RE-ANALYSIS OF SELECTED INPUT DATA

VIS-A-VIS IBM'S INDUSTRY FORMAT AND ASSUMPTIONS

Submitted to

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Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

Introduction

I Introduction

This chapter introduces the research conducted by INPUT for IBM Corporation in the professional services delivery mode. The introduction is divided into the following three sections:

A. Objectives
B. Scope
C. Methodology

A
Objectives

The project's key objective is to re-state INPUT's market forecast for one delivery mode within the information services industry.

Specifically, this report looks at the professional services delivery mode for information services provided within the United States in 1988 and user expenditures for the same services forecast through 1993. This re-statement quantifies the market to reflect industry sectors and economic assumptions defined by IBM Corporation.

For its on-going program research INPUT uses two distinct delivery modes -- professional services and systems integration. For this research project, INPUT combined the four sub-modes from the professional services delivery mode with the non-hardware component of the systems integration market. In other words, expenditures for the hardware portion of systems integration projects have been "backed out."

In this context, the total size of the professional services market was not changed, except as follows:

- INPUT's inflation factor assumptions were subtracted from the INPUT forecast and, in their place, IBM's inflation factor assumptions were applied uniformly.
- A list of key applications, the development of which require professional services, was provided on a "best efforts" basis. This information is supplied for industry and delivery submode (consulting, software development, education and training, systems operations, and systems integration.)
- A list of major vendors for each submode was provided.
- A list of major vendors by industry segment was provided.

NOTE: The professional services category "Professional services facilities management" is now called "Systems operations."

B
Scope

The scope of the project is defined as follows:

1. The forecasts are limited to the professional services delivery mode within the information services industry. Please refer to Appendix A.

2. The forecast uses 1987 as the base year and extends through 1993 and uses IBM's inflation factors instead of INPUT's.

3. The industry sectors contained in the forecast figures were defined by IBM and provided to INPUT when the project began.

4. The supporting data pertaining to key applications, major vendors, and large contracts awarded (all within the professional services delivery mode) was extracted from existing INPUT files. For this study, INPUT did not conduct primary research.

5. For its on-going program research INPUT uses two distinct delivery modes -- professional services and systems integration. For this research project, INPUT combined the four sub-modes from the professional services delivery mode with the non-hardware component of the systems integration market. In other words, expenditures for the hardware portion of systems integration projects have been "backed out."

C
Methodology

The methodology for recasting INPUT's forecast data is described below.

1. INPUT created a series of 15 worksheets, one for each major industry sector, as defined by INPUT. Each worksheet contained the following information:

a. A list of the two-digit Standard Industrial Classification (SIC) codes that comprise the industry sub-sector (Please see Appendix B).

b. For each subsector, a definition of the IBM-defined industry sector (Please refer to Appendix D).

c. An algorithm was developed, where appropriate, for moving the INPUT-defined subsector data to the appropriate IBM-defined subsector.

d. The value to be moved was obtained through a combination of primary research and data from the U.S. Department of Commerce (1986 County Business Patterns). Pertinent data, the number of employees per subsector, was used to develop a "raw percentage" for each applicable industry sector or subsector.

e. Where necessary, an INPUT-defined adjustment factor was developed to reflect the appropriate professional services market potential. This adjustment was necessary when a subsector was divided to conform with IBM's market definition.

2. A computer program was written and used to:

a. Combine the professional services with the non-hardware portion of systems integration. This was done in order to be consistent with:

- IBM's definition of professional services
- Previous custom work by INPUT for IBM in this area

b. Delete the INPUT inflation factors from the original INPUT professional services market forecast.

c. Execute the algorithms to segment the INPUT data and recast it in the IBM format.

d. Apply the IBM-defined inflation factors.

e. Create the new forecast data in the format defined by IBM for each of the 19 industry sectors.

f. Create the new forecast data for each of the five professional services delivery modes.

3. Some of the totals may not add up to their components due to rounding

4. INPUT applied logic checks after each phase described in step 2, above, to ensure that the data appeared reasonable, consistent, and accurate.

Professional Services Market Overview

II Professional Services Market Overview

This chapter presents summary information on the U.S. professional services market. The chapter is divided into:

A. Industry Forecasts
B. Delivery Sub-Mode Forecasts
C. Key Applications
D. Major Vendors

A
Industry Forecasts

1. 1988 Market Size by Industry

Industry	1988 Market Size ($ Millions)
Federal government	$4,265
Discrete manufacturing	2,840
State & local government	2,187
Finance	1,716
Process manufacturing	1,588
Insurance	1,298
Media	669
Retail distribution	637
Communications	580
Utilities	493
Wholesale distribution	478
Health	404
Securities	364
Transportation	201
Construction	118
Higher education	73
Schools	29
Consultants/accountants	20
Computer services	14

2. Forecast Growth Rate by Industry

Industry	Growth Rate (CAGR Percent)
Retail distribution	23
Process manufacturing	22

Industry	Growth Rate (CAGR Percent)
Health	20
Discrete manufacturing	20
Finance	20
Securities	20
Consultants/accountants	20
Wholesale distribution	19
Computer services	19
State & local government	19
Media	19
Transportation	19
Insurance	18
Higher education	17
Construction	17
Communications	17
Utilities	16
Schools	15
Federal government	15

3. 1993 Market Size by Industry

Industry	1993 Forecast Market Size ($ Millions)
Federal government	$8,611
Discrete manufacturing	7,180
State & local government	5,268
Process manufacturing	4,280
Finance	4,249
Insurance	2,911
Retail distribution	1,830
Media	1,570
Communications	1,250
Wholesale distribution	1,120
Utilities	1,038
Health	1,025
Securities	901
Transportation	472
Construction	257
Higher education	162
Schools	55
Consultants/accountants	49
Computer services	33

B
Delivery Sub-Mode Forecasts

The following five delivery modes, all related to professional services, are discussed in the order listed:

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

Professional services, by INPUT's traditional definition, includes software development, consulting, education and training, and systems operations.

Systems integration typically includes a hardware component and a professional services portion. This analysis focuses only on the services portion, thus excluding the revenue contribution from hardware.

1. Consulting

1988 Size: $3,120 million
1988-1993 Growth Rate: 21%

2. Software Development

1988 Size: $8,831 million
1988-1993 Growth Rate: 16%

3. Education and Training

1988 Size: $1,960
1988-1993 Growth Rate: 19%

4. Systems Operations (Formerly: "Facilities management")

1988 Size: $1,151
1988-1993 Growth Rate: 12%

5. Systems Integration

1988 Size: $2,791
1988-1993 Growth Rate: 26%

C
Key Applications

This section lists the key applications using professional services in the 19-industry IBM model.

Each industry section (contained in Chapter III) will include at least three professional services applications. In this section, INPUT's goal is to identify the single major professional services application in each industry.

Industry	Key Application
Discrete Manufacturing	Manufacturing Resource Planning (MRP II)
Process Manufacturing	Process Control
Utilities	Marketing Information Systems
Construction	Cost Estimating Systems
Finance	Integrated Deposit Accounting
Securities	Risk Analysis
Distribution (Retail, Wholesale)	Customer Service
Insurance	Claims Handling/Customer Service
State & Local Government	Revenue Collection
Health	Patient Record Management
Communications	Customer Service
Transportation	Revenue Modelling/Sales Analysis
Media	Distribution Management Systems
Consultants/accountants	Office Automation
Computer Services	Marketing Information Systems
Higher Education	Alumni Development

Industry	Key Application
Schools	Office Automation
Federal Government	Records Management

D
Major Vendors

1. Major Vendors in Professional Services

Based on information in INPUT's database, the leading vendors of combined commercial/federal professional services and systems integration services are:

Vendor	Estimated 1988 Revenues ($ Millions)
IBM	$1,300
Andersen Consulting	650
GM/EDS	510
Unisys	450
Computer Sciences Corp.	345
DEC	300
AT&T	285
Science Applications Int'l Co.	275
National Education Corp.	200
Boeing Computer Services	175
Arthur D. Little	145
Computer Task Group	125
Planning Research Corp.	115
McDonnell Douglas Automation	100
SHL Systemhouse	95
Bechtel Group	85

2. Top Vendors by Industry

Industry	Vendor	Estimated 1988 Revenues ($ Millions)
Discrete manufacturing	IBM	235
	Andersen Consulting	180
	Unisys	70
Process manufacturing	IBM	185
	Andersen Consulting	110
	DEC	55

Industry	Vendor	Estimated 1988 Revenues ($ Millions)
Utilities	Bechtel	60
	Andersen Consulting	45
	Arthur D. Little	40
	DEC	40
Construction	McDonnell Douglas	15
	Bechtel Group	15
	Computer Task Group	10
	IBM	10
Finance	AT&T	50
	IBM	40
	GM/EDS	30
	Unisys	30
Securities	AT&T	85
	IBM	75
	SIAC	40
Distribution (Retail, Wholesale)	Andersen Consulting	90
	GM/EDS	40
	IBM	25
Insurance	IBM	150
	Policy Management	65
	GM/EDS	35
State & local gov't	Arthur D. Little	45
	AT&T	40
	Unisys	35
Health	HBO & Company	45
	Arthur D. Little	40
	Andersen Consulting	35
Communications	DEC	55
	Andersen Consulting	35
	AGS/Nynex	25
	Computer Horizons	25
Transportation	IBM	40
	Unisys	30
	Andersen Consulting	25

Industry	Vendor	Estimated 1988 Revenues ($ Millions)
Media	IBM	60
	Andersen Consulting	35
	Ernst & Whinney	20
Consultants/accountants	IBM	5
	AT&T	3
	National Education Corp.	1
Computer Services	IBM	3
	DEC	2
	H-P	1
Higher Education	IBM	18
	Prime	7
	Systems & Computer Technology	4
Schools	IBM	5
	National Education Corp.	2
	Systems & Computer Technology	2
Federal government	IBM	450
	GM/EDS	350
	Computer Sciences Corp.	300
	SAIC	275

Industry Forecasts

III Industry Forecasts

This chapter discusses each IBM defined industry sector, divided into the following major sectors:

- Industrial
- Service
- General and Public
- Education
- Federal Government

Each industry sector section will contain the following information:

1. Industry characteristics
a. Key SICs within the industry
b. Industry sector size and growth rate
c. Issues

2. Key applications by sub-mode (See NOTE)

3. Major vendors
a. Estimated 1988 revenues
b. Estimated 1988 market share
c. Delivery sub-mode expertise in that industry
d. Target vertical sub-markets

4. Secondary vendors

5. Leading vendors by sub-mode

6. "Up and coming" firms

NOTE: The professional services sub-modes include:
- Consulting
- Software development
- Education and training
- Systems operations (formerly "facilities management")
- Systems integration

See Appendix C for definitions.
This report is organized in the order of the IBM defined industry sectors (see Appendix D).

A
Discrete Manufacturing

1. Industry Characteristics

a. Key SICs within the Industry

- Auto/truck/bus
- Aircraft
- Electronics
- Instruments
- Metal

b. Industry Sector Size and Growth Rate

For professional services, in 1988 discrete manufacturing firms spent $2,840 million, which is expected to grow at a CAGR of 20% through 1993.

c. Issues

Computer-integrated manufacturing (CIM) is widely touted as the next phase in manufacturing firm automation. The goal is to link factory business applications with those in design/engineering and the factory floor. Given most of the current products available, CIM translates into links between any two of the three application areas (business, design/engineering, and factory floor).

Manufacturers must continue to closely monitor overall costs since other factors depend directly on cost control -- especially gross margin and the price of the company's stock.

Since it represents the ultimate execution of the manufacturing process, quality continues to receive a great deal of attention. In the last couple years, though, the concept of quality has spread beyond the final product to include the engineering and design steps necessary to efficiently and profitably manufacture the product.

Manufacturers are also focusing more attention on customer service and support. Since current customers are most likely to buy again, manufacturers are placing more emphasis on systems to improve pre- and post-sale support.

2. Key Applications by Submode

Application	Delivery Submodes
Inventory Management; Receiving; Warehousing	Software Development; Consulting; Systems Integration
MRP II	Software Development

Application	Delivery Submodes
CAD/CAE Networks	Consulting; Software Development; Systems Integration
Testing & Inspection	Software Development; Systems Integration
Order Entry/ Order Tracking	Consulting; Software Development
Plant Maintenance	Software Development; Consulting; Systems Integration

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
IBM	$235	8%	-SI -SW -Cons -E&T	- All
Andersen Consulting	$180	6%	-SI -SW -Cons -E&T	- Mach. - Elect - Instr
Unisys	$ 70	2%	-SI -SW -Cons -E&T	- Aeros - Autos

4. Secondary Vendors

DEC, GM/EDS, ASK Computer Systems, McAuto, Computer Task Group, Peat Marwick, Coopers & Lybrand, Boeing Computer Services, AGS/NYNEX, National Education Corp, AT&T.

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$563	
Andersen Consulting	$ 30	5%
IBM	$ 25	4%
DEC	$ 10	2%

Unisys; GM/EDS; CTG; Peat Marwick; Coopers & Lybrand; Touche Ross; AT&T; and Prime/Computervision represent 10% of the estimated market share with other vendors at 78%.

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Software Development	$1,575	
IBM	$150	10%
Andersen Consulting	$ 80	5%
Unisys	$ 45	3%

GM/EDS; DEC; McAuto; AGS/Nynex; Peat Marwick; Computer Task Group; Coopers & Lybrand; Touche Ross; AT&T; and Boeing Computer Services represent 17% of the estimated 1988 market share with other vendors representing 66%.

Education & Training	$341	
National Education Corp.	$ 30	9%
IBM	$ 20	6%
Andersen Consulting	$ 15	4%

GM/EDS; AT&T; DEC; Unisys; Peat Marwick; and Prime/Computervision represent 14% of the estimated 1988 market share with other vendors representing 67%.

Systems Operations	$55	
Boeing Computer Services	$ 25	45%

Other vendors represent the remaining 55%.

Systems Integration	$305	
Andersen Consulting	$ 50	16%
IBM	$ 40	13%
DEC	20	7%

Computer Task Group; McDonnell Douglas Auto.; Unisys; Peat Marwick; and Coopers & Lybrand represent 14% of the estimated 1988 market share with other vendors representing 50%.

6. "Up and Coming" Firms

Peat Marwick Main
AGS/NYNEX
Computer Task Group

B
Process Manufacturing

1. Industry Characteristics

a. Key SICs within the Industry

- Petroleum
- Chemicals
- Stone, Glass, Clay
- Food
- Primary Metals

b. Industry Sector Size and Growth Rate

In 1988, process manufacturing spent $1,588 million for professional services, which is expected to grow at a CAGR of 22% through 1993.

c. Issues

- Plant optimization: Manufacturers want to improve operations through improved plant floor layout, work flow planning, and easier physical plant maintenance.

- Decentralization is sweeping all segments of the process manufacturing industry. Fortune 1500 manufacturers are moving from fewer large plants with 1,000 employees to a greater number of small plants, each employing no more than 300. Economies of scale, raw material/customer location considerations, access to multiple modes of transportation, and the ability to diminish the power of a single union local are key contributing factors to this trend.

- Process manufacturers are implementing computer integrated manufacturing (CIM). As a result of better application software, process manufacturers are moving away from in-house developed to third-party CIM solutions.

2. Key Applications by Submode

Application	Delivery Submode(s)
Process Control	Consulting; Software Development; Education & Training; Systems Integration
Maintenance Scheduling	Consulting; Software Development
Customer Service	Consulting; Software Development; Systems Integration
Lab Data Collection and Analysis	Consulting; Software Development; Systems Integration

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
IBM	$185	12%	-SW -Cons -SI -E&T	- All
Andersen Consulting	$110	7%	-SI -SW -Cons -E&T	- All
DEC	$ 55	3%	-SW -Cons -E&T -SI	- All

4. Secondary Vendors

Bechtel; H-P; Computer Task Group; National Education Corp.; CSC; Peat Marwick; AT&T; Coopers & Lybrand; Touche Ross; ASK Computer Systems; Prime/CV

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$338	
IBM	$ 25	7%
Andersen Consulting	$ 15	4%
DEC	$ 10	3%

Hewlett-Packard; Touche Ross; Bechtel Group; Computer Task Group; AT&T; Peat Marwick; Coopers & Lybrand; ASK Computer Systems; and Prime/Computervision represent 20% of the 1988 market share with other vendors representing 65%.

Software Development	$945	
IBM	$110	12%
Andersen Consulting	$ 60	6%
Bechtel	$ 25	3%

DEC;Computer Task Group; Peat Marwick; Coopers & Lybrand; ASK Computer Systems; AT&T; Prime/Computervision; and Touche Ross represent 12% of the 1988 market share with other vendors representing 67%.

Education & Training	$205	
National Education Corp.	$ 25	12%
IBM	$ 20	10%
Andersen Consulting	$ 15	7%

Computer Task Group; DEC; Hewlett-Packard; Peat Marwick; AT&T; Prime/Computervision; and ASK Computer Systems represent 17% of the 1988 market share with other vendors representing 53%.

Systems Operations	$33	
Computer Sciences Corp.	$ 15	45%

Other vendors represent the remaining 55%.

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Systems Integration	$67	
IBM	$ 6	9%
Andersen Consulting	$ 4	6%
DEC	$ 3	4%

Bechtel; Computer Task Group; and Hewlett-Packard represent 30% of the 1988 market share with other vendors representing 48%.

6. "Up and Coming" Firms

Computer Task Group
AT&T
Peat Marwick
Bechtel

C
Utilities

1. Industry Characteristics

a. Key SICs within the Industry

- Electric utilities
- Gas utilities

- Water and sewage utilities
- Combined utilities

b. Industry Sector Size and Growth Rate

In 1988, utility firms' expenditures for professional services were $493 million and are expected to grow at a CAGR of 16% through 1993.

c. Issues

- Electric and gas utilities want to upgrade their existing plants to maintain high utilization rates, rather than borrow funds in uncertain financial markets to construct new plants.
- Customer service is one area receiving a great deal of attention. Better systems for serving the customer help in two important ways. One, good customer information provides the basis for new marketing programs. Two, good relations with customers avoid problems with state and local regulatory agencies.
- Increasing direct and indirect labor costs are leading to automating of meter reading in addition to automated mapping of streets, underground pipes, and electric lines.
- Safety, especially in nuclear plants, remains an issue since the days of the Three Mile Island problem.

2. Key Applications by Submode

Application	Delivery Submode(s)
Customer service	Education and training; Software development; Consulting; Systems integration
Marketing information systems	Software development; Consulting
Mapping	Systems integration; Consulting; Software development

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
Bechtel	$ 60	12%	-SI -Con -SW - Gas	- Elect
Andersen Consulting	$ 45	9%	-SW -Con -SI -E&T	- All

Arthur D. Little	$ 40	8%	-SW -Cons - All	
DEC	$ 40	8%	-SW -SI -Con -E&T	- All

4. Secondary Vendors

Cap Gemini; Price Waterhouse; Computer Task Group; Babcock & Wilcox; E.I. International; Peat Marwick; Coopers & Lybrand; National Education Corp.

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$88	
Arthur D. Little	$ 15	17%
Bechtel	$ 5	6%
Computer Task Group	$ 5	6%

DEC; Andersen Consulting; Price Waterhouse; and Peat Marwick represent 23% of the 1988 market share with other vendors representing 49%.

Software Development	$248	
Cap Gemini	$ 30	12%
Arthur D. Little	$ 25	10%
Andersen Consulting	$ 20	8%

Bechtel; Price Waterhouse; E.I. International; Computer Task Group; Babcock & Wilcox; DEC; Coopers & Lybrand; and Peat Marwick represent 31% of the 1988 market share with other vendors representing 39%.

Education & Training	$54	
National Education Corp.	$ 10	19%
DEC	$ 5	9%
Andersen Consulting	$ 5	9%

Peat Marwick; and Coopers & Lybrand represent 7% of the 1988 market share with other vendors representing 56%.

Systems Operations	$9

There are no major vendors in the INPUT data base.

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Systems Integration	$95	
Bechtel	$ 35	37%
DEC	$ 25	26%
Andersen Consulting	$ 15	16%

Other vendors represent the remaining 21% of the 1988 market share.

6. "Up and Coming" Firms

None

D
Construction

1. Industry Characteristics

a. Key SICs within the Industry

- General contractors
- Property managers and developers
- Home and apartment builders
- Mechanical/electrical/plumbing contractors
- Architects and engineers
- Road and heavy contractors

b. Industry Sector Size and Growth Rate

In 1988, user expenditures by construction firms for professional services were $118 million and are expected to grow at a CAGR of 17% through 1993.

c. Issues

- As in other services businesses, competition is increasing, forcing firms to look for means to differentiate.

- Since construction and engineering/architecture service firms are highly labor intensive, labor cost control is important.

- Construction companies and the larger services firms need to improve their fixed asset utilization.

2. Key Applications by Submode

Application	Delivery Submodes
Cost estimating systems	Software development; Systems integration; Consulting; Education and training
Subcontractor reporting	Software development
Integrated project scheduling	Software development; Consulting; Education and training; Systems integration
CAD/CAM/CADD	Software development; Consulting; Education and training; Systems integration
Marketing data	Software development; Consulting; Education and training
Maintenance management	Software development; Consulting
Education and training	Consulting; Education and training

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
McDon-Doug. Automation	$ 15	13%	-SI -SW -E&T -Cons	-All
Bechtel	$ 15	13%	-SW -SI -Cons -E&T	-All

4. Secondary Vendors

Computer Task Group; IBM; Fluor; Price Waterhouse; Rust International; Metier Mgmt.; General Instrument; MSA; SAS Institute; Information Builders; Project Software & Development; PMB Systems Engineering; AGS Management Systems

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$23	
McDonnell Douglas Auto.	$ 4	17%
Price Waterhouse	$ 4	17%
Fluor	$ 3	13%

Bechtel; IBM; Rust International; and Computer Task Group represent 30% of the 1988 market share with other vendors representing 22%.

Software Development	$63	
McDonnell Douglas Auto.	$ 7	11%
Bechtel	$ 7	11%
Computer Task Group	$ 6	10%

Fluor; IBM; Metier Management; Rust International; Price Waterhouse; General Instrument; Project Software & Development; PMB Systems Engineering; and AGS/NYNEX represent 37% of the 1988 market share with other vendors representing 31%.

Education & Training	$14	
MSA	$ 1	7%
SAS Institute	$ 1	7%
Bechtel	$ 1	7%

McDonnell Douglas Auto.; Information Builders; Fluor; General Instrument; IBM; Rust International; and Metier Management represent 44% of the 1988 market share with other vendors representing 35%.

Systems Operations	$2	
General Instrument Corp.	$ 1	50%

Other vendors represent the remaining 50%.

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Systems Integration	$16	
Bechtel	$ 3	19%
Computer Task Group	$ 3	19%
IBM	$ 2	13%

Other vendors represent the remaining 59%.

6. "Up and Coming" Firms

Bechtel
Fluor
Rust International

E
Finance

1. Industry Characteristics

a. Key SICs within the Industry

- Banks
- Savings and loans
- Credit Unions

b. Industry Sector Size and Growth Rate

In 1988, expenditures by financial firms for professional services were $1,716 million and are expected to grow at a CAGR of 20% through 1993.

c. Issues

- Deregulation
- Customer service and marketing
- Cost containment

2. Key Applications by Submode

Application	Delivery Submode(s)
Consumer loan tracking	Software development; Consulting; Systems integration
Consumer loan servicing	Software development; Consulting; Systems integration
Trust management services	Software development
Integrated deposit accounting	Systems integration; Software development

3. Leading vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
AT&T	$ 50	3%	-SI -Cons -SW -E&T	-All
IBM	$ 40	2%	-SW -Cons -E&T -SI	-All
GM/EDS	$ 30	2%	-SI -Cons -SW	-All
Unisys	$ 30	2%	-SI -SW	-All

4. Secondary Vendors

NCR; American Management Systems; DEC; Price Waterhouse; Touche Ross; National Education Corp.

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$354	
IBM	$ 10	3%
Price Waterhouse	$ 10	3%
AT&T	$ 8	2%

GM/EDS; DEC; Unisys; and Touche Ross represent 5% of the 1988 market share with other vendors representing 87%.

Software Development	$990	
AT&T	$ 20	2%
IBM	$ 20	2%
Computer Task Group	$ 10	1%

Unisys; Touche Ross; DEC; Price Waterhouse; and GM/EDS represent 4% of the 1988 market share with other vendors representing 91%.

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Education & Training	$215	
National Educ. Corp.	$ 5	2%
IBM	$ 5	2%
Price Waterhouse	$ 5	2%
Other vendors represent the remaining		93%.
Systems Operations	$35	
American Mgmt. Systems	$ 25	71%
Other vendors represent the remaining 29%		
Systems Integration	$123	
GM/EDS	$ 20	16%
AT&T	$ 20	16%
Unisys	$ 15	12%

Other vendors represent the remaining 56%.

6. Up and Coming Vendors

Unisys
Andersen Consulting

F
Securities

1. Industry Characteristics

a. Key SICs within the Industry

- Broker/Dealers
- Exchanges
- Investments

b. Industry Sector Size and Growth Rate

In 1988, securities firms' expenditures for professional services were $364 million and are expected to grow at a CAGR of 20% through 1993.

c. Issues

- Diversification beyond traditional products
- Cost control
- 24-hour global trading
- Rapid information gathering, analysis, and action, especially in the trading area

2. Key Applications by Submode

Application	Delivery Submode(s)
Branch office support	Systems integration; Consulting; Software development
Back office	Systems integration; Software development; Education and training
Executing trades	Software development
Risk analysis	Software development; Consulting

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
AT&T	$ 85	23%	-SI -SW	- Branch - Trades - Back
IBM	$ 75	21%	-SI -SW -Con -E&T	- All
SIAC	$ 40	11%	-Cons -SW -E&T	- Trades

4. Secondary Vendors

Andersen Consulting; AGS/NYNEX; GEIS Co; National Education Corp.; DST Systems; Computer Task Group; Computer Horizons; Teknekron Financial Services

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$75	
Securities Industry Automation Co.	$ 15	20%
AT&T	$ 10	13%
Andersen Consulting	$ 5	7%

Other vendors represent the remaining 60%.

Software Development	$210	
AT&T	$ 60	29%
Securities Industry Automation Co.	$ 15	7%
Andersen Consulting	$ 15	7%

AGS/NYNEX; DST, Inc.; Computer Horizons; Teknekron Financial Services; GE Information Services Co.; and Computer Task Group represent 15% of the 1988 market share with other vendors representing 42%.

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Education & Training	$46	
National Education Corp.	$ 10	22%
Andersen Consulting	$ 7	15%
AT&T	$ 5	11%

Other vendors represent the remaining 52%.

Systems Operations	$7	

There are no major vendors in the INPUT data base.

Systems Integration	$26	
AT&T	$ 5	19%
Securities Industry Automation Co. (SIAC)	$ 3	12%
Andersen Consulting	$ 3	12%

Other vendors represent the remaining 57%.

6. Up and Coming Vendors

SIAC
AGS/NYNEX

G
Distribution (Retail/Wholesale)

1. Industry Characteristics

a. Key SICs within the Industry

- Retail
  - Apparel
  - Leather
  - General Merchandise Retailers

- Wholesale
  - Durable Goods
  - Repair Services
  - Lodging
  - Business Service

b. Industry Sector Size and Growth Rate

In 1988, the retail distribution industry spent $637 million and the wholesale distribution industry spent $478 million for professional services. These user expenditures are expected to grow, with retail growing at 23% and wholesale compounding at a 19% annual rate.

NOTE: This section discusses the combined wholesale/retail industry.

c. Issues

- Electronic linkage of wholesalers and/or retailers with manufacturers through electronic data interchange (EDI) is a major issue.
- Distributors of capital equipment must adjust to the changing demands brought on by Just-in-Time (JiT) manufacturing environments.
- Distributors must provide additional services to retailers in order to keep the retailer's business.

2. Key Applications by Submode

Application	Delivery Submode(s)
Automated warehouses	Systems integration
Customer service	Systems Integration; Software Development
Sales Tracking, Analysis and Order Processing	Systems Integration; Software Development

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
Andersen Consulting	$ 90	8%	-SI -SW -Cons	-Gen'l Merch. -Lodging
GM/EDS	$ 40	4%	-SI -SW -Cons	-Gen'l Merch. -Lodging -Food Whsle.
IBM	$ 25	2%	-SI -SW -Cons -E&T	-Gen'l Merch. -Lodging -Food Whsle.

4. Secondary Vendors

CSC; SHL Systemhouse; American Software; AT&T; Unisys; Triad; National Education Corp.; CACI, Inc.; Touche Ross

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$201	
Andersen Consulting	$ 20	10%
CSC	$ 15	7%
IBM	$ 7	3%

GM/EDS; AT&T; American Software; SHL Systemhouse; and Unisys represent 14% of the 1988 market share with other vendors representing 65%.

Software Development	$564	
Andersen Consulting	$ 50	9%
GM/EDS	$ 25	4%
SHL Systemhouse	12	2%

American Software; IBM; Unisys; AT&T; and Touche Ross represent 5% of the 1988 market share with other vendors representing 80%.

Education & Training	$122	
National Education Corp.	$ 10	8%
Triad	$ 10	8%
Computer Sciences	5	4%

Andersen Consulting; IBM; AT&T; and Touche Ross represent 15% of the 1988 market share with other vendors representing 65%.

Systems Operations	$20	

There are no major firms in the INPUT data base.

Systems Integration	$209	
Andersen Consulting	$ 15	7%
IBM	$ 10	5%
GM/EDS	$ 10	5%

Other vendors represent the remaining 83%.

6. "Up and Coming" Firms

CACI
SHL Systemhouse

H
Insurance

1. Industry Characteristics

a. Key SICs within the Industry

- Property and casualty
- Life
- Health

b. Industry Sector Size and Growth Rate

In 1988, user expenditures by the insurance industry for professional services were $1,298 million and are expected to grow at a CAGR of 18% through 1993.

c. Issues

- The industry must continue to develop more products, focused to meet the needs of different insurance consumers.

- Successful carriers must have a sound distribution structure for their products, providing timely, accurate information to independent or captive brokers and agents.

- Carriers are under pressure, in some states, to control rates and rate increases. Extensive modeling and forecasting capabilities are needed to help justify rate changes.

- In addition to the pressure to provide timely, accurate responses to requests from agents and brokers, successful carriers provide high levels of support to the customer. Low rates won't overcome poor claims handling procedures or ineffective means of problem resolution.

2. Key Applications by Submode

Application	Delivery Submode(s)
Claims handling/ Customer service	Software Development; Systems Integration
Marketing	Software Development; Consulting; Education & Training; Systems Integration

Application	Delivery Submode(s)
Systems for Insurance Agents Offices	Software Development; Consulting; Systems Integration
Risk Analysis Systems	Software Development; Consulting

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
IBM	$150	12%	-SW -Cons -E&T -SI	-Prop/Cas -Life -Health
Policy Management	$ 65	5%	-E&T -Cons -SW	-Life -Prop/Cas
GM/EDS	$ 35	3%	-SI -SW	-Prop/Cas -Life -Health

4. Secondary Vendors

Andersen Consulting; Price Waterhouse; National Education Corp.; Touche Ross; AGS/NYNEX; Wang; Computer Horizons; Computer Task Group

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$269	
IBM	$ 20	7%
Policy Management	$ 15	6%
Andersen Consulting	$ 10	4%

Price Waterhouse; Touche Ross; and Wang represent 8% of the 1988 market share with other vendors representing 75%

Software Development	$754	
IBM	$ 90	12%
Policy Management	$ 40	5%
AGS	$ 10	1%

GM/EDS; AGS/NYNEX; Computer Task Group; Wang; Price Waterhouse; Computer Horizons; and Touche Ross represent 6% of the 1988 market share with other vendors representing 75%.

Education & Training	$163	
National Education Corp.	$ 15	9%
IBM	$ 10	6%
Andersen Consulting	$ 5	3%

Other vendors represent the remaining 82%.

Systems Operations	$27	

There are no major firms in the INPUT data base.

Systems Integration	$85	
IBM	$ 15	18%
Policy Management	$ 11	13%
GM/EDS	$ 10	12%

Andersen Consulting; Price Waterhouse; National Education Corp.; AGS/NYNEX; Wang; Touche Ross; Computer Task Group; and Computer Horizons represent 35% of the 1988 market share with other vendors representing 26%.

6. "Up and Coming" Firms

Wang
Policy Management

I
State & Local Government

1. Industry Characteristics

a. Key SICs within the Industry

- State government
- City/County government

b. Industry Sector Size and Growth Rate

In 1988, user expenditures by state and local governments for professional services were $2,187 million and are expected to grow at a CAGR of 19% through 1993.

c. Issues

- Timely, accurate revenue collection is increasingly important for state and, especially, local governments. Local governments must "pay as they go."
- Public safety (police, fire, paramedics, corrections), dispatch and scheduling areas have received more attention during the past two years and will continue to do so.
- Health and Human Services eligibility systems have received attention as states attempt to effectively implement welfare, food stamp, and medical care assistance.
- Like any employer, state and local governments must attract and retain employees. This is especially difficult to do at senior management and policy making levels.

2. Key Applications by Submode

Application	Delivery Submode(s)
Revenue collection	Systems Integration; Software Development
Job bank/job matching	Software Development; Consulting
Caseload management	Software Development; Consulting
Vehicle inspections	Systems Integration
Manpower resource planning	Software Development

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
Arthur D. Little	$ 45	2%	-SW -Cons	-Local -State
AT&T	$ 40	2%	-SW -Cons -SI -E&T	-State
Unisys	$ 35	2%	-SW -Cons -SI	- Both

4. Secondary Vendors

Andersen Consulting; National Education Corp; SHL Systemhouse; Peat Marwick; Boeing Computer Services; Systems & Computer Technology; Touche Ross; Price Waterhouse;

DEC; Bechtel; Wang; OAO Corp.; American Management Systems; Computer Sciences Corp; Litton

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$433	
Arthur D. Little	$ 30	7%
Andersen Consulting	$ 10	2%
Unisys	$ 5	1%

SHL Systemhouse; Price Waterhouse; AT&T; Touche Ross; Peat Marwick; DEC; Wang; Systems & Computer Technology; Bechtel; and Litton represent 8% of the 1988 market share with other vendors representing 82%.

Software Development	$1,212	
Unisys	$ 20	2%
AT&T	$ 20	2%
Arthur D. Little	$ 15	1%

Andersen Consulting; Peat Marwick; Wang; SCT; Touche Ross; OAO; SHL Systemhouse; Bechtel; Litton Computer Services; DEC; and Price Waterhouse represent 10% of the 1988 market share with other vendors representing 85%.

Education & Training	$263	
National Education Corp.	$ 30	11%
CSC	$ 5	2%
Andersen Consulting	$ 5	2%

AT&T; Peat Marwick; and Price Waterhouse represent 4% of the 1988 market share with other vendors representing 81%.

Systems Operations	$43	
Boeing Computer Services	$ 15	35%
American Mgmt. Systems	$ 5	12%
SCT	$ 5	12%

Other vendors represent the remaining 42%.

Systems Integration	$237	
SHL Systemhouse	$ 15	6%
AT&T	$ 10	4%
Unisys	$ 10	4%

Andersen Consulting; DEC; Bechtel; Peat Marwick; and Litton Computer Services represent 40% of the 1988 market share with other vendors representing 45%.

6. "Up and Coming" Firms

Arthur D. Little
SCT
SHL Systemhouse

J
Health

1. Industry Characteristics

a. Key SICs within the Industry

- Hospitals/clinics
- Physicians
- HMOs
- Nursing homes
- Home health care
- Laboratories

b. Industry Sector Size and Growth Rate

In 1988, user expenditures by the health/medical industry for professional services were $404 million and are expected to grow at a CAGR of 20% through 1993.

c. Issues

- As in other industries, consolidations of hospitals, HMOs, nursing homes, and laboratories are occurring more frequently.

- Cost control, related to the government's Diagnostic Related Groups (DRGs), remains a key industry issue.

- Information systems combining separate databases for personnel and administration, scheduling, integrated patient care, and laboratory reporting are necessary in 1990s health care environments.

2. Key Applications by Submode

Application	Delivery Submode(s)
Patient management	Systems Integration; Consulting; Software Development
Accounting/Financial Analysis	Software Development; Education & Training; Consulting
Patient Billing/Reimbursement	Software Development; Consulting; Education & Training
Laboratory Automation	Systems Integration; Consulting; Software Development

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
HBO & Co.	$ 45	11%	-SI -SysOps -SW -Cons	-Hospitals (incl. VA)
Arthur D. Little	$ 40	10%	-SW -SI -Cons	-Hospitals
Andersen Consulting	$ 35	9%	-SW -SI -Cons -E&T	-Hospitals

4. Secondary Vendors

Shared Medical Systems; DEC; Price Waterhouse; Pentamation; IBM; CAP Gemini America; Touche Ross; John Hancock Health Plans; Wang; National Education Corporation; Computer Sciences Corp.; Meditech; Ameritech

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$69	
Arthur D. Little	$ 15	22%
Price Waterhouse	$ 5	7%
Touche Ross	$ 4	6%

HBO & Co.; Andersen Consulting; Pentamation; Wang; DEC; Shared Medical Systems; Meditech; IBM; and Ameritech represent 35% of the 1988 market share with other vendors representing 30%.

Software Development	$192	
HBO & Co.	$ 15	8%
Andersen Consulting	$ 15	8%
CAP Gemini America	$ 15	

Arthur D. Little; DEC; Shared Medical Systems; Price Waterhouse; Wang; IBM; Pentamation; Touche Ross; John Hancock Health Plans; Meditech; and Ameritech represent 32% of the 1988 market share with other vendors representing 44%.

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Education & Training	$42	
National Ed. Corp.	$ 10	24%
Andersen Consulting	$ 5	12%
IBM	$ 3	7%

DEC; Price Waterhouse; and Shared Medical Systems represent 13% of the 1988 market share with other vendors representing 43%.

Systems Operations	$7	
HBO & Company	$ 2	29%
Shared Medical Systems	$ 1	14%
John Hancock Health Plans	< $ 1	6%
Pentamation	< $ 1	3%

Other vendors represent the remaining 48%.

Systems Integration	$95	
Andersen Consulting	$ 10	11%
HBO & Co.	$ 5	5%
Arthur D. Little	$ 5	5%

DEC; IBM; CSC; Price Waterhouse; and Ameritech represent 18% of the 1988 market share with other vendors representing 61%.

6. "Up and Coming" Firms

CAP Gemini America
John Hancock Health Plans
Arthur D. Little

K
Communications

1. Industry Characteristics

a. Key SICs within the Industry

- AT&T and Regional Bell Operating Companies (RBOCs)
- Local Telephone Companies
- Communications carriers
- Satellites
- Cable television plant and equipment

b. Industry Sector Size and Growth Rate

In 1988, user expenditures by the communications industry for professional services were $580 million and are expected to grow at a CAGR of 17% through 1993.

c. Issues

- Manufacturers/service providers must introduce new services to maintain revenue growth.

- Although it has been more than 10 years since Judge Green's historic ruling on the breakup of AT&T, uncertainty about the limits of products and services continues.

2. Key Applications by Submode

Application	Delivery Submode(s)
Customer service	Education and training; Software development
Marketing information	Software development; Consulting
Long-range planning	Consulting; Software development; Education & training

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
DEC	$ 55	9%	-SW -Cons -SI -E&T	- Tel.Cos. - RBOC - Cable TV
Andersen Consulting	$ 35	6%	-SI -E&T -SW	- All
AGS/NYNEX	$ 25	4%	-SW -Cons	- Tel. Cos. - Carriers
Computer Horizons	$ 25	4%	-SW - All	

4. Secondary Vendors

American Management Systems; IBM; Unisys; Computer Sciences; CAP Gemini America; Computer Task Group; Auxco/Cincinnati Bell; GTE; National Education Corporation

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$114	
Andersen Consulting	$ 15	13%
DEC	$ 10	9%
CSC	$ 10	9%

Unisys; AGS/NYNEX; IBM; and Auxco/Cincinnati Bell represents 16% of the 1988 market share with other vendors representing 53%.

Software Development	$319	
DEC	$ 30	9%
Computer Horizons	$ 25	8%
AGS/NYNEX	$ 20	6%

Cap Gemini; Andersen Consulting; Unisys; Computer Task Group; Auxco/Cincinnati Bell; and IBM represent 16% of the 1988 market share with other vendors representing 60%.

Education & Training	$69	
National Education Corp	$ 10	14%
Andersen Consulting	$ 5	7%
DEC	$ 5	7%

CSC; IBM; Unisys; and Auxco/Cincinnati Bell represent 16% of the 1988 market share with other vendors representing 55%.

Systems Operations	$11	
American Mgmt. Systems	$ 3	27%
GTE	$ 2	18%

Other vendors represent the remaining 55%.

Systems Integration	$67	
DEC	$ 10	15%
IBM	$ 8	12%
Andersen Consulting	$ 5	7%

Other vendors represent the remaining 66%.

6. "Up and Coming" Firms

Auxco/Cincinnati Bell
Computer Horizons
American Management Systems
Bell Atlantic

L
Transportation

1. Industry Characteristics

a. Key SICs within the Industry

- Airlines
- Rail
- Truck
- Water
- Bus/Taxi
- Other

b. Industry Sector Size and Growth Rate

In 1988, user expenditures by the transportation industry for professional services were $201 million and are expected to grow at a CAGR of 19% through 1993.

c. Issues

- Increased competition and more international trading are forcing firms to develop intermodal transportation methods.
- As the manufacturing environment has adopted Just-in-Time (JiT) manufacturing methodologies, transportation carriers must adjust their services (as well as schedules, equipment, and operations) to better serve manufacturing customers.
- Deregulation is also forcing transportation firms, especially scheduled air carriers, to continually adjust operations and prices to comply with new restrictions and requirements.

2. Key Applications by Submode

Application	Delivery Submodes
Revenue modelling/ sales analysis	Software development; Consulting
Customer service	Systems integration; Consulting; Software development; Education and training
Integrated maintenance systems	Software development; Systems integration
Application	**Delivery Submodes**
Automated warehouse and logistics systems	Systems integration; Consulting; Software development; Education and training
Terminal/cargo management	Software development; Consulting

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
IBM	$ 40	20%	-SW -SI -Cons -E&T	-Air -Rail -Truck
Unisys	$ 30	15%	-SW -SI -Cons	-Air -Truck
Andersen Consulting	$ 25	12%	-SW -SI -Cons -E&T	- All

4. Secondary Vendors

Arthur D. Little; Computer Horizons; Boeing Computer Services; National Education Corporation; Intermetrics; Computer Dynamics

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$32	
Arthur D. Little	$ 6	19%
Andersen Consulting	$ 4	13%
IBM	$ 3	9%

Unisys; Computer Horizons; and Intermetrics represent 31% of the 1988 market share with other vendors representing 28%.

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Software Development	$89	
IBM	$ 23	26%
Unisys	$ 15	17%
Andersen Consulting	$ 10	11%

Computer Horizons; Computer Dynamics; Arthur D. Little; and Intermetrics represent 22% of the 1988 market share with other vendors representing 24%.

Education & Training	$19	
National Education Corp.	$ 10	53%
Andersen Consulting	$ 3	16%
IBM	$ 2	11%

Other vendors represent the remaining 21%.

Systems Operations	$3	
Boeing Computer Services	$ 1	33%

Other vendors represent the remaining 66%.

Systems Integration	$58	
IBM	$ 10	17%
Unisys	$ 10	17%
Andersen Consulting	$ 7	12%

Other vendors represent the remaining 54%.

6. "Up and Coming" Firms

Unisys
Computer Dynamics
Computer Horizons

M
Media

1. Industry Characteristics

a. Key SICs within the Industry

- Publishers
- Printers
- Associations
- Entertainment/leisure
- Radio/television stations
- Cable television programs

b. Industry Sector Size and Growth Rate

In 1988, user expenditures for professional services by the media were $669 million and are expected to grow at a CAGR of 19% through 1993.

c. Issues

- Control of production and distribution costs is always important. A few tenths of a percent improvement in both areas yields a great difference in the bottom line. Substituting in-house publishing for outside assistance is highly cost effective.
- Subscriber list management is increasingly important since publishers want to maintain their base and minimize marketing expenses of attracting new readers.
- Productivity of telemarketing staff members must be increased.
- Media firms survive on marketing. Improved marketing information and analysis tools are crucial to these firms' success.

2. Key Applications by Submode

Application	Delivery Submodes
Audience/readership information/ analysis system	Software development; Consulting; Systems integration
Telemarketing system	Software development; Consulting; Education and training
Distribution management System	Software development; Systems integration Systems operations
Mail list management System	Software development
Desktop/integrated Publishing	Systems integration; Consulting; Software development; Education and training

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
IBM	$ 60	9%	-SW -Cons -SI -E&T	- All
Andersen Consulting	$ 35	5%	-E&T -Cons -SW -SI	- All
Ernst & Whinney	$ 20	3%	-SW -Cons -SI	- Publishing - Printing - Ent/Leisure

4. Secondary Vendors

Deloitte Haskins; National Education Corp; Compugraphic; Sterling Software

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$131	
IBM	$ 10	8%
Ernst & Whinney	$ 5	4%
Andersen Consulting	$ 5	4%

Deloitte Haskins; Compugraphic; and Perot Systems represent 5% of the 1988 market share with other vendors representing 80%.

Software Development	$368	
IBM	$ 30	8%
Ernst & Whinney	$ 10	3%
Andersen Consulting	$ 10	3%

Deloitte Haskins; Compugraphic; Sterling Software; and Perot Systems represent 5% of the 1988 market share with other vendors representing 81%.

Education & Training	$80	
National Education Corp.	$ 15	19%
Andersen Consulting	$ 10	13%
IBM	$ 5	6%

Other vendors represent the remaining 62%.

Systems Operations	$13	

There are no major vendors listed in the INPUT data base.

Systems Integration	$77	
IBM	$ 15	19%
Andersen Consulting	$ 10	13%
Ernst & Whinney	$ 5	6%

Other vendors represent the remaining 61%.

6. "Up and Coming" Firms

Perot Systems

N
Consultants

1. Industry Characteristics

a. Key SICs within the Industry

- Management consultants
- Accountants

b. Industry Sector Size and Growth Rate

In 1988, user expenditures for professional services by consultants and accountants were $20 million and are expected to grow at a CAGR of 20% through 1993.

c. Issues

- Revenue in these two professions depends on the number of hours billed. A major goal is to reduce non-billable hours, outside of training and continuing professional education.
- With the declining birth rate and fewer college graduates, firms compete vigorously for new employees, which must also be retained after they receive their professional credentials or three years of experience.
- Internal communication through office automation is necessary as firms expand their geographic coverage.

2. Key Applications by Submode

Application	Delivery Submodes
Office automation	Education and training; Software development
Project management	Education and training; Consulting; Software development; Systems integration
Desktop/integrated publishing	Software development; Systems integration; Consulting

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
IBM	$ 5	25%	-E&T -Con -SW	- All
AT&T	$ 3	15%	-SW -E&T	- All
National Ed. Corp	$ 1	5%	-E&T	- All

4. Secondary Vendors

DEC; Apple; Andersen Consulting

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$4	
IBM	$ 1	25%
Other vendors represent the remaining 75%.		
Software Development	$11	
AT&T	$ 2	18%
IBM	$ 1	9%
DEC	< $ 1	7%
Other vendors represent the remaining 66%		
Education & Training	$ 2	
IBM	$ 1	50%
Apple	< $ 1	10%
AT&T	< $ 1	8%
Other vendors represent the remaining 32%.		

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Systems Operations	$0 (due to rounding)	

There are no major firms listed in the INPUT data base.

Systems Integration	$3

There are no major firms listed in the INPUT data base.

6. "Up and Coming" Firms

Apple

O
Computer Services

1. Industry Characteristics

a. Key SICs within the Industry

- Processing service firms
- Software vendors
- Professional service firms

b. Industry Sector Size and Growth Rate

In 1988, user expenditures for professional services by the computer services industry were $14 million and are expected to grow at a CAGR of 19% through 1993.

c. Issues

- Attract and retain qualified personnel.
- Aggressively control costs.
- Develop added value services to retain customers; alternatively, reduce the migration of customers to microcomputers and workstations.
- Marketing, marketing, marketing (software and services vendors) emphasizing distribution channels, pricing, and selection of hardware platforms and/or operating systems.

2. Key Applications by Submode

Application	Delivery Submodes
Marketing information	Software development; Consulting; Systems integration
Customer service	Software development; Consulting; Systems integration
Employee training	Education and training

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
IBM	$ 3	21%	-E&T -Cons -SW	- All
DEC	$ 2	14%	-E&T -Cons -SW	- All
H-P	$ 1	9%	-E&T -Cons -SW	- All

4. Secondary Vendors

Prime; Wang; Data General; Apple; Compaq

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$ 2	
IBM	$ 1	50%
DEC	< $ 1	19%
Unisys	< $ 1	12%

Other vendors represent the remaining 19%.

Software Development $7

There are no major firms listed in the INPUT data base.

Education & Training $2

There are no major firms listed in the INPUT data base.

Systems Operations $0
(due to rounding)

There are no major firms listed in the INPUT data base.

Systems Integration $3

There are no major firms listed in the INPUT data base.

6. "Up and Coming" Firms

None identified at this time.

P
Higher Education

1. Industry Characteristics

a. Key SICs within the Industry

- Universities
- Two-Year Colleges
- Four-Year Colleges
- Libraries and Other

b. Industry Sector Size and Growth Rate

In 1988, user expenditures for professional services by colleges and universities were $73 million and are expected to grow at a CAGR of 17% through 1993.

c. Issues

- Student loan accounting and management received increased attention in view of Bank of America's recent problems with their portfolio. Public institutions which self fund and monitor student loans and repayment are especially concerned.
- Many colleges and universities are in the midst of projects to provide integrated campus communications and computer services for staff and students.
- At all institutions of higher education, fund raising is a major issue and one major criterion for evaluating the effectiveness of the administration.
- Colleges and universities must work extremely hard to attract and retain professors and key administrators, in light of competition from firms in the private sector.
- Managing physical assets is an issue of growing importance.

2. Key Applications by Submode

Application	Delivery Submodes
Integrated communications	Systems integration; Consulting
Alumni development	Software development; Consulting; Systems integration
Benefits planning and administration	Software development; Consulting; Systems integration
Application	**Delivery Submodes**
EEO compliance monitoring and reporting	Software development; Consulting
Desktop/integrated publishing	Software development; Consulting; Education & training

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
IBM	$ 18	25%	-SW -Cons -SI	- All
Prime	$ 5	7%	-E&T -SW -Cons -SI	- All
Systems & Computer Technology	$ 4	5%	-SysOps -SW -Cons	- All

4. Secondary Vendors

American Management Systems; DEC; Information Associates/MSA; William M. Mercer Meidinger Hansen

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$10	
IBM	$ 5	50%
SCT	$ 2	20%

Other vendors represent the remaining 30%.

Software Development	$28	
IBM	$ 5	18%
Prime	$ 3	11%
SCT	$ 2	7%

Other vendors represent the remaining 64%.

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Education & Training	$6	
IBM	$ 3	50%
DEC	<$ 1	14%
National Education Corp	<$ 1	12%

Other vendors represent the remaining 24%.

Systems Operations	$1	

There are no major firms listed in the INPUT data base.

Systems Integration	$27	
IBM	$ 5	19%
Prime	$ 2	7%
DEC	$ 1	4%

Other vendors represent the remaining 70%.

6. "Up and Coming" Firms

SCT
OnLine Computer Library Center (OCLC)

Q
Schools

1. Industry Characteristics

a. Key SICs within the Industry

- Elementary and Secondary Schools
- Vocational Schools (Non-Profit)

- Correspondence, Business, Vocational Schools (Profit Making)
- Elementary/Secondary Regional School Centers

b. Industry Sector Size and Growth Rate

In 1988, user expenditures for professional services by elementary and secondary schools were $29 million and are expected to grow at a CAGR of 17% through 1993.

c. Issues

- Attract and retain teachers
- Compliance with laws, such as EEO, busing, and financial reporting.
- Facilities maintenance and upgrades to fixed assets.
- Improve the quality of education through additional computer assistance.

2. Key Applications by Submode

Application	Delivery Submodes
Desktop/integrated publishing	Software development Education and training
Office automation	Software development; Consulting; Systems integration; Education and training
Integrated student accounting	Software development; Consulting; Systems integration
Special education monitoring & management	Software development; Consulting
Vehicle maintenance and operations	Software development Consulting; Systems integration
Training & education (for teachers, etc.)	Consulting; Education and training

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
IBM	$ 5	17%	-SW -E&T -SI -Cons	- All
Nat'l Ed. Corp.	$ 2	7%	-E&T	- All
Sys. & Computer Tech.	$ 2	7%	-SysOps -SW -Cons	- Admin.

4. Secondary Vendors

Pentamation; On Line Computer Library Center (OCLC); DEC; American Management Systems

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$4	
IBM	$ 1	25%
Pentamation	< $ 1	14%
OCLC	< $ 1	8%
Other vendors represent the remaining 53%.		
Software Development	$12	
IBM	2	17%
Pentamation	< $ 1	7%
SCT	< $ 1	6%
Other vendors represent the remaining 69%.		
Education & Training	$ 3	
National Education Corp	< $ 2	45%
IBM	< $ 1	16%
DEC	< $ 1	7%
Other vendors represent the remaining 32%		
Systems Operations	$ 0 (due to rounding)	

Pentamation	< $ 1	NM
SCT	< $ 1	NM
AMS	< $ 1	NM

NM = Not Meaningful

Systems Integration	$ 9	
IBM	$ 2	22%
DEC	< $ 1	10%

Other vendors represent the remaining 68%.

6. "Up and Coming" Firms

Pentamation

R
Federal Government

1. Industry Characteristics

a. Key SICs within the Industry

- Foreign affairs/Special operations
- NASA/Treasury/Federal Reserve Board/IRS
- Energy/TVA/Commerce
- Education
- PX/BX
- International Support (Consulate, Embassies, UN)
- Regulatory/Veterans Administration
- Labor/GSA/Smithsonian
- Army
- Navy
- Air Force
- Health
- FAA/Transportation
- Security/Defense Intelligence
- Interior/Agriculture
- Executive/Legislative
- Justice/Judiciary

b. Industry Sector Size and Growth Rate

In 1988, user expenditures for professional services by the federal government were $4,265 million and are expected to grow at a CAGR of 15% through 1993.

c. Issues

- Reduce the federal budget deficit.
- Cost control/reduce waste.
- Improved information for executive & legislature.
- Attract & retain personnel, especially senior-level.

2. Key Applications by Submode

Application	Delivery Submodes
Office automation	Software development; Consulting; Systems integration; Education and training
Integrated logistics management	Software development; Consulting; Systems integration
Records management (IRS, VA, SEC, FBI, CIA, HHS)	Systems integration; Software development; Consulting
Mapping (DoD; DoT)	Software development; Systems integration; Consulting

3. Major Vendors

Vendor	Market Revenues	Share	Delivery Modes	Sub-Markets
IBM	$450	11%	-SW -SI -Cons -E&T	- DoD - Civilian - E/L/J
GM/EDS	$350	8%	-SW -Cons -E&T	- DoD - Civilian - E/L/J
CSC	$300	7% -E&T	-SW -SysOp -Cons	- DoD - Civilian
SAIC	$275	6%	-Cons -SW -SI	- DoD - Civilian

NOTE: E/L/J = Exec/Legis/Judic

4. Secondary Vendors

Grumman; Unisys/SDC; Boeing Computer Services; PRC/Emhart; BDM International/Ford; TRW; McDonnell Douglas Automation; Martin Marietta Data Systems; Logicon; AT&T; SHL Systemhouse; DEC

5. Leading Vendors by Submode

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Consulting	$422	
SAIC	$100	24%
Unisys	$40	9%
IBM	$25	6%

GM/EDS; Boeing Computer Services; BDM International; Grumman represent 20% of the 1988 market share with other vendors representing 41%.

Software Development	$1,284	
IBM	$175	14%
SAIC	$175	14%
CSC	$160	12%

GM/EDS; Unisys; Grumman; PRC; and BDM International/Ford represent 41% of the 1988 market share with other vendors representing 21%.

Education & Training	$327	
IBM	$40	12%
GM/EDS	$30	9%
Boeing Comp. Services	$25	8%

CSC; McDonnell Douglas; Unisys; and Logicon represent 12% of the 1988 market share with other vendors representing 59%.

Systems Operations	$925	
Boeing Comp Services	$ 45	5%
Computer Sciences Corp	$ 20	2%
McDonnell Douglas Auto.	$ 15	1%

Other vendors represent the remaining 92%.

Vendor	Est. 1988 Rev. ($ Millions)	Est. 1988 Market Share
Systems Integration	$1,308	
IBM	$210	16%
GM/EDS	$175	13%
Grumman	$115	8%

Other vendors represent the remaining 63%.

6. "Up and Coming" Firms

SHL Systemhouse
McDonnell Douglas Automation

Conclusions

IV Conclusions

This chapter, which summarizes INPUT's research for IBM on the professional services/systems integration market, is presented in three parts:

- Key opportunities
- Major competitors
- Open issues

A
Key Opportunities

Professional services/systems integration represents a major market and delivery mode opportunity. The following three areas represent exciting opportunities for vendors:

- Education and training
- Software development
- Systems integration

1. Education and Training

The goal is for education and training to move from a reactive posture to a proactive posture. In other words, users needing to know about new technologies, strategies, products, and services should be able to turn first to education and training, rather than consulting.

In this situation, education and training offers more general information and education, where consulting continues to offer customized information. Training is broadened to include senior Information Technology (IT) management.

Specific examples of proactive education and training opportunities include:

- Software development methodologies
- Introduction to new systems
- Introduction of new technical concepts to managers
- Introduction of Computer Integrated Manufacturing
  - CIM and IT implications for JiT inventory environments
  - Strategic role of IT

2. Software Development

Software development, although a mature segment, offers new opportunities such as:

- New operating systems
- Conversions from one operating system to another, especially to UNIX
- Use of 4GL methodologies for application development
- Development of specific scientific/technical applications

3. Systems Integration

Systems integration is clearly not a fad. It is a necessary step in the maturation of computing environments. While the desktop, department, and corporate computers were envisioned to operate in certain well-defined roles, the advent of new, high-speed microprocessors, networks, and workstations have clearly disrupted the long-standing model of the computing world.

Systems integration, then, is genuinely needed to re-tie everything into integrated systems or, at least, bandage the old models of the computing world into more effective systems.

Specific areas of opportunity in systems integration include:

- True Computer Integrated Manufacturing (CIM), linking factory islands of automation through an integrated,central database.
- Office automation systems, with linkages moving to the departmental level.
- Networks of workstations integrated with minicomputers and mainframes, as well as moving workstations into factory floor applications.
- Major integrated systems will be needed by the federal and state governments. The older generations of systems will be replaced, most likely with UNIX-based products, and previously separate applications will begin to integrate to realize significant operating improvements.

B
Major Competitors

1. Leading Professional Services/Systems Integration Vendors

Before providing a recap of leading vendors, it is appropriate to note that IBM has a leadership position in 10 of the 19 industries and occupies the number two position in two other industries.

Major competitors are listed below:

Vendor	Estimated 1988 Revenues
Andersen Consulting	650
GM/EDS	510
Unisys	450
Computer Sciences Corp.	345
DEC	300
AT&T	285

Vendor	Estimated 1988 Revenues
Science Applications Int'l	275
National Education Corp.	200
Boeing Computer Services	175
Arthur D. Little	145
Computer Task Group	125
Planning Research Corp.	115
McDonnell Douglas Automation	100
SHL Systemhouse	95
Bechtel	85

Admittedly, this list is long. However, to evaluate IBM's position relative to each professional services sub-mode (education and training, consulting, software development, systems operations, and the professional services portion of systems integration) requires a complete listing of vendors.

With the possible exception of Canada-based SHL Systemhouse, all competitors listed are well-funded, have established client relationships, and have access to hardware/software/ program management products. They, too, are in professional services for the long haul.

2. Top Vendors by Industry

Industry	Vendor	Estimated 1988 Revenues ($ Millions)
Discrete manufacturing	IBM	235
	Andersen Consulting	180
	Unisys	70
Process manufacturing	IBM	185
	Andersen Consulting	110
	DEC	55
Utilities	Bechtel	60
	Andersen Consulting	45
	Arthur D. Little	40
	DEC	40
Construction	McDonnell Douglas	15
	Bechtel Group	15
	Computer Task Group	10
	IBM	10
Finance	AT&T	50
	IBM	40

Industry	Vendor	Estimated 1988 Revenues ($ Millions)
	GM/EDS	30
	Unisys	30
Securities	AT&T	85
	IBM	75
	SIAC	40
Distribution	Andersen Consulting	90
(Retail, Wholesale)	GM/EDS	40
	IBM	25
Insurance	IBM	150
	Policy Management	65
	GM/EDS	35
State & local gov't	Arthur D. Little	45
	AT&T	40
	Unisys	35
Health	HBO & Company	45
	Arthur D. Little	40
	Andersen Consulting	35
Communications	DEC	55
	Andersen Consulting	35
	AGS/Nynex	25
	Computer Horizons	25
Transportation	IBM	40
	Unisys	30
	Andersen Consulting	25
Media	IBM	60
	Andersen Consulting	35
	Ernst & Whinney	20

Industry	Vendor	Estimated 1988 Revenues ($ Millions)
Consultants	IBM	5
	AT&T	3
	National Education Corp.	1
Computer Services	IBM	3
	DEC	2
	H-P	1
Higher Education	IBM	18
	Prime	7
	Systems & Computer Technology	4
Schools	IBM	5
	National Education Corp.	2
	Systems & Computer Technology	2
Federal government	IBM	450
	GM/EDS	350
	Computer Sciences Corp.	300
	SAIC	275

C
Open Issues

1. Assumptions

- Mergers and acquisition activity will continue, although will more likely involve medium and small firms in nearly every industry.

- Definitions differ for systems integration and professional services on a vendor-to-vendor basis. To the extent possible, INPUT has reconciled these differences.

- Vendors tend to "fudge" the financial reporting of systems integration/ professional services jobs. An eight-year $40 million job is seldom divided into $5 million increments; rather the entire amount is "promoted" in the first year.

2. Items for Further Investigation

INPUT has not identified areas requiring further investigation.

Appendix

Appendix A

Appendix A contains a series of tables that present the primary data associated with this project. The tables are listed below and are briefly described.

Table 1. INPUT Forecast With Inflation by Industry Mode

This table is similar to previously published INPUT data. The non-hardware portion of Systems Integration has been added to remain consistent with previous work for IBM in the Professional Services area.

Table 2. INPUT Forecast Without Inflation by Industry Mode

This is similar to Table 1 but the effects of inflation, as predicted by INPUT, have been removed.

Table 3. IBM Forecast Without Inflation by Industry Mode

This information represents the repackaged, or restructured, forecast data, presented by industry segment, as defined by IBM. Please note that Table 7 contains the basic "crosswalk" guidelines that were used in the restructuring process.

Table 4. IBM Forecast With Inflation by Industry Mode

This is Table 3 data, but with the inflation factors, as defined by IBM, added to each cell.

Table 5. IBM Forecast With Inflation by Mode of Delivery

This table contains the same data as presented in Table 4, shown by mode of delivery (within the context of Professional Services) as opposed to the industry segment data contained in Table 4.

Table 6. IBM Forecast with Inflation by Mode of Delivery and Industry

This table is similar to Table 5 except that all five service modes are presented by industry.

Table 7. Industry Sector Crosswalk

This table illustrates the basic approach that was taken in restructuring the data presented in Table 1 into the data presented in Table 3. In order to understand the intent of the information contained in the table, it should be viewed from the perspective of the IBM sectors. For example, the IBM defined Manufacturing sector is comprised of data from INPUT's:

- Discrete Manufacturing Sector
- Process Manufacturing Sector
- Wholesale Distribution Sector

- Services Sector
- Other Industries Sector

Additionally, for example, IBM's Transportation Sector is comprised of data from INPUT's:

- Transportation Sector
- Services Sector
- Other Industries Sector

Table 1

INPUT FORECAST WITH INFLATION BY INDUSTRY MODE

SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
DISCRETE MANUFACTURING								
PROFESSIONAL SERVICES	2459	3122	3742	4452	5293	6273	7431	19
SYSTEMS INTEGRATION	270	375	481	620	805	1037	1344	29
SOFTWARE DEVELOPMENT	128	175	227	290	379	482	622	29
DESIGN/INTEGRATION	51	72	90	115	147	185	235	27
PROJECT MGMT/CONSULTING	48	67	82	104	130	164	206	25
SOFTWARE PRODUCTS	25	36	51	73	104	148	210	42
OTHER SERVICES	18	25	31	38	45	58	71	23
TOTAL	2729	3497	4223	5072	6098	7310	8775	20
PROCESS MANUFACTURING								
PROFESSIONAL SERVICES	1222	1491	1833	2237	2728	3316	4029	22
SYSTEMS INTEGRATION	44	55	72	94	115	137	171	25
SOFTWARE DEVELOPMENT	20	25	33	43	53	63	78	26
DESIGN/INTEGRATION	7	8	10	13	16	19	24	25
PROJECT MGMT/CONSULTING	7	8	10	15	19	22	28	28
SOFTWARE PRODUCTS	5	7	9	11	13	16	20	23
OTHER SERVICES	6	7	10	12	14	17	21	25
TOTAL	1266	1546	1905	2331	2843	3453	4200	22
TRANSPORTATION								
PROFESSIONAL SERVICES	145	166	196	229	267	311	363	17
SYSTEMS INTEGRATION	50	69	82	102	130	157	191	23
SOFTWARE DEVELOPMENT	23	32	39	49	64	80	99	25
DESIGN/INTEGRATION	9	13	15	18	21	24	28	17
PROJECT MGMT/CONSULTING	12	16	18	22	27	30	35	17
SOFTWARE PRODUCTS	3	4	5	7	9	12	15	30
OTHER SERVICES	3	4	5	7	9	11	14	28
TOTAL	195	235	278	331	397	468	554	19
UTILITIES								
PROFESSIONAL SERVICES	371	423	477	534	596	665	740	12
SYSTEMS INTEGRATION	78	101	135	174	227	285	364	29
SOFTWARE DEVELOPMENT	43	56	75	97	130	160	207	30
DESIGN/INTEGRATION	11	14	19	24	30	38	47	27
PROJECT MGMT/CONSULTING	15	19	24	29	35	44	52	22
SOFTWARE PRODUCTS	4	5	8	11	15	20	27	40
OTHER SERVICES	5	7	9	13	17	23	31	35
TOTAL	449	524	612	708	823	950	1104	16

Table 1 (Continued)

INPUT FORECAST WITH INFLATION BY INDUSTRY MODE

SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
TELECOMMUNICATIONS								
PROFESSIONAL SERVICES	613	679	813	936	1086	1255	1455	16
SYSTEMS INTEGRATION	71	89	104	125	144	169	203	18
SOFTWARE DEVELOPMENT	37	46	54	66	76	90	110	19
DESIGN/INTEGRATION	13	16	18	21	23	26	30	13
PROJECT MGMT/CONSULTING	14	17	20	23	27	31	36	16
SOFTWARE PRODUCTS	5	6	7	8	10	12	14	18
OTHER SERVICES	3	4	5	7	8	10	13	27
TOTAL	684	768	917	1061	1230	1424	1658	17
RETAIL DISTRIBUTION								
PROFESSIONAL SERVICES	140	180	216	257	306	362	429	19
SYSTEMS INTEGRATION	61	86	122	175	246	346	481	41
SOFTWARE DEVELOPMENT	26	37	53	78	112	159	222	43
DESIGN/INTEGRATION	13	18	25	37	51	70	98	40
PROJECT MGMT/CONSULTING	11	16	23	32	44	61	84	39
SOFTWARE PRODUCTS	6	9	13	18	25	37	53	43
OTHER SERVICES	4	6	8	10	14	19	24	32
TOTAL	201	266	338	432	552	708	910	28
WHOLESALE DISTRIBUTION								
PROFESSIONAL SERVICES	238	281	331	387	452	527	613	17
SYSTEMS INTEGRATION	57	69	89	108	133	160	200	24
SOFTWARE DEVELOPMENT	25	30	40	48	60	74	94	26
DESIGN/INTEGRATION	12	15	19	23	28	33	40	22
PROJECT MGMT/CONSULTING	11	13	17	20	25	30	37	23
SOFTWARE PRODUCTS	5	6	7	9	10	12	15	20
OTHER SERVICES	4	5	6	8	9	11	14	23
TOTAL	295	350	420	495	585	687	813	18
BANKING AND FINANCE								
PROFESSIONAL SERVICES	1602	1907	2247	2628	3071	3577	4165	17
SYSTEMS INTEGRATION	102	146	213	312	452	651	927	45
SOFTWARE DEVELOPMENT	38	55	83	118	172	246	348	45
DESIGN/INTEGRATION	22	32	46	67	95	136	191	43
PROJECT MGMT/CONSULTING	22	32	44	65	91	129	178	41
SOFTWARE PRODUCTS	10	14	22	36	57	88	137	58
OTHER SERVICES	9	13	18	26	37	52	73	41
TOTAL	1704	2053	2460	2940	3523	4228	5092	20

Table 1 (Continued)

INPUT FORECAST WITH INFLATION BY INDUSTRY MODE

SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
INSURANCE								
PROFESSIONAL SERVICES	1047	1204	1419	1660	1939	2259	2630	17
SYSTEMS INTEGRATION	60	84	103	128	157	191	264	26
SOFTWARE DEVELOPMENT	21	29	36	43	51	59	80	23
DESIGN/INTEGRATION	13	18	21	27	34	42	58	26
PROJECT MGMT/CONSULTING	17	24	29	36	45	56	78	27
SOFTWARE PRODUCTS	6	8	11	15	19	25	38	37
OTHER SERVICES	4	5	6	7	8	9	10	15
TOTAL	1107	1288	1522	1788	2096	2450	2894	18
MEDICAL								
PROFESSIONAL SERVICES	260	299	355	419	494	581	682	18
SYSTEMS INTEGRATION	70	93	123	155	200	248	315	28
SOFTWARE DEVELOPMENT	32	43	56	70	93	109	137	26
DESIGN/INTEGRATION	10	13	18	23	29	38	48	30
PROJECT MGMT/CONSULTING	11	14	19	24	30	39	50	29
SOFTWARE PRODUCTS	10	13	17	22	28	36	47	29
OTHER SERVICES	8	10	13	16	20	26	33	27
TOTAL	330	392	478	574	694	829	997	21
EDUCATION								
PROFESSIONAL SERVICES	52	59	70	82	96	111	130	17
SYSTEMS INTEGRATION	33	36	45	51	58	66	82	18
SOFTWARE DEVELOPMENT	14	15	19	22	26	30	38	20
DESIGN/INTEGRATION	7	8	9	10	11	12	14	13
PROJECT MGMT/CONSULTING	7	8	9	10	10	11	12	10
SOFTWARE PRODUCTS	2	3	4	5	7	9	14	41
OTHER SERVICES	3	4	4	4	4	4	4	3
TOTAL	85	95	115	133	154	177	212	17
SERVICES								
PROFESSIONAL SERVICES	103	117	138	162	189	220	256	17
SYSTEMS INTEGRATION	13	19	25	31	44	58	81	34
SOFTWARE DEVELOPMENT	5	8	11	13	19	27	38	37
DESIGN/INTEGRATION	3	4	5	7	9	11	15	30
PROJECT MGMT/CONSULTING	2	3	4	5	7	9	13	34
SOFTWARE PRODUCTS	1	2	3	3	4	5	7	28
OTHER SERVICES	1	2	3	3	5	6	8	32
TOTAL	116	136	163	193	233	278	337	20

Table 1 (Continued)

INPUT FORECAST WITH INFLATION BY INDUSTRY MODE

SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
FEDERAL GOVERNMENT								
PROFESSIONAL SERVICES	2552	2908	3278	3667	4101	4531	5004	11
SYSTEMS INTEGRATION	1117	1287	1588	1973	2392	2894	3468	22
SOFTWARE DEVELOPMENT	525	605	743	895	1103	1322	1568	21
DESIGN/INTEGRATION	191	220	280	350	448	556	684	25
PROJECT MGMT/CONSULTING	150	173	220	272	346	428	523	25
SOFTWARE PRODUCTS	126	145	185	282	298	374	462	26
OTHER SERVICES	125	144	160	174	197	214	231	10
TOTAL	3669	4195	4866	5640	6493	7425	8472	15
STATE & LOCAL GOVERNMENT								
PROFESSIONAL SERVICES	1655	1937	2322	2762	3284	3892	4610	19
SYSTEMS INTEGRATION	161	235	290	352	436	522	632	22
SOFTWARE DEVELOPMENT	71	104	126	152	186	220	263	20
DESIGN/INTEGRATION	23	33	42	54	70	90	114	28
PROJECT MGMT/CONSULTING	31	46	60	72	90	105	126	22
SOFTWARE PRODUCTS	18	26	33	42	54	68	87	27
OTHER SERVICES	18	26	29	32	36	39	42	10
TOTAL	1816	2172	2612	3114	3720	4414	5242	19
OTHER INDUSTRY-SPECIFIC								
PROFESSIONAL SERVICES	260	288	345	397	460	532	617	16
SYSTEMS INTEGRATION	40	46	58	68	79	95	113	20
SOFTWARE DEVELOPMENT	17	19	25	30	37	44	52	22
DESIGN/INTEGRATION	8	10	12	14	15	17	19	15
PROJECT MGMT/CONSULTING	8	10	11	12	13	15	17	12
SOFTWARE PRODUCTS	3	3	5	7	9	14	19	43
OTHER SERVICES	4	4	5	5	5	5	6	6
TOTAL	300	334	403	465	539	627	730	17
GRAND TOTAL								
PROFESSIONAL SERVICES	12719	15061	17782	20809	24362	28412	33154	17
SYSTEMS INTEGRATION	2226	2791	3530	4468	5617	7016	8836	26
SOFTWARE DEVELOPMENT	1026	1279	1620	2014	2561	3165	3956	25
DESIGN/INTEGRATION	392	493	629	803	1027	1297	1645	27
PROJECT MGMT/CONSULTING	365	465	590	741	938	1174	1475	26
SOFTWARE PRODUCTS	228	287	380	549	662	876	1165	32
OTHER SERVICES	215	266	311	361	428	504	595	17
TOTAL	14945	17852	21312	25277	29979	35428	41990	19

Table 2

INPUT FORECAST WITHOUT INFLATION BY INDUSTRY MODE

SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
	1.0000	1.0340	1.0550	1.0500	1.0500	1.0450	1.0450	
INFLATION FACTORS	1.0000	1.0340	1.0909	1.1454	1.2027	1.2568	1.3134	
DISCRETE MANUFACTURING								
PROFESSIONAL SERVICES	2459	3019	3430	3887	4401	4991	5658	13
SYSTEMS INTEGRATION	270	363	441	541	669	825	1023	23
SOFTWARE DEVELOPMENT	128	169	208	253	315	384	474	23
DESIGN/INTEGRATION	51	70	83	100	122	147	179	21
PROJECT MGMT/CONSULTING	48	65	75	91	108	130	157	19
SOFTWARE PRODUCTS	25	35	47	64	86	118	160	36
OTHER SERVICES	18	24	28	33	37	46	54	17
TOTAL	2729	3382	3871	4428	5070	5816	6681	15
PROCESS MANUFACTURING								
PROFESSIONAL SERVICES	1222	1442	1680	1953	2268	2638	3068	16
SYSTEMS INTEGRATION	44	53	66	82	96	109	130	20
SOFTWARE DEVELOPMENT	20	24	30	38	44	50	59	20
DESIGN/INTEGRATION	7	8	9	11	13	15	18	19
PROJECT MGMT/CONSULTING	7	8	9	13	16	18	21	22
SOFTWARE PRODUCTS	5	7	8	10	11	13	15	18
OTHER SERVICES	6	7	9	10	12	14	16	19
TOTAL	1266	1495	1746	2035	2364	2747	3198	16
TRANSPORTATION								
PROFESSIONAL SERVICES	145	161	180	200	222	247	276	11
SYSTEMS INTEGRATION	50	67	75	89	108	125	145	17
SOFTWARE DEVELOPMENT	23	31	36	43	53	64	75	19
DESIGN/INTEGRATION	9	13	14	16	17	19	21	11
PROJECT MGMT/CONSULTING	12	15	17	19	22	24	27	11
SOFTWARE PRODUCTS	3	4	5	6	7	10	11	24
OTHER SERVICES	3	4	5	6	7	9	11	22
TOTAL	195	227	255	289	330	372	422	13
UTILITIES								
PROFESSIONAL SERVICES	371	409	437	466	496	529	563	7
SYSTEMS INTEGRATION	78	98	124	152	189	227	277	23
SOFTWARE DEVELOPMENT	43	54	69	85	108	127	158	24
DESIGN/INTEGRATION	11	14	17	21	25	30	36	21
PROJECT MGMT/CONSULTING	15	18	22	25	29	35	40	17
SOFTWARE PRODUCTS	4	5	7	10	12	16	21	34
OTHER SERVICES	5	7	8	11	14	18	24	28
TOTAL	449	507	561	618	684	756	841	11

Table 2 (Continued)

INPUT FORECAST WITHOUT INFLATION BY INDUSTRY MODE

SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
	1.0000	1.0340	1.0550	1.0500	1.0500	1.0450	1.0450	
INFLATION FACTORS	1.0000	1.0340	1.0909	1.1454	1.2027	1.2568	1.3134	
TELECOMMUNICATIONS								
PROFESSIONAL SERVICES	613	657	745	817	903	999	1108	11
SYSTEMS INTEGRATION	71	86	95	109	120	134	155	12
SOFTWARE DEVELOPMENT	37	44	50	58	63	72	84	13
DESIGN/INTEGRATION	13	15	17	18	19	21	23	8
PROJECT MGMT/CONSULTING	14	16	18	20	22	25	27	11
SOFTWARE PRODUCTS	5	6	6	7	8	10	11	13
OTHER SERVICES	3	4	5	6	7	8	10	21
TOTAL	684	743	841	926	1023	1133	1262	11
RETAIL DISTRIBUTION								
PROFESSIONAL SERVICES	140	174	198	224	254	288	327	13
SYSTEMS INTEGRATION	61	83	112	153	205	275	366	35
SOFTWARE DEVELOPMENT	26	36	49	68	93	127	169	36
DESIGN/INTEGRATION	13	17	23	32	42	56	75	34
PROJECT MGMT/CONSULTING	11	15	21	28	37	49	64	33
SOFTWARE PRODUCTS	6	9	12	16	21	29	40	36
OTHER SERVICES	4	6	7	9	12	15	18	26
TOTAL	201	257	310	377	459	563	693	22
WHOLESALE DISTRIBUTION								
PROFESSIONAL SERVICES	238	272	303	338	376	419	467	11
SYSTEMS INTEGRATION	57	67	82	94	110	127	152	18
SOFTWARE DEVELOPMENT	25	29	37	42	50	59	72	20
DESIGN/INTEGRATION	12	15	17	20	23	26	30	16
PROJECT MGMT/CONSULTING	11	13	16	17	21	24	28	18
SOFTWARE PRODUCTS	5	6	7	8	9	10	11	15
OTHER SERVICES	4	5	6	7	8	9	11	17
TOTAL	295	338	385	432	486	547	619	13
BANKING AND FINANCE								
PROFESSIONAL SERVICES	1602	1844	2060	2294	2553	2846	3171	11
SYSTEMS INTEGRATION	102	141	195	272	376	518	706	38
SOFTWARE DEVELOPMENT	38	53	76	103	143	196	265	38
DESIGN/INTEGRATION	22	31	42	58	79	108	145	36
PROJECT MGMT/CONSULTING	22	31	40	57	76	103	136	34
SOFTWARE PRODUCTS	10	14	20	31	47	70	104	50
OTHER SERVICES	9	13	17	23	31	41	56	35
TOTAL	1704	1985	2255	2567	2929	3364	3877	14

Table 2 (Continued)

INPUT FORECAST WITHOUT INFLATION BY INDUSTRY MODE

SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
INFLATION FACTORS	1.0000	1.0340	1.0550	1.0500	1.0500	1.0450	1.0450	
	1.0000	1.0340	1.0909	1.1454	1.2027	1.2568	1.3134	
INSURANCE								
PROFESSIONAL SERVICES	1047	1164	1301	1449	1612	1797	2002	11
SYSTEMS INTEGRATION	60	81	94	111	130	152	201	20
SOFTWARE DEVELOPMENT	21	28	33	38	42	47	61	17
DESIGN/INTEGRATION	13	17	19	24	28	33	44	20
PROJECT MGMT/CONSULTING	17	23	27	31	37	45	59	21
SOFTWARE PRODUCTS	6	8	10	13	16	20	29	30
OTHER SERVICES	4	5	5	6	6	7	8	10
TOTAL	1107	1246	1395	1561	1742	1949	2204	12
MEDICAL								
PROFESSIONAL SERVICES	260	289	325	366	411	462	519	12
SYSTEMS INTEGRATION	70	90	113	135	166	197	240	22
SOFTWARE DEVELOPMENT	32	42	51	61	77	87	104	20
DESIGN/INTEGRATION	10	13	17	20	24	30	37	24
PROJECT MGMT/CONSULTING	11	14	17	21	25	31	38	23
SOFTWARE PRODUCTS	10	13	16	19	23	29	36	23
OTHER SERVICES	8	10	12	14	17	21	25	21
TOTAL	330	379	438	501	577	660	759	15
EDUCATION								
PROFESSIONAL SERVICES	52	57	64	72	80	88	99	12
SYSTEMS INTEGRATION	33	35	41	45	48	53	62	12
SOFTWARE DEVELOPMENT	14	15	17	19	22	24	29	15
DESIGN/INTEGRATION	7	7	8	9	9	10	11	8
PROJECT MGMT/CONSULTING	7	7	8	9	8	9	9	5
SOFTWARE PRODUCTS	2	2	4	4	6	7	11	34
OTHER SERVICES	3	3	4	3	3	3	3	-2
TOTAL	85	92	105	116	128	141	161	12
SERVICES								
PROFESSIONAL SERVICES	103	113	127	141	157	175	195	11
SYSTEMS INTEGRATION	13	18	23	27	37	46	62	27
SOFTWARE DEVELOPMENT	5	8	10	11	16	21	29	30
DESIGN/INTEGRATION	3	4	5	6	7	9	11	24
PROJECT MGMT/CONSULTING	2	3	4	4	6	7	10	28
SOFTWARE PRODUCTS	1	2	2	3	3	4	5	22
OTHER SERVICES	1	2	2	3	4	5	6	26
TOTAL	116	132	149	168	194	221	257	14

Table 2 (Continued)

INPUT FORECAST WITHOUT INFLATION BY INDUSTRY MODE

SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
INFLATION FACTORS	1.0000	1.0340	1.0550	1.0500	1.0500	1.0450	1.0450	
	1.0000	1.0340	1.0909	1.1454	1.2027	1.2568	1.3134	
FEDERAL GOVERNMENT								
PROFESSIONAL SERVICES	2552	2812	3005	3201	3410	3605	3810	6
SYSTEMS INTEGRATION	1117	1245	1456	1723	1989	2303	2641	16
SOFTWARE DEVELOPMENT	525	585	681	781	917	1052	1194	15
DESIGN/INTEGRATION	191	213	257	306	373	442	521	20
PROJECT MGMT/CONSULTING	150	167	202	237	288	341	398	19
SOFTWARE PRODUCTS	126	140	170	246	248	298	352	20
OTHER SERVICES	125	139	147	152	164	170	176	5
TOTAL	3669	4057	4461	4924	5399	5908	6451	10
STATE & LOCAL GOVERNMENT								
PROFESSIONAL SERVICES	1655	1873	2129	2411	2731	3097	3510	13
SYSTEMS INTEGRATION	161	227	266	307	363	415	481	16
SOFTWARE DEVELOPMENT	71	101	116	133	155	175	200	15
DESIGN/INTEGRATION	23	32	39	47	58	72	87	22
PROJECT MGMT/CONSULTING	31	44	55	63	75	84	96	17
SOFTWARE PRODUCTS	18	25	30	37	45	54	66	21
OTHER SERVICES	18	25	27	28	30	31	32	5
TOTAL	1816	2101	2394	2719	3093	3512	3991	14
OTHER INDUSTRY-SPECIFIC								
PROFESSIONAL SERVICES	260	279	316	347	382	423	470	11
SYSTEMS INTEGRATION	40	45	53	59	66	76	86	14
SOFTWARE DEVELOPMENT	17	19	23	26	31	35	40	16
DESIGN/INTEGRATION	8	9	11	12	12	14	14	9
PROJECT MGMT/CONSULTING	8	9	10	10	11	12	13	7
SOFTWARE PRODUCTS	3	3	5	6	7	11	14	36
OTHER SERVICES	4	4	5	4	4	4	5	1
TOTAL	300	323	369	406	448	499	556	11
GRAND TOTAL								
PROFESSIONAL SERVICES	12719	14566	16301	18167	20256	22607	25244	12
SYSTEMS INTEGRATION	2226	2699	3236	3901	4671	5582	6728	20
SOFTWARE DEVELOPMENT	1026	1237	1485	1758	2130	2518	3012	19
DESIGN/INTEGRATION	392	477	577	701	854	1032	1253	21
PROJECT MGMT/CONSULTING	365	450	541	647	780	934	1123	20
SOFTWARE PRODUCTS	228	277	348	479	551	697	887	26
OTHER SERVICES	215	257	285	315	356	401	453	12
TOTAL	14945	17265	19537	22068	24927	28189	31971	13

Table 3

IBM FORECAST WITHOUT INFLATION BY INDUSTRY MODE

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
DISCRETE MANUFACTURING								
PROFESSIONAL SERVICES	1986	2435	2766	3133	3547	4022	4558	13
SYSTEMS INTEGRATION	219	293	357	438	541	667	828	23
SOFTWARE DEVELOPMENT	103	137	168	204	255	310	383	23
DESIGN/INTEGRATION	41	56	67	81	99	119	145	21
PROJECT MGMT/CONSULTING	39	52	61	73	87	105	127	19
SOFTWARE PRODUCTS	20	28	38	51	70	95	129	35
OTHER SERVICES	15	20	23	27	31	38	44	18
TOTAL	2205	2728	3122	3571	4088	4689	5386	15
PROCESS MANUFACTURING								
PROFESSIONAL SERVICES	1239	1461	1699	1971	2284	2653	3079	16
SYSTEMS INTEGRATION	53	64	80	99	117	136	163	20
SOFTWARE DEVELOPMENT	25	30	37	46	55	64	77	21
DESIGN/INTEGRATION	8	10	12	14	17	20	24	20
PROJECT MGMT/CONSULTING	8	10	12	16	19	22	27	22
SOFTWARE PRODUCTS	6	7	9	11	13	15	18	20
OTHER SERVICES	6	7	10	12	13	15	18	19
TOTAL	1292	1525	1779	2070	2402	2788	3243	16
UTILITIES								
PROFESSIONAL SERVICES	347	383	409	436	464	495	527	7
SYSTEMS INTEGRATION	73	91	116	142	176	212	259	23
SOFTWARE DEVELOPMENT	40	51	64	79	101	119	147	24
DESIGN/INTEGRATION	10	13	16	20	23	28	33	21
PROJECT MGMT/CONSULTING	14	17	21	24	27	33	37	17
SOFTWARE PRODUCTS	4	5	7	9	12	15	19	34
OTHER SERVICES	5	6	8	11	13	17	22	28
TOTAL	420	474	525	578	640	707	786	11
CONSTRUCTION								
PROFESSIONAL SERVICES	91	97	111	121	134	148	164	11
SYSTEMS INTEGRATION	14	16	19	21	23	26	30	14
SOFTWARE DEVELOPMENT	6	7	8	9	11	12	14	16
DESIGN/INTEGRATION	3	3	4	4	4	5	5	9
PROJECT MGMT/CONSULTING	3	3	4	4	4	4	5	7
SOFTWARE PRODUCTS	1	1	2	2	3	4	5	36
OTHER SERVICES	1	2	2	2	1	1	2	1
TOTAL	105	113	129	142	157	175	195	11

Table 3 (Continued)

IBM FORECAST WITHOUT INFLATION BY INDUSTRY MODE

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
FINANCE								
PROFESSIONAL SERVICES	1330	1531	1710	1904	2119	2362	2632	11
SYSTEMS INTEGRATION	85	118	163	227	313	431	588	38
SOFTWARE DEVELOPMENT	32	45	64	86	119	163	221	38
DESIGN/INTEGRATION	19	26	35	49	66	90	121	36
PROJECT MGMT/CONSULTING	19	26	34	47	63	85	113	34
SOFTWARE PRODUCTS	8	11	17	26	39	58	86	50
OTHER SERVICES	8	11	14	19	26	35	46	34
TOTAL	1415	1649	1873	2131	2433	2793	3220	14
SECURITIES								
PROFESSIONAL SERVICES	282	325	363	404	449	501	558	11
SYSTEMS INTEGRATION	18	25	34	48	66	91	124	38
SOFTWARE DEVELOPMENT	7	9	13	18	25	34	47	38
DESIGN/INTEGRATION	4	5	7	10	14	19	26	36
PROJECT MGMT/CONSULTING	4	5	7	10	13	18	24	34
SOFTWARE PRODUCTS	2	2	4	6	8	12	18	50
OTHER SERVICES	2	2	3	4	5	7	10	35
TOTAL	300	349	397	452	516	592	682	14
RETAIL DISTRIBUTION								
PROFESSIONAL SERVICES	404	497	566	642	729	827	940	14
SYSTEMS INTEGRATION	84	115	150	198	260	342	447	31
SOFTWARE DEVELOPMENT	38	51	67	90	119	157	206	32
DESIGN/INTEGRATION	17	23	30	40	52	67	88	30
PROJECT MGMT/CONSULTING	15	21	27	35	45	59	76	29
SOFTWARE PRODUCTS	9	12	16	21	28	40	54	36
OTHER SERVICES	6	8	10	12	15	19	23	23
TOTAL	489	612	716	841	989	1169	1386	18
WHOLESALE DISTRIBUTION								
PROFESSIONAL SERVICES	332	374	419	466	517	577	642	11
SYSTEMS INTEGRATION	71	85	105	122	145	170	207	19
SOFTWARE DEVELOPMENT	31	37	46	54	65	79	97	21
DESIGN/INTEGRATION	15	18	22	26	30	34	41	17
PROJECT MGMT/CONSULTING	13	16	20	22	26	31	37	18
SOFTWARE PRODUCTS	6	7	9	11	12	15	18	20
OTHER SERVICES	6	7	8	9	10	12	15	17
TOTAL	403	459	523	587	662	747	849	13

Table 3 (Continued)

IBM FORECAST WITHOUT INFLATION BY INDUSTRY MODE

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
INSURANCE								
PROFESSIONAL SERVICES	1048	1165	1302	1450	1613	1799	2004	11
SYSTEMS INTEGRATION	60	81	94	112	130	152	202	20
SOFTWARE DEVELOPMENT	21	28	33	38	43	47	61	17
DESIGN/INTEGRATION	13	17	19	24	28	33	44	20
PROJECT MGMT/CONSULTING	17	23	27	31	37	45	59	21
SOFTWARE PRODUCTS	6	8	10	13	16	20	29	30
OTHER SERVICES	4	5	5	6	6	7	8	10
TOTAL	1108	1247	1396	1562	1744	1951	2206	12
STATE/LOCAL GOVERNMENT								
PROFESSIONAL SERVICES	1655	1873	2129	2411	2731	3097	3510	13
SYSTEMS INTEGRATION	161	227	266	307	363	415	481	16
SOFTWARE DEVELOPMENT	71	101	116	133	155	175	200	15
DESIGN/INTEGRATION	23	32	39	47	58	72	87	22
PROJECT MGMT/CONSULTING	31	44	55	63	75	84	96	17
SOFTWARE PRODUCTS	18	25	30	37	45	54	66	21
OTHER SERVICES	18	25	27	28	30	31	32	5
TOTAL	1816	2101	2394	2719	3093	3512	3991	14
HEALTH								
PROFESSIONAL SERVICES	267	297	334	375	421	474	532	12
SYSTEMS INTEGRATION	71	91	115	137	169	201	244	22
SOFTWARE DEVELOPMENT	33	42	52	62	79	88	106	20
DESIGN/INTEGRATION	10	13	17	21	25	31	37	24
PROJECT MGMT/CONSULTING	11	14	18	21	25	32	39	23
SOFTWARE PRODUCTS	10	13	16	19	24	29	36	23
OTHER SERVICES	8	10	12	14	17	21	26	21
TOTAL	338	388	449	513	590	675	777	15
COMMUNICATIONS								
PROFESSIONAL SERVICES	460	493	559	613	677	749	831	11
SYSTEMS INTEGRATION	53	65	72	82	90	101	116	12
SOFTWARE DEVELOPMENT	28	33	37	43	47	54	63	13
DESIGN/INTEGRATION	10	12	12	14	15	16	17	8
PROJECT MGMT/CONSULTING	10	12	14	15	17	18	21	11
SOFTWARE PRODUCTS	4	4	5	5	6	7	8	13
OTHER SERVICES	2	3	3	5	5	6	7	21
TOTAL	513	557	630	695	767	850	947	11

Table 3 (Continued)

IBM FORECAST WITHOUT INFLATION BY INDUSTRY MODE

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
TRANSPORTATION								
PROFESSIONAL SERVICES	124	138	154	171	190	212	237	11
SYSTEMS INTEGRATION	42	56	63	74	90	104	121	17
SOFTWARE DEVELOPMENT	19	26	30	36	44	53	63	19
DESIGN/INTEGRATION	8	10	11	13	15	16	18	11
PROJECT MGMT/CONSULTING	10	13	14	16	19	20	22	11
SOFTWARE PRODUCTS	2	3	4	5	6	8	10	24
OTHER SERVICES	2	3	4	5	6	7	9	22
TOTAL	166	193	217	246	280	316	358	13
MEDIA								
PROFESSIONAL SERVICES	495	568	645	720	806	904	1016	12
SYSTEMS INTEGRATION	59	74	88	103	122	145	174	19
SOFTWARE DEVELOPMENT	28	35	42	49	59	69	83	19
DESIGN/INTEGRATION	11	14	16	19	22	25	29	15
PROJECT MGMT/CONSULTING	11	14	16	18	20	24	28	15
SOFTWARE PRODUCTS	5	6	8	10	13	18	24	31
OTHER SERVICES	4	5	6	6	7	8	10	14
TOTAL	554	643	733	824	928	1049	1189	13
CONSULTANTS								
PROFESSIONAL SERVICES	15	17	18	21	23	26	28	11
SYSTEMS INTEGRATION	2	3	3	4	5	7	9	27
SOFTWARE DEVELOPMENT	1	1	1	2	2	3	4	30
DESIGN/INTEGRATION	0	1	1	1	1	1	2	24
PROJECT MGMT/CONSULTING	0	0	1	1	1	1	1	28
SOFTWARE PRODUCTS	0	0	0	0	0	1	1	22
OTHER SERVICES	0	0	0	0	1	1	1	26
TOTAL	17	19	22	25	28	32	37	14
COMPUTER SERVICES								
PROFESSIONAL SERVICES	10	11	12	13	15	17	19	12
SYSTEMS INTEGRATION	2	3	3	4	4	5	7	22
SOFTWARE DEVELOPMENT	1	1	1	1	2	2	3	25
DESIGN/INTEGRATION	0	1	1	1	1	1	1	18
PROJECT MGMT/CONSULTING	0	0	1	1	1	1	1	19
SOFTWARE PRODUCTS	0	0	0	0	0	1	1	27
OTHER SERVICES	0	0	0	0	0	0	1	18
TOTAL	12	13	15	17	19	22	25	14

Table 3 (Continued)

IBM FORECAST WITHOUT INFLATION BY INDUSTRY MODE

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
HIGHER EDUCATION								
PROFESSIONAL SERVICES	40	44	49	55	61	68	76	12
SYSTEMS INTEGRATION	25	26	31	33	36	39	47	12
SOFTWARE DEVELOPMENT	10	11	13	14	16	18	22	15
DESIGN/INTEGRATION	5	5	6	7	7	7	8	8
PROJECT MGMT/CONSULTING	5	5	6	7	6	7	7	5
SOFTWARE PRODUCTS	2	2	3	3	4	5	8	34
OTHER SERVICES	2	3	3	3	2	2	2	-2
TOTAL	65	70	80	88	97	107	123	12
SCHOOLS								
PROFESSIONAL SERVICES	17	19	21	23	26	29	32	11
SYSTEMS INTEGRATION	8	9	10	11	12	13	16	12
SOFTWARE DEVELOPMENT	3	4	4	5	5	6	7	15
DESIGN/INTEGRATION	2	2	2	2	2	2	3	8
PROJECT MGMT/CONSULTING	2	2	2	2	2	2	2	5
SOFTWARE PRODUCTS	1	1	1	1	1	2	3	34
OTHER SERVICES	1	1	1	1	1	1	1	-2
TOTAL	25	27	31	34	38	42	48	12
FEDERAL GOVERNMENT								
PROFESSIONAL SERVICES	2577	2840	3036	3236	3449	3648	3858	6
SYSTEMS INTEGRATION	1126	1256	1469	1738	2008	2325	2666	16
SOFTWARE DEVELOPMENT	529	591	687	789	926	1063	1207	15
DESIGN/INTEGRATION	193	215	259	308	376	446	525	20
PROJECT MGMT/CONSULTING	152	170	205	241	292	345	403	19
SOFTWARE PRODUCTS	126	141	170	247	249	299	354	20
OTHER SERVICES	125	140	147	153	165	172	178	5
TOTAL	3703	4097	4505	4975	5457	5973	6524	10
GRAND TOTAL								
PROFESSIONAL SERVICES	12719	14566	16301	18167	20256	22607	25244	12
SYSTEMS INTEGRATION	2226	2699	3236	3901	4671	5582	6728	20
SOFTWARE DEVELOPMENT	1026	1237	1485	1758	2130	2518	3012	19
DESIGN/INTEGRATION	392	477	577	701	854	1032	1253	21
PROJECT MGMT/CONSULTING	365	450	541	647	780	934	1123	20
SOFTWARE PRODUCTS	228	277	348	479	551	697	887	26
OTHER SERVICES	215	257	285	315	356	401	453	12
TOTAL	14945	17265	19537	22068	24927	28189	31971	13

Table 4

IBM FORECAST WITH INFLATION BY INDUSTRY MODE

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
	1.0000	1.0410	1.0500	1.0460	1.0490	1.0490	1.0490	
INFLATION FACTOR	1.0000	1.0410	1.0931	1.1433	1.1994	1.2581	1.3198	
DISCRETE MANUFACTURING								
PROFESSIONAL SERVICES	1986	2534	3023	3582	4254	5060	6016	19
SYSTEMS INTEGRATION	219	305	390	500	649	839	1092	29
SOFTWARE DEVELOPMENT	103	142	184	234	305	390	506	29
DESIGN/INTEGRATION	41	59	73	93	119	150	191	27
PROJECT MGMT/CONSULTING	39	55	66	84	105	133	168	25
SOFTWARE PRODUCTS	20	29	41	59	83	119	170	42
OTHER SERVICES	15	21	25	31	37	47	58	23
TOTAL	2205	2840	3413	4082	4903	5899	7108	20
PROCESS MANUFACTURING								
PROFESSIONAL SERVICES	1239	1521	1857	2253	2740	3337	4064	22
SYSTEMS INTEGRATION	53	67	87	114	141	171	216	26
SOFTWARE DEVELOPMENT	25	31	41	53	66	80	101	27
DESIGN/INTEGRATION	8	10	13	16	20	25	31	25
PROJECT MGMT/CONSULTING	8	10	13	18	23	28	35	28
SOFTWARE PRODUCTS	6	8	10	12	15	19	24	25
OTHER SERVICES	6	8	11	13	16	19	24	25
TOTAL	1292	1588	1944	2367	2880	3508	4280	22
UTILITIES								
PROFESSIONAL SERVICES	347	398	447	499	556	623	696	12
SYSTEMS INTEGRATION	73	95	127	162	212	267	342	29
SOFTWARE DEVELOPMENT	40	53	70	91	121	150	195	30
DESIGN/INTEGRATION	10	13	18	22	28	36	44	27
PROJECT MGMT/CONSULTING	14	18	22	27	32	41	49	22
SOFTWARE PRODUCTS	4	5	7	10	14	19	25	40
OTHER SERVICES	5	7	8	12	16	22	29	35
TOTAL	420	493	574	661	767	889	1038	16
CONSTRUCTION								
PROFESSIONAL SERVICES	91	101	121	139	161	186	217	16
SYSTEMS INTEGRATION	14	16	20	24	28	33	40	20
SOFTWARE DEVELOPMENT	6	7	9	10	13	15	18	22
DESIGN/INTEGRATION	3	3	4	5	5	6	7	15
PROJECT MGMT/CONSULTING	3	3	4	4	5	5	6	12
SOFTWARE PRODUCTS	1	1	2	2	3	5	7	43
OTHER SERVICES	1	2	2	2	2	2	2	6
TOTAL	105	118	141	162	188	220	257	17

Table 4 (Continued)

IBM FORECAST WITH INFLATION BY INDUSTRY MODE

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
INFLATION FACTOR	1.0000	1.0410	1.0500	1.0460	1.0490	1.0490	1.0490	
	1.0000	1.0410	1.0931	1.1433	1.1994	1.2581	1.3198	
FINANCE								
PROFESSIONAL SERVICES	1330	1593	1869	2177	2542	2972	3474	17
SYSTEMS INTEGRATION	85	123	178	260	376	543	775	45
SOFTWARE DEVELOPMENT	32	46	70	98	143	206	292	44
DESIGN/INTEGRATION	19	27	38	56	79	113	160	43
PROJECT MGMT/CONSULTING	19	27	37	54	75	107	149	41
SOFTWARE PRODUCTS	8	12	18	30	47	73	114	57
OTHER SERVICES	8	11	15	22	31	43	61	41
TOTAL	1415	1716	2047	2437	2917	3515	4249	20
SECURITIES								
PROFESSIONAL SERVICES	282	338	396	462	539	630	737	17
SYSTEMS INTEGRATION	18	26	38	55	79	115	164	45
SOFTWARE DEVELOPMENT	7	10	15	21	30	43	62	45
DESIGN/INTEGRATION	4	6	8	12	17	24	34	43
PROJECT MGMT/CONSULTING	4	6	8	11	16	23	31	41
SOFTWARE PRODUCTS	2	2	4	6	10	16	24	58
OTHER SERVICES	2	2	3	5	6	9	13	41
TOTAL	300	364	434	516	618	745	901	20
RETAIL DISTRIBUTION								
PROFESSIONAL SERVICES	404	518	619	734	874	1041	1240	19
SYSTEMS INTEGRATION	84	120	164	227	312	430	590	38
SOFTWARE DEVELOPMENT	38	53	73	103	143	198	272	39
DESIGN/INTEGRATION	17	24	33	46	62	84	116	37
PROJECT MGMT/CONSULTING	15	22	30	41	54	74	100	35
SOFTWARE PRODUCTS	9	12	17	24	34	50	71	42
OTHER SERVICES	6	8	11	13	18	24	30	29
TOTAL	489	637	782	961	1186	1471	1830	23
WHOLESALE DISTRIBUTION								
PROFESSIONAL SERVICES	332	389	458	532	620	725	847	17
SYSTEMS INTEGRATION	71	89	114	139	173	214	273	25
SOFTWARE DEVELOPMENT	31	38	51	61	78	99	128	27
DESIGN/INTEGRATION	15	19	24	30	36	43	54	23
PROJECT MGMT/CONSULTING	13	17	21	25	32	39	49	24
SOFTWARE PRODUCTS	6	8	10	12	15	18	24	25
OTHER SERVICES	6	7	8	10	13	15	19	23
TOTAL	403	478	572	671	794	940	1120	19

Table 4 (Continued)

IBM FORECAST WITH INFLATION BY INDUSTRY MODE

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
	1.0000	1.0410	1.0500	1.0460	1.0490	1.0490	1.0490	
INFLATION FACTOR	1.0000	1.0410	1.0931	1.1433	1.1994	1.2581	1.3198	
INSURANCE								
PROFESSIONAL SERVICES	1048	1213	1423	1658	1935	2263	2645	17
SYSTEMS INTEGRATION	60	85	103	128	156	191	266	26
SOFTWARE DEVELOPMENT	21	29	36	43	51	59	81	22
DESIGN/INTEGRATION	13	18	21	27	34	42	58	26
PROJECT MGMT/CONSULTING	17	24	29	36	45	56	78	27
SOFTWARE PRODUCTS	6	8	11	15	19	25	38	36
OTHER SERVICES	4	5	6	7	8	9	10	15
TOTAL	1108	1298	1526	1786	2092	2454	2911	18
STATE/LOCAL GOVERNMENT								
PROFESSIONAL SERVICES	1655	1950	2327	2757	3275	3896	4632	19
SYSTEMS INTEGRATION	161	237	291	351	435	523	635	22
SOFTWARE DEVELOPMENT	71	105	126	152	185	220	264	20
DESIGN/INTEGRATION	23	33	42	54	70	90	115	28
PROJECT MGMT/CONSULTING	31	46	60	72	90	105	127	22
SOFTWARE PRODUCTS	18	26	33	42	54	68	87	27
OTHER SERVICES	18	26	29	32	36	39	42	10
TOTAL	1816	2187	2617	3108	3710	4419	5268	19
HEALTH								
PROFESSIONAL SERVICES	267	309	365	429	505	596	703	18
SYSTEMS INTEGRATION	71	95	125	157	203	253	322	28
SOFTWARE DEVELOPMENT	33	44	57	71	94	111	140	26
DESIGN/INTEGRATION	10	13	18	23	30	39	49	30
PROJECT MGMT/CONSULTING	11	14	19	24	30	40	51	29
SOFTWARE PRODUCTS	10	13	17	22	28	36	48	29
OTHER SERVICES	8	10	13	16	20	26	34	27
TOTAL	338	404	490	586	708	849	1025	20
COMMUNICATIONS								
PROFESSIONAL SERVICES	460	513	611	701	812	942	1097	16
SYSTEMS INTEGRATION	53	67	78	94	108	127	153	18
SOFTWARE DEVELOPMENT	28	35	41	49	57	68	83	19
DESIGN/INTEGRATION	10	12	14	16	17	20	23	13
PROJECT MGMT/CONSULTING	10	13	15	17	20	23	27	16
SOFTWARE PRODUCTS	4	5	5	6	7	9	11	18
OTHER SERVICES	2	3	4	5	6	8	10	27
TOTAL	513	580	689	794	920	1069	1250	17

Table 4 (Continued)

IBM FORECAST WITH INFLATION BY INDUSTRY MODE

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
	1.0000	1.0410	1.0500	1.0460	1.0490	1.0490	1.0490	
INFLATION FACTOR	1.0000	1.0410	1.0931	1.1433	1.1994	1.2581	1.3198	
TRANSPORTATION								
PROFESSIONAL SERVICES	124	143	168	196	228	267	312	17
SYSTEMS INTEGRATION	42	58	69	85	108	131	160	22
SOFTWARE DEVELOPMENT	19	27	33	41	53	67	83	25
DESIGN/INTEGRATION	8	11	13	15	17	20	23	17
PROJECT MGMT/CONSULTING	10	13	15	18	22	25	29	17
SOFTWARE PRODUCTS	2	3	4	6	8	10	13	31
OTHER SERVICES	2	3	4	6	7	9	12	28
TOTAL	166	201	237	281	336	397	472	19
MEDIA								
PROFESSIONAL SERVICES	495	592	705	824	967	1138	1340	18
SYSTEMS INTEGRATION	59	77	96	118	146	182	230	24
SOFTWARE DEVELOPMENT	28	36	46	56	70	87	110	25
DESIGN/INTEGRATION	11	15	18	22	26	31	39	21
PROJECT MGMT/CONSULTING	11	15	17	21	24	30	36	20
SOFTWARE PRODUCTS	5	6	9	12	16	23	32	38
OTHER SERVICES	4	5	6	7	8	10	13	20
TOTAL	554	669	801	942	1113	1320	1570	19
CONSULTANTS								
PROFESSIONAL SERVICES	15	17	20	24	28	32	38	17
SYSTEMS INTEGRATION	2	3	4	5	6	8	12	34
SOFTWARE DEVELOPMENT	1	1	2	2	3	4	6	37
DESIGN/INTEGRATION	0	1	1	1	1	2	2	30
PROJECT MGMT/CONSULTING	0	0	1	1	1	1	2	34
SOFTWARE PRODUCTS	0	0	0	0	1	1	1	28
OTHER SERVICES	0	0	0	0	1	1	1	32
TOTAL	17	20	24	28	34	41	49	20
COMPUTER SERVICES								
PROFESSIONAL SERVICES	10	11	13	15	18	21	24	17
SYSTEMS INTEGRATION	2	3	3	4	5	7	9	28
SOFTWARE DEVELOPMENT	1	1	1	2	2	3	4	31
DESIGN/INTEGRATION	0	1	1	1	1	1	2	24
PROJECT MGMT/CONSULTING	0	0	1	1	1	1	1	25
SOFTWARE PRODUCTS	0	0	0	0	1	1	1	33
OTHER SERVICES	0	0	0	0	1	1	1	23
TOTAL	12	14	17	19	23	28	33	19

Table 4 (Continued)

IBM FORECAST WITH INFLATION BY INDUSTRY MODE

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
	1.0000	1.0410	1.0500	1.0460	1.0490	1.0490	1.0490	
INFLATION FACTOR	1.0000	1.0410	1.0931	1.1433	1.1994	1.2581	1.3198	
HIGHER EDUCATION								
PROFESSIONAL SERVICES	40	46	54	63	73	85	100	17
SYSTEMS INTEGRATION	25	27	34	38	43	50	62	18
SOFTWARE DEVELOPMENT	10	11	14	16	20	23	29	20
DESIGN/INTEGRATION	5	6	7	7	8	9	11	13
PROJECT MGMT/CONSULTING	5	6	7	7	7	8	9	10
SOFTWARE PRODUCTS	2	2	3	4	5	7	11	41
OTHER SERVICES	2	3	3	3	3	3	3	3
TOTAL	65	73	87	101	117	135	162	17
SCHOOLS								
PROFESSIONAL SERVICES	17	19	23	27	31	36	42	17
SYSTEMS INTEGRATION	8	9	11	13	14	17	21	18
SOFTWARE DEVELOPMENT	3	4	5	5	7	8	10	20
DESIGN/INTEGRATION	2	2	2	3	3	3	4	13
PROJECT MGMT/CONSULTING	2	2	2	2	2	3	3	10
SOFTWARE PRODUCTS	1	1	1	1	2	2	4	41
OTHER SERVICES	1	1	1	1	1	1	1	3
TOTAL	25	29	34	39	46	53	63	17
FEDERAL GOVERNMENT								
PROFESSIONAL SERVICES	2577	2957	3319	3700	4136	4590	5092	11
SYSTEMS INTEGRATION	1126	1308	1606	1987	2408	2925	3519	22
SOFTWARE DEVELOPMENT	529	615	751	902	1111	1337	1593	21
DESIGN/INTEGRATION	193	224	283	353	450	561	692	25
PROJECT MGMT/CONSULTING	152	177	224	275	350	434	532	25
SOFTWARE PRODUCTS	126	147	186	283	299	376	467	26
OTHER SERVICES	125	146	161	175	198	216	235	10
TOTAL	3703	4265	4924	5688	6544	7515	8611	15
GRAND TOTAL								
PROFESSIONAL SERVICES	12719	15163	17818	20771	24295	28442	33316	17
SYSTEMS INTEGRATION	2226	2809	3537	4460	5602	7023	8879	26
SOFTWARE DEVELOPMENT	1026	1288	1623	2010	2554	3168	3975	25
DESIGN/INTEGRATION	392	497	630	802	1024	1298	1653	27
PROJECT MGMT/CONSULTING	365	468	591	740	936	1175	1482	26
SOFTWARE PRODUCTS	228	289	380	548	661	877	1171	32
OTHER SERVICES	215	268	312	361	427	504	598	17
TOTAL	14945	17972	21354	25231	29896	35465	42195	19

Table 5

IBM FORECAST WITH INFLATION BY DELIVERY MODE

SEGEMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
FEDERAL GOVERNMENT								
PROFESSIONAL SERVICES								
SOFTWARE DEVELOPMENT	1093	1284	1446	1621	1831	2035	2270	12
CONSULTING	378	422	478	536	611	687	771	13
EDUCATION & TRAINING	304	327	386	447	488	561	620	14
SYSTEMS INTEGRATION	1126	1308	1606	1987	2408	2925	3519	22
FACILITIES MANAGEMENT	803	925	1009	1097	1206	1308	1431	9
SUB-TOTAL	3703	4265	4924	5688	6544	7515	8611	15
COMMERICAL								
PROFESSIONAL SERVICES								
SOFTWARE DEVELOPMENT	6445	7585	8860	10271	11929	13951	16310	17
CONSULTING	2135	2710	3346	4065	4938	5985	7251	22
EDUCATION & TRAINING	1331	1644	1967	2338	2815	3345	3996	19
SYSTEMS INTEGRATION	1100	1502	1931	2473	3194	4099	5361	29
FACILITIES MANAGEMENT	231	267	326	397	476	571	667	20
SUB-TOTAL	11242	13708	16430	19543	23352	27950	33584	20
GRAND TOTAL								
PROFESSIONAL SERVICES								
SOFTWARE DEVELOPMENT	7538	8869	10306	11891	13759	15986	18580	16
CONSULTING	2513	3132	3824	4601	5550	6672	8022	21
EDUCATION & TRAINING	1634	1970	2353	2786	3304	3906	4616	19
SYSTEMS INTEGRATION	2226	2809	3537	4460	5602	7023	8879	26
SYSTEMS OPERATIONS	1034	1192	1335	1493	1682	1878	2098	12
GRAND TOTAL	14945	17972	21354	25231	29896	35465	42195	19

Table 6

IBM FORECAST WITH INFLATION
BY MODE OF DELIVERY AND INDUSTRY

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
DISCRETE MANUFACTURING								
PROFESSIONAL SERVICES	1986	2534	3023	3582	4254	5060	6016	19
SOFTWARE DEVELOPMENT	1262	1575	1847	2155	2517	2960	3477	17
CONSULTING	418	563	698	853	1042	1270	1545	22
EDUCATION & TRAINING	261	341	410	491	594	710	852	20
SYSTEMS OPERATION	45	55	68	83	100	121	142	21
SYSTEMS INTEGRATION	219	305	390	500	649	839	1092	29
SOFTWARE DEVELOPMENT	103	142	184	234	305	390	506	29
DESIGN/INTEGRATION	41	59	73	93	119	150	191	27
PROJECT MGMT/CONSULTING	39	55	66	84	105	133	168	25
SOFTWARE PRODUCTS	20	29	41	59	83	119	170	42
OTHER SERVICES	15	21	25	31	37	47	58	23
TOTAL	2205	2840	3413	4082	4903	5899	7108	20
PROCESS MANUFACTURING								
PROFESSIONAL SERVICES	1239	1521	1857	2253	2740	3337	4064	22
SOFTWARE DEVELOPMENT	788	945	1135	1356	1621	1952	2349	20
CONSULTING	261	338	428	537	671	837	1044	25
EDUCATION & TRAINING	163	205	252	309	383	468	575	23
SYSTEMS OPERATION	28	33	42	52	65	80	96	24
SYSTEMS INTEGRATION	53	67	87	114	141	171	216	26
SOFTWARE DEVELOPMENT	25	31	41	53	66	80	101	27
DESIGN/INTEGRATION	8	10	13	16	20	25	31	25
PROJECT MGMT/CONSULTING	8	10	13	18	23	28	35	28
SOFTWARE PRODUCTS	6	8	10	12	15	19	24	25
OTHER SERVICES	6	8	11	13	16	19	24	25
TOTAL	1292	1588	1944	2367	2880	3508	4280	22
UTILITIES								
PROFESSIONAL SERVICES	347	398	447	499	556	623	696	12
SOFTWARE DEVELOPMENT	221	248	273	300	329	364	402	10
CONSULTING	73	88	103	119	136	156	179	15
EDUCATION & TRAINING	46	54	61	68	78	87	98	13
SYSTEMS OPERATION	8	9	10	12	13	15	16	14
SYSTEMS INTEGRATION	73	95	127	162	212	267	342	29
SOFTWARE DEVELOPMENT	40	53	70	91	121	150	195	30
DESIGN/INTEGRATION	10	13	18	22	28	36	44	27
PROJECT MGMT/CONSULTING	14	18	22	27	32	41	49	22
SOFTWARE PRODUCTS	4	5	7	10	14	19	25	40
OTHER SERVICES	5	7	8	12	16	22	29	35
TOTAL	420	493	574	661	767	889	1038	16

Table 6 (Continued)

IBM FORECAST WITH INFLATION BY MODE OF DELIVERY AND INDUSTRY

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
CONSTRUCTION								
PROFESSIONAL SERVICES	91	101	121	139	161	186	217	16
SOFTWARE DEVELOPMENT	58	63	74	83	95	109	125	15
CONSULTING	19	23	28	33	39	47	56	20
EDUCATION & TRAINING	12	14	16	19	22	26	31	18
SYSTEMS OPERATION	2	2	3	3	4	4	5	18
SYSTEMS INTEGRATION	14	16	20	24	28	33	40	20
SOFTWARE DEVELOPMENT	6	7	9	10	13	15	18	22
DESIGN/INTEGRATION	3	3	4	5	5	6	7	15
PROJECT MGMT/CONSULTING	3	3	4	4	5	5	6	12
SOFTWARE PRODUCTS	1	1	2	2	3	5	7	43
OTHER SERVICES	1	2	2	2	2	2	2	6
TOTAL	105	118	141	162	188	220	257	17
FINANCE								
PROFESSIONAL SERVICES	1330	1593	1869	2177	2542	2972	3474	17
SOFTWARE DEVELOPMENT	845	990	1142	1310	1504	1738	2007	15
CONSULTING	280	354	431	518	623	746	892	20
EDUCATION & TRAINING	175	215	253	298	355	417	492	18
SYSTEMS OPERATION	30	35	42	51	60	71	82	19
SYSTEMS INTEGRATION	85	123	178	260	376	543	775	45
SOFTWARE DEVELOPMENT	32	46	70	98	143	206	292	44
DESIGN/INTEGRATION	19	27	38	56	79	113	160	43
PROJECT MGMT/CONSULTING	19	27	37	54	75	107	149	41
SOFTWARE PRODUCTS	8	12	18	30	47	73	114	57
OTHER SERVICES	8	11	15	22	31	43	61	41
TOTAL	1415	1716	2047	2437	2917	3515	4249	20
SECURITIES								
PROFESSIONAL SERVICES	282	338	396	462	539	630	737	17
SOFTWARE DEVELOPMENT	179	210	242	278	319	369	426	15
CONSULTING	59	75	91	110	132	158	189	20
EDUCATION & TRAINING	37	46	54	63	75	88	104	18
SYSTEMS OPERATION	6	7	9	11	13	15	17	19
SYSTEMS INTEGRATION	18	26	38	55	79	115	164	45
SOFTWARE DEVELOPMENT	7	10	15	21	30	43	62	45
DESIGN/INTEGRATION	4	6	8	12	17	24	34	43
PROJECT MGMT/CONSULTING	4	6	8	11	16	23	31	41
SOFTWARE PRODUCTS	2	2	4	6	10	16	24	58
OTHER SERVICES	2	2	3	5	6	9	13	41
TOTAL	300	364	434	516	618	745	901	20

Table 6 (Continued)

IBM FORECAST WITH INFLATION BY MODE OF DELIVERY AND INDUSTRY

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
RETAIL DISTRIBUTION								
PROFESSIONAL SERVICES	404	518	619	734	874	1041	1240	19
SOFTWARE DEVELOPMENT	257	322	378	442	517	609	717	17
CONSULTING	85	115	143	175	214	261	319	23
EDUCATION & TRAINING	53	70	84	101	122	146	176	20
SYSTEMS OPERATION	9	11	14	17	21	25	29	21
SYSTEMS INTEGRATION	84	120	164	227	312	430	590	38
SOFTWARE DEVELOPMENT	38	53	73	103	143	198	272	39
DESIGN/INTEGRATION	17	24	33	46	62	84	116	37
PROJECT MGMT/CONSULTING	15	22	30	41	54	74	100	35
SOFTWARE PRODUCTS	9	12	17	24	34	50	71	42
OTHER SERVICES	6	8	11	13	18	24	30	29
TOTAL	489	637	782	961	1186	1471	1830	23
WHOLESALE DISTRIBUTION								
PROFESSIONAL SERVICES	332	389	458	532	620	725	847	17
SOFTWARE DEVELOPMENT	211	242	280	320	367	424	489	15
CONSULTING	70	86	106	127	152	182	218	20
EDUCATION & TRAINING	44	52	62	73	87	102	120	18
SYSTEMS OPERATION	8	9	10	12	15	17	20	19
SYSTEMS INTEGRATION	71	89	114	139	173	214	273	25
SOFTWARE DEVELOPMENT	31	38	51	61	78	99	128	27
DESIGN/INTEGRATION	15	19	24	30	36	43	54	23
PROJECT MGMT/CONSULTING	13	17	21	25	32	39	49	24
SOFTWARE PRODUCTS	6	8	10	12	15	18	24	25
OTHER SERVICES	6	7	8	10	13	15	19	23
TOTAL	403	478	572	671	794	940	1120	19
INSURANCE								
PROFESSIONAL SERVICES	1048	1213	1423	1658	1935	2263	2645	17
SOFTWARE DEVELOPMENT	666	754	870	998	1145	1324	1528	15
CONSULTING	221	269	328	395	474	568	679	20
EDUCATION & TRAINING	137	163	193	227	270	317	374	18
SYSTEMS OPERATION	24	27	32	39	46	54	63	19
SYSTEMS INTEGRATION	60	85	103	128	156	191	266	26
SOFTWARE DEVELOPMENT	21	29	36	43	51	59	81	22
DESIGN/INTEGRATION	13	18	21	27	34	42	58	26
PROJECT MGMT/CONSULTING	17	24	29	36	45	56	78	27
SOFTWARE PRODUCTS	6	8	11	15	19	25	38	36
OTHER SERVICES	4	5	6	7	8	9	10	15
TOTAL	1108	1298	1526	1786	2092	2454	2911	18

Table 6 (Continued)

IBM FORECAST WITH INFLATION BY MODE OF DELIVERY AND INDUSTRY

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
STATE/LOCAL GOVERNMENT								
PROFESSIONAL SERVICES	1655	1950	2327	2757	3275	3896	4632	19
SOFTWARE DEVELOPMENT	1052	1212	1422	1659	1938	2279	2677	17
CONSULTING	348	433	537	657	802	978	1190	22
EDUCATION & TRAINING	217	263	316	378	457	546	656	20
SYSTEMS OPERATION	38	43	52	64	77	93	110	21
SYSTEMS INTEGRATION	161	237	291	351	435	523	635	22
SOFTWARE DEVELOPMENT	71	105	126	152	185	220	264	20
DESIGN/INTEGRATION	23	33	42	54	70	90	115	28
PROJECT MGMT/CONSULTING	31	46	60	72	90	105	127	22
SOFTWARE PRODUCTS	18	26	33	42	54	68	87	27
OTHER SERVICES	18	26	29	32	36	39	42	10
TOTAL	1816	2187	2617	3108	3710	4419	5268	19
HEALTH								
PROFESSIONAL SERVICES	267	309	365	429	505	596	703	18
SOFTWARE DEVELOPMENT	170	192	223	258	299	349	406	16
CONSULTING	56	69	84	102	124	150	180	21
EDUCATION & TRAINING	35	42	50	59	71	84	99	19
SYSTEMS OPERATION	6	7	8	10	12	14	17	20
SYSTEMS INTEGRATION	71	95	125	157	203	253	322	28
SOFTWARE DEVELOPMENT	33	44	57	71	94	111	140	26
DESIGN/INTEGRATION	10	13	18	23	30	39	49	30
PROJECT MGMT/CONSULTING	11	14	19	24	30	40	51	29
SOFTWARE PRODUCTS	10	13	17	22	28	36	48	29
OTHER SERVICES	8	10	13	16	20	26	34	27
TOTAL	338	404	490	586	708	849	1025	20
COMMUNICATIONS								
PROFESSIONAL SERVICES	460	513	611	701	812	942	1097	16
SOFTWARE DEVELOPMENT	292	319	373	422	481	551	634	15
CONSULTING	97	114	141	167	199	236	282	20
EDUCATION & TRAINING	60	69	83	96	113	132	155	18
SYSTEMS OPERATION	10	11	14	16	19	23	26	18
SYSTEMS INTEGRATION	53	67	78	94	108	127	153	18
SOFTWARE DEVELOPMENT	28	35	41	49	57	68	83	19
DESIGN/INTEGRATION	10	12	14	16	17	20	23	13
PROJECT MGMT/CONSULTING	10	13	15	17	20	23	27	16
SOFTWARE PRODUCTS	4	5	5	6	7	9	11	18
OTHER SERVICES	2	3	4	5	6	8	10	27
TOTAL	513	580	689	794	920	1069	1250	17

Table 6 (Continued)

IBM FORECAST WITH INFLATION BY MODE OF DELIVERY AND INDUSTRY

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
TRANSPORTATION								
PROFESSIONAL SERVICES	124	143	168	196	228	267	312	17
SOFTWARE DEVELOPMENT	79	89	103	118	135	156	180	15
CONSULTING	26	32	39	47	56	67	80	20
EDUCATION & TRAINING	16	19	23	27	32	37	44	18
SYSTEMS OPERATION	3	3	4	5	5	6	7	19
SYSTEMS INTEGRATION	42	58	69	85	108	131	160	22
SOFTWARE DEVELOPMENT	19	27	33	41	53	67	83	25
DESIGN/INTEGRATION	8	11	13	15	17	20	23	17
PROJECT MGMT/CONSULTING	10	13	15	18	22	25	29	17
SOFTWARE PRODUCTS	2	3	4	6	8	10	13	31
OTHER SERVICES	2	3	4	6	7	9	12	28
TOTAL	166	201	237	281	336	397	472	19
MEDIA								
PROFESSIONAL SERVICES	495	592	705	824	967	1138	1340	18
SOFTWARE DEVELOPMENT	314	368	431	495	572	666	775	16
CONSULTING	104	131	163	196	237	286	344	21
EDUCATION & TRAINING	65	80	96	113	135	160	190	19
SYSTEMS OPERATION	11	13	16	19	23	27	32	20
SYSTEMS INTEGRATION	59	77	96	118	146	182	230	24
SOFTWARE DEVELOPMENT	28	36	46	56	70	87	110	25
DESIGN/INTEGRATION	11	15	18	22	26	31	39	21
PROJECT MGMT/CONSULTING	11	15	17	21	24	30	36	20
SOFTWARE PRODUCTS	5	6	9	12	16	23	32	38
OTHER SERVICES	4	5	6	7	8	10	13	20
TOTAL	554	669	801	942	1113	1320	1570	19
CONSULTANTS								
PROFESSIONAL SERVICES	15	17	20	24	28	32	38	17
SOFTWARE DEVELOPMENT	10	11	12	14	16	19	22	15
CONSULTING	3	4	5	6	7	8	10	20
EDUCATION & TRAINING	2	2	3	3	4	5	5	18
SYSTEMS OPERATION	0	0	0	1	1	1	1	19
SYSTEMS INTEGRATION	2	3	4	5	6	8	12	34
SOFTWARE DEVELOPMENT	1	1	2	2	3	4	6	37
DESIGN/INTEGRATION	0	1	1	1	1	2	2	30
PROJECT MGMT/CONSULTING	0	0	1	1	1	1	2	34
SOFTWARE PRODUCTS	0	0	0	0	1	1	1	28
OTHER SERVICES	0	0	0	0	1	1	1	32
TOTAL	17	20	24	28	34	41	49	20

Table 6 (Continued)

IBM FORECAST WITH INFLATION BY MODE OF DELIVERY AND INDUSTRY

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
COMPUTER SERVICES								
PROFESSIONAL SERVICES	10	11	13	15	18	21	24	17
SOFTWARE DEVELOPMENT	6	7	8	9	11	12	14	15
CONSULTING	2	2	3	4	4	5	6	20
EDUCATION & TRAINING	1	2	2	2	3	3	3	18
SYSTEMS OPERATION	0	0	0	0	0	1	1	19
SYSTEMS INTEGRATION	2	3	3	4	5	7	9	28
SOFTWARE DEVELOPMENT	1	1	1	2	2	3	4	31
DESIGN/INTEGRATION	0	1	1	1	1	1	2	24
PROJECT MGMT/CONSULTING	0	0	1	1	1	1	1	25
SOFTWARE PRODUCTS	0	0	0	0	1	1	1	33
OTHER SERVICES	0	0	0	0	1	1	1	23
TOTAL	12	14	17	19	23	28	33	19
HIGHER EDUCATION								
PROFESSIONAL SERVICES	40	46	54	63	73	85	100	17
SOFTWARE DEVELOPMENT	25	28	33	38	43	50	58	15
CONSULTING	8	10	12	15	18	21	26	21
EDUCATION & TRAINING	5	6	7	9	10	12	14	18
SYSTEMS OPERATION	1	1	1	1	2	2	2	19
SYSTEMS INTEGRATION	25	27	34	38	43	50	62	18
SOFTWARE DEVELOPMENT	10	11	14	16	20	23	29	20
DESIGN/INTEGRATION	5	6	7	7	8	9	11	13
PROJECT MGMT/CONSULTING	5	6	7	7	7	8	9	10
SOFTWARE PRODUCTS	2	2	3	4	5	7	11	41
OTHER SERVICES	2	3	3	3	3	3	3	3
TOTAL	65	73	87	101	117	135	162	17
SCHOOLS								
PROFESSIONAL SERVICES	17	19	23	27	31	36	42	17
SOFTWARE DEVELOPMENT	11	12	14	16	18	21	24	15
CONSULTING	4	4	5	6	8	9	11	20
EDUCATION & TRAINING	2	3	3	4	4	5	6	18
SYSTEMS OPERATION	0	0	1	1	1	1	1	19
SYSTEMS INTEGRATION	8	9	11	13	14	17	21	18
SOFTWARE DEVELOPMENT	3	4	5	5	7	8	10	20
DESIGN/INTEGRATION	2	2	2	3	3	3	4	13
PROJECT MGMT/CONSULTING	2	2	2	2	2	3	3	10
SOFTWARE PRODUCTS	1	1	1	1	2	2	4	41
OTHER SERVICES	1	1	1	1	1	1	1	3
TOTAL	25	29	34	39	46	53	63	17

Table 6 (Continued)

IBM FORECAST WITH INFLATION BY MODE OF DELIVERY AND INDUSTRY

IBM SEGMENTATION	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	'88-'93 CAGR (%)
FEDERAL GOVERNMENT								
PROFESSIONAL SERVICES	2577	2957	3319	3700	4136	4590	5092	11
SOFTWARE DEVELOPMENT	1093	1284	1446	1621	1831	2035	2270	12
CONSULTING	378	422	478	536	611	687	771	13
EDUCATION & TRAINING	304	327	386	447	488	561	620	14
SYSTEMS OPERATION	803	925	1009	1097	1206	1308	1431	9
SYSTEMS INTEGRATION	1126	1308	1606	1987	2408	2925	3519	22
SOFTWARE DEVELOPMENT	529	615	751	902	1111	1337	1593	21
DESIGN/INTEGRATION	193	224	283	353	450	561	692	25
PROJECT MGMT/CONSULTING	152	177	224	275	350	434	532	25
SOFTWARE PRODUCTS	126	147	186	283	299	376	467	26
OTHER SERVICES	125	146	161	175	198	216	235	10
TOTAL	3703	4265	4924	5688	6544	7515	8611	15
GRAND TOTAL								
PROFESSIONAL SERVICES	12719	15163	17818	20771	24295	28442	33316	17
SOFTWARE DEVELOPMENT	7538	8869	10306	11891	13759	15986	18580	16
CONSULTING	2513	3132	3824	4601	5550	6672	8022	21
EDUCATION & TRAINING	1634	1970	2353	2786	3304	3906	4616	19
SYSTEMS OPERATION	1034	1192	1335	1493	1682	1878	2098	12
SYSTEMS INTEGRATION	2226	2809	3537	4460	5602	7023	8879	26
SOFTWARE DEVELOPMENT	1026	1288	1623	2010	2554	3168	3975	25
DESIGN/INTEGRATION	392	497	630	802	1024	1298	1653	27
PROJECT MGMT/CONSULTING	365	468	591	740	936	1175	1482	26
SOFTWARE PRODUCTS	228	289	380	548	661	877	1171	32
OTHER SERVICES	215	268	312	361	427	504	598	17
TOTAL	14945	17972	21354	25231	29896	35465	42195	19

Table 7a

INDUSTRY SECTOR CROSSWALK

INPUT SECTORS	IBM SECTORS									
	Manuf. M	Process P	Util. U	Construct I	Finance F	Sec'ties S	Ret.Dist. D	Whl.Dist. J	Insur. N	State/ Loc. Gov. G
DISCRETE MANUFACTURING	X	X					X			
PROCESS MANUFACTURING	X	X					X			
TRANSPORTATION		X								
UTILITIES		X	X							
TELECOMMUNICATIONS										
WHOLESALE DISTRIBUTION	X	X						X		
RETAIL DISTRIBUTION		X					X	X		
BANKING & FINANCE					X	X				
INSURANCE									X	
MEDICAL										
EDUCATION										
SERVICES	X		X		X			X	X	
FEDERAL GOVERNMENT										
STATE/LOCAL GOVERNMENT										X
OTHER INDUSTRIES	X			X				X		

Table 7b

INDUSTRY SECTOR CROSSWALK

INPUT SECTORS	IBM SECTORS								
	Health H	Comm. A	Transp. T	Media K	Consult. C	Comp. Servs. B	Higher Ed. E	Schools R	Fed. Gov. Y
DISCRETE MANUFACTURING				X					
PROCESS MANUFACTURING									
TRANSPORTATION			X						X
UTILITIES									
TELECOMMUNICATIONS		X		X					
WHOLESALE DISTRIBUTION									
RETAIL DISTRIBUTION									
BANKING & FINANCE									
INSURANCE									
MEDICAL	X								
EDUCATION	X					X	X	X	
SERVICES	X		X	X	X	X	X		
FEDERAL GOVERNMENT									X
STATE/LOCAL GOVERNMENT									
OTHER INDUSTRIES			X	X			X	X	

Appendix: INPUT-Defined Industry Sectors

Appendix B: INPUT-Defined Industry Sectors

EXHIBIT B-1

INDUSTRY SECTOR DEFINITIONS

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

EXHIBIT B-1 (Cont.)

INDUSTRY SECTOR DEFINITIONS

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 B-1 (Cont.)

INDUSTRY SECTOR DEFINITIONS

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

Appendix: Relevant INPUT Definitions

Appendix C: Relevant INPUT Definitions

Definitions used by INPUT to describe the Information Services Industry.

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

- Processing of computer-based applications using vendor computers (called "processing services")
- Network-oriented services or functions such as value-added networks, electronic mail, electronic document interchange, on-line data bases, news data bases, videotex
- Products and services that assist users in performing functions on their own computers or vendor computers (called "software products" or "professional services")
- Services that utilize a combination of hardware and software, integrated into a total system (called "turnkey systems" and/or "systems integration")

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

1. Processing Services

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

- *Transaction Processing Services* - Updates client-owned data files by entry of specific business activity, such as sales order, inventory receipt, cash disbursement, etc. Transactions may be entered in one of three modes.
  - *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.

- *User Site Hardware Services (USHS)* - Those offerings provided by processing services 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

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

• *Utility Processing* - Vendor provides access to basic software tools, enabling the users to develop their own problem solutions such as language compilers assemblers, DBMS, sorts scientific library routines, and other systems software.

• *"Other" Processing Services* - Include computer output microfilm, other data output services, data entry services, disaster recovery and backup services.

• *Systems Operations (Processing)* - Also referred to as "resource management," facilities management, or "COCO" (contractor-owned, contractor-operated). Systems control is the management of all or part of a user's data processing functions under a long-term contract of not less than one year. This would include remote computing and batch services. To qualify, the contractor must directly plan, control, operate, and own the facility provided to the user—either onsite, through communications lines, or in a mixed mode.

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. 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. Examples of industry-specialty applications are seismic data

processing, numerically controlled machine tool software development, and demand deposit accounting.

2. Network Services

Network services include a wide variety of network-based functions and operations. Their common thread is that none of these functions could be performed without network involvement. Network services is divided into two major segments: network applications and electronic information systems.

a. Network Applications

The network applications segment is composed of three subsets:

- *Value-Added Networks (VANs)* - VANs typically involve common carrier network transmission facilities that are augmented with computerized switches. 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.

- *Electronic Data Interchange (EDI)* - EDI is the application-to-application electronic communications between organizations, based on established business document standards.

- *Electronic Mail (E-Mail)* - Transmission of messages across an electronic mail network managed by a services vendor.

b. Electronic Information Services

Electronic information services are data bases that provide specific terminal-based inquiry such as stock prices, legal precedents, economic indicators, medical diagnosis, airline schedules, current news stories, automobile valuations, etc. Users typically inquire into and extract information from these data bases but do not update them.

3. 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 or 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.

a. Applications Software Products

Applications software products perform functions directly related to solving user's 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 only in a specific industry sector, such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting, airline scheduling, material resource planning, and insurance claim management.

b. Systems Software Products

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

- *System Control Products* - Function during applications program execution to manage the computer system's resources. Examples include operating systems, communication monitors, emulators, spoolers, network control, library control, windowing, access control.

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

- *Applications Development Products* - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include traditional programming languages, 4GLs, sorts, productivity aids, assemblers, compilers, data dictionaries, data base management systems, report writers, project control and CASE systems.

4. Turnkey Systems

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

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

- Turnkey systems revenue is divided into two categories.

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

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

- Revenue includes hardware, software, and support functions.

5. Systems Integration (SI)

Systems integration (SI) is the delivery of complex, multidisciplinary multivendor systems, incorporating some or all of these products or services: systems design, programming, integration, equipment, communication networks, installation, education and training, SI-related professional services, and system acceptance. Systems integration contracts typically include custom software, take more than a year to complete, and involve a prime contractor assuming full risk and accepting full responsibility.

6. Professional Services

This category includes consulting, education and training, software development, and systems operations as defined below.

- *Software Development* - Development of a software system on a custom basis. It includes one or more of the following: user requirements definition, system design, contract programming, documentation.

- *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, project assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.

- *Systems Operations (Professional Services)* - This is a counterpart to systems operations (processing services) except the computing equipment is owned or leased by the client, not by the vendor. The vendor provides the staff to operate, maintain, and manage the client's facility.

C
Equipment/Computer Systems

1. Equipment

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

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

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

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

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

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

- *Terminals* - Three types of terminals are described below:

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

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

  - *User Nonprogrammable*

    ° Single-station
    ° Multistation shared processor
    ° Teleprinter

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

2. Computer Systems

Computer systems include all processors from microcomputers to supercomputers. Computer systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices.

- *Microcomputer (Price below $15,000)* - Combines all of the CPU, memory, and peripheral functions of an 8- or 16-bit computer on a chip in the form of:

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

- *Workstation (Price between $10,000 and $100,000)* - An integrated multifunctional workstation capable of routine higher-speed communications with mini and mainframe computers and of performing complex local processing. While similar to microcomputers, the workstation typically will have 16- or 32-bit architectures, plus greater graphics and integrated communications capabilities.

- *Minicomputer (Price between $15,000 and $350,000)* - Usually a 16- or 32-bit computer. May represent a portion of a larger system or a complete stand-alone system by itself.

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

- *Mainframe (Price above $350,000)* - Typically a 32- or 64-bit computer with extensive applications software and a number of peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) applications; also called a general-purpose computer.

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

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

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

    ° Parallel processors
    ° Pipeline processor
    ° Vector processor

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

D
Telecommunications

1. Networks

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

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

- *Value-Added Network (VAN)* - (See listing under Section B.2, Delivery Modes.)

- *Local Area Network (LAN)* - Limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. Uses one of two signaling methods.

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

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

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

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

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

2. Transmission Facilities

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

- *Mode* - may be either:
  - *Analog* - Transmission or signal with continuous-waveform representation, typified by AT&T's predominantly voice-grade DDD network and most telephone operating company distribution systems
  - *Digital* - Transmission or signal using discontinuous, discrete quantities to represent data, which may be voice, data, record, video, or text, in binary form
- *Media* - May be any of the following:
  - *Wire* - Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair), to four-wire full- duplex balanced lines
  - *Carrier* - A wave, pulse train, or other signal suitable for modulation by an information-bearing signal to be transmitted over a communications system, used in multiplexing applications to increase network capacity
  - *Coaxial Cable* - A cable used in HF (high-frequency) and VHF (very high frequency), single-frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance
  - *Microwave* - UHF (ultra-high-frequency) multichannel, point-to-point, repeated radio transmission; also capable of wide frequency channels
  - *Optical Fiber* - Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and TDM for multichannel applications
  - *Communications Satellites* - Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation
  - *Cellular Radio* - Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units. Each radio serves a small area called a cell. The computer switches service connections to the mobile unit from cell to cell.

E
Other Considerations

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

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

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

Appendix: IBM-Defined Industry Sectors

Appendix D: IBM-Defined Industry Sectors

Industrial Sector

1.	Discrete manufacturing	M
2.	Process manufacturing	P
3.	Utilities	U
4.	Construction	I

Service Sector

5.	Finance	F
6.	Securities	S
7.	Retail Distribution	D
8.	Wholesale Distribution	J
9.	Insurance	N

General and Public Sector

10.	State & Local Government	G
11.	Health	H
12.	Communications	A
13.	Transportation	T
14.	Media	K
15.	Consultants	C
16.	Computer Services	B
17.	Higher Education	E

Education

18.	Schools	R

Federal Government

19.	Federal Government	Y