U.S. INFORMATION SERVICES
MARKET ANALYSIS PROGRAM

Education and Training

Information Services Opportunities in Cross-Industry Markets

1992-1997

INPUT®

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

AUGUST 1992

INFORMATION SERVICES OPPORTUNITIES IN CROSS-INDUSTRY MARKETS

1992-1997

EXCERPT

Education and Training

INPUT®

1280 Villa Street, Mountain View, California 94041-1194 (415) 961-3300

Published by
INPUT
1280 Villa Street
Mountain View, CA 94041-1194
U.S.A.

U.S. Information Services
Market Analysis Program
(MAP)

Information Services Opportunities in Cross-Industry Markets, 1992-1997
Education and Training

MAACE • 504 • 1992

Abstract

This document extracts Chapter V, *Education and Training*, from INPUT's full report, *Information Services Opportunities in Cross-Industry Markets, 1992-1997*. The excerpt contains the *Introduction* (Chapter I) and *Education and Training* (Chapter V) chapters from the full report, and also provides Appendix A, *Definition of Terms*, and the market-specific financials from Appendix B, *Forecast Data Base*.

The excerpt does *not* contain either the *Executive Overview* or *Conclusions and Recommendations* chapters from the full report, since these sections address all cross-industry market sectors at an overview level.

The extract is intended for readers who have an interest in a single cross-industry market sector. If data and analysis of other cross-industry market sectors is required, it can be obtained by purchasing the full report, *Information Services Opportunities in Cross-Industry Markets, 1992-1997*.

Table of Contents

Table of Contents (Continued)

Exhibits

Introduction

A
Purpose and Organization

This report is part of a series of market analysis reports written each year by INPUT on industry and cross-industry sectors of the U.S. information services industry. This report analyzes the cross-industry sectors of the U.S. information services industry.

1. Purpose

The objectives of this report are to:

- Forecast user expenditures during the next five years on information services for each of the seven cross-industry sectors
- Identify and discuss user department directions as they relate to each of the seven cross-industry sectors
- Identify technological issues and trends that are driving the use of information services for the cross-industry sectors
- Discuss the competitive environment and profile leading vendors in each of the cross-industry sectors
- Summarize findings through comparing and contrasting the cross-industry sectors

The report provides readers with insights and information that will help them:

- Review the forces shaping their markets
- Develop internal corporate financial projections

- Identify new markets and product and services opportunities
- Assess the competitive trends
- Determine potential market directions
- Assist in prioritizing investments

2. Organization

This report is organized as follows:

- Chapter II is an overview of the cross-industry sectors of the information services market.
- Chapters III through IX are individual discussions of each of the seven cross-industry sectors. Within each chapter there are five sections.
  - Section 1, *Definitions*, introduces and defines each of the cross-industry sectors.
  - Section 2, *Information Services Markets*, presents the information services market forecasts by delivery mode and submode for each of the seven cross-industry sectors.
  - Section 3, *User Department Directions*, discusses and analyzes interviews with end-user organizations representing the seven cross-industry sectors.
  - Section 4, *Trends/Technology Ratings of Importance*, provides vendor and user respondent ratings of the relative importance of eight technologies.
  - Section 5, *Vendors and Competitive Environment*, discusses the competitive environment for information services within each of the cross-industry sectors and profiles leading and emerging vendors.
- Chapter X summarizes the conclusions of Chapters III through IX.
- Appendix A—*Definition of Terms*—provides definitions and descriptions of market structures and terms used throughout INPUT's reports.

- Appendix B—*Forecast Data Base*—provides a detailed forecast by delivery mode for each cross-industry sector. It also contains a reconciliation to the previous year's cross-industry sector reports.

B
Scope and Methodology

This report addresses the U.S. information services industry in seven cross-industry sectors. It includes only user expenditures that are noncaptive (generally available to vendors). Many large organizations have portions of their information services requirements satisfied by internal divisions. The resulting expenditure is not available for competitive bid by the general vendor community and is not included in INPUT's projections.

1. Cross-Industry Sector Definitions

INPUT defines cross-industry information services as packaged functional application solutions that are used by multiple industry sectors. In other words, these application solutions are not verticalized. For example, accounting, and planning and analysis are functions that are similar enough across all industries to be considered markets in their own right for nonverticalized application solutions.

The seven cross-industry sectors identified by INPUT are:

- Accounting
- Human Resources
- Education and Training
- Engineering and Scientific
- Office Systems
- Planning and Analysis
- Sales and Marketing

2. Delivery Mode Definitions

Cross-industry information services are delivered via applications software products, turnkey systems and transaction processing services. Management support information services such as systems operations, systems integration and professional services, information delivery services and systems software are excluded from cross-industry consideration.

For a more complete discussion of INPUT's information services industry structure and market sector definitions, please refer to the separate volume, INPUT's *Definition of Terms* found in the volume I binder of the 1992 Market Analysis Program reports.

3. Methodology

Data was collected and analyzed from in-depth telephone interviews with 37 vendors and 18 user departments representing all cross-industry sectors. In addition, INPUT's library was used as an information resource, as were the results of previous INPUT reports on key aspects of the information services industry.

C
Forecast Assumptions

In developing the five-year forecasts, INPUT has incorporated current economic assumptions regarding the outlook for the U.S. economy as a whole.

- The GNP and GNP deflator growth rates used in INPUT's market projections are from the CONSENSUS forecast of the Blue Chip Economic Indicators of Sedona, Arizona. The Blue Chip CONSENSUS forecast is derived from a panel of economists representing leading financial, industrial, and research firms across the U.S. and has a 13-year track record of balanced and accurate projections.

- The economic situation is showing signs of improvement and its impact on the information services market will be more favorable in 1992 and beyond than it was in 1991.

1. Economic Overview

The year 1991 was one in which the recession was expected to end, the recovery to start, and the ambiguities of an uncertain economy to gradually disappear. The end of the Middle East crisis brought a brief euphoria, as American troops, victorious in Iraq, returned home to hopes that the end of the conflict would "jump-start" the economy. Some encouraging signs were seen, but by year-end 1991, the U.S. economy was still sluggish, with no clear signs of a near-term sustainable recovery.

Phrases such as "all the necessary pieces to initiate and sustain a recovery are in place" have been common in the media, but as late as May 1992, the hoped-for sustainable upturn in the economy is just starting to be seen. Few disagree that a return to economic growth will happen, but opinions vary widely as to when a steady, sustainable turnaround will be solidly assured, how quickly the economy will rebound, and what the new growth rates will be for the country, the various industries and the financial resources that fuel the economy.

At present, economists are expecting an inflation-adjusted gross domestic product (GDP) to increase 2.8% from the fourth quarter of 1991 to the fourth quarter of 1992, and about the same increase in 1993. This will be the best economic performance in four years, but it is only half the average pace recorded in the initial years of previous recoveries.

2. Economic Impact

Official or unofficial, recession in the U.S. finally ended a decade of largely uninterrupted economic growth.

Economic growth is significant because the economy, as well as the overall size of the information services industry, is a significant factor in the user expenditure level for information services and software products. For example:

- The inflation rate of the past few years has been much more modest than in the mid-1980s and, as noted above, is expected to continue at modest levels. Because INPUT's forecasts and market sizes are in current dollars, lower inflation means lower growth.

- Real economic growth had been modest over the few years prior to the economic slowdown. As a result, deferred and canceled expansion plans in all industry sectors have slowed the expansion of information services expenditures. A 2.8% increase per year in the GDP for 1992 and 1993 is not likely to change this condition.

- The trend toward shifting information processing to smaller computers lowers the software products investment, based on current pricing practices. Thus, the quantities of software products sold increase, but revenue levels grow at a more modest rate.

The net economic influence on the cross-industry sectors for information services is that the slowdown in growth and constraints on budgets seen over the last two years will not appreciably change over the next two years.

Businesses that use cross-industry information services will still be dealing with their own market, product and organizational uncertainties, and although such an environment offers many opportunities for the use of new products and technologies, users are expected to continue their tendency toward cautious change and growth, and strong expense controls.

D
Related Reports

Related reports of possible interest to the reader include:

1. U.S. Markets

- *U.S. Application Solutions Market, 1991-1996*
- *U.S. Processing Services Market, 1991-1996*
- *U.S. Industry Sector Markets, 1991-1996* (15 reports on all major industry sectors, e.g., insurance)

2. European Markets

- *The Western European Market Forecast for Computer Software and Services, 1991-1996*
- *Trends in Processing Services—Western Europe, 1991-1996*

Education and Training

A
Definitions

The education and training cross-industry sector encompasses computer-based training (CBT) products. Training that is instructor-led is not considered in this report.

CBT consists of both authoring systems and courseware. Authoring systems provide a tool kit or shell for courseware development.

CBT is not limited to training about information systems subjects. Initially, CBT focused on technical subjects, but now CBT exists on any subject and for any classification of employee. Examples of major application areas are sales/marketing, safety, health awareness and basic skills/adult literacy, as well as machine and mechanical technologies, industrial maintenance, diesel and automotive technology, and engineering technologies.

INPUT estimates that $2.9 billion will be spent in 1992 on instructor-led education and training related to information systems and services. These expenditures and this type of instruction is included in the professional services delivery mode and is outside the scope of this report.

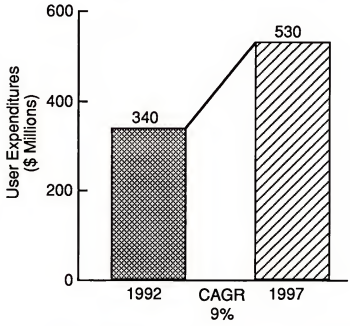
INPUT's coverage of live education and training that is specifically information systems-related is included in its annual report, *U.S. Professional Services Market, 1991-1996*, which will be updated this year for the time period 1992-1997.

B
Information Services Markets

Although CBT as a product/technology is over 40 years old, it is still a small market. INPUT's information services forecast for this sector is shown in Exhibit V-1.

EXHIBIT V-1

Education and Training Cross-Industry Sector Information Services Market, 1992-1997



INPUT is not as bullish on CBT this year as it was last year. Last year INPUT estimated the 1991 market at $519 million, to grow over a five-year period at an overall rate of 12% compounded annually. This year, however, INPUT has dropped its base market number as well as the CBT outlook. INPUT believed last year that CBT was gaining more momentum than it actually was. In reality, CBT continues to be a difficult concept to sell.

As is true with all other growth areas within information services, the need to reduce costs and improve efficiency is a key driver for the education and training sector. Given the findings and publicity of projects like *Workforce 2000*, it is widely acknowledged that the U.S. work force is under-trained.

Nonetheless, the CBT market has serious growth inhibitors:

- The "hard-sell" issues won't go away quickly. A limiter on the size of the market is the perception that some kinds of instruction just cannot be done by a computer. It is unclear how much this view is held because some educators and trainers are concerned about being replaced, or because some material actually is not appropriately taught via computer. In either case, lack of receptivity continues to be an issue for this cross-industry sector.

- As users continue to seek less expensive forms of training, they will investigate CBT. On the other hand, if there is any hesitancy about buying something new and unproved—as CBT is for first-time users—this hesitancy is magnified during an uncertain economy.

- Authoring system availability and acceptance needs to precede widespread courseware usage. Few companies produce and sell authoring systems and the technologies are still relatively complex and expensive. The learning curve for efficient use of CBT remains expensive.

  A number of authoring systems have appeared. Authorware Professional is a prime example. But the market for authoring systems has been slow to take off. One reason for the lack of acceptance has been the personal attributes needed to effectively use an authoring system. The author needs not only a solid understanding of the subject matter and how to teach through the use of technology, but also she or he must have a clear understanding of multimedia tools and know how to design interactions that are fun and conducive to learning.

- Multimedia instruction is limited due to lack of affordable hardware. Also, it is currently limited to a single workstation. Multimedia instruction must be digitized across a network in order to achieve widespread use. Technologies like digital video interactive (DVI) technology, which allows motion video to be transferred digitally across a network, continue to develop and will eventually be affordable, but not in the short term.

- The potential buyer within a corporation is difficult to identify, often being a project team of a functional department rather than a training group or MIS.

What has given the market more credibility recently is the publicity about and recognition over this last year of the efforts of IBM/Apple and Microsoft in multimedia. Multimedia will play a significant role in CBT as it continues to develop.

Opportunity continues to exist for CBT about technologies and products such as new operating systems, networking, client/server architectures, object-oriented programming and applications development.

INPUT believes the market would be given a boost if information technology vendors more strongly endorsed CBT for use with their own products, each enhancing the other's business significantly. The recent Goal/LEGENT merger will be interesting to watch in this regard. LEGENT is a leading systems control software products firm and Goal Systems, although the majority of its revenue comes from systems software products, has a strong CBT business division.

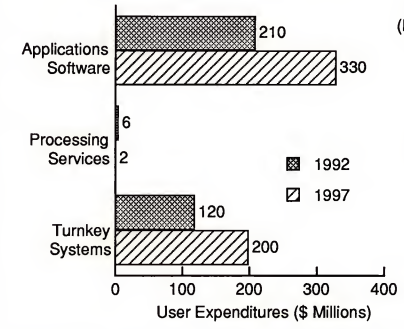
Another potential win for CBT is the area of performance support, which is still in its infancy. The goal of a performance support system is to provide whatever is necessary to generate performance and learning at the moment of need. At present, performance support systems are limited by the technological difficulty in developing them. Only a few companies have software tools for performance support.

Over the long term, however, INPUT believes this could be CBT's strongest hope for eventual widespread acceptance and use, given users' lax support for CBT.

Given the above factors, Exhibit V-2 shows INPUT's forecast for moderate growth of expenditures for education and training applications software products and turnkey systems. Processing services expenditures are rapidly declining.

EXHIBIT V-2

Education and Training Cross-Industry Sector Information Services Market by Delivery Mode 1992-1997



Following is a discussion of each of the individual delivery mode forecasts.

1. Applications Software Products

INPUT's estimate of the 1992 applications software products market by hardware platform for the education and training cross-industry sector is presented in Exhibit V-3.

EXHIBIT V-3

Education and Training Cross-Industry Sector Applications Software Products Market by Platform Size, 1992-1997

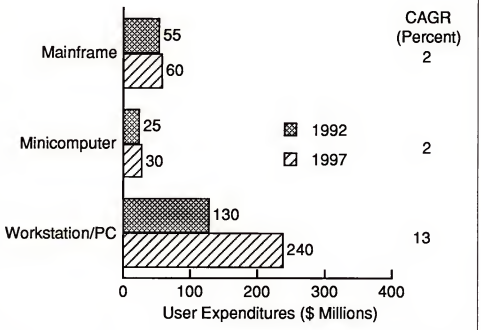


Exhibit V-3 reflects the following:

- Initially, all CBT was delivered via mainframe. For example, all Crwth and Goal Systems CBT products were mainframe-based; now both companies are moving rapidly to PC- and workstation-based products. The transition of individualized instruction from host-based systems to standalone PCs, and then to networked personal computer-based systems will continue during the 1992 to 1997 time period.

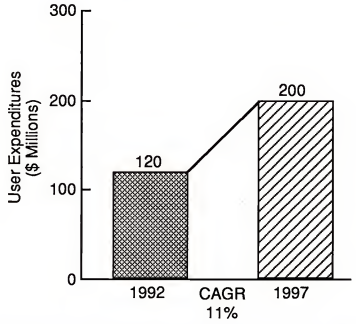
- Although INPUT has lowered its forecasted growth rate from last year's 22% CAGR, PC-based CBT will still experience reasonable growth, one reason being the small base from which it is starting. What will promote the growth of this platform size is the introduction of more generic, shell application packages that can be customized by the end user. What will also promote growth is additional user success stories such as the experience of AT&T's Consumer Products Division (see Section 3 below). However, the availability of on-line help systems will inhibit growth.

2. Turnkey Systems

Exhibit V-4 is INPUT's forecast for computer-based training delivered via turnkey systems.

EXHIBIT V-4

Education and Training Cross-Industry Sector Turnkey Systems Market, 1992-1997



Vendors are providing turnkey solutions that incorporate third-party video disks and CD ROMs as well as the computer platform and applications software. Unlike other cross-industry turnkey systems that are most frequently used by smaller firms, in the case of CBT turnkey systems are used by large firms as well.

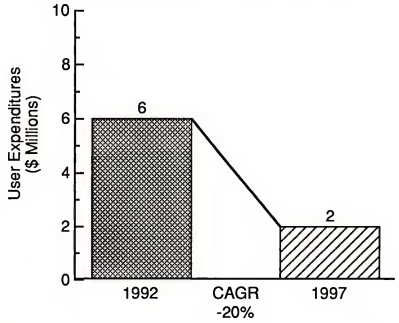
Even so, INPUT has lowered its base market number (1992) for turnkey CBT solutions this year, with the recognition that the majority of turnkey CBT systems are sold into the government sector rather than across industries.

3. Processing Services

Exhibit V-5 presents INPUT's education and training processing services forecast.

EXHIBIT V-5

Education and Training Cross-Industry Sector Processing Services Market, 1992-1997



This segment consists of a reservoir of Plato users, but it will continue to decline rapidly due to the availability of CBT on personal computers. Mainframe-based Plato was the first interactive training system and was developed by Control Data Corp. CDC sold the Plato-based family of products to several different companies, none of which expanded the business. The value of the product could not justify the communications costs to connect the host to the terminal.

C

User Department Directions

An IS education consultant within a large pharmaceuticals firm and an instructional technologist within AT&T's Consumer Products Division provide contrasting perspectives about CBT. These two examples provide insights regarding how and when CBT can and cannot succeed. Both indicated constant pressure to get people trained faster and that training is becoming more demanding.

The first company, where an information systems training consultant was interviewed, has multiple autonomous training groups. Training for the various functions, although decentralized, typically takes place within the same geographic region.

Its computer environment is characterized by:

- Different kinds of users—scientists, accountants and marketing employees for example—use spreadsheets in different ways and need different types of training.
- Different divisions have different hardware and software standards.
- The company's IS strategy over the next three years includes putting a GUI-based computer on every desk. In addition to training on how to use GUIs, training about interconnectivity issues will be required.

CBT is not being considered because of the following opinions:

- It is easy for individuals to postpone use of CBT, given the frantic nature of many jobs. Employees are more likely to take the time to learn if they have a specific place to go at a specific time.
- CBT isn't needed for personal productivity tools such as word processing on an elementary level because these applications packages come with built-in tutorials.
- CBT is too expensive; performance support and multimedia are still too expensive.
- Little support in general is given to training at this company. Many departments don't have a training budget.

In contrast, the Consumer Products Division of AT&T had a centralized training unit as it planned for CBT (much of it has subsequently been decentralized).

The following situation existed prior to CBT implementation:

- Sales associates from stores all over the U.S. traveled to a central training site.
- The turnover rate for sales associates is high, as is true in retail overall, at between 40% to 50% per year; thus much of the sales instruction costs were wasted annually.

The goal in investigating alternative methods to train the retail salespeople was to save time and money, to improve selling skills, and to be able to provide better customer service. Other types of written self-paced training methods were investigated, but the decision was to go with CBT.

Trainers who felt their jobs were at risk and that person-to-person interaction was the only effective way to train resisted CBT. It was also initially viewed by all concerned as just another example of the company wanting to save money at the expense of its employees (employees would no longer be able to travel to a training site).

The education unit did a number of things that turned this situation around:

- It had strong leadership and vision, and was willing to make directional decisions in a rapidly changing technological arena.
- It worked hard to continuously build CBT sponsorship.
  - A strong financial case for CBT was presented to upper management showing that CBT would pay for itself within a 2-3-year time period.
  - The phone center managers were brought in on CBT issues and decisions. They were shown the system, knew when it was coming and what to expect. They were trained in how to be training administrators. And the system was made easy to set up.
  - The sales associates were involved through focus groups and were kept informed.

After a year's effort, each of the 400 phone centers was equipped with a 386-based PC with 110 MB hard disk drive, streaming tape drive, laser disk player, stereo monitor for a VCR, touch screen interface, modem and a keyboard. Each CBT station was networked to a central UNIX-based host for CMI (computer-managed instruction) so that students' activity and progress could be polled and tracked.

The CBT stations are in kiosks that can be wheeled out onto the phone center floor. Their function will continue to expand to include being an easy-to-access resource on product information.

In addition to CBT paying for itself within a three-year time period, and saving the time lost due to travel, sales productivity has improved. Ten dollars more per sales person per hour is being sold now than was sold before CBT was implemented.

INPUT concludes that CBT is more likely to be implemented in situations where the same subject needs to be taught in essentially the same way to a large audience; where the audience is spread throughout a large geographic region; where the training department has strong leadership and the function is recognized as important; where cost advantages are easily demonstrated; and when the training department is able to gain the sponsorship and support of a wide group of managers as well as the potential students themselves.

D

Trends/Technology Ratings of Importance

Respondents within all cross-industry sectors, vendors and users, were asked to rate various trends and technologies on a scale of one to five, where one is unimportant or of little impact and five is very important or of significant impact.

The technologies listed in Exhibit V-6 were selected because INPUT believes they will receive the most attention from vendors and users over the next five years. In addition, INPUT believes that their impacts on vendors and users will be profound. Users who deploy these technologies will be re-engineering their business functions. And vendors will need to change not only their products, but also the ways in which they price, sell and support them.

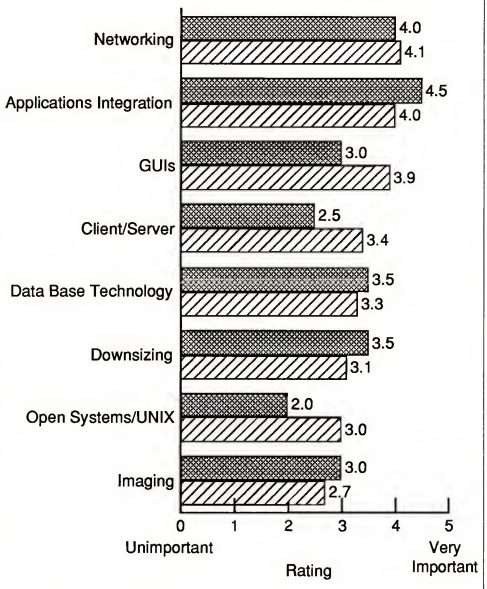
Exhibit V-6 shows the composite ratings of the education and training cross-industry sector compared to the ratings of all cross-industry sectors combined.

As is true with all cross-industry sectors combined, networking and applications integration are rated as the most important for the education and training sector. However, this industry sector does not rank imaging as least important; and in fact imaging is rated as just as important as GUIs. INPUT believes this relatively higher rating is indicative of the role that on-line document viewing and document management will play in education and training. Particularly in performance support, students/employees will want to have on-line access to instructions or descriptions of certain areas of their work or training at any time during the course of their work.

Understandably for this sector, which must emphasize ease of use, open systems/UNIX is considered least important. Given the importance of ease of use, one would expect GUIs to have a higher rating. INPUT believes that GUIs in fact would create more confusion and distraction, and that ease of use must be built into the training program itself. On the other hand, GUIs will simplify the task of the authoring system developer.

EXHIBIT V-6

Education and Training Cross-Industry Sector Respondents' Indication of Relative Importance of Trends and Technologies



Respondents were also asked if there were any trends or technologies of importance in addition to the ones listed by INPUT. In other sectors there was little response to this question; however, for the education and training sector, several different and new technologies emerged as important. Vendors mentioned the following:

- Shift from analog to video—A program stored on a video disc player has been the main means of animated CBT delivery over the last five years; now, however, other compression techniques, such as the ability to store video on a hard or compact disk, are starting to become available. DVI (Digital Video Interactive) technology is also a key technology that will allow video to be transferred over networks including telephone lines. Intel and IBM are pioneering development in this area.

- Multimedia—As desktop computer prices continue to fall, multimedia capabilities will eventually be available at prices affordable enough for widespread implementation.

Respondents for all cross-industry sectors were also asked to rate the technologies and trends in terms of importance five years from now. All technologies for all cross-industry sectors increase in importance over the five-year period.

Vendors' participation in the technologies and trends are indicated below in Section E.

E

Vendors and Competitive Environment

1. Vendor Characteristics and Trends

Vendor trends include:

- Vendors continue to introduce CBT on technical subjects, including the increasingly complex area of information systems.

- Although far from widespread in development and implementation, more vendors are beginning to develop multimedia instruction—in both academic education and industrial training—and there is more experimentation with performance support systems.

- The competitive landscape will change over the next several years as startup companies enter the multimedia market. There is a risk that these smaller companies will be underfunded.

- As on-line documentation catches on and as multimedia instruction progresses, vendors that participate in the education and training cross-industry market will be competing against electronic publishing firms such as Interleaf and Frame Technology as well as CAD vendors. These three sets of vendors are all experimenting with multimedia; electronic publishing is seeking new uses for on-line "view only" products.

- Historically, CBT vendors sold technology courseware to IS departments. As customers outsource and downsize their applications software products—and as technology moves out to end users—vendors are changing their marketing and selling strategies to reach a broader market. This broader market includes not only information systems managers and departments but also special projects within corporations.

Types of companies that compete in this sector are:

- Companies that provide full-service training solutions, including class instruction, written materials, video tapes, and computer-based training on a variety of technical and academic subjects for public and private schools, business and government

- Smaller companies that provide specific CBT solutions to a range of customer types or a single industry

- Companies that provide software-only education and training for specific products such as Word for Windows or Lotus 1-2-3

- Authoring system vendors

Most education and training vendors are vertically specialized and therefore are not represented in this report. Other vendors that are represented in this report sell authoring systems and consulting services to assist end users in developing their own specialized materials. In many instances, cross-industry solutions represent only a small portion of their overall training offerings.

2. Leading and Emerging Vendors

Dozens of companies—possibly as many as one hundred—sell cross-industry CBT. Leading vendors are listed in Exhibit V-7.

EXHIBIT V-7

Education and Training Cross-Industry Sector Leading and Emerging Applications Software Products Vendors

- Authoring Systems
  - Aimtech
  - MacroMind-Paracomp
  - Computer Teaching Corporation
  - Quest/Allen Communications
- Technology Courseware
  - Crwth Computer Courseware (Division of Science Research Associates)
  - Goal Systems Division of LEGENT
  - National Education Training (formerly Applied Learning International)
- Remedial/General Business
  - Josten's Learning
  - Computer Curriculum Corp.
  - Roach Organization

For many of the companies that compete in this cross-industry sector, CBT is but one education and training delivery mode. For example, Learning International provides traditional seminars, videos, workbooks and trainers; only about one percent of revenue comes from CBT.

Two competitor events in this cross-industry sector are significant:

- Authorware merged with Paracomp, creating MacroMind-Paracomp, Inc. This merger signals the difficulties of maintaining a presence in this small market.

- Goal Systems International has entered into an agreement to merge with LEGENT Corporation. Goal's CBT business, its Information Technology Division, will be operated as an independent business. INPUT believes is likely that LEGENT will ignore Goal's training

business, at least for now, as it continues to emphasize its own primary business, which is systems control products. It is also likely that in the longer term it may incorporate Goal's performance support products into its own product line and use it as a strong selling point.

3. Vendor Profiles

This section contains profiles of a sampling of vendors, showing the diversity of types of companies and approaches.

a. American Training International (ATI)

ATI was formed in 1981 to provide custom training to large organizations. The company redirected its efforts to become a leading publisher of third-party training and assessment programs for personal computer software users.

The company's catalog currently lists over 75 titles under three product categories:

- "Teach Yourself..." training programs for the most popular word processing, data base, spreadsheet and integrated programs, operating systems, and training materials for LAN applications
- "Teach Me..." tutorials designed for the mass merchandising market
- In 1990, ATI introduced computer-skills testing programs. Similar to typing or shorthand tests administered to clerical personnel, ATI's Certify! testing programs provide an objective assessment of a user's skill level on a given software program.

ATI programs are available for DOS, OS/2, Apple Macintosh and UNIX environments.

b. Crwth Computer Courseware

Crwth, founded in 1981, develops and markets mainframe CBT to Fortune 1000 organizations throughout the United States and Canada. Crwth is a business unit of Science Research Associates (SRA). SRA develops and markets self-study training courses for IBM hardware and software, including AIX. Courses are text, video tape and PC-based simulation and exercises. SRA is a division of the MacMillan/McGraw-Hill School Publishing Company.

FORMAT Courseware is the company's flagship product. Courseware is also available under Goal System's PHOENIX EASE. Crwth recently acquired rights to market Computer Systems Research's client/server Enterprise curriculum. A challenge for Crwth will be to develop and/or acquire additional PC-based products and to incorporate some of the features that PCs provide, such as high-quality graphics, into its mainframe product line.

Crwth sells its CBT products to office systems, software product evaluation and end-user computing managers, as well as to accounting/finance departments.

c. Goal Systems International, Information Technology Division

Over this past year Goal Systems:

- Announced intentions to merge with LEGENT Corporation
- Changed its strategy away from CBT to a more all-encompassing concept of performance support
- Continued to move toward a multiplatform product strategy. Goal's older products—Phoenix and Preference—are still predominantly mainframe based. Goal claims that it now has as many products that run on other platforms as products that run on mainframes.
- Moved quickly to introduce GUI-based products. The first GUI-based product introduced was Syllabus, which operates under Windows. OS/2, Mach and UNIX versions are in the works.

Its flagship products are Phoenix, a mainframe-based authoring and presentation system that now extends to IBM midrange and microcomputers; and Preference, a mainframe-based text reference tool. Goal Systems sells the generic courseware shell and the customer develops the specifics of the courseware.

- A relatively new product is Preference/Phoenix, a performance support system.
- Syllabus is a new multimedia authoring system enabling clients to create their own training courseware in the four major GUI environments: Windows, OS/2 PM, UNIX (X-Windows) and Apple Macintosh. Its target market is the distributed, client/server environment.
- Explain is an on-line documentation and on-line help system. With the mainframe as the file server, it provides access to all types of reference text or manuals via PCs, LANs, UNIX workstations, and mainframe environments.

In 1991, Goal broadened its technical capability for on-line documentation and help through its acquisition of Training America Inc. (White Plains, NY) and its Explain product. TAI revenues were in the $2 million range for the year ended June 30, 1991. More acquisitions are planned.

Goal's Information Technology Division's worldwide revenue for calendar 1991 was in the $18 million range.

d. National Education Training Group

National Education Training Group (The Training Group)—formerly Applied Learning International—is a subsidiary of National Education Corporation (NEC). Its purpose is to provide training for information processing, technology management, end-user computing, and human resource development topics to industry and government markets. The Training Group's products include interactive video, CBT, and instructor-led and linear video instruction.

The company was formed in 1987 with the merger of the DELTAK Training Corporation and Advanced Systems, Inc. The Training Group recently reorganized into the following divisions in order to better serve its markets as well as to address opportunities for new technology training.

- Deltak sells products and services to IS centers.
- Human Resources Skills Division sells management, supervisory and personal development education and training materials to human resources departments.
- Industrial Skills Division sells skills-based courses to industrial and manufacturing entities. The Training Group has just recently begun to sell CBT to functional areas other than human resources.
- James Martin Insight, established in June 1991, develops training products on leading information technologies such as open systems, client/server, object-oriented programming and re-engineering. James Martin Insight is a partnership between The Training Group and James Martin & Associates.

The Training Group is working aggressively to round out its product line and decrease its dependence on mainframe hardware and software instruction. James Martin Insight has already released several products on application development techniques, including two extensive products that are interactive.

The company derives 100% of its revenue from training and education to cross-industry markets. The Training Group is NEC's largest operation. Revenue for the parent company is in the $400 million range, and has been flat for the last several years. It is National Education Training's expectation that its new products—along with the reorganization—will boost sales to previous levels.

Definition of Terms

A
Introduction

INPUT's *Definition of Terms* provides the framework for all of INPUT's market analyses and forecasts of the information services industry. It is used for all U.S. programs. The structure defined in Exhibit A-1 is also used in Europe and for the worldwide forecast.

One of the strengths of INPUT's market analysis services is the consistency of the underlying market sizing and forecast data. Each year INPUT reviews its industry structure and makes changes if they are required. When changes are made they are carefully documented and the new definitions and forecasts reconciled to the prior definitions and forecasts. INPUT clients have the benefit of being able to track market forecast data from year to year against a proven and consistent foundation of definitions.

For 1992 INPUT has added one delivery mode and defined three new submodes to its Information Services Industry Structure:

- *Equipment Services* has been added as the ninth delivery mode. INPUT has forecasted the equipment maintenance, support and related services market through its Customer Services Programs for a number or years. Starting in 1992, the equipment services portion of the customer services market will be included in the total information services industry as defined by INPUT. Other portions of this market (such as software support) are already included.

- Two new submodes have been defined in the *Systems Operations* delivery mode - *desktop services* and *network management*. They are defined on pages 5 and 6.

- A fourth submode has been defined within the Professional Services delivery mode—*applications management*. This change reflects a shift in the way some software development and maintenance services are purchased. A complete definition is provided on page 6.

A series of definitions for computer equipment have also been added.

Changes from the 1991 INPUT *Definition of Terms* are indicated with a ☆.

B

Overall Definitions and Analytical Framework

1. Information Services

Information Services are computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Use of vendor-provided computer processing services to develop or run applications or provide services such as disaster recovery or data entry (called *Processing Services*)
- A combination of computer equipment, packaged software and associated support services which will meet an application systems need (called *Turnkey Systems*)
- Packaged software products, including systems software or applications software products (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)
- The combination of products (software and equipment) and services where the vendor assumes total responsibility for the development of a custom integrated solution to an information systems need (called *Systems Integration*)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services that support the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange (called *Network Applications*)
- Services that support the access and use of public and proprietary information such as on-line data bases and news services (called *Electronic Information Services*)
- Services that support the operation of computer and digital communication equipment (called *Equipment Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., electronic data interchange services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the information services industry consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels; and competitive issues.

2. Market Forecasts/User Expenditures

All information services market forecasts are estimates of *User Expenditures* for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)
- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers

Captive Information Services User Expenditures are expenditures for products and services provided by a vendor that is part of the same parent corporation as the user. These expenditures are not included in INPUT forecasts.

Non-captive Information Services User Expenditures are expenditures that go to vendors that have a different parent corporation than the user. It is these expenditures which constitute the information services market analyzed by INPUT and that are included in INPUT forecasts.

3. Delivery Modes

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the nine delivery modes defined by INPUT, six are considered primary products or services:

- *Processing Services*
- *Network Services*
- *Professional Services*
- *Applications Software Products*
- *Systems Software Products*
- *Equipment Services*

The remaining three delivery modes represent combinations of these products and services, combined with equipment, management and/or other services:

- *Turnkey Systems*
- *Systems Operations*
- *Systems Integration*

Section C describes the delivery modes and their structure in more detail.

4. Market Sectors

Market Sectors or markets are groupings or categories of the buyers of information services. There are three types of user markets:

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc. These are called "industry-specific" markets.

- *Functional Application* markets, such as Human Resources, Accounting, etc. These are called "cross-industry" markets.

- *Other* markets, which are neither industry- nor application-specific, such as the market for systems software products and much of the on-line data base market.

Specific market sectors used by INPUT are defined in Section E, below.

5. Trading Communities

Information technology is playing a major role in re-engineering, not just companies but the value chain or *Trading Communities* in which these companies operate. This re-engineering is resulting in electronic commerce emerging where interorganizational electronic systems facilitate the business processes of the trading community.

- A trading community is the group or organizations—commercial and non-commercial—involved in producing a good or services.

- Electronic commerce and trading communities are addressed in INPUT's EDI and Electronic Commerce Program.

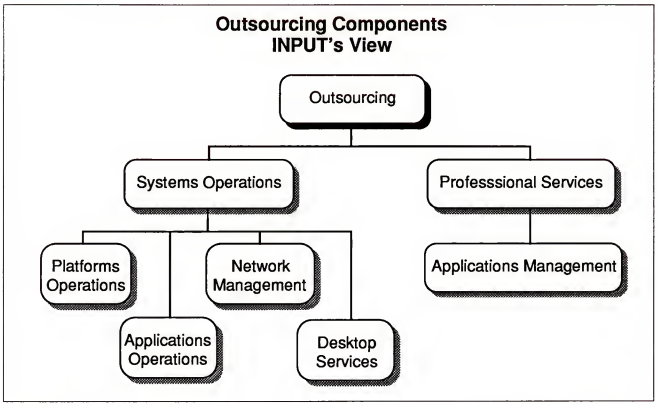
6. Outsourcing

Over the past few years a major change has occurred in the way clients are buying some information services. The shift has been labeled *outsourcing*.

INPUT views outsourcing as a change in the form of the client/vendor relationship. Under an outsourcing relationship, all or a major portion of the information systems function is contracted to a vendor in a long-term relationship. The vendor is responsible for the performance of the function.

INPUT considers the following submodes to be outsourcing-type relationships and in aggregate to represent the outsourcing market. See Exhibit A-1. Complete definitions are provided in Section C of this document. INPUT provides these forecasts as part of the corresponding delivery modes.

EXHIBIT A-1



- *Platform Systems Operations* - The vendor is responsible for managing and operating the client's computer systems.

- *Applications System Operations* - The vendor is responsible for developing and/or maintaining a client's applications as well as operating the computer systems.

☆*Network Management* - The vendor assumes full responsibility for operating and managing the client's data communications systems. This may also include the voice communications of the client.

☆*Applications Management/Maintenance* - The professional services vendor has full responsibility for developing and/or maintaining some or all of the applications systems that a client uses to support business operations. The services are provided on a long-term contractual basis.

☆*Desktop Services* - The vendor assumes responsibility for the deployment, maintenance, and connectivity between the personal computers and/or intelligent workstations in the client organization. The services may also include performing the help-desk function. The services are provided on a long-term contractual basis.

C
Delivery Modes and Submodes

Exhibit A-2 provides the overall structure of the information services industry as defined and used by INPUT. This section of *Definition of Terms* provides definitions for each of the delivery modes and their submodes or components.

1. Software Products

INPUT divides the software products market into two delivery modes: systems software and applications software.

The two delivery modes have many similarities. Both involve purchases of software packages for in-house computer systems. Included are both 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. Vendor-provided training or support in operation and use of the package, if part of the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the professional services delivery mode. Fees for work related to education, consulting, and/or custom modification of software products are also counted as professional services, provided such fees are charged separately from the price of the software product itself.

EXHIBIT A-2

Information Services Industry Structure—1992

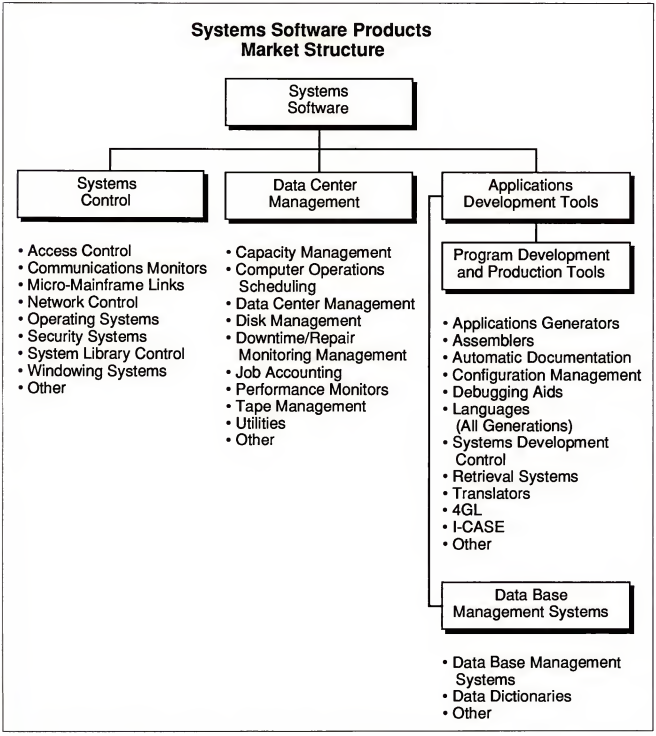
- Systems Software Products
  - Mainframe
  - Minicomputer
  - Workstation/ PC
- Applications Software Products
  - Mainframe
  - Minicomputer
  - Workstation/ PC
- Turnkey Systems
  - Equipment
  - Software Products
  - Professional Services
- Equipment Services
  - Equipment Maintenance
  - Environmental Services
- Professional Services
  - Consulting
  - Education & Training
  - Software Development/ Maintenance
  - Application Management/ Maintenance
- Systems Integration
  - Equipment
  - Software Products
  - Professional Services
  - Other
- Systems Operations
  - Platform Operations
  - Applications Operations
  - Desktop Services
  - Network Management
- Processing Services
  - Transaction
  - Utility
  - Other
- Network Services
  - Electronic Information Services
  - Network Applications

Source: INPUT

a. Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. INPUT divides systems software products into three submodes. See Exhibit A-3.

EXHIBIT A-3



- *Systems Control Products* - Software programs that manage computer system resources and control the execution of programs. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.

- *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.

- *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems and other development productivity aids.

INPUT also forecasts the systems software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

b. Applications Software Products

Applications software products enable a user or group of users to support an operational or administrative process within an organization. Examples include accounts payable, order entry, project management and office systems. INPUT categorizes applications software products into two groups of market sectors. (See Exhibit A-4.)

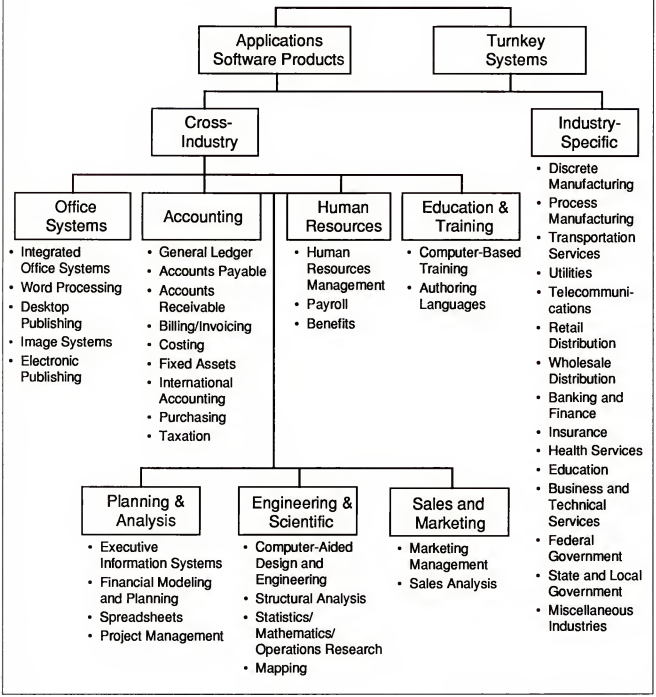
- *Industry Applications Software Products* - Software products that perform functions related to fulfilling business or organizational needs unique to a specific industry (vertical) market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile dealer parts inventory, etc.

- *Cross-Industry Applications Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Examples include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

INPUT also forecasts the applications software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

EXHIBIT A-4

Application Products and Turnkey Systems



2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged applications software into a single product developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and professional services provided. INPUT categorizes turnkey systems into two groups of market sectors as it does for applications software products. (See Exhibit A-4.)

Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Computer manufacturers (e.g., IBM or DEC) that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

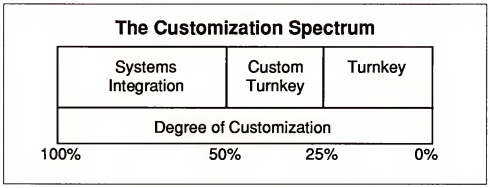
- *Value-Added Reseller (VAR):* A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually applications software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services, software support, and applications upgrades.

Turnkey systems have three components:

- Equipment - computer hardware supplied as part of the turnkey system
- Software products - prepackaged systems and applications software products
- Professional services - services to install or customize the system or train the user, provided as part of the turnkey system sale

Exhibit A-5 contrasts turnkey systems with systems integration. Turnkey systems are based on available software products that a vendor may modify to a modest degree.

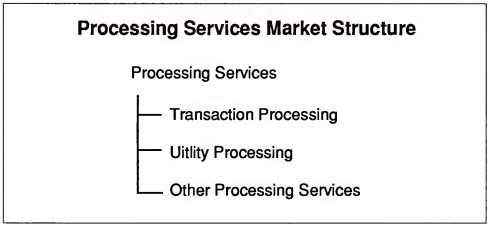
EXHIBIT A-5



3. Processing Services

This delivery mode includes three submodes: transaction processing, utility processing, and "other" processing services. See Exhibit A-6.

EXHIBIT A-6



- *Transaction Processing* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at the vendor site or customer site to process specific applications and update client data bases. The application software is typically provided by the vendor.

- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), enabling clients to develop and/or operate their own programs or process data on the vendor's system.

- *Other Processing Services* - Vendor provides service—usually at the vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

4. Systems Operations

Systems operations as a delivery mode was introduced in the 1990 Market Analysis and Systems Operations programs. Previously called Facilities Management, this delivery mode was created by taking the Systems Operations submode out of both Processing Services and Professional Services. For 1992 the submodes have been defined as follows.

Systems operations involves the operation and management of all or a significant part of the client's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes where the difference is whether the support of applications, as well as data center operations, is included.

- *Platform systems operations* - The vendor manages and operates the computer systems, to perform the client's business functions, without taking responsibility for the client's application systems.

- *Applications systems operations* - The vendor manages and operates the computer systems to perform the client's business functions, and is also responsible for maintaining, or developing and maintaining, the client's application systems.

☆*Network Management* - The vendor assumes responsibility for operating and managing the client's data communications systems. This may also include the voice communications of the client. A network management outsourcing contract may include only the management services or the full costs of the communications services and equipment plus the management services.

☆*Desktop Services* - The vendor assumes responsibility for the deployment, maintenance, and connectivity among the personal computers and/or workstations in the client organization. The services may also include performing the help-desk function. Equipment as well as services can be part of a desktop services outsourcing contract.

Note: This type of client service can also be provided through traditional professional services where the contractual criteria of outsourcing are not present.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the client's information systems environment (equipment, networks, applications systems), either at the client's site or the vendor's site.

Note: In the federal government market, systems operation services are also defined by equipment ownership with the terms "COCO" (Contractor-Owned, Contractor-Operated), and "GOCO" (Government-Owned, Contractor-Operated).

5. Systems Integration (SI)

Systems integration is a vendor service that provides a complete solution to an information system, networking or automation development requirement through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price. (Refer to Exhibit A-7.)

The components of a systems integration project are the following:

- *Equipment* - information processing and communications equipment required to build the systems solution. This component may include custom as well as off-the-shelf equipment to meet the unique needs of the project. The systems integration equipment category excludes turnkey systems by definition.

- *Software products* - prepackaged applications and systems software products.

- *Professional services* - the value-added component that adapts the equipment and develops, assembles, or modifies the software and hardware to meet the system's requirements. It includes all of the professional services activities required to develop, implement, and if included in the contract, operate an information system, including consulting, program/project management, design and integration, software development, education and training, documentation, and systems operations and maintenance.

- *Other services* - most systems integration contracts include other services and product expenditures that are not classified elsewhere. This category includes miscellaneous items such as engineering services, automation equipment, computer supplies, business support services and supplies, and other items required for a smooth development effort.

EXHIBIT A-7

Products/Services in Systems Integration Projects

Equipment

- Information systems
- Communications

Software Products

- Systems software
- Applications software

Professional Services

- Consulting
  - Feasibility and trade-off studies
  - Selection of equipment, network and software
- Program/project management
- Design/integration
  - Systems design
  - Installation of equipment, network, and software
  - Demonstration and testing
- Software development
  - Modification of software packages
  - Modification of existing software
  - Custom development of software
- Education/training and documentation
- Systems operations/maintenance

Other Miscellaneous Products/Services

- Site preparation
- Data processing supplies
- Processing/network services
- Data/voice communication services

6. Professional Services

This category includes four submodes: consulting, education and training, software development, and applications management. Exhibit A-8 provides additional detail.

- *Consulting:* Services include management consulting (related to information systems), information systems re-engineering, information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of the information system, including equipment, software, networks and systems operations.

- *Education and Training:* Services that provide training and education or the development of training materials related to information systems and services for the information systems professional and the user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation. Education and training provided by school systems are not included. General education and training products are included as a cross-industry market sector.

- *Software Development:* Services include user requirements definition, systems design, contract programming, documentation, and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

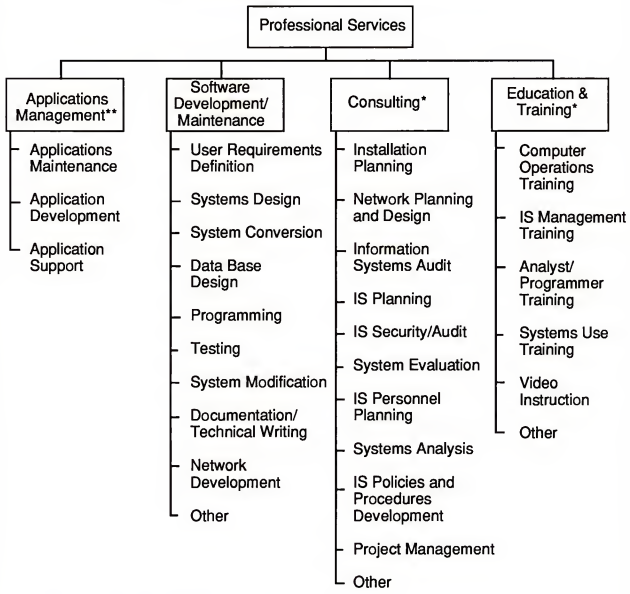
☆*Applications Management*: The vendor has full responsibility for maintaining and upgrading some or all of the application systems that a client uses to support business operations and may develop and implement new application systems for the client.

An applications management contract differs from traditional software development in the form of the client/vendor relationship. Under traditional software development services the relationship is project based. Under applications management it is time and function based.

These services may be provided in combination or separately from platform systems operations.

EXHIBIT A-8

Professional Services Market Structure



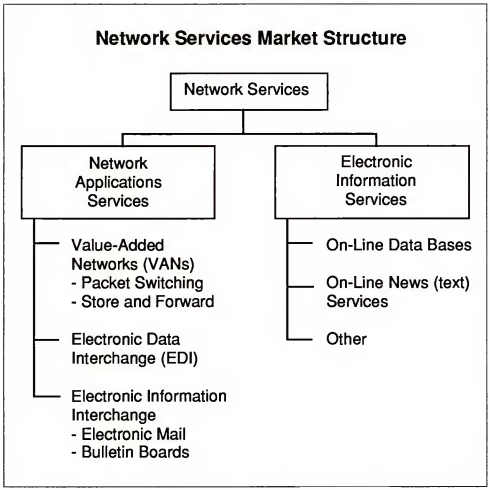
*Related to computer systems, topics, or issues

**Vendor assumes full responsibility on contracted longer term basis

7. Network Services

Network services are a variety of telecommunications-based functions and operations. Network service includes two submodes, as shown in Exhibit A-9.

EXHIBIT A-9



a. Electronic Information Services

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers.

Users inquire into and extract information from the data bases. They may load extracted data into their own computer systems; the vendor does not provide data processing or manipulation capability as part of the electronic information service and users cannot update the vendor's data bases. However, the vendor may offer other services (network applications or processing services) that do offer processing or manipulation capability.

The two kinds of electronic information services are:

- *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.

- Unstructured, primarily textual information on people, companies, events, etc. These are often news services.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

b. Network Applications

Value-Added Network Services (VAN Services) - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

Electronic Data Interchange (EDI) - Application-to-application electronic exchange of business data between trade partners or facilitators using a telecommunications network.

Electronic Information Interchange- The transmission of messages across an electronic network managed by a services vendor, including electronic mail, voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.

8. Equipment Services

☆The equipment services delivery mode includes two submodes. Both deal with the support and maintenance of computer equipment.

☆*Equipment Maintenance* - Services provided to repair, diagnose problems and provide preventive maintenance both on-site and off-site for computer equipment. The costs of parts, media and other supplies are excluded. These services are typically provided on a contract basis.

☆*Environmental Services* - Composed of equipment and data center related special services such as cabling, air conditioning and power supply, equipment relocation and similar services.

D
Computer Equipment

☆These definitions have been included to provide the basis for market segmentation in the software products markets.

☆*Computer 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. Unless otherwise noted in an INPUT forecast, computer equipment is only included where it is part of the purchase of services or software products (e.g., turnkey systems and systems integration).

☆*Peripherals* - Includes all input, output, communications, and storage devices (other than main memory) that can be channel connected to a 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 modem, 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

☆*Computer Systems* - Includes all processors from personal computers to supercomputers. Computer systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices and processors or CPUs not provided as part of an integrated (turnkey) system.

☆*Personal computers* - Smaller computers using 8-, 16-, or 32-bit computer technology. Generally designed to sit on a desktop and are portable for individual use. Price generally less than $5,000.

☆*Workstations* - High-performance, desktop, single-user computers often employing Reduced Instruction Set Computing (RISC). Workstations provide integrated, high-speed, local network-based services such as data base access, file storage and back-up, remote communications, and peripheral support. These products usually cost from $5,000 to $15,000.

☆*Minicomputer or midsize computers* - Minicomputers are generally priced from $15,000 to $350,000. Many of the emerging client/server computers are in this category.

☆*Mainframe or large computers* - Traditional mainframe and supercomputers costing more than $350,000.

E
Sector Definitions

1. Industry Sector Definitions

INPUT structures the information services market into industry sectors such as process manufacturing, insurance, transportation, etc. The definitions of these sectors are based on the 1987 revision of the Standard Industrial Classification (SIC) code system. The specific industries (and their SIC codes) included under these industry sectors are detailed in Exhibit A-10.

INPUT includes all delivery modes except systems software products and equipment services in industry market sectors. See Exhibit A-9 and section E-3 (Delivery Mode Reporting by Sector).

Note: SIC code 88 is Personal Households. INPUT does not currently analyze or forecast information services in this market sector.

EXHIBIT A-10

Industry Sector Definitions

Industry Sector	SIC Code	Description
Discrete Manufacturing	23xx	Apparel and other finished products
	25xx	Furniture and fixtures
	27xx	Printing, publishing and allied industries
	31xx	Leather and leather products
	34xx	Fabricated metal products, except machinery and transportation equipment
	35xx	Industrial and commercial machinery and computer equipment
	36xx	Electronic and other electrical equipment and components, except computer equipment
	37xx	Transportation equipment
	38xx	Instruments; photo/med/optical goods; watches/clocks
	39xx	Miscellaneous manufacturing industry
Process Manufacturing	10xx	Metal mining
	12xx	Coal mining
	13xx	Oil and gas extraction
	14xx	Mining/quarrying nonmetalic minerals
	20xx	Food and kindred products
	21xx	Tobacco products
	22xx	Textile mill products
	24xx	Lumber and wood products, except furniture
	26xx	Paper and allied products
	28xx	Chemicals and allied products
	29xx	Petroleum refining and related industries
	30xx	Rubber and miscellaneous plastic products
	32xx	Stone, clay, glass and concrete products
	33xx	Primary metal industries
Transportation Services	40xx	Railroad transport
	41xx	Public transit/transport
	42xx	Motor freight transport/warehousing
	43xx	U.S. Postal Service
	44xx	Water transportation
	45xx	Air transportation (including airline reservation services in 4512)
	46xx	Pipelines, except natural gas
	47xx	Transportation services (including 472x, arrangement of passenger transportation)

EXHIBIT A-10 (CONT.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Telecommunications	48xx	Communications
Utilities	49xx	Electric, gas and sanitary services
Retail Distribution	52xx	Building materials
	53xx	General merchandise stores
	54xx	Food stores
	55xx	Automotive dealers, gas stations
	56xx	Apparel and accessory stores
	57xx	Home furniture, furnishings and accessory stores
	58xx	Eating and drinking places
	59xx	Miscellaneous retail
Wholesale Distribution	50xx	Wholesale trade - durable goods
	51xx	Wholesale trade - nondurable goods
Banking and Finance	60xx	Depositary institutions
	61xx	Nondepositary institutions
	62xx	Security and commodity brokers, dealers, exchanges and services
	67xx	Holding and other investment offices
Insurance	63xx	Insurance carriers
	64xx	Insurance agents, brokers and services
Health Services	80xx	Health services
Education	82xx	Educational services

EXHIBIT A-10 (CONT.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Business Services	65xx	Real estate
	70xx	Hotels, rooming houses, camps, and other lodging places
	72xx	Personal services
	73xx	Business services (except hotel reservation services in 7389)
	7389x	Hotel reservation services
	75xx	Automotive repair, services and parking
	76xx	Miscellaneous repair services
	78xx	Motion pictures
	79xx	Amusement and recreation services
	81xx	Legal services
	83xx	Social services
	84xx	Museums, art galleries, and botanical/zoological gardens
	86xx	Membership organizations
	87xx	Engineering, accounting, research, management, and related services
	89xx	Miscellaneous services
Federal Government	9xxx	
State and Local Government	9xxx	
Miscellaneous Industries	01xx	Agricultural production - crops
	02xx	Agricultural production - livestock/animals
	07xx	Agricultural services
	08xx	Forestry
	09xx	Fishing, hunting and trapping
	15xx	Building construction - general contractors, operative builders
	16xx	Heavy construction - contractors
	17xx	Construction - special trade contractors

2. Cross-Industry Sector Definitions

INPUT has identified seven cross-industry market sectors. These sectors or markets involve multi-industry applications such as human resource systems, accounting systems, etc.

- In order to be included in an industry sector, the service or product delivered must be specific to that sector only. If a service or product is used in more than one industry sector, it is counted as cross-industry.

- INPUT only includes the turnkey systems, applications software products, and transaction processing services in the cross-industry sectors.

The seven cross-industry markets are:

Accounting - consists of applications software products and information services that serve such functions as:

- General ledger
- Financial management
- Accounts payable
- Accounts receivable
- Billing/invoicing
- Fixed assets
- International accounting
- Purchasing
- Taxation
- Financial consolidation

- Excluded are accounting products and services directed to a specific industry, such as tax processing services for CPAs and accountants within the business services industry sector.

Human Resources - consists of application solutions purchased by multiple industry sectors to serve the functions of human resources management and payroll. Examples of specific applications within these two major functions are:

- Employee relations
- Benefits administration
- Government compliance
- Manpower planning
- Compensation administration
- Applicant tracking
- Position control
- Payroll processing

Education and Training - consists of education and training for information systems professionals and users of information systems delivered as a software product, turnkey system or through processing services. The market for computer-based training tools for the training of any employee on any subject is also included.

Office Systems consists of the following:

- Integrated office systems (IOS)
- Word processing
- Desktop publishing
- Electronic publishing
- Image systems

- IOSs—such as IBM's OfficeVision, HP's NewWave Office and DEC's All-In-1—typically include the following core functions, all of which are accessed from the same desktop: electronic mail, decision support systems, time management and filing systems.

- Office systems graphics include presentation graphics (which represent the bulk of office systems graphics), paint and line art, page description languages, and electronic form programs.

- The fundamental difference between electronic publishing and desktop publishing (within the office systems sector) is that electronic publishing encompasses a method of document management and control from a single point—regardless of how many authors/locations work on a document—whereas desktop publishing is a personal productivity tool and is generally a lower end product residing on a personal computer.

- Electronic or computer publishing systems that are sold strictly and specifically to commercial publishers, printers, and typesetters are excluded from cross-industry consideration and are included in the discrete manufacturing industry.

Engineering and Scientific encompasses the following applications:

- Computer-aided design and engineering (CAD and CAE)
- Structural analysis
- Statistics/mathematics/operations research
- Mapping/GIS

- Computer-aided manufacturing (CAM) or CAD that is integrated with CAM is excluded from the cross-industry sector as it is specific to the manufacturing industries. CAD or CAE that is dedicated to integrated circuit design is also excluded because it is specific to the semiconductor industry.

Planning and Analysis consists of software products and information services in four application areas:

- Executive Information Systems (EIS)
- Financial modeling or planning systems
- Spreadsheets
- Project management

Sales and Marketing encompasses marketing management and sales analysis application solutions.

- Sales and marketing includes:

  - Sales analysis
  - Marketing management
  - Demographic market planning models

3. Delivery Mode Reporting by Sector

This section describes how the delivery mode forecasts relate to the market sector forecasts. Exhibit A-11 summarizes the relationships.

- *Processing services* - The transaction processing services submode is forecasted for each industry and cross-industry market sector. The utility and other processing services submodes are forecasted in total market in the general market sector.

- *Turnkey systems* - Turnkey systems is forecasted for the 15 industry and 7 cross-industry sectors. Each component of turnkey systems is forecasted in each sector.

- *Applications software products* - The applications software products delivery mode is forecasted for the 15 industry and 7 cross-industry sectors. In addition, each forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.

- *Systems operations* - Each of the systems operations submodes is forecasted for each of the 15 industry sectors.

- *Systems integration* - Systems integration and each of the components of systems integration are forecasted for each of the 15 industry sectors.

- *Professional services* - Professional services and each of the submodes is forecasted for each of the 15 industry sectors.

EXHIBIT A-11

Delivery Mode versus Market Sector Forecast Content

Delivery Mode	Submode	Market Sectors		
		Industry Sectors	Cross-Industry Sectors	General
Processing Services	Transaction	X	X	
	Utility			X
	Other			X
Turnkey Systems		X	X	
Applications Software Products		X	X	
Systems Operations	Platform	X		
	Applications	X		
Systems Integration		X		
Professional Services		X		
Network Services	Network Applications	X		
	Electronic Information Services	X		X
Systems Software Products				X
Equipment Services				X

- *Network services* - The network applications submode of network services forecasted for each of the 15 industry sectors.

  Industry and cross-industry electronic information services are forecast in relevant market sectors. The remainder of electronic information services is forecasted in total for the general market sector.

- *Systems software products* - Systems software products and its submodes are forecasted in total for the general market sector. Each submode forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.

- *Equipment services* - Equipment services and its submodes are forecasted in total in the general market sectors.

F

Vendor Revenue and User Expenditure Conversion

The size of the information services market may be viewed from two perspectives: vendor (producer) revenues and user expenditures. INPUT defines and forecasts the information services market in terms of user expenditures. User expenditures reflect the markup in producer sales when a product such as software is delivered through indirect distribution channels (such as original equipment manufacturers (OEMs), retailers and distributors). The focus on user expenditure also eliminates the double counting of revenues that would occur if sales were tabulated for both producer (e.g., Lotus) and distributor (e.g., ComputerLand).

For most delivery modes, vendor revenues and user expenditures are fairly close. However, there are some areas of significant difference. Many microcomputer software products, for example, are marketed through distribution channels. To capture the valued added through these distribution channels, adjustment factors are used to convert estimated information services vendor revenues to user expenditures.

For some delivery modes, including software products, systems integration and turnkey systems, there is a significant volume of intra-industry sales. For example, systems integrators purchase software and subcontract the services of other professional services vendors. Turnkey vendors incorporate purchased software into the systems they sell to users.

To account for such intra-industry transactions, INPUT uses conversion ratios to derive the estimate of end-user expenditures.

Exhibit A-12 summarizes the net effect of the various ratios used by INPUT to convert vendor revenues to user expenditure (market size) figures for each delivery mode.

EXHIBIT A-12

Vendor Revenue to User Expenditure Conversion

Delivery Mode	Vendor Revenue Multiplier
Applications Software Products	1.18
Systems Software Products	1.10
Systems Operations	0.95
Systems Integration	0.95
Professional Services	0.99
Network Services	0.99
Processing Services	0.99
Turnkey Systems	0.95
Equipment Services	0.99

Forecast Data Base

INPUT has lowered its processing services forecast for the education and training sector due to new information that indicates that expenditures on the Plato-based family of products (essentially the only processing services available for this sector) are lower than what INPUT had estimated last year.

Current and future expenditures on applications software products were also overstated by INPUT last year.

EXHIBIT B-1

Education and Training Cross-Industry Sector User Expenditure Forecast by Delivery Mode, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Sector Total	321	6	339	357	384	420	467	533	9
Processing Services	10	-40	6	4	3	2	2	2	-20
- Transaction Processing	10	-40	6	4	3	2	2	2	-20
Turnkey Systems	110	9	120	130	140	155	170	200	11
Applications Software Products	201	6	213	223	241	263	295	331	9
- Mainframe	55	2	56	56	58	60	61	62	2
- Minicomputer	26	2	27	27	28	28	29	29	2
- Workstation/PC	120	8	130	140	155	175	205	240	13

EXHIBIT B-2

Education and Training Cross-Industry Sector
1992 MAP Data Base Reconciliation by Delivery Mode

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Sector Total	519	321	-198	-38	919	467	-452	-49	12	8
Processing Services	95	10	-85	-89	68	2	-66	-97	-6	-28
- Transaction Processing	95	10	-85	-89	68	2	-66	-97	-6	-28
Turnkey Systems	182	110	-72	-40	293	170	-123	-42	10	9
Applications Software Products	242	201	-41	-17	558	295	-263	-47	18	8
- Mainframe	40	55	15	38	46	61	15	33	3	2
- Minicomputer	26	26	0	0	36	29	-7	-19	7	2
- Workstation/PC	176	120	-56	-32	476	205	-271	-57	22	11

About INPUT

INPUT is a worldwide consulting and market research firm uniquely focused on the information technology services and software markets. Executives in many technically advanced companies in North America, Europe, and Japan rely on INPUT for data, objective analysis, and insightful opinions to support their business plans, market assessments, and technology directions. By leveraging INPUT's considerable knowledge and expertise, clients make informed decisions more quickly, and benefit by saving on the cost of internal research.

Since 1974, INPUT has compiled the most extensive research base available on the worldwide information services market and its key segments, providing detailed market forecasts, vertical industry sector analysis and forecasts and analysis of vendor strategies and products. INPUT delivers specific expertise in the fast changing areas of outsourcing, systems integration, EDI/electronic commerce, software development/CASE, and on the impact of downsizing.

Consulting services are provided by more than 50 professionals in major international business centers. Clients retain INPUT for custom consulting/ proprietary research, subscription-based continuous advisory programs, merger/acquisition analysis and detailed studies of U.S. federal government IT procurements.

Most clients have retained INPUT continuously for a number of years, providing testimony to INPUT's consistent delivery of high-value solutions to complex business problems. To find out how your company can leverage INPUT's market knowledge and experience to gain a competitive edge, call us today.

INPUT OFFICES

North America

San Francisco
1280 Villa Street
Mountain View, CA 94041-1194
Tel. (415) 961-3300 Fax (415) 961-3966

New York
Atrium at Glenpointe
400 Frank W. Burr Blvd.
Teaneck, NJ 07666
Tel. (201) 801-0050 Fax (201) 801-0441

Washington, D.C. - INPUT, INC.
1953 Gallows Road, Suite 560
Vienna, VA 22182
Tel. (703) 847-6870 Fax (703) 847-6872

International

London - INPUT LTD.
Piccadilly House
33/37 Regent Street
London SW1Y 4NF, England
Tel. (071) 493-9335 Fax (071) 629-0179

Paris - INPUT SARL
24, avenue du Recteur Poincaré
75016 Paris, France
Tel. (1) 46 47 65 65 Fax (1) 46 47 69 50

Frankfurt - INPUT LTD.
Sudetenstrasse 9
W-6306 Langgöns-Niederkleen, Germany
Tel. 0 6447-7229 Fax 0 6447-7327

Tokyo - INPUT KK
Saida Building, 4-6
Kanda Sakuma-cho, Chiyoda-ku
Tokyo 101, Japan
Tel. (03) 3864-0531 Fax (03) 3864-4114

M&S 459/01 5/92