinics: revenues > $2 million (400)
  - Other practitioners: > 10 practitioners (425)

EXHIBIT A-8

Other Industry-Specific

- Small
  - Agriculture: < $1 million revenues (1,900,000)
  - Auto services: < $100,000 revenues (95,000)
  - Construction: < $1 million revenues (1,100,000)
  - Hotels: < $1 million revenues (36,000)
  - Nonprofits: annual budget < $50,000 (750,000)
  - Recreation: < $1 million revenues (780,000)
- Medium
  - Agriculture: $1-$25 million revenue (250,000)
  - Auto Services: $100,000 - $ 1 million revenues (35,000)
  - Construction: $1 - $20 million revenues (375,000)
  - Hotels: $1 - $10 million revenues (8,200)
  - Nonprofits: annual budget $50,000 - $300,000 (440,000)
  - Recreation: $1 - $5 million revenues (165,000)
- Large
  - Agriculture: > $25 million revenues (50,000)
  - Auto services: > $1 million revenues (10,000)
  - Construction: > $20 million revenues (25,000)
  - Hotels: > $10 million revenues (800)
  - Nonprofits: annual budget > $300,000 (10,000)
  - Recreation: > $5 million revenues (15,000)

EXHIBIT A-9

Process Manufacturing

- Includes: metal mining, anthracite mining, coal mining; oil & gas exploration, minerals, food products, tobacco, textiles, lumber & wood products, paper goods, chemicals, Petroleum, rubber & plastics, stone, glass, clay; primary metals

- Small
  - Number of Employees: <20
  - Number of Firms: 107,000
- Medium
  - Number of Employees: 20 - 500
  - Number of Firms: 42,250
- Large
  - Number of Employees: >500
  - Number of Firms: 1,500

EXHIBIT A-10

Retail Distribution

- Small
  - Gen'l Mdse./Dept. Stores: revenues < $1 million (26, 300)
  - Bldg. Mat 'ls: revenues < $1 million (52,500)
  - Grocery/Bakery: revenues < $1 million (128,000)
  - Auto Dealers/Svc Sta: revenues < $1 million (120,000)
  - Clothing/Shoes: revenues < $0.5 million (105,000)
  - Furniture: revenues < $1 million (57,800)
  - Restaurants/Bars: revenues < $0.1 million (252,900)
  - Misc.: revenues < $0.1 million (197,000)
- Medium
  - Gen'l Mdse./Dept. Stores: revenues $1 million to $1 billion (8,900)
  - Bldg. Mat'ls: revenues $1 million to $1 billion (16,000)
  - Grocery/Bakery: revenues $1 million - $10 million (45, 600)
  - Auto Dealers/Service Sta: revenues $1 million - $10 million (79, 000)
  - Clothing/Shoes: revenues $0.5 - $5.0 million (34,600)
  - Furniture: revenues $1 - $ 10 million (36,300)
  - Restaurant/Bar: revenues $0 .1 - $10 million (98, 350)
  - Misc.: revenues $0.1 to $1 million (98,500)
- Large
  - Gen'l Mdse./Dept. Stores: revenues > $1billion (85)
  - Bldg. Mat'ls: revenues > $1 billion (5)
  - Grocery/Bakery: revenues > $10 million (9,100)
  - Auto Dealers/Service Sta: revenues >$10 million (1,000)
  - Clothing/Shoes: revenues >$5 million (400)
  - Furniture: revenues > $10 million (3,900)
  - Restaurants/Bars: revenues >$10 million (30)
  - Misc.: revenues > $1 million (22, 250)

EXHIBIT A-11

Services

- Small
  - Accounting: Solo practice (23,800)
  - Legal: Solo practice (69,100)
  - Arch/Engr: Solo practice (25,500)
  - Business' Services: Solo practice (9,200)
  - Repairs: Solo practice (18,700)
- Medium
  - Accounting: 2-5 persons (33,100)
  - Legal: 2-5 persons (50,300)
  - Arch/Engr: 2-5 persons (26,100)
  - Business' Services: 2-5 persons (226,000)
  - Repairs: 2-5 persons (31,700)
- Large
  - Accounting: >5 persons (1,200)
  - Legal: >5 persons (6,300)
  - Arch/Engr: >5 persons (1,600)
  - Business' Services: >5 persons (23,200)
  - Repairs: >5 persons (6,300)

EXHIBIT A-12

State and Local Government

- Small
  - Cities: population < 250,000 (2,273)
  - Counties: population < 250,000 (2,800)
- Medium
  - Cities: population 250,000 - 1,000,000 (52)
  - Counties: population 250,000 - 1,000,000 (140)
- Large
  - States: (50)
  - Cities: population > 1,000,000 (8)
  - Counties: population > 1,000,000 (45)

EXHIBIT A-13

Telecommunications

- Small
  - Local telecommunications carriers (1,880)
- Medium
  - None
- Large
  - AT&T, MCI, U.S. Sprint, 7 Regional Bell Operating Companies (RBOCs) (10)

EXHIBIT A-14

Transportation

- Small
  - Local/Bus: revenues < $5 million (13,900)
  - Trucking: revenues < $5 million (56,700)
  - Rail: revenues < $5 million (300)
  - Water: revenues <$5 million (4,600)
  - Air: revenues < $5 million (16,200)
- Medium
  - Local/Bus: revenues $5 - $20 million (6,350)
  - Trucking: revenues $5 - $20 million (11,900)
  - Rail: revenues $5 - $20 million (700)
  - Water: revenues $5 - $20 million (2,400)
  - Air: revenues $5 - $20 million (6,400)
- Large
  - Local/Bus: revenues > $20 million (205)
  - Trucking: revenues > $20 million (1,400)
  - Rail: revenues > $20 million (1,300)
  - Water: revenues > $20 million (75)
  - Air: revenues > $20 million (200)

EXHIBIT A-15

Utilities—Vertical Industry Definitions

- Small
  - Electric: revenues < $5 million (2,100)
  - Gas: revenues < $5 million (2,750)
  - Water/Waste: revenues < $1 million (26,000)
- Medium
  - Electric: revenues $5 - $80 million (1,400)
  - Gas: revenues $5 - $50 million (1,100)
  - Water/Waste: revenues $1 - $20 million (4,700)
- Large
  - Electric: revenues> $80 million (900)
  - Gas: revenues > $50 million (250)
  - Water/Waste: revenues > $20 million (300)

EXHIBIT A-16

Wholesale Distribution

- Small
  - Durable goods: revenues <$5 million (46,100)
  - Nondurable goods: revenues <$5 million (49,500)
- Medium
  - Durable goods: revenues $5 - $35 million (189,500)
  - Nondurable goods: revenues $5 - $35 million (92,600)
- Large
  - Durable goods: revenues > $35 million (20,500)
  - Nondurable goods: revenues >$35 million (17,600)
- Definitions
  - *Durable goods*: autos, furniture & home furnishings, construction materials, sporting goods, metals, electrical goods, hardware & plumbing equipment, machinery equipment & supplies, miscellaneous
  - *Nondurable goods*: paper products, drugs, apparel, groceries, farm-related raw materials, chemicals, petroleum, beer, wine, & alcoholic beverages, miscellaneous

B

Appendix: Market Data Base, 1989-1994

B

Appendix: Market Data Base, 1989-1994

EXHIBIT B-1

Professional Services Industry by Delivery Mode 1989-1994

	Market Size ($ Million)								
	1988	CAGR 1988-1989 (Percent)	1989	1990	1991	1992	1993	1994	CAGR 1989-1994 (Percent)
Professional Services	15,020	17	17,558	20,013	22,829	26,062	29,780	34,051	14
- Consulting	3,018	20	3,622	4,273	5,043	5,950	7,021	8,285	18
- Education and Training	1,819	18	2,146	2,447	2,789	3,180	3,625	4,133	14
- Software Development	8,780	16	10,185	11,509	13,005	14,696	16,606	18,765	13
- Systems Operations	1,403	14	1,605	1,784	1,992	2,236	2,527	2,869	12

EXHIBIT B-2

Professional Services Market by Industry Sector, 1989-1994

	Market Size ($ Million)								
	1988	CAGR 1988-1989 (Percent)	1989	1990	1991	1992	1993	1994	CAGR 1989-1994 (Percent)
Discrete Manufacturing	3,120	21	3,775	4,365	5,045	5,830	6,740	7,790	16
Process Manufacturing	1,490	22	1,818	2,127	2,488	2,911	3,406	3,985	17
Transportation	170	14	194	219	247	280	316	357	13
Utilities	410	10	451	510	576	651	735	831	13
Telecommunication	680	19	809	939	1,089	1,263	1,465	1,700	16
Wholesale Distribution	280	16	325	367	415	469	530	598	13
Retail Distribution	180	20	216	248	286	329	378	434	15
Banking and Finance	1,910	19	2,273	2,682	3,165	3,734	4,407	5,200	18
Insurance	1,200	15	1,380	1,573	1,793	2,045	2,331	2,657	14
Medical	300	15	345	379	417	459	505	556	10
Education	60	15	69	79	91	105	121	139	15
Services	120	14	137	153	172	192	215	241	12
Federal Government	2,910	12	3,259	3,520	3,802	4,106	4,434	4,789	8
State and Local Government	1,900	15	2,185	2,491	2,840	3,237	3,690	4,207	14
Other Industry	290	11	322	361	404	452	507	567	12

C

Appendix: Data Base Reconciliation, 1988-1989

C

Appendix: Data Base Reconciliation, 1988-1989

A

Reconciliation of Professional Services Industry

The 1987 report forecast a 1988 professional services industry totalling $15,060 million. Actual 1988 professional services industry size was $15,020 million a difference of only 0.3%.

The five-year growth rate changed from 17% to 14%, reflecting the following trends:

- Significantly slower economic growth in the forecast period, (approximately 1% of GNP)
- A more mature market
- A small shift in consulting and software development toward systems integration-based services

B

Reconciliation by Delivery Mode

The data discussed in this section can be found in Exhibit C-1.

1. Consulting

In 1987, INPUT forecast the size of the 1988 consulting submode at $3,120 million, compared with the actual 1988 figure of $3,020, reflecting an actual growth rate of only 20%.

The primary reason for the slower growth is the impact of systems integration on professional services, a trend identified by INPUT in an August 1988 report. Consulting services are sometimes provided by systems integration vendors as part of the SI process. The effect was to lessen reported consulting revenues under the professional services delivery mode by $70 million.

EXHIBIT C-1

Professional Services Data Base Reconciliation by Delivery Mode 1988-1993

Delivery Mode	1988 Market			1993 Market			88-93 CAGR perdata 88 Rpt. (%)	88-93 CAGR perdata 89 Rpt. (%)
	1988 Report (Forecast) ($M)	1989 Report (Actual) ($M)	Variance as % of 1988 Report	1988 Report (Forecast) ($M)	1989 Report (Forecast) ($M)	Variance as % of 1988 Report		
Professional Services	15,060	15,020	0	33,155	29,779	(10)	17	14
- Consulting	3,120	3,018	(3)	8,015	7,021	(12)	21	18
- Education and Training	1,960	1,819	(7)	4,600	3,625	(21)	19	15
- Software Development	8,830	8,780	(1)	18,530	16,606	(10)	16	14
- Systems Operations	1,150	1,403	22	2,010	2,527	26	12	12

The five-year forecast growth rate for consulting slowed from 21% to 18% because of the following factors:

- Shifting of consulting services as part of systems integration and systems operations projects, rather than as standalone professional services projects
- Expected impact of an overall shortage of skilled information services and systems professionals due, in part, to the lower birth rates of the 1960s and 1970s
- Expected crowding of the market and lack of vendor service differentiation, resulting in increased price competition and decreased delivery mode revenues

2. Education and Training

In 1987, the education and training submode only grew at 11% to $1,819 million, compared with a forecast growth of 20% and market in 1988 of $1,960 million.

The slower growth can be attributed to the following factors:

- More education and training was delivered as part of a systems integration project than was forecast in 1987.
- Improved embedded education and training function and built-in help functionality (including graphic user interfaces) meant less formal training than had been expected
- Few new major application and systems software products were announced in 1988

The education and training forecast growth rate will decrease from 19% to 15% due to:

- The shifting from professional services-based education and training to systems integration-based education and training
- Computer-based training replacing some customized training
- The tightening user organization budgets which is forcing IS-related education and training expenses to be cut or deferred
- Dramatically slower employment growth in IS staffs

3. Software Development

The 1987 to 1988 the forecast growth rate for software development was 17%. The actual growth rate was 16%.

The five-year forecast growth rate for software development decreased from 16% to 14%. The prime inhibiting factor is the slower economic growth forecast for the next five years.

4. Systems Operations

The 1988 user expenditures for professional services systems operations exceeded the 1987 estimate by $253 million for the following reasons:

- Greater spending than expected by the federal and state and local governments for systems operations
- Surveys conducted by INPUT in 1989 identified additional user expenditures and vendor revenues than previously reported

The five-year forecast growth rate for systems operations remains unchanged at 12% per year.

C
Reconciliation by Industry Sector

1. Reported Industry Sector Revenues in 1988

The differences between INPUT's 1987 forecast of the size of each industry sector in professional services and actual figures for 1988 are minor. The variances, which occurred in four of 15 industry sectors, are within acceptable margins of error. See Exhibit C-2.

2. Industry Sector Forecasts

Forecast growth rates for all 15 industry sectors changed. However, the slower economic growth rate affects every industry sector. Only those sectors that had additional factors to consider are discussed here.

a. Discrete Manufacturing

The growth rate slowed from 19% to 17% due to the following factors:

- A decline in the rate of replacement of batch-oriented systems, because the majority have converted to on-line environments
- A slowdown in MAP/TOP implementations
- The shift from professional services engagements to systems integration projects in networks, manufacturing resource planning (MRP II), and accounting applications

b. Process Manufacturing

INPUT reduced the forecast growth rate in process manufacturing from 22% to 18% because of:

- The effects of business cycles and eroding gross profit margins on IS spending in three key process manufacturing SICs—petroleum, chemicals, and primary metals
- Some changing from professional services engagements to systems integration projects in real-time computing and integration of the manufacturing environment
- The negative effects of process manufacturing mergers and acquisitions on overall IS expenditures

EXHIBIT C-2

Professional Services Data Base Reconciliation by Industry 1988-1993

	1988 Market			1993 Market			88-93 CAGR perdata 88 Rpt. (%)	88-93 CAGR perdata 89 Rpt. (%)
	1988 Report (Forecast) ($M)	1989 Report (Actual) ($M)	Variance as % of 1988 Report	1988 Report (Forecast) ($M)	1989 Report (Forecast) ($M)	Variance as % of 1988 Report		
Discrete Manufacturing	3,120	3,120	0	7,430	6,740	(9)	19	17
Process Manufacturing	1,490	1,490	0	4,030	3,406	(15)	22	18
Transportation	165	170	3	360	316	(12)	17	13
Utilities	420	410	(2)	740	735	(1)	12	12
Telecommunication	680	680	0	1,455	1,465	1	16	17
Wholesale Distribution	280	280	0	610	530	(13)	17	14
Retail Distribution	180	180	0	430	378	(12)	19	16
Banking and Finance	1,905	1,910	0	4,165	4,407	6	17	18
Insurance	1,205	1,200	0	2,630	2,331	(11)	17	14
Medical	300	300	0	680	505	(26)	18	11
Education	60	60	0	130	121	(7)	17	15
Services	115	120	4	255	215	(16)	17	12
Federal Government	2,910	2,910	0	5,000	4,434	(11)	11	9
State and Local Government	1,935	1,900	(2)	4,610	3,690	(20)	19	14
Other Industry	290	290	0	615	507	(18)	16	12

c. Transportation

This sector's five-year forecast growth rate will decrease from 17% to 13% as a result of:

- Consolidation into fewer information systems due to mergers and acquisitions
- Increased price competition, with slowed revenue growth resulting in decreased IS expenditures, especially in air and trucking transportation

d. Wholesale Distribution

The forecast growth rate for wholesale distribution decreased from 17% to 14% due to the following factors:

- Expected slowing of professional services projects by midsize and small wholesale firms
- Shift by large wholesale organizations from professional services to systems integration projects, especially ones involving EDI and data communications

e. Retail Distribution

The forecast growth rate in professional services for retail distribution decreased from 19% to 16% due to the following factors:

- Increased saving by consumers, reducing disposable income for retail purchases and lowering profits for retailers and the funds available for professional services
- In an effort to identify product winners and losers quickly, aggressive shifts by retailers of all sizes toward more specific systems integration projects, especially ones involving EDI, bar codes, scanners, networking, and other new technologies

f. Insurance

The forecast growth rate in professional services for the insurance sector decreased from 17% to 14% due to the shift from professional services to systems integration of projects related to electronic claims processing, catastrophic health care, and networks between agents and insurers.

g. Medical

The forecast growth rate in professional services for the medical sector decreased from 18% to 11%, primarily due to a slowing of expenditures

in all delivery modes except network services and systems integration as organizations (hospitals, HMOs, group physician/dental practices, and nursing homes) pause to catch up with changing federal government reporting requirements and the impacts of mergers and acquisitions. Intense cost pressures are affecting the hopital environment.

h. Services

The forecast growth rate in professional services for the services sector decreased from 17% to 12% due to the replacement, not upgrading, of systems by small business services firms which results in less demand for education and training, software development, and consulting than when systems were first installed

i. Federal Government

The forecast growth rate in professional services for the federal government sector decreased from 11% to 9% due to the following factors:

- Continuing budget tightening
- Shifting projects from professional services (out of operations and maintenance funds) to systems integration (long term projects and from a budget authorized by Congress for a specific project)
- Reduced discretionary Defense department expenditures

j. State and Local Government

The forecast growth rate in professional services for the state and local government sector decreased from 19% to 14% due primarily to the shift from ad hoc professional services jobs to longer term, specific systems integration projects; tighter IS budgets, following increased expenditures for computer systems and services during the past two years; and better retention of IS people by governments as the computer systems and information services business slows.

k. Other Industry Sector

The forecast growth rate in professional services for the other industry sector decreased from 16% to 12% due to the following factors:

- Slowing IS expenditures in construction and the hotel/motel industry due to a slower economy
- Shifting expenditures from general professional services tasks to specific systems integration projects

D

Appendix: Select Financial Information on Professional Services Vendors

D

Appendix: Select Financial Information on Professional/ Services Vendors

In response to client requests, INPUT prepared an appendix of select financial information on publicly traded professional services vendors.

The following vendors were evaluated:

- American Management Systems
- Analysts International Corporation
- Computer Horizons Corporation
- Computer Task Group
- Keane, Inc.
- SHL Systemhouse (Canada-based)
- Systems and Computer Technology
- Technalysis Corporation

Exhibits D-1 through D-5 provide:

- Summary financial information
- Gross profit margins
- Pre-tax profit margins
- Net profit margins
- Return on equity

for the vendors listed above.

Exhibit D-6 presents revenue per employee based on size of firm (1988) data. These calculations are based on data furnished by privately held professional services firms.

EXHIBIT D-1

Financial Summary of Professional Services Firms

Financial Category	Range (Low to High) (Percent)
Gross Profit Margin	14.7 to 55.5
Pretax Profit Margin	3.0 to 16.4
Net Profit Margin	2.4 to 9.6
Return on Equity	3.6 to 32.6

EXHIBIT D-2

Gross Profit Margins of Selected Publicly Held Professional Services Firms*

Vendor	Cost of Services ($ Million)	Revenue ($ Million)	Gross Profit Margin (%)
American Management Systems	127.5	213.0	40.1
Analysts International	61.1	89.9	32.0
Computer Horizons	58.2	79.0	26.3
Computer Task Group	186.6	218.7	14.7
Keane, Inc.	34.5	60.0	42.5
SHL Systemhouse	107.2	240.7	55.5
Systems & Computer Technology	29.1	37.6	22.6
Technalysis	11.5	17.7	35.0

* Based on fiscal year 1988 results

EXHIBIT D-3

Net Profit Margins of Selected Publicly Held Professional Services Firms

Vendor	Aftertax Profit Margin* (%)
American Management Systems	3.5
Analysts International	5.6
Computer Horizons	2.9
Computer Task Group	2.9
Keane, Inc.	4.8
SHL Systemhouse	2.4
Systems & Computer Technology	9.3
Technalysis	9.6

* Based on fiscal year 1988 results

EXHIBIT D-4

Pretax Profit Margins of Selected Publicly Held Professional Services Firms*

Vendor	Pretax Profit Margin* (%)
American Management Systems	4.9
Analysts International	9.3
Computer Horizons	5.0
Computer Task Group	4.9
Keane, Inc.	8.0
SHL Systemhouse	3.0
Systems & Computer Technology	8.8
Technalysis	16.4

* Based on fiscal year 1988 results

EXHIBIT D-5

Return on Equity of Selected Publicly Held Professional Services Firms

Vendor	Return on Fiscal 1988 Year-End Equity (%)
American Management Systems	16.9
Analysts International	32.6
Computer Horizons	14.1
Computer Task Group	9.6
Keane, Inc.	32.2
SHL Systemhouse	3.6
Systems & Computer Technology	9.5
Technalysis	21.5

EXHIBIT D-6

1988 Revenue per Employee by Size of Professional Services Firm

Fiscal Year 1988 Revenue Range ($ Millions)	Revenue per Employee (%)	Number of Firms Evaluated (%)
$25.0 -$50.0	77,200	5
$10.0 -$24.9	79,100	13
$5.0 -$9.9	81,600	7
> $5 million	57,300	7
Overall	78,215	

Source: INPUT data base

August 16, 1990

Dear Client:

It has been drawn to our attention that there is a small misstatement on page 68 of the U.S Software Products Market, 1989-1994 report published in December of 1989. The error is highlighted below and we ask that you note the correction in your copy(s) of this report.

> On page 68, first paragraph, lines and 4 should read: "as update (write) data as part of a two-phase commit across heterogeneous platforms."

We apologize for the error and any inconvenience it may have caused.

Sincerely,

Douglas H. Tayler
Director, Research

Enclosure