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PROFESSIONAL SERVICES OPPORTUNITIES

Prepared for

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Introduction

Introduction

This chapter contains a statement of the objectives of this study, which was performed for AT&T by INPUT, together with a statement of the scope of the project. In addition, this chapter describes, in detail, the methodology employed throughout the project. (Applicable definitions have been included in Appendix A.)

A Objectives

The primary objective of the project was to identify the various applications systems that are, or could be, applicable to a commercial systems integration (CSI) type of development activity by AT&T. These applications have been defined by industry sector, e.g., manufacturing, finance, etc.

These applications are described in this report in the following way:

- Applications within the four market sectors that are key to AT&T (Chapter III)
  - Discrete and Process Manufacturing
  - Banking and Finance
  - Wholesale and Retail Distribution
  - State and Local Government
- Applications for all other industry-specific sectors and cross-industry sectors (Chapter IV)

B Scope

The scope of this project has been defined as follows:

1. The identification of key applications has been limited to the commercial systems integration business.

2. The applications are considered to be key applications, by industry sector. This report does not purport to contain an exhaustive list of all CSI applications.

3. This project does not include revenue forecasts for user expenditures for either key applications or market sectors.

4. The project primarily encompasses the U.S. market but, where appropriate, also includes applications that are considered key for the Canadian and European markets as well.

C Methodology

A series of secondary sources (INPUT files, trade publications, etc.) was first utilized to develop a list of key CSI applications systems.

Next, each system was categorized by the industry-specific market segment that is most appropriate for the application.

The four primary industry sectors were first addressed. Key applications were listed for each of those market sectors.

A second list of key applications was then developed for all remaining industry sectors.

Both lists contain only "major projects." A major project is defined as a CSI system in place, or under development, for a user and involving major dollar expenditures by the user. This list was developed using existing INPUT source data.

A third list was also developed. This third list consists of key CSI applications that may be viewed as "emerging" systems. Emerging systems are those that will have a major market impact within the next five years. This list was also developed using existing INPUT data.

The "examples" that are contained within each industry sector have been selected from previous research projects performed by INPUT. In each case, only the identification of the appropriate project is listed.

It is to be noted that there was no primary research performed as part of this project.

Executive Overview

Executive Overview

The purpose of this chapter is to provide a brief overview of the computer services industry, with specific focus on the Commercial Systems Integration market.

Also, in each of the subsequent industry sector application descriptions there are comments describing the information systems "driving forces" associated with that particular industry segment. This chapter contains a synopsis of driving forces associated with the key industry segments, together with an outline of key future applications by sector.

In addition, this section contains an outline of our conclusions and recommendations relative to AT&T and the CSI market.

A Overview

There are a number of factors that dominate management's thinking concerning corporate information systems. They are:

- A recognition that a corporation's information systems play a critical role in the competitive nature of the entire business.
- A recognition that the existing corporate investment in information systems and software should be leveraged to the greatest possible degree so as to derive more of a return on existing resources.
- A significant pressure on Information Systems management to contain and reduce the costs of future information systems activities.

Network integration has become a dominant systems concern among larger organizations. In this context, the distribution of computing power throughout the organization will continue at an accelerated rate.

The previous growth rate of information systems budgets within commercial organizations has decreased. The double-digit increases in information systems budgets have now been reduced to an increase of approximately 7-8% per year. Although significant, this rate of increase is a marked slowdown in the growth rate of information systems budgets, as compared to the 1970s and early 1980s.

Personnel costs continue to represent the highest single factor within corporate information systems budgets. This factor has been estimated at approximately 37% of the overall IS budget for 1986.

Systems integration activities, which got their start within the context of the federal government, are now becoming more and more important within the commercial information systems (CIS) sector.

The increasing influence of commercial systems integration projects will have a significant impact on almost every type of information industry firm.

The increasing importance of systems integration projects in the information systems industry will require the evolution of new skills and levels of expertise. The importance of the availability of these new skills, in sufficient quantity, should not be underestimated by the vendor of integrated systems.

B

Industry Sector Driving Forces and Key Future Applications

1. Discrete Manufacturing

a. Driving Forces

- The discrete manufacturing industry continues to represent a dynamic market for systems integrators because of the pressures on the industry to continue to automate to meet the threat of foreign competition. Given the current labor rates in foreign countries, the only viable approach for a U.S. manufacturer is to lower the labor content of any product that faces foreign competition.

- A current buzzword in the manufacturing industry is "flexible manufacturing systems" (FMS). These highly automated systems are designed to reduce the cost of inventory in a manufacturing process, to improve a manufacturing plant's utilization rate, and to more effectively schedule labor.

- Computer-integrated manufacturing (CIM) is viewed, at this time, as the ultimate in automated manufacturing processes. A greater acceptance of the emerging industry standard, the Manufacturing Applications Protocol (MAP), has provided impetus to the industry's acceptance of computer-integrated manufacturing. IBM and General Motors, together with EDS, have been the leading proponents of MAP within the manufacturing industry.

- One of the greatest opportunities for a systems integrator in the discrete manufacturing industry is in the area of linking, and improving the efficiency of, existing discrete manufacturing systems. To date, most manufacturing systems have been developed on a piecemeal basis and have not been integrated into an overall computerized manufacturing control system. The systems integrator that is able to demonstrate an ability to integrate will find ready acceptance within large- and medium-sized manufacturing organizations.

b. Key Future Applications

- Electronic Data Interchange. This capability will enable, in part, the linking of existing manufacturing information systems to each other and to the external world of suppliers and customers.

- Computer-Aided Design/Computer-Aided Manufacturing/Computer-Aided Engineering. Although there is undoubtedly room for additional CAD/CAM/CAE systems, INPUT believes the real opportunity in this area is for a systems integrator that is able to integrate, wherever applicable, these various systems into an overall manufacturing system.

- Computer-Integrated Manufacturing (CIM). All of the above imply that the opportunity in the discrete manufacturing industry for a systems integrator lies in the area of Computer-Integrated Manufacturing (CIM). While there will continue to be improvements to existing specific applications areas, the integration of these various applications into a CIM system represents, in summary, the single greatest opportunity for a systems integrator in the discrete manufacturing industry.

2. Banking and Finance

a. Driving Forces

- The most apparent, and dynamic, driving force in the banking and finance industry consists of the current high degree of instability in this industry and the resulting consolidation of banking and financial services companies in a single organization. The previous distinction between banks, thrift organizations, brokerage firms, etc. has already blurred; these distinctions will continue to fade with each passing year.

- The distribution of financial services to the end user through electronic means is also a significant driving force in this industry. Home-shopping networks, together with the use of credit cards, are a primary example of this trend. In addition, ATM and POS systems are also a part of this emerging force.

- One-stop shopping for a broad array of financial services is becoming a reality for the retail consumer. These consolidated systems all require intense automation and a very high degree of systems integration.

- The use of personal computers by investors will become more prevalent and will have a significant impact on the financial services industry. The use of PCs as terminals will enable retail users of financial services to perform, on their own, many of the functions formerly performed by highly paid specialists.

b. Key Future Applications

- Central Information File. The centralized information file, in the context of financial services, has been under development, in various ways, for many years. However, relatively few multiproduct financial service organizations have a complete centralized customer information file. Such a file is vital to support a highly integrated, full-scale financial services organization. The development effort to create such a system is immense; yet a vast market awaits the systems integrator that is able to develop and install such a system.

- Third-party ATM/POS services. The demand for increased quantity and quality in electronic banking services is immense. At this time, electronic banking has basically involved standalone ATM or POS systems. The ability to effectively and economically link a variety of these systems, to facilitate more convenient financial transactions at the retail level, represents a prime opportunity for any systems integrator.

- Cash management systems. Commercial organizations continue to focus on the more efficient use of cash assets. The need for more sophisticated and responsive cash management systems continues in the banking and finance industry. Financial service companies that can offer a more effective cash management system can win significant numbers of new accounts with the concomitant benefit of increased cash resources.

- System Integration. It is probable that the full array of individual financial service applications is now in place. These applications will be enhanced and expanded. However, as in the manufacturing industry, the key opportunity for a systems integrator in the banking and finance industry is in the integration of these various financial applications.

- Switching facilities. The banking and finance industry has long had the need for electronic switches to route electronic transactions (representing the flow of funds) from one institution to another. Various agencies, including the federal government, have provided these electronic switches. At this time there is still significant industry dissatisfaction with existing electronic switches. The development of an improved switching network, both within the U.S. and globally, can create a significant and secure market niche for a systems integration vendor.

3. Retail and Wholesale Distribution

a. Driving Forces

- Until recently, it would have been impractical to discuss the information systems aspect of the combined retail distribution and wholesale distribution industries. However, in recent years there has been a consolidation within the distribution industry, with wholesalers taking on many of the characteristics of retailers and vice versa, especially from a systems perspective.

- The requirement for a comprehensive electronic data interchange (EDI) system within the distribution industry is extremely pressing. The need to rapidly pass electronic records representing various types of transactions within the industry, and between the distribution industry and the banking industry, is crucial. Systems integrators that can provide an EDI system for the distribution industry will find a strong demand for their network products.

b. Key Future Applications

- Point-of-sale systems. Point-of-sale systems are important in both the wholesale and retail portions of the distribution industry. To date, POS systems have gained greatest acceptance in the retail industry, but are now becoming extremely prevalent throughout the distribution industry. The need to enhance these systems, and integrate them directly with inventory control and inventory planning systems, remains as a key future application.

- Product Scanning. In conjunction with POS systems, there is significant effort being expended on bar coding and other forms of scanning to record the actual unit of merchandise involved in a specific transaction. Both the scanning devices themselves, as well as the software applications to interpret and process the scanned data, represent significant future applications.

- Distribution resource planning (DRP). DRP applications automate the purchasing, storage, and retrieval of actual and forecasted transactions

in order to provide a more sophisticated inventory control system. DRP systems are evolving into very sophisticated planning systems, with some resemblance to expert systems. These systems will drive the basic functions of wholesale and retail distributors. In the distribution industry, these systems are analogous to CIM systems in the manufacturing industry, and represent a high potential for systems integrators.

- Distribution Network Management Systems. More pertinent to the wholesale distribution industry, but just as useful to retailers, are distribution network management systems. These systems are computerized models that enable the distributor to more effectively develop:

  - Delivery Routes
  - Fleet and Equipment Requirements
  - Delivery Frequency Schedules
  - Multilocation Inventory Stock Levels

The potential for cost reduction within a wholesale distributor as a result of more-effective distribution network management is extremely high. In some cases, a wholesaler's cost has been reduced by as much as 50% due to the installation of an effective network management system. Such systems represent a prime opportunity for systems integrators.

4. State and Local Government

a. Driving Forces

- There are over 82,000 individual state and local government agencies. These agencies encompass counties, municipalities, townships, school districts, and numerous special districts. There is, on the average, a state or local governmental agency for each 3,000 people in the United States.

- Government agencies cherish their autonomy and individuality. At this time, there is no industry trend to link these various agencies together in a meaningful manner nor has the federal government exerted any siginifcant influence in that direction.

- Because of the nature of these agencies, and the lack of any incentive to improve their efficiency, there is a noticeable lack of interest in increasing the effectiveness of computer systems at any level within the state and local government market. Therefore, many of the trends common to other industry sectors do not exist in the state and local government sector.

- Congruent with the above, the bulk of local government information service revenues, for vendors, stems from various types of processing services, including:

  - Remote Processing
  - Batch Processing
  - Facilities Management

- This revenue division is completely contrary to that of almost all other industry sectors. An additional key function within the state and local government sector is the development of standalone turnkey systems. Although future versions of these turnkey systems do not seem to involve any unique applications compared to existing systems, future versions will be more powerful than the systems they replace.

b. Key Future Applications

- Personnel/Payroll Systems. Replacement of existing personnel and payroll systems.

- Financial Systems. Replacement of existing financial systems.

- Systems Integration. Integrated systems for financial and project management.

- Court Management Systems. Court management systems provide integrated management and services for the court systems within local and county governments. These systems are expected to become more numerous in the future.

- Networks. Statewide networks that provide an integrated computing environment linking a state's EDP facility with multiple state and local departments represent a potential for systems integrators. This type of system could be, in effect, a specialized EDI system.

C

Conclusions and Recommendations

In subsequent chapters of this report, we identify a variety of specific systems integration applications. The applications that we identify are prevalent in the various industry sectors, as reported, at the current time. Other applications that are identified are under development and appear to be applications that will become common, in their respective industry sectors, in the future. The report also contains a series of examples, by industry sector, of large-scale systems integration projects that are currently known to INPUT.

Recognizing that AT&T is using the information contained in this report to investigate the feasibility of a potential commercial venture in systems integration activities, we wish to offer certain recommendations as to how the information contained in this report should be applied to that endeavor.

It should be noted that the majority, if not all, of the systems integration applications described in the previous chapters of this report were, or are being, developed on a highly customized basis. That is, there is very little in the way of off-the-shelf systems components. In fact, the very definition of systems integration implies a high-labor-content, customized development project.

A close examination of the description of the various applications described in this report will reveal that the applications are, first of all, primarily applicable to the industry segment for which they were developed. That is, there is very little portability of any of these applications from one industry sector to another. Further, even within an industry sector, the users of custom, integrated applications have a vested interest in ensuring that these are not off-the-shelf packages. Users generally believe customized systems will give their organizations an advantage with respect to competitors. Therefore, if users believe their systems can be replicated by a competitor contracting with the same vendor, these users would not be inclined to contract with that particular systems integrator – at least for a packaged system. In essence, users want unique systems to perform a unique function (or at least a common function in a unique manner) so that the organization can be different and, if possible, more competitive than other organizations in the same industry.

The above statements are not applicable when considering generic, horizontal applications such as payroll, accounts receivable, etc. These are considered to be utility applications and are not normally a part of the services offered by a vendor of systems integration services.

One additional consideration we wish to focus on is that today most newly developed integrated systems have a strong network connotation. That is, they are rarely standalone systems. Instead, they are normally integrated into a complex system environment. Integration generally implies some form of system networking function. This networking in itself requires a significant amount of customization during the development process.

Another aspect, which must be considered by AT&T, is that frequently the prospective systems integration client may not believe a single organization can adequately perform in all of the functional areas required to develop, implement, and install a complex, customized system. It is, in fact, the case that most successful systems integrators, especially when dealing with large, complex projects, will perform certain segments of the work themselves and subcontract (and manage) other segments. Users recognize this state of affairs as the norm and may be concerned when a single vendor represents itself as being able to perform all functions in an exemplary fashion.

Therefore, considering all of the above, we strongly recommend that AT&T consider the following approach as it studies its potential entry into the systems integration market:

1. View the systems integration market as a market within which AT&T can capitalize on its existing system developmental capabilities. That is, INPUT believes AT&T should represent its systems integrations strength as the depth and breadth of its technical system development skills, expertise, and experience.

2. In order to complement 1, above, we also suggest that AT&T identify certain system components that exist today within AT&T. Although we strongly recommend against solely marketing of these system components, *per se*, we do believe that they should be utilized and that their existence should be promoted as evidence of existing systems integration skills. In essence, these components should be sold as systems components, and when applicable, within the context of the development of complex integrated systems.

3. At this time AT&T is recognized as an important information systems vendor in many respects, but is not commonly viewed as a systems integrator. With this in mind, it is our recommendation that AT&T seriously consider market entry (into the commercial systems integration market) as a cocontractor or subcontractor. If this entry were tion.

4. In summary, we are recommending that, as AT&T evaluates its potential entry into the systems integration market, it recognizes that the key to success in being a systems integration vendor is the ability to creatively, and successfully, develop systems that are unique and that will, when installed, result in a unique advantage to the client organization. We also strongly suggest that, as part of the evaluation proc-

ess, AT&T inventory system components that could logically become part of future systems integration projects. We emphatically suggest that creative capability is the most important element in this inventory. The ability to creatively utilize these existing resources is the key to success in this market segment.

Application Systems—Four Target Industry Segments

Application Systems—Four Target Industry Segments

This chapter contains lists of applications systems, by industry sector, that are believed to be current targets of significant development efforts within commercial organizations. This chapter specifically addresses those four industry sectors that are of particular interest to AT&T.

A Manufacturing Industry Sector

1. Driving Forces

The discrete manufacturing industry is the largest single market for any type of information services vendor. In addition to being the largest sector, the discrete manufacturing industry is also one of the fastest growing markets for information services vendors. The manufacturing industry sector cannot be looked upon as a monolithic industry. There are a great variety of types of manufacturers; all have their own information systems requirements.

The sheer size of the manufacturing sector has attracted a large number of information services vendors, each attempting to differentiate itself and find a secure market niche. For example, the process control portion of the manufacturing industry represents a subsector within which the various member firms have similar characteristics. That is:

- they manufacture a product in a bulk process.
- they use a continuous-flow process.
- their manufacturing process is normally a high-volume, highly automated process.

Equipment used in the process control subsector tends to be extremely specialized and peculiar to the product being manufactured.

Companies in the process control industry are highly capital intensive with a high ratio of capital to labor. AT&T should therefore focus its attention on discrete manufacturing.

2. Current Applications

Bill of Materials Planning—related to the assembly of components into subassemblies:

- These applications typically allow the scheduling and control of multiple assemblies with a variety of levels of subassemblies.

Product Configurators

- These applications will configure and retrieve a bill of materials for assemblies, with specific model options. The system stores and maintains both model information and option information. Such systems often can retrieve engineering and manufacturing inventory and production information from an overall manufacturing data base.

Engineering Machine Control Processor

- This application controls the relationship between assembly functions and the specifics of the bills of materials for these functions. Such items as starting and ending dates, engineering changes, and pending engineering changes are maintained and reported to the user. Typically this application is integrated with an overall bill of materials/production control application.

Schematic Design Application

- This application creates patterns and symbols from lines, arcs, and text. For example, in electrical design, it assigns electrical parameters for interfacing to a routing system and to a simulation system. It also provides a network list, develops a schematic for a printed card circuit board, and routes the production of the circuit board within the overall production operation.

Machinery Monitoring System

- These applications are designed to detect machine malfunctions in the production process before the malfunction can affect the product.

Typically, the applications detect defects in machinery that are characterized and identified by changes in the acoustic signature of the machine. The software can be preprogrammed to establish alarm points on the data being managed. When an alarm point is reached, the system can either signal a human operator or take the malfunctioning machine out of the production flow and reschedule the production around the deleted equipment.

Quality Control Plotting

- These applications typically produce quality control statistics, and analyses of the statistics, for production cycles on the manufacturing floor. Applications will plot the frequency and the distribution of these statistics and produce a variety of statistically derived data such as Poisson curves, and normal and exponential probability curve overlays. These applications also generate means, ranges, standard deviations, and individual variants. The output consists typically of parameter tables and percentile ranks.

3. Examples

A materials management system has been developed for Detroit Edison by Electronic Data Systems (EDS). This project was completed approximately two years ago, and EDS continues to be retained for modifications and enhancements to the system. A just-in-time inventory control system was developed for General Signal by an unknown vendor. Information obtained by INPUT indicates that this was a project that involved development fees in the upper six figures.

4. Future Application Projects

Quality Control Decision Management System

- This application will collect, analyze, and display variable data from the manufacturing process and from product test workstations. It will provide control charts, histograms, and scattergrams to identify product control problems. The software will have the ability to identify the cause of these problems and identify the relationship between the process, the materials, the workmanship, and the product defect itself.

Production and Inventory Optimization Scheduling

- Integrated information systems are being developed to integrate bill of materials planning, materials resource planning, shop floor control, master production scheduling, purchasing, and cost management.

These applications can support a single plan, or multiple plans, using one exposition of the bill of materials. The system encompasses both production scheduling and production planning.

B
Banking and Finance

1. Driving Forces

The financial industry sector is the most highly regulated industry sector in the U.S. Regulation normally implies a high degree of standardization and, in a sense, this is true. However, because of competitive pressure, financial institutions are beginning to show great diversity in their marketing and operations, and in their information systems requirements.

These same competitive pressures are creating the requirement for product diversification based on innovative information systems. These new products and systems, in turn, generate the need for a variety of new information services.

In addition, competitive pressures are creating a note of instability in the financial sector, a level of instability that was rarely present in the past. For example, major banks such as Continental Illinois and the Bank of America have been on the verge of bankruptcy. More recently, there have been a series of major failures of Savings and Loans institutions throughout the U.S. and, in particular, in Texas.

There is a marked trend toward consolidation of financial institutions throughout the U.S. This consolidation is characterized by the following types of events:

- Commercial banks acquiring savings and loan institutions
- Interstate banking
- Major banks acquiring smaller banks and bank holding companies, on both intrastate and interstate bases.

There has been considerable pressure on Congress to loosen, or repeal, the Glass-Steagall Act. The recent (October, 1987) market crash has reduced these pressures and it would seem that, at least for the time being, the Glass-Steagall Act will remain in place, ensuring the separation of banking and brokerage organizations and activities.

2. Current Applications

Trust Accounting

- Integrated system applications for trust accounting are applicable to small- and medium-sized banks, as well as to major banks. Trust, IRA, and farm accounting systems are frequently included within a trust accounting system. Also frequently included are stock investment reviews, asset maturity maps, market value updates, and stock and bond portfolio reporting. Depending on the particular requirements, a trust accounting system can also handle direct and indirect lease accounting.

Fixed-Assets Accounting

- These applications can be used within the financial institution itself or in relation to major client accounts. The applications allow for a variety of depreciation methods and generate monthly depreciation accruals and schedules. A key element of these systems is their ability to provide advance warnings related to assets that are approaching salvage value. These applications typically offer a multiyear projection of depreciation expenses.

Forced Closed Accounts System

- This type of system allows a bank to take a closed account, within which there are losses, and distribute the losses throughout general-ledger accounts within the bank. The system allows inquiry and changes to the system's data base, and handles the creation and resequencing of bad loan data. The system reports and lists the forced closed accounts and sorts them by a variety of methods for general-reporting purposes.

Branch Customer Information System

- These systems are typically integrated systems and designed for use at the branch level. They support demand deposit accounts, savings accounts, CDs, installment loans, credit cards, and ATM usage statistics. Data is combined into a centralized report of customer/account information. These reports summarize various transactions and normally include a daily audit journal. These systems typically have more than one access security level.

3. Examples

- Central Information File (CIF)
- Claims Processing

- Loan Processing
- Electronics Funds Transfer
- Platform Automation

4. Future Application Projects

International/Domestic Functional Integration

- These applications are designed to incorporate international banking functions into a commercial bank's operations. Subsystems support foreign exchange; foreign exchange exposures, balances, and positions; placement and loan transactions; money transfers; wire transfers; letters of credit and bankers acceptances; and multicurrency accounting.

On-Line Banking System Reconcilement

- These systems are designed to eliminate the lengthy and labor-intensive batch proofing operations at the end of the banking day. The reconcilement is done on-line during the check processing application. The key goal of the application is to detect single free items and out-of-balance deposits. The application automates the manual aspects of check reconcilement and eliminates the need for manual searches for the specific data required in the reconcilement process.

Bank Calling Officer's Workstation

- These integrated systems store data describing sales people, bank branches, regions, customers, and prospects. Data can be organized by SIC codes or bank products. The system tracks sales calls by prospect, customer, calling officer, branch, product, and industry.

Wirenet Funds Transfer and Management Systems

- These systems integrate and interface Fedwire, Bankwire, Swift, Telex, and TWX. They contain preformatted message templates and the automated data mapping related to wire service formats, security, advice generation, and record storage. The systems track the bank's position at the Federal Reserve Bank and allow for DDA and general ledger posting.

C
Retail and Wholesale Distribution

1. Driving Forces

The use of various types of computer systems and digital communication networks has allowed wholesale distributors to adapt their modes of operation to the peculiarities of the industries they service. These various adaptations have led to a rapidly increasing market for customized turn-key systems in the wholesale distribution industry.

Turnkey systems have always been, and will continue to be, an important part of the wholesale distribution industry. In the retail distribution sector, the requirement for advanced inventory control systems and the support of point-of-sale terminals have become important factors in the market for integrated services.

There is a direct systems link between point-of-sale systems and inventory control systems. Each retailer seems to look upon its requirements for these combined systems in a different way.

Even small retailers have been, through competitive pressures, forced to automate their operations. Although a small retailer normally cannot afford high levels of information services expenditures, it may still be necessary for smaller retailers to purchase a customized turnkey system to support retail operations.

Product and market diversification and geographic expansion will be key activities for wholesale distributor firms during the course of the next five years. Data communication and integrated systems will be an enabling factor in this type of expansion.

2. Current Applications

Small-Store Inventory Management

- These systems maintain perpetual inventory control for single-store or multistore locations. The systems process daily sales and provide daily, weekly, and monthly sales analysis statistics. The systems also process delayed shipments and backorders, as well as produce mailing lists, letters of credit, and trade acceptance documentation. The systems typically interface with point-of-sale cash registers for the entry of daily sales.

Retail Merchandise Control System

- This system provides merchandise control (including a purchase journal) and analysis reports for merchandise transfers, markdowns, price changes, etc. It also provides sales order entry data, summarizes daily sales by store and cash register, and provides for cash balancing at the end of the sales day. The system may also provide for the interface of POS systems. It may also interface to a general-ledger, accounts payable, and/or payroll system.

Small Distributor Multiwarehousing Control System

- This system can provide single-warehouse or multiwarehouse control systems for small distributors and also allows for inventory transaction editing and posting within an edit list and journal. The system provides a detailed LIFO/FIFO cost history. It also typically includes price lists, stock status, inventory value, purchasing advice, and usage reports.

3. Examples

- Inventory Control
- Merchandising Information System
- Store Business System
- Warehouse Control
- Network Integration

4. Future Application Projects

Store Resource Management System

- This system plans, reports, and controls how people and equipment resources are used within a retail store environment. It maintains daily sales and percent distribution of sales for different time periods during the sales day. It also maintains a history of customer and item count by selected time periods during the selling day. The system may keep a history of customer service by recording the average and maximum number of customers awaiting service at checkout positions. In general, the system allows various store areas to compute fixed and variable manpower requirements by time frame and can create departmental employee work schedules.

Retail Store Inventory Management System

- This system works in conjunction with an overall inventory management system and is oriented toward tracking markdowns and sales of markdown items for various periods of time. It prints audit trails, inventory reports, stock item status, and markdowns by specific vendors and specific departments. The management system is basically aimed at allowing a discounter, or a normal retailer entering a discount market, to control and project discounts and compare profit margins when items are discounted.

Warehouse Control Systems

- These systems support the entry, maintenance, picking, shopping, and tracking of sales orders. They may be designed to handle multiware-

house, multicompany, multiregion, and multidivision capabilities. These systems are applicable to wholesale distributors and the distribution function within a manufacturing organization. A current key element is the use of these systems in various field locations on a turnkey basis with integrated feedback to a centralized system at the corporate location.

D

State and Local Government

1. Driving Forces

There is a strong degree of commonalty in information systems applications throughout state and local governments. Their functions are essentially the same, and variations in function from one level of government to another are not significant.

Althouhg state and local governments (especially local governments) were among the last industry sectors to automate, the degree of automation, even at the local level, is currently quite extensive.

State governments are heavy users of mainframe computer equipment and tend to be centralized in their data processing applications.

Local governments, except for major cities, are more oriented toward mini- and microcomputer applications.

In many cases, state and local information systems include applications from other industry sectors, for example, health, education, and utilities.

Because of standardization and budgetary limitations, the state and local government sector is, on a proportional basis, one of the lowest ranked users of customized software services.

Whatever the application, in almost every case, state and local governments are required by law to engage in competitive bidding for any type of information service.

2. Current Applications

Revenue and Expense Projections

- These systems are used to develop (from taxation and associated sources) a profile for a municipality's revenue stream. Profiles include residential, commercial, and other types of property, from both an assessment and tax generation perspective. These systems also fre-

quently include tax valuations and the ability to project new valuations and tax receipts for each specific property and type of property. Where appropriate, water and sewer revenues and expenses are included.

Tax Assessment and Collection Systems

- These systems are, in essence, a real and personal property tax administration system. They include property appraisal, assessment, and billing functions.

Building Permit Processing Systems

- These systems provide the storage and retrieval of building and other permits as they are administered by local governments. The systems normally handle residential, commercial, and industrial building permits, as well as electrical, mechanical, plumbing, and other types of permits. The systems typically calculate fees, determine critical dates, and track various types of permit review functions.

Municipal Utility Billing

- These systems handle metered electricity, water, sewer, garbage, and other types of utilities monitored or provided by municipal governments.

Vehicle Registration System

- These systems can be either batch or on-line, and can encompass the recording, maintenance, and reporting of information concerning registered vehicles. The systems are designed to allow the reporting of information to the vehicle registrar about vehicle registration, vehicle lists, and a projection of vehicles to be registered, by month, during given periods.

Municipal Court Scheduling System

- These systems develop and print court docket schedules by court date, session, and type of court. They typically provide tracking for each type of violation and type of court case. The systems also monitor, track, and report on the payments of fines, sentencing, probation, etc.

3. Examples

- Driver Registration System
- Child Support System

- Expenditure Management System
- Social Services Client Data Base
- Voice/Data Integration

4. Future Application Projects

Fund Accounting Information Systems

- These turnkey systems are on-line, interactive accounting/cash management systems. Typically, they include general ledger, budgetary accounting, accounts payable, vendor management, grant/project accounting, cash receipts, encumbrance control, etc. The systems are also able to generate checks and 1099 forms for various types of public service agencies.

Budget Modeling Systems

- These are on-line forecasting and budget preparation systems for state and local governments. They provide projections based on current and historical data for use in preparing budget requests.

Fiscal Modeling Systems

- The more complex and complete systems that are under development include the creation and maintenance of all line item accounts, titles, program descriptions, and allocation bases and tend to provide large amounts of historical information in support of a financial modeling process.

Crime Analysis Systems Support

- This system supports the crime analysis needs of various types of law enforcement agencies. It provides the user with the capability to do crime pattern detection, crime/suspect correlation, target profiles, crime potential forecasting, and exception reporting.

CIS Applications—All Other Industries

CIS Applications—All Other Industries

This chapter contains a description of each of the industries that were not included in Chapter III. Again, in each case the industry sector is described by:

1- Driving Forces
2- Current Applications
3- Examples
4- Future Application Projects

A Transportation Industry

1. Driving Forces

Deregulation of this industry has contributed to increased competition and increased consolidation within each of the transportation segments, as well as increased competition among the various modes of transportation. Since industry deregulation, cost containment and increased productivity—together with improved service levels—have become increasingly important in all phases of the transportation industry.

The railroad industry continues to move toward fewer and larger railroads.

The airline industry has gone through several phases of consolidation and increased competition. The demise of Peoples Express has led to decreases in fare reduction pressures in the industry and thus, at least temporarily, the industry is returning to an era of fare stability, albeit at levels considerably below those prevailing before deregulation.

Several of the larger transportation companies have developed systems

applications internally and are providing information services to other outside organizations. Although most transportation companies are capital intensive, the trucking industry is typified by a large number of small carriers. Therefore, although statistically attractive, the trucking industry is, because of its fragmentation, the least attractive mode within the transportation industry segment for information services vendors.

Recent advances in telecommunications technology and reduced costs now allow transportation companies to control their operations at the vehicle level.

2. Current Applications

Automated Truck Routing

- These systems produce driving routes, mileage, travel time, and fuel usage for different pickup and delivery routes. Typical systems include a data base containing a large number of cities and road junctions throughout the U.S. and compute the shortest route between points. Variations involve avoidance of tolls and pay roads.

Vehicle Maintenance

- These systems provide preventative maintenance schedules and cost histories for vehicle repairs. Maintenance can typically be based on mileage, hours, elapsed days, or specific dates. Historical labor and material costs are typically maintained, and fuel usage reports are also generated.

Flight Load Optimization

- These systems determine optimum aircraft load distribution and fuel loads. They also perform preliminary and final center-of-gravity calculations.

Market Analysis Systems

- These systems extract summary data from on-line passenger service systems and analyze it to identify yields, new markets, revenue, and traffic and earnings data. Market analysis systems are normally applicable to airline operations but can be applied to bus and railroad operations as well.

3. Examples

- Automated Train Control
- Office Automation
- Expansion of an On-Line Reservation System
- Personnel System
- Reservations System Development

4. Future Application Projects

Equipment Management Systems

- These are turnkey systems to provide maintenance and operating data for fleet management. These systems integrate vehicle repair orders, parts inventory, labor, and fuel costs. They track the fixed and operating costs associated with each vehicle in a fleet. They can schedule preventative maintenance as well as report on depreciation, vehicle performance, etc.

Cargo Movement Control

- These are applicable to air and surface transportation companies. These systems enable the user to determine the location of any shipment and its movement through the transportation system. Systems also are able to predict and control available space, as well as reserve and allocate this space to cargo shippers. More-advanced systems generate waybill data and reports concerning the utilization of the resources within the transportation system.

Integrated Preventative Maintenance Scheduling Systems

- These are preemptive maintenance scheduling systems for equipment and vehicles. They use mobile data collection devices, including such input devices as electronic data collectors at service islands, to collect key daily servicing data. The systems are capable of generating daily reports, including preventative maintenance schedules, vehicles not serviced, defects, vehicle fuel efficiency, and warranty reports.

Transportation Route Modeling

- This application enables a user to develop a set of supply and customer parameters and to adjust the transportation network to optimize the relationship between customer demands and transportation supply points. It is used to deploy resources and to develop the quickest, shortest, or least expensive way for traveling, or for shipping an item between two points in cases where there are multiple paths between origin and destination.

B

Utilities Industry

1. Driving Forces

The utilities industry is divided into three major segments:

- Electric
- Gas
- Water and Sewage/Waste Disposal

The utilities industry is highly regulated, which distinguishes the sector from others. The computer systems used in the operations side of utility applications combine real-time process control applications with engineering and technical simulation.

Because of the highly regulated nature of the utilities industry, the financial and administrative applications combine business-oriented information with state and federal regulatory compliance applications.

The utilities industry is currently suffering significant hardware and software obsolescence. Many older systems are in need of upgrade and replacement.

2. Current Applications

Utility Billing

- There are a variety of billing applications in existence within the utilities industry. Typically these applications contain the following functional capabilities:
  - Variable-period statements
  - Customer listing with aging
  - Delinquency and last-payment information
  - Master list of service codes
  - Calculation of finance charges
  - Account aging
- Within the context of utility billing, there are a variety of interface capabilities; typically utility-billing packages interface with the utility's general ledger.

Outage-Reporting Systems

- These systems contain a data base concerning details of all distribution outages. The systems determine reliability levels and pinpoint areas

with high outage rates. In certain cases, the systems can determine emergency crew needs and asses the efficiency of emergency procedures and personnel.

Revenue Generation Simulation

- These systems are applicable to electric and gas utilities. Such systems simulate revenue generation based on forecasts of weather and other factors influencing demand.

Utility Customer Services Systems

- These systems maintain a complete customer profile within their data base. Include are applications such as budgeting, billing, service orders, cash management, deposits, credit and collection, usage estimates, and deferred payment agreements.

3. Examples

- Automated Meter Reading
- Customer Billing Information Data Base Development
- Job Order System
- Personnel Accounting System
- Energy Management System

4. Future Application Projects

Interactive Utility Systems

- These systems tend to be multicompany, multicycle. They can provide the user with current and historical account data for all utilities used by the customer. The systems provide actual current billing applications as well as generate historical data. For example, some can produce reports containing previous consumption history by period, surcharge capabilities, and the financial history of each customer.

Construction Management Systems

- These systems are oriented toward electric and gas utilities and involve construction planning, estimating, and control systems for construction projects.

On-Line Customer Information Systems

- These are interactive, on-line data base-oriented systems and include both billing from the data base and on-line information systems for

customer service purposes. These systems allow all information, including cash and meter readings, to be updated in real time.

On-Line Transmission System Planning

- These systems are oriented toward electric utilities and are designed to evaluate the alternative transmission expansion plan for the utility. The system can measure the effects of expansion plans on the utility system and can calculate a performance index for each planned system, so that the various plans can be compared quantitatively. Problems caused by any plan can be isolated by the system and the system will allow the user to examine various aspects of the plan in various levels of detail. These systems are also designed to generate information for submission to regulatory agencies.

C Telecommunications Industry

1. Driving Forces

The increased diversity in the U.S. telecommunications industry has led to requirements for more-sophisticated tools to plan and manage complex communications channels composed of a mix of satellites, fiber optics, and data networks. The recent upheaval in the telecommunications industry and the resultant mergers and acquisitions, consolidations, and deregulatory activities are creating significant opportunities for information service providers.

The industry is traditionally capital intensive; deregulation, digitization, and customer demand for more-complex networks as well as network control have led to increased demands for information services.

2. Current Applications

Telephone Service Management Systems

- Management Support Systems provide analysis of telephone usage and costs by user, station, and department, as well as extensive analysis of call patterns by type of service.

- Management Control Systems, frequently resident in a PABX or offered as part of a Central Office (CO)-based Service, are used to identify station/user services such as access to long-distance discount services, speed-dial lists, access to voice mail services, etc. Management Control Systems are also used to control an individual's right to access services such as toll or long distance.

Network Design and Management Systems

- These systems support network design and management for distributed processing configurations and also provide a data base management system for the inventory of equipment, lines, and network design.

- They provide the ability to consider the numerous alternatives for network structure to develop least-cost routing schemes. They provide the ability to analyze traffic and througput patterns and develop "what-if" scenarios from a data base of network lines and equipment.

Telephone Traffic and Accounting Systems

- Generally managed by ROBCs and OCCs, these systems process station message detail records and exchange message records. They enable the vendor to identify customer usage, apply charges, and prepare statements. These systems are typically categorized into two areas:

  - Billings and Accounts Receivable
  - Traffic and Network Analysis

3. Examples

- Office Automation
- Customer Information System
- Voice/Data Network Integration

4. Future Application Projects

Automated Billing Financial and Administrative Systems

- These systems are newly designed to support cellular radio systems, as well as long-distance and local telephone networks. They process call detail record data, pricing, and invoice production, with an interface to accounts-receivable packages. Systems under development also provide for on-line correction of errors, data base updates, traffic statistics, and on-line management reports.

On-Line Data Collection Using Portable Data Collection Terminals

- These systems provide for a variety of input devices, including unattended 24-hour remote data devices via multiple telephone lines. Bar code readers may be attached to portable storage terminals. The systems are designed to be used in industrial, retail, and distribution applications. Typically, these applications include remote order entry,

inventory data collection, manufacturing item control, branch location reporting, retail sales reporting, etc.

Cost Allocation Traffic Analysis Systems

- These consist of a series of data base management modules, each module designed to perform a specific task in accumulating and organizing telephone data formats for decision making and the control of telephone and telephone-related expenses. The systems provide cost allocation capabilities, budget performance, flexible reporting, and historical expense structures.

D
Insurance Industry

1. Driving Forces

The insurance industry is subdivided into four sectors:

- Life Insurance
- Property/Casualty Insurance
- Health Insurance
- Reinsurance

The insurance industry is highly regulated; this situation is true for each of the various subsectors within the industry. Although an important part of the U.S. economy, the insurance industry has always been one of the least dynamic industries.

A major competitive threat to organizations in the insurance industry is acquisition by companies that are attempting to form broad-based financial services organizations.

Cost control, especially in the life insurance and property/casualty insurance areas, has become an important focus for the major insurance carriers. Cost control normally depends on the company's agency structure. Many insurance carriers are finding ways to reduce the number of agents and agencies through consolidation or attrition.

2. Current Applications

Financial Needs Analysis Systems

- These systems are utilized by insurance agents and can calculate the amount of insurance required by clients for cash and income requirements. The systems typically include Social Security benefits and user-designed interest and inflation assumptions.

Claims Management Systems

- These systems include credit insurance administration and state reporting requirements. They maintain files of creditors; certificates; incurred claims; and disability, life, and mortality factors.

Group Administration Systems

- These systems capture data regarding policies, subpolicies, billing groups, agents, class descriptions, and coverage data. They generate reminder listings, notices, premium bills, and late and lapsed listings. These systems are basically designed for the administrator of group insurance policies.

Claims-Processing Systems

- These systems perform the following functions:
  - Claim eligibility verification
  - Claim pricing
  - Benefit calculations
  - Determinations of the applicability of deductible limits.

Typically, the systems used are turnkey systems, and they interface with a variety of other systems at the agency and corporate levels.

3. Examples

- Insurance Agent Automation
- Communications Network Development
- Flexible Life Insurance System

4. Future Application Projects

Customer Information Systems

- The insurance industry is beginning to express an interest in developing on-line customer information systems similar to those that are already in use in the banking industry. These systems will allow single-file access to all customer policies and activities rather than accessing a customer's policies within each product line, as is now normally the case.

Interactive Loss Analysis Systems

- These systems analyze various types of insurance losses and provide for automatic take-down and release calculations. The systems report

loss by product line, state, type of policy, etc. They also enable the user to maintain loss and expense information, separately and by product line.

Turnkey Agency Management Systems

- These systems are basically oriented toward the independent insurance agency. They provide for client profiling, prospecting and solicitation capabilities, and sales analysis reports. They include agency accounting applications, client file and policy information, and generate new policies and proposals on-line

On-Line Quotation Systems

- These systems are designed to enable the corporate agency, or the independent agency, to generate quotes and proposals for insurance policies on-line. These systems include the calculation of premiums, a word processing capability, and the ability to create and access a prospect's data base for direct-mail marketing purposes.

E
Medical Services Industry

1. Driving Forces

The medical and health services sector has changed dramatically during the past several years. The current emphasis on cost containment and the type of reimbursement plans for health services has caused great changes in the health industry itself. These changes have, in turn, had a marked effect on the information services aspect of the medical and health services industry.

More-efficient and more-complex information services to support the reporting associated with health care service reimbursement are in demand. There has been an increase in the diversity of health care organizations. For example, Health Maintenance Organizations (HMOs), together with prepaid health plans, home health agencies, and free-standing emergency centers, have all added to the complexity and diversity of the health care industry.

Although hospitals continue to be the primary vendors of health care services, their relative importance is declining rapidly.

Conversely, whereas in the past the individual medical practitioner was the mainstay of the medical industry, the individual practitioner is now being displaced by group practices.

A new factor in the medical and health services industry is competition. Hospitals and other health care organizations are now, more than ever, competing for patients and physicians. Information systems could be a factor in establishing the levels of health care service a particular institution can provide.

2. Current Applications

Image Analysis Systems

- These systems analyze the many types of biomedical images, metallographs, X-rays, autoradiograms, and electrophoresis gels. They allow measurements in two and three dimensions. The systems typically print values for later analysis by the medical practitioner.

Medical Billing Systems

- These systems encompass billing, collection, and statistical gathering for all types of medical practitioners. The systems are frequently custom tailored for specific medical specialties such as radiology or pathology. They enable the accumulation of charges until patient discharge. In addition, these systems are able to generate specific customized messages on statements, dunning letters, and optional write-offs on certain accounts. Many of these systems also include management reports, patient and insurance statements, and a detailed audit trail.

Long-Term Care Resident Management System

- These are turnkey systems that pertain to health care facilities. They include admissions, discharge, and transfer applications, as well as the generation of patient census days, revenue, and census tracking by billing and patient type. The systems are typically able to build variations such as room and board charges, ancillary charges, and other types of charges pertinent to the individual health care facility. They typically interface with general-ledger and Medicare/Medicaid types of insurance billing systems.

Health Care Cost-Accounting Systems

- These systems are normally applicable to hospitals or other types of complex patient care facilities. They facilitate the development of costs for each service unit in the health care facility. They are able to monitor the activities in the health care facility by department and produce dollar volume and dollar variant figures by department.

3. Examples

- Hospital Information System
- Automated Diagnostic System
- Patient Billing System

4. Future Application Projects

Automated Diagnostic Systems

- There are a series of systems under development that will run differential diagnoses on any combination of 300-400 common acute diseases or conditions. These systems typically incorporate a disease reference module that displays symptoms associated with any of the stored diseases. The system is able to compare the input of symptoms with stored symptoms by disease, and to print out diagnoses and references for the aid of the internist or other health care practitioner.

On-Line Patient Information Systems

- These systems (under development) provide on-line access to patient histories. The systems extract data through an interface to a patient data management system and provide a reference for the medical records department. The systems are also able to establish a retrospective statistical study for the health care institution and provide data to the business department or regulatory agencies.

Health Care Financial Management and Modeling Systems

- There are a variety of turnkey systems that provide financial support to the administrator of a health care facility. These systems are basically made up of three separate modules:

  - A budgetary module, which handles expense, revenue, labor, and payroll budgeting and monitoring

  - A reimbursement and profit-and-loss modeling system

  - A report-generating module for state and federal regulatory filing.

These systems can generate budget systems, pay or reimbursement analyses, profit-and-loss forecasts, and reimbursement maximization possibilities.

F

Education

1. Driving Forces

Most post-secondary institutions are in a period of consolidation as a reaction to meeting significant budgetary and cost constraints.

Most four-year colleges and universities now adopt aggressive marketing techniques in order to attract good students and faculty members.

The administrations of most post-secondary educational organizations are aware that computer literacy is an important part of student education. However, the approach to providing computer literacy is often fragmented and uncoordinated.

Two-year colleges and vocational schools are also increasing their attempts to provide students with computer access and training.

There has been a dramatic increase in the use of computers in primary and secondary schools throughout the U.S.

A significant number of high schools, elementary schools, and vocational schools are using computers for academic and administrative functions.

School systems at the elementary and secondary levels are prone to form cooperatives to take better advantage of computer systems.

2. Current Applications

Fund Accounting

- Fund accounting systems can include or interface with accounts payable, accounts receivable, general-ledger, payroll, and other types of financial systems. Basically, these systems generate cash requirements showing cash flow needs over various time frames and an audit trail for expenditures during the past several accounting periods. These systems also maintain up to 40 or 50 fund accounts and allow for a variety of transactions per fiscal period. The systems also prepare reports on individual funds and generate detailed transaction journals.

Transportation Analysis Systems

- These systems are aimed at school systems where pupil transportation is an important element of the overall administrative function. These systems pertain to all aspects of the school district's transportation

policy, including maximum and minimum loading and early pick-up, starting, and dismissal times. Taking all of these factors into consideration, the systems produce a unified routing system. They also typically generate transportation summary reports concerning vehicle miles, reimbursable pupil miles, etc.

Student and Class Scheduling

- These systems are in common use in most secondary and higher educational institutions and allow the scheduling of students and classes and the interaction between the two groups. These systems are typically performed on a batch basis, but currently there are a large number of systems, especially in the higher education institutions, that perform these functions on an on-line basis.

3. Examples

- Student Aid System
- Computer-Aided Instruction
- Office Automation

4. Future Application Projects

Financial Aid and Management Control Systems

- These systems are beginning to be installed in post-secondary educational institutions. They support the U.S. Office of Education and state financial aid requirements for student reimbursement purposes. They typically operate through an interface with the institution's data center and support the complete array of financial aid available to students.

Student Information Systems

- These systems vary significantly in their scope and are usually installed at the college and university level. They are able to track a student from the time of initial application through the completion of his/her academic career, including alumni-related information.

Student Loan Systems

- These systems provide record keeping and loan information, from application through final payment. They tend to be developed to support federal, state, and private loan-reporting requirements. Systems under development enable an on-line inquiry capability and the automatic generation of vouchers, checks, promissory notes, repayment schedules, etc. The more sophisticated systems provide an audit trail,

multischool capabilities, and user-defined processing rules and regulations for the system.

G Services Industry

1. Driving Forces

The Services Industry, as defined by INPUT, consists of the following segments:

- Accounting
- Legal Services
- Architectural and Engineering Services
- Real Estate
- Business Services
- Business Consulting
- Advertising

Mathematical modeling of the economy and of business problems is an important aspect of the use of computers in the business services subsector.

The unifying feature in the services subsectors is that the product is people oriented and labor intensive. Therefore, computer applications in the services industry focus on improving personal productivity.

Computers are enabling the accountant to change from a strictly financial role to a more sophisticated analytical and advisory role.

The real estate subsector is becoming more dependent on computers for marketing, as well as for management functions.

The computer services subsector of the services industry is more of a provider of information services than a consumer of information services.

2. Current Applications

Advertising Management Systems

- Designed for small- to medium-sized advertising agency and public relations firms, these systems include a variety of functions such as:

  - Time/media billing
  - Agency business analysis
  - Project estimating

- Financial applications, such as accounts receivable, general ledger, and budgeting.

Media Scheduling Systems

- These systems establish media schedules at the beginning of a media planning year and track budgeted vs. projected costs and activities.

CPA Client Write-up Systems

- These systems provide financial statements for each client, including audit trails, batch balancing, and, where appropriate, after-the-fact payroll.

Practice Management

- Most professional organizations in the services industry require the use of some form of practice management system. These systems keep track of time and expense by professional employee, and provide an objective criterion for evaluating staff performance and client profitability. The systems usually include detailed work-in-progress journals, work-in-progress reports, unbilled fees, and a client service analysis capability.

Litigation Support Systems

- These systems, developed for law firms, have the capability to search names, dates, document types and characteristics, and information describing deposition and trial exhibit numbers. They are used by group practices or sole practitioners to develop data to support litigation activities.

Property Management Systems

- These systems are applicable to multiunit real estate management companies. They provide property information, leasing information, rent control statistics, management reporting, and cash flow analyses. They also will provide a detailed cost-reporting, capability, together with vacancy reporting, notification of future vacancies, lease renewal notices, etc. Optionally, these applications can include payroll, job costing, financial modeling, etc.; typically they interface with other systems providing these application capabilities.

3. Examples

- Local-Area Network Development
- Legal Information Retrieval System
- Architectural Design Specification Data Base

4. Future Application Projects

Because of the great diversity of industries within the Service Industry sector, it is a practical impossibility to delineate what applications are being developed for this industry sector. As a sector, it is an agglomeration of various industries without any real correlation except all labor intensive.

As can be construed by the statement above, most new applications oriented toward the services industry are aimed at creating a more efficient labor force. This desire is independent of whether the particular organization is a professional services company, such as a law firm or CPA firm, or a real estate office or travel agency.

The development and market acceptance of the microcomputer has made the automation of this industry a reality in the last five to six years. The industry is typified by small companies that are not able to afford a minicomputer or mainframe computer-based system; thus the use of microcomputer-based systems has spread throughout the services industry.

H
Federal Government

1. Driving Forces

It is expected that the federal government market for information services will continue to grow, but the rate of growth will be reduced as a function of deficit reduction efforts.

Although heavily automated, the federal government's (except for the Department of Defense) data processing activities are traditionally behind the state-of-the-art level in the private sector.

The federal government is a heavy user of third-party services, including a great variety of data processing services.

Penetrating the federal government marketplace presents opportunities and challenges that are significantly different from the comparable efforts in the private sector.

Most significant federal government expenditures for data processing products and services are based on competitive bids (except in the case of preferred contractor situations).

Because of the size of the federal government sector and the amount of money being spent by the federal government, it is a highly competitive sector for vendors of all types of information services.

2. Current Applications

The applications pertaining to the federal government are as diverse as the government itself. It would be virtually impossible to compile even a partial list of these applications within the context of a report such as this. Virtually all federal government agencies are potential markets for the vendors of information services. Without exception, each major federal government agency is a significant purchaser of information services.

Unlike most large commercial organizations, the federal government is inadequately staffed in almost all aspects of data processing. In part, this is because the
government is unable or unwilling to pay the salaries necessary to attract and retain qualified information systems personnel.

3. Examples

- Customs Administration
- Electronic Mail
- Office Automation
- Personnel Information System
- Remote Maintenance Monitoring

4. Future Application Projects

As it was a practical impossibility to categorize current applications within the context of the federal government, it is equally impossible to characterize future application projects for the federal government. These projects are diverse and encompass almost all types of information systems activities.

With the exception of the Department of Defense and its ancillary activities, most information systems projects for the federal government are directly parallel to projects in the commercial sector. Department of Defense applications tend to be extremely specialized, esoteric, and have little or no direct commercial applicability.

Appendix: Definitions

Appendix

Definitions

This section defines terms used in this report.

Cross-Industry Services
- Involve the processing of applications that are targeted to specific user departments and that cut across more than one industry.

Industry-Specific Services
- Provide processing for particular functions or problems that are unique to an industry or industry group.

Utility Services
- Applications that provide access to a computer and/or communications network and enable users to develop or process their own applications systems.

Professional Services
- A group of information services that are labor intensive and contain a variety of delivery modes. One of these modes is the development of software on a custom basis.

Turnkey Systems
- Also known as integrated systems.
- The integration of systems software and applications software with the appropriate hardware so that all may be packaged and sold as a single applications solution.

Systems Integration
- A variety of services associated with systems design, such as the integration of computing components or the installation and acceptance

of an overall computer/communications system. Systems Integration services generally lead to, as a final product, "turnkey systems." Systems Integration services are one of the modes of delivery within INPUT's overall category of Professional Services.