INPUT

FIELD SERVICE PLANNING
INFORMATION PROGRAM

FIELD SERVICE BRIEF

FIELD SERVICE INFORMATION SYSTEMS:
ANALYSIS AND BENEFITS

APRIL 1980

FIELD SERVICE PLANNING INFORMATION PROGRAM

OBJECTIVE: To provide senior field service managers with basic information and data to support their planning and operational decisions.

DESCRIPTION: Clients of this program receive the following services each year:

- Field Service Briefs - Six reports which analyze important new technical and management issues within the field service areas. Reports focus on specific issues that require timely attention by senior management.
- Major Planning Reports - Three reports that will present an in-depth analysis and recommendations of a major technical or management issue that will assist in the formulation of major policy alternatives in the planning of field services.
- Annual Report - This report will summarize major activities in the field services industry during that year in order to determine major trends and their effect on the establishment of future field service planning. Forecasts will be provided of the likely technical and management changes that may occur in order to meet the future requirements of users of these services.
- Annual Presentation - INPUT staff will make an annual in-house presentation to field service executives to summarize the results of the previous year's research and to formulate jointly the strategic guidelines for the research program for the current year. These presentations will occur in the Spring of each year.
- Consulting Support - Individual consultation with INPUT research staff on an as-needed basis through telephone inquiries and visits.

RESEARCH METHOD: INPUT carries out extensive research in computers, communications and associated fields:

- Research topics are selected by INPUT based on discussions with client representatives.
- Research for this program includes professional interviews with users, vendors, universities, industry associations, and other analysts.
- Conclusions derived from the research are based on the judgement of INPUT's staff.
- Professional staff supporting this program have 20 or more years of experience in data processing and communications, including senior management positions with major vendors and users.

For further information on this report or program, please call or write:

INPUT
Park 80 Plaza West-1
Saddle Brook, NJ 07662
(201) 368-9471

or

INPUT
2471 East Bayshore Road
Suite 600
Palo Alto, CA 94303
(415) 493-1600

FIELD SERVICE BRIEF

FIELD SERVICE INFORMATION SYSTEMS:
ANALYSIS AND BENEFITS

APRIL 1980

.

FIELD SERVICE INFORMATION SYSTEMS:
ANALYSIS AND BENEFITS

TABLE OF CONTENTS

INPUT

FIELD SERVICE INFORMATION SYSTEMS:
ANALYSIS AND BENEFITS

- ii -

LIST OF EXHIBITS

INPUT

.

I INTRODUCTION

I INTRODUCTION

- Field Service executives, just like any business organization, need INFORMATION to be effective decision-makers.

    - Many information systems simply provide DATA and the manager is required to attach a structure in order to abstract the INFORMATION from it in order to satisfy planning and operational decisions.

- This brief summarizes a method for examining the information requirements, the supporting information system, and the type of mechanization to consider for field service organizations.

- It is not the only method, but it does provide a logical way for initiating an evaluation of a current system or the development of a new system.

- In using the information in this brief, the reader should be aware that some liberties have been taken in compartmentalizing the field service organization's information needs.

    - It should be recognized that an information system for a field service organization is a subset of a larger information system for a total corporate entity.

- I -

INPUT

- Some of the information required for the operation of a field service organization may be contained within existing company information systems.

- To develop an independent system that will satisfy only the needs of a field service organization without regard for the capturing of existing information for other company information systems is neither efficient nor effective.

- Once a field service organization determines what its information needs are, it should check carefully to see that the information does not already exist and may not have to be captured twice from the same source.

- Finally, remember that information systems are of value only IF they provide those elements of information necessary to support the decision-making process.

- Once an information system has been established, there is a common tendency for the management of it to force decision-makers to modify their judgement to accommodate the system rather than change the system. When a field service mangement team sees this happen, it's time to get a new information system manager.

- Your comments on this document and its utility to your organization are solicited.

INPUT

II DEFINING INFORMATION REQUIREMENTS

II   DEFINING INFORMATION REQUIREMENTS

A.   GOAL SETTING

- Any field service information system must reflect the general goals of the corporation.

- Given these general goals, several questions must be answered before determining whether:

    - The present system is adequate.

    - A new system is needed.

    - The present system can be modified.

- These questions are:

    - What specific field service functions should be monitored and controlled?

    - What is the cost of system operations?

INPUT

B.   MANAGING THE PERFORMANCE AREAS

- Field service operations can be measured in three performance areas:

    - Financial performance.

    - People performance.

    - Product performance.

I.   FINANCIAL PERFORMANCE

- Financial performance is measured by tracking total cost of operations and revenue generated by the operation.

    - Whether the field service operation is a P and L center or a cost center, this financial information (cost and revenue) is a basic requirement for the management of the organization.

- This information shows where costs are being incurred and provides information for operational decisions.

- While financial information is normally provided by the accounting organization, the manipulation of this function may have to be accomplished by the field service information system.   This should be reviewed from two perspectives:

    - Is the information provided from the accounting system usable in its current form?

    - Can a modification of this information, if it does not meet the field service organization needs, be cost justified?

- 4 -

INPUT

2. PEOPLE PERFORMANCE

- People performance can be measured in two ways.

  - Efficiency.

  - Revenue and/or expense per person.

- Although the efficiency measurement is widely used in the manufacturing environment, it is not applicable to the field service operation because of the reactive and customer-responsive characteristics of the working environment.

- Consequently, efficiency is not between 90% and 100%, as in a manufacturing environment, but is significantly lower (approaching 50%) for FEs.

- The efficiency figure is usually based on such variables as:

  - Equipment serviced.

  - Geographics.

  - Size of the service force.

- Revenue and/or expense per person is a financial measurement of personnel performance.

  - Maintenance revenue or expenses per FE should reflect workload.

  - Increased revenues or decreased expenses compared to the FE's responsibility can be measured.

- People performance measurements should account for the growth in knowledge gained by the individual and the application of that knowledge to the job.

INPUT

3.   PRODUCT PERFORMANCE

- Product performance is an important measurement for forecasting mainte-
  nance requirements.

- That performance, which shows the operation of the product and the mainte-
  nance performed, can be compared to maintenance cost.

  - The service manager is forced to determine maintenance requirements
    and related costs with incomplete information.

  - Product performance shows trends used to forecast workload and costs
    in the future.

  - This information enables planned manpower to meet maintenance
    needs.

C.   BASIC REQUIREMENTS

- The basic requirements for the management of a field service operation can be
  divided into the following information classifications:

  - Service call.

  - Customer.

  - Personnel.

  - Product.

  - Financial.

INPUT

I.   SERVICE CALL INFORMATION

- Information elements directly related to the service call are time-based.

- These elements involve the time that is expended per employee to perform the maintenance action.

    - Response time.

    - Travel time.

    - Wait time.

    - Actual maintenance time.

- Response time can be defined in two ways:

    - The time from which the customer informs the field service organization of a problem until the FE is on-site.

    - The time from which the customer informs the field service organization of a problem until a contact by the FE (whether by telephone or otherwise) is made to the customer.

- The travel time is the period spent by the FE to travel to the customer site from the service office or from the previous service activity.

    - Return travel to the service office after the maintenance activity, if no other service is pending, is either travel time or wait time.

    - This is dependent upon the field service organization's philosophy of time accounting.

- Wait time covers a number of overhead actions:

INPUT

- Standby, awaiting dispatch to a service call.

- Training time for self-taught, refresher courses.

- Administrative paperwork or parts tagging.

- Actual maintenance time is the period spent performing fault isolation, testing, and repair to restore equipment operation.

2.   CUSTOMER INFORMATION

- Customer information elements profile the customer.

- This information is important for field service management in measuring the quality of service.

- This customer profile includes five information elements:

  - Customer's name, address, and telephone number.

  - Account numbers.

  - Product identification (types, serial numbers, etc.) of equipment used by the customer.

  - Account classification (if there is a critical sales situation or there are special maintenance requirements).

  - Service profile (8 to 5 maintenance, 24 hour coverage, or time, materials, and travel charges).

3.   PERSONNEL INFORMATION

- Personnel information is straightforward and probably exists in some form.

INPUT

- However, the tricky part is to ensure that every management level is operating with the same information.

- Given the current rate of personnel turnover, this may not always be possible.

- Elements of personnel information are:

  - Personnel identification (company ID, SS number, name, address, telephone number).

  - Salary.

  - Experience level - job classification.

  - Training profile.

  - Geographic location.

  - Organization.

- Although most of this information is usually maintained by the Industrial Relations (Personnel) organization, their information needs do not have the same reaction time requirements. They are record keepers and use the information to satisfy an entirely different set of company goals and government (state and federal) organizations and reporting requirements.

4. PRODUCT INFORMATION

- Elements of data related to the product maintained are important to the organization in evaluating the product's performance.

- Equally important to the service management is the mix of products, because the maintenance of any two products is not exactly the same.

INPUT

- Along with performance and mix of a product are the elements of the maintenance revenue generated and the maintenance requirements for keeping the product operational.

- All of these elements, when combined and evaluated, give product performance figures that are used by all facets of a company.

5. FINANCIAL INFORMATION

- The biggest money users in any service force are the payroll, taxes, and insurance.

- Dependent upon maintenance requirements, the next highest money consumers are parts usage, travel costs, and supplies.

- While product development costs are not normally incurred by a field service organization, some of these costs can be attributed to servicing, especially after new product introductions.

- All of these costs, when compared with other operational information, can be used to determine the maintenance costs and be compared to the revenue generated.

D. WISH LISTS

- It's easy to become enamored with an information system, especially if it is computer-based. Once a management team is exposed to the potentials of the variety of information that can be provided, all types of "wish lists" start to emerge.

- Use three simple rules for evaluating "wish lists." Determine whether the information being asked for will:

- 10 -

- Reduce costs and increase profits.

- Provide visible improvements in customer support.

- Increase motivation levels of the field service organization.

● If not, then someone may have just found a new toy. Sound line organizations take an active part in shaping the information needs and must periodically review the value of the information provided. This responsibility cannot be delegated to the "tool builder."

E.   BENEFITS AND COST REDUCTIONS

● Any information system, whether in place or planned, must be monitored to determine if the benefits realized justify the costs incurred.

● Before upgrading an existing system or installing a new system, the benefits must be determined.

● When this feat is achieved, the system can also change the output and analysis capabilities of the collected information which can ultimately increase the efficiency of service management and the usage of service resources.

● Consequently, the more analysis and output capabilities a data collection system provides, the greater the potential for benefits and cost reductions in the field service organization.

INPUT

INPUT

III DETERMINING THE INFORMATION SYSTEM

III DETERMINING THE INFORMATION SYSTEM

- The major difficulty in implementing an information system is determining "what" the system is to provide, not how it is to be mechanized. Before beginning actual implementation, a clear definition of information requirements ("what") must be documented and approved by the field service executive.

    - Available methods range from manual files for small operations to large central processors with field locations linked by an on-line communications network.

    - INPUT's Field Service Brief on the Termicare system describes a national system.

- To determine the information system for a specific operation requires a comparison of the following factors:

    - Product line maintained.

    - Maintenance response.

    - Size of the maintenance force.

    - Geographic coverage.

INPUT

- Anticipated growth of the service organization.

- Current versus future technology.

- Exhibits III-I through III-6 each project a plot of these factors.

- The six curves permit the calculation of a series of weighted scores to determine the information requirements for an organization.

- For field service organizations that have an operational system, these curves can be used to compare their current system and to estimate future requirements.

  - Field service organizations that are planning on a change to their current system can use these curves as an aid to determine system requirements.

  - These curves can be used to forecast future system trends.

  - Examples are provided in this section to demonstrate the use of these curves to aid in determining system requirements.

  - By applying the field service organization's profile against the curve, a weighted number is calculated.

  - The simple average of these scores provides a level of system requirements.

A.   PRODUCT LINE

- Exhibit III-I is used to determine the weighted score based upon the sale price of the product being maintained.

INPUT

EXHIBIT III-1

PRODUCT LINE

INPUT
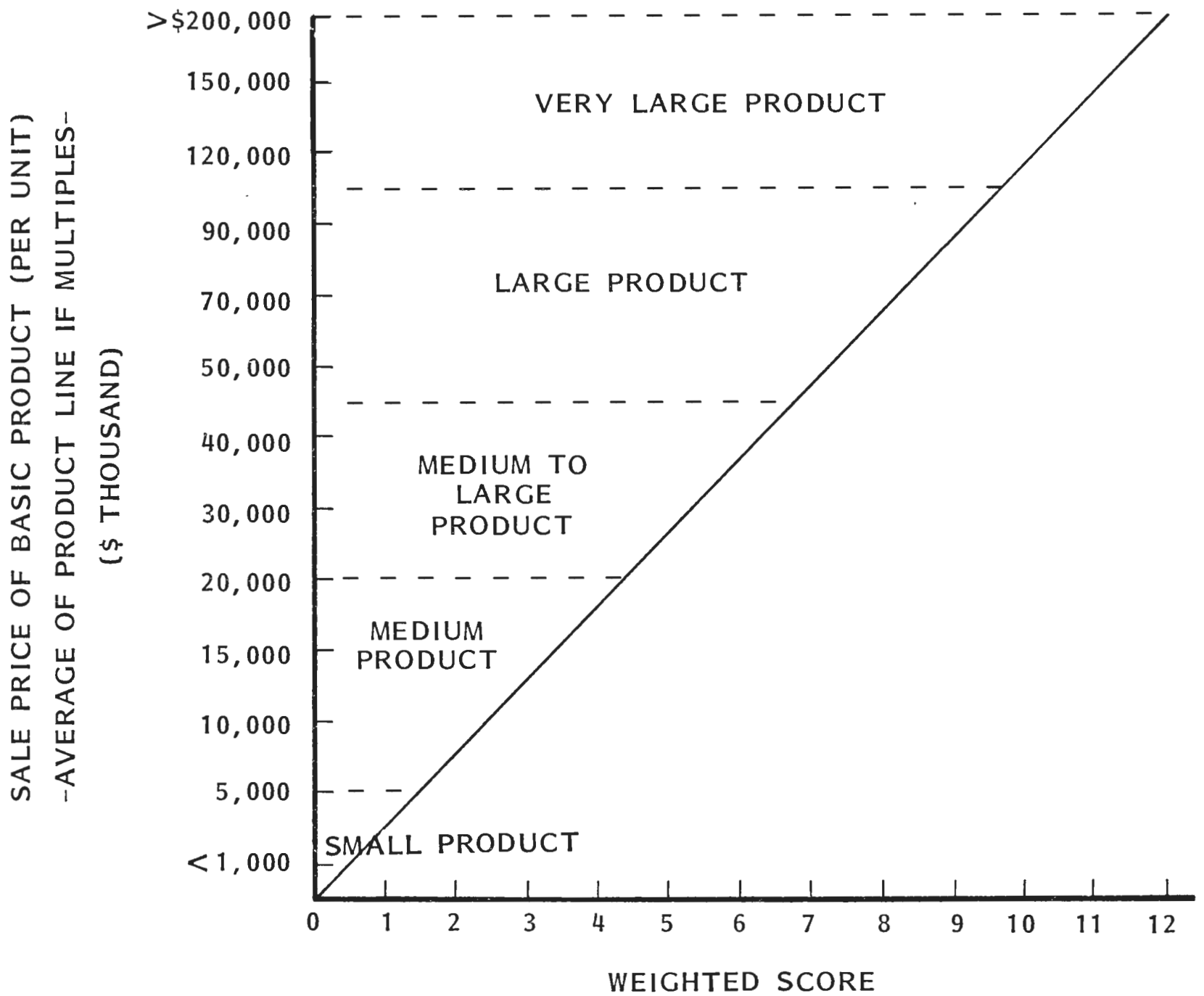
- The prices of multiple products and multifeatured products are determined by the product mix and average features used.

- Lower priced products are sold (or leased), with customer-performed maintenance requirements an important factor in establishing a competitive price for the product.

- Low priced products do not generate a field service requirement for a sophisticated information system.

B. MAINTENANCE RESPONSE

- Exhibit III-2 plots the maintenance response of a service organization expressed in response time to customer requests for unscheduled maintenance.

  - As the response time commitment becomes shorter, the requirement for an information system which supports those commitments increases.

  - Exhibit III-2 is designed to plot those commitments against the weighted number which determines the information system to meet the demands.

  - For the purpose of this curve, response time is the time from the initial call request from the customer until the time a field service engineer is on site.

C. SIZE OF MAINTENANCE FORCE

- Exhibit III-3 presents a curve that is based upon the size of the maintenance force (non-managerial personnel but including technical support specialists).

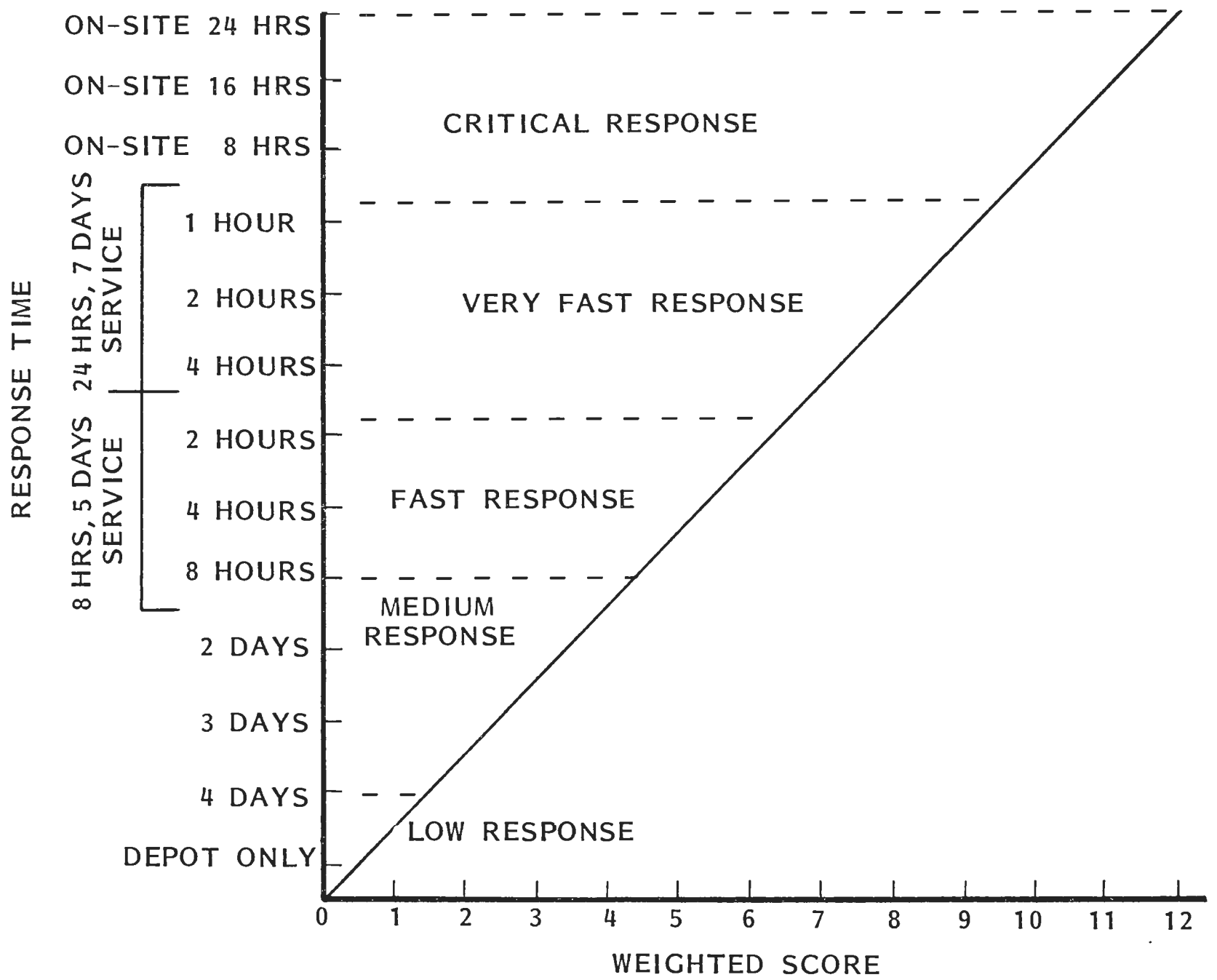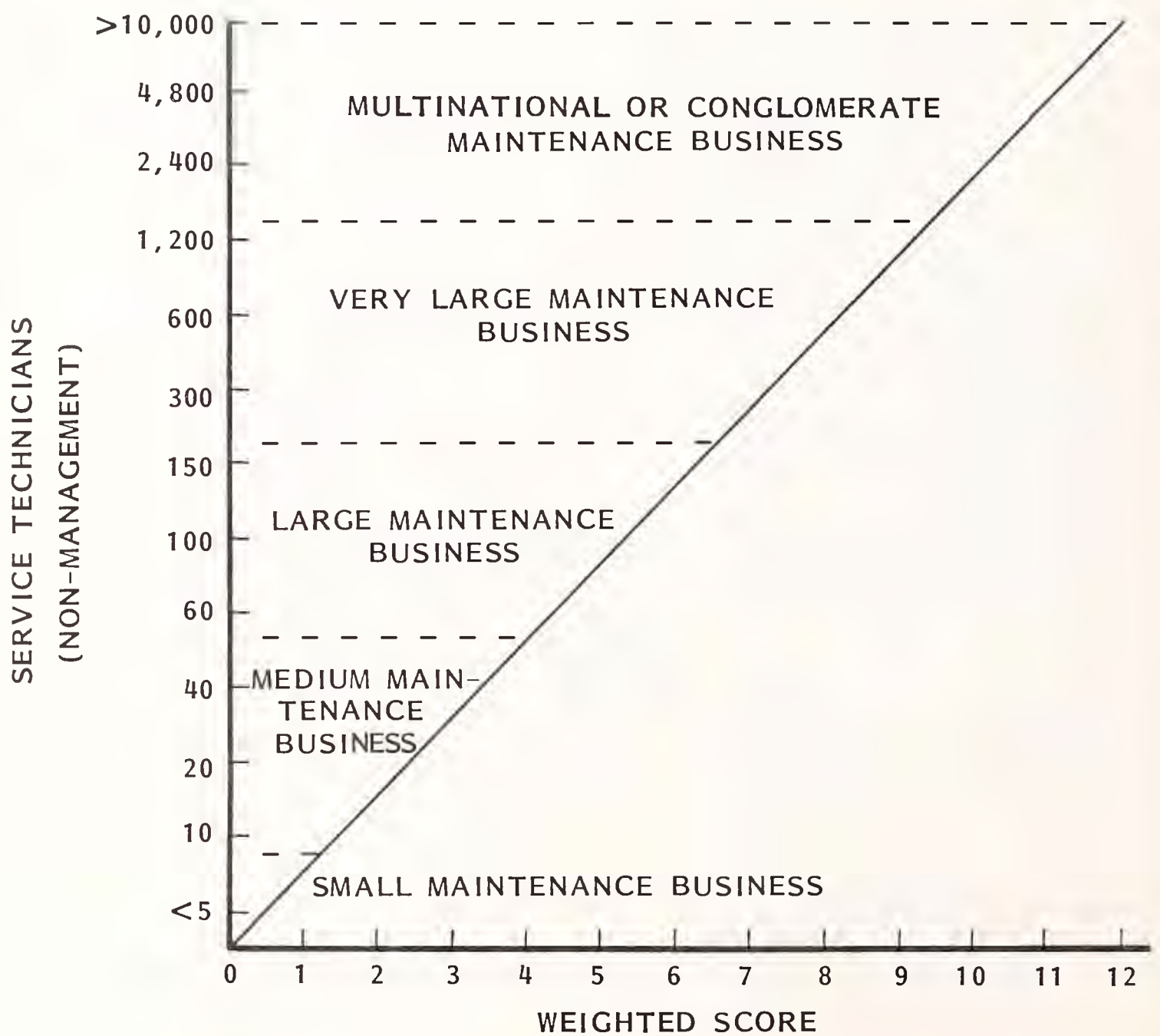- 16 -

EXHIBIT III-2

MAINTENANCE RESPONSE

INPUT

EXHIBIT III-3

SIZE OF MAINTENANCE FORCE

INPUT

- The size of the maintenance force will drive the requirements for a information system that can satisfy record keeping consistent with the amount of work performed.

- The size of the force is directly related to the maintenance performed (labor distribution).

- A smaller maintenance force, even though maintaining a large dollar value item, requires a less sophisticated information system.

D.   GEOGRAPHICS

- The geographics of the service function expressed in the number of budgeted service locations is presented in Exhibit III-4.

    - A single budgeted service location is a geographic area (there may be multiples in one city) based upon the management scope and functional organization philosophy of the field service operation.

    - These geographics are related to service force size, the commitments to customer requirements and the basic accounting (or financial) operation of the service organization.

    - A company with a large number of budgeted service locations is demonstrating a commitment to respond to customer needs and requires a more sophisticated information system.

E.   ORGANIZATION GROWTH

- Expected organization growth as a factor in determining information require- ments is expressed as a percentage for the next three years in Exhibit III-5.
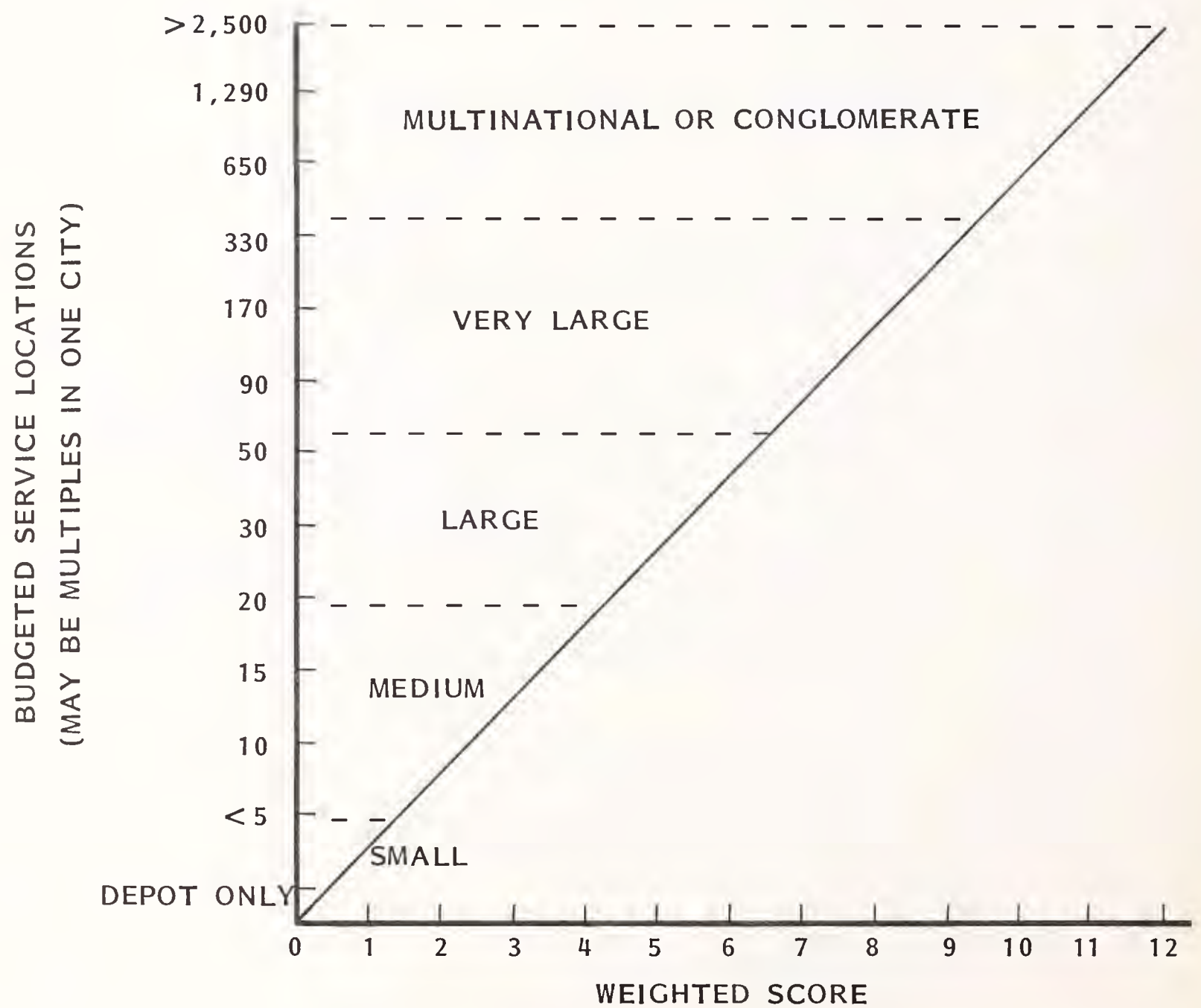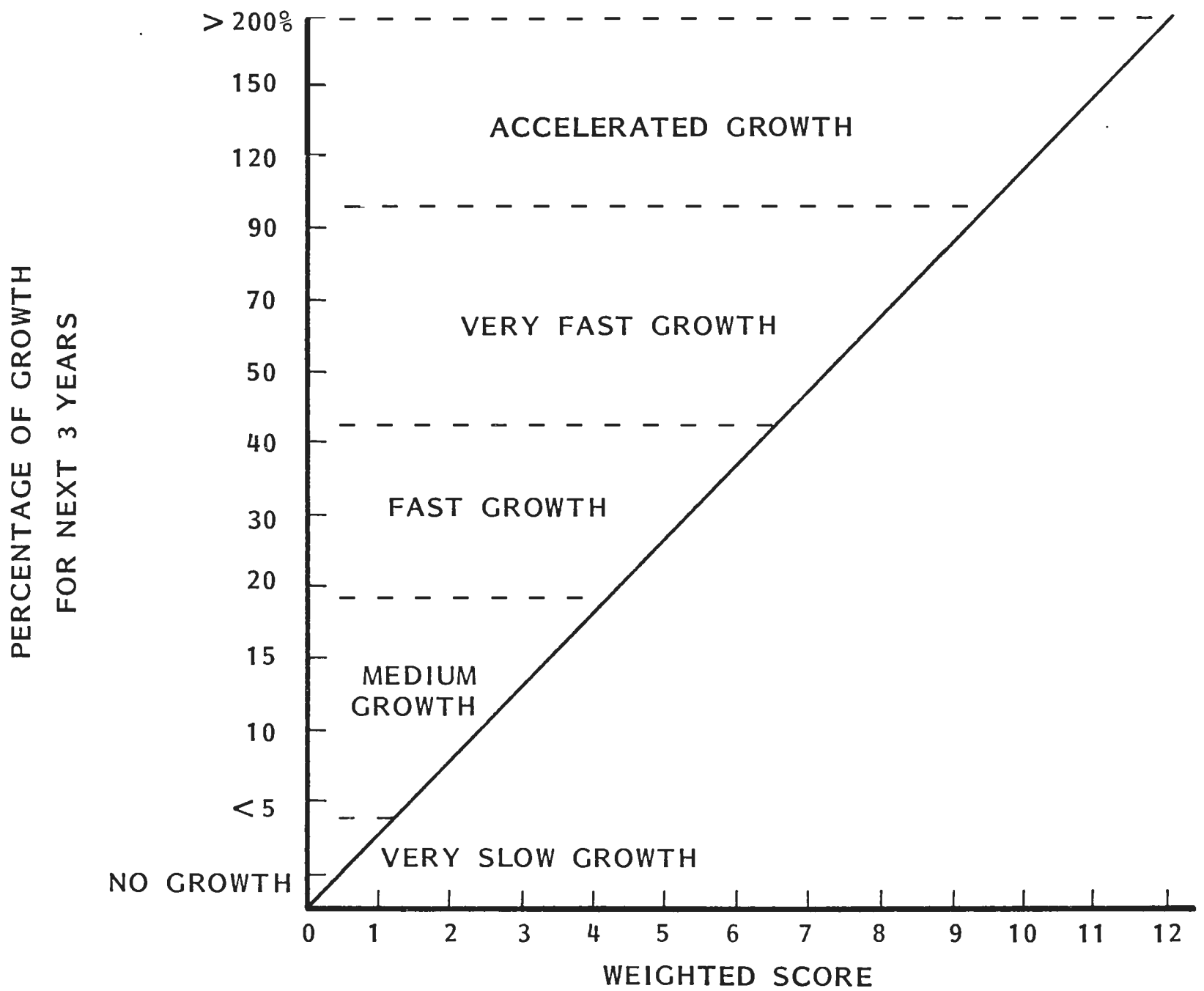
- 19 -

INPUT

EXHIBIT III-4

GEOGRAPHICS

INPUT

EXHIBIT III-5

ORGANIZATION GROWTH

INPUT

- The percentage figure is determined by forecasting the organization's growth in either headcount or revenue.

- The increase in expenses is not a valid measurement for this curve since one objective of an effective information system is to reduce expenses.

● The higher the organization's growth rate, the greater the need for information to control that growth effectively.

F. CURRENT VERSUS FUTURE TECHNOLOGY

● The maturity of the technology as related to products maintained by the field service organization is the factor shown in Exhibit III-6.

- The technology ranges from basic mechanical operation to the implementation of advanced technology are used to determine the weighted number requirements for an information system.

- The lower level technologies shown in this exhibit have well-known reliability levels that permit field service management to forecast product performance accurately.

- Future technology presents an unknown reliability exposure due to the absence of performance statistics. Reliable information in a timely manner for use by field service management is classified by the larger scores.

● Due to the possible combinations in the products, the use of the curve in Exhibit III-6 requires the selection of the lower and upper limits on the left side then the determination of the center before calculating weighted scores.

- 22 -

EXHIBIT III-6

TECHNOLOGY LEVELS

INPUT
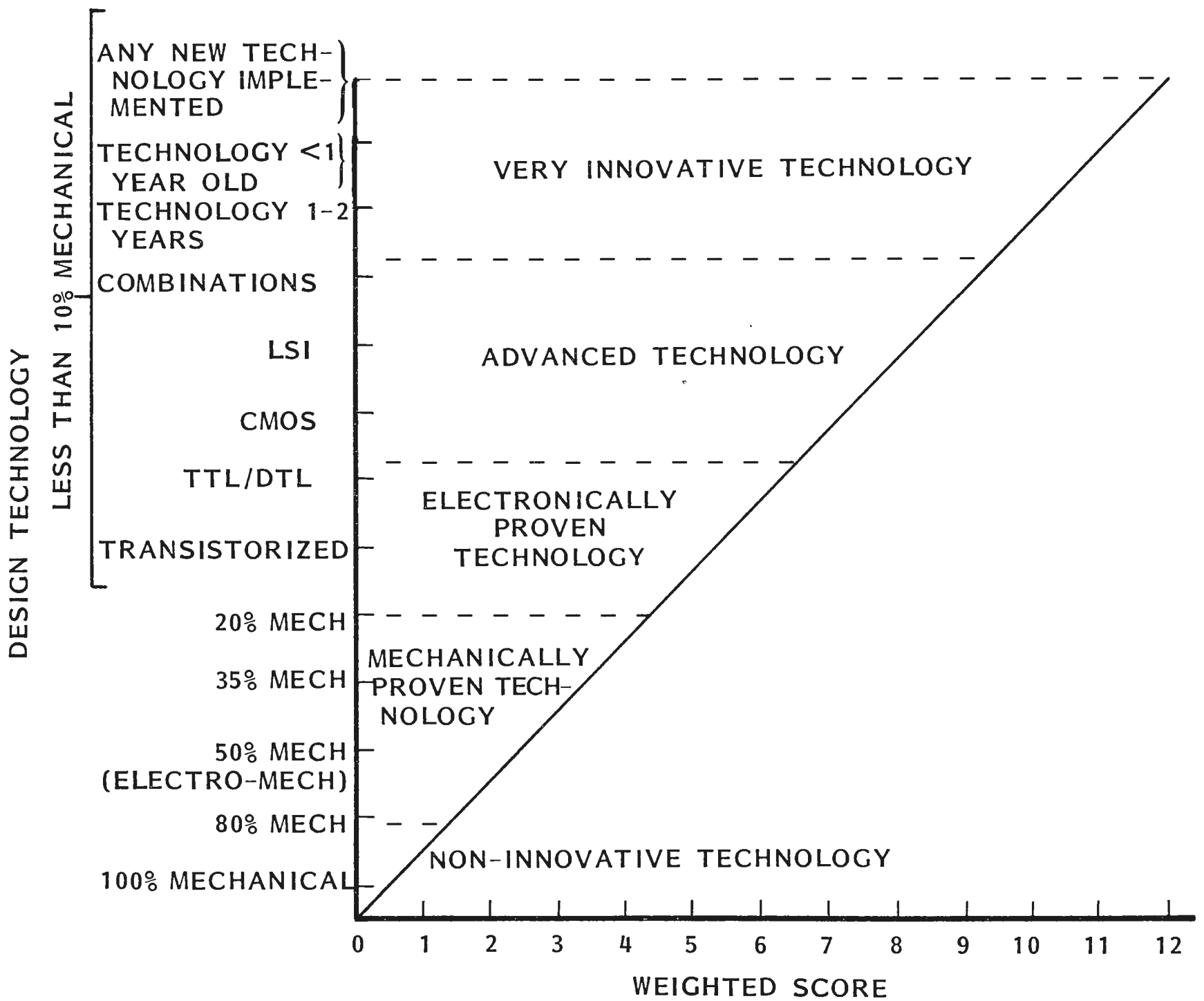
- As an example, if a company maintains an electro-mechanical device that is 50% mechanical, and the electronics technology is a combination of LSI, CMOS, and TTL, the effective technology rating is between "TTL/DTL" and "Transistorized".

G.   WEIGHTED NUMBER AVERAGES

- The simple average of the resulting numbers is used to determine the minimum requirements for an information system that is now in use or planned to be implemented.

1.   SMALL SCALE SYSTEM (AVERAGE 0 TO 1.5)

- Manual, card file system, updated by clerks on at least a once a month basis.

- Data collection is generally by word of mouth (or telephone) or by a basic service report.

- Management reports and data analysis are generated by hand.

2.   MEDIUM SCALE SYSTEM (AVERAGE 1.5 TO 4.5)

- A machine processed data base with updates at least once a week is required.

- Data is typically stored on low cost magnetic media used with a small business (minicomputer) system.

- Partial management reports and data analysis are automated, the remainder performed by hand.

- Data collection is manual but submitted on standard forms; some verbal updates are used.

- 24 -

INPUT

3. LARGE SCALE SYSTEM (Average 4.5 to 6.5)

- A fully computerized data base is required with updates at least daily.

- Data is typically retrievable on two hours notice and processing is performed on medium sized computers or shared, large mainframes.

- All management and analysis reports are automated but selective intepretation of data is not possible.

- Data collection is both manual and automated with all updates via standard format; no verbal updates are used.

4. VERY LARGE SCALE SYSTEM (AVERAGE 6.5 TO 9.5)

- A fully computerized data base is required with updates immediate as reported.

- Data is typically stored on real-time files and processing is performed on medium to large scale mainframes.

- The system is dedicated to the field service information operations and the data is shared with other company information processing elements.

- All management and analysis reporting is automated with remote management access and selective intepretation of processed data available.

- Data collection is automated via a number of central dispatching and data collection facilities using dedicated networks for communications.

5. HIGHLY SOPHISTICATED SYSTEM (AVERAGE 9.5 TO 12.0)

- The system is similar to the very large scale system (6.5 to 9.5), however, automated processing nodes are interconnected with a main processing facility.

INPUT

o   A sophisticated voice and data communications system exists among the service technican, management, and the data collection nodes.

H.   EXAMPLES

I.   SMALL TO MEDIUM SIZED BUSINESS

- This example is a small to medium sized business that maintains company products with its own maintenance force.

- The product has an average sale price of $4,000 and the design technology is TTL/DTL logic (some CMOS) with the average mechnical portion 35%.

- Field service is performed from 25 service locations with a service force of 110 FEs that is expected to grow to 130 FEs in three years.

- Customer response requirement is within 8 hours, with 8 A.M. to 5 P.M. maintenance coverage five days per week.

Product	$4,000	1.1
Maintenance Philosophy	8 hours	4.5
Number of FEs	110	5.8
Geographics	25 offices	4.9
Growth	19%	4.4
Technology	CMOS to 35% mechanical	5.1
AVERAGE		4.3

- Based upon the average of 4.3, this company would use a Medium Scale System (1.5 to 4.5).

- Expected growth to 130 FEs in three years places them on the edge of a large scale sytem.

- 26 -

INPUT

2. LARGE COMPANY

- This example is a large company with a product mix that has an average sale price of $65,000.

- Its products contain combinations of electronic technology with 10-20% mechanical operation.

- The products are currently maintained by 650 FEs with expected growth to 1,000 FEs in three years.

- While there are some on-site FEs from eight to five in a 24 hour, 7 day maintenance environment, the service organization guarantees a response within two hours.

- Service is performed from 83 branch offices.

Product	$65,000	7.7
Maintenance Philosophy	2 hr. to on-site (8 hr.)	9.1
Number of FEs	650	8.5
Geographics	83 offices	6.9
Growth	54%	7.3
Technology	Combos to 15% mechanical	7.0
AVERAGE		7.75

- The company in this example would require a very large system.

3. ONE OFFICE THIRD PARTY MAINTENANCE COMPANY

- This company maintains a mixture of products from various manufacturers with an average sale price of $3,500 each.

- The technologies of the products range from 80% mechancial operation to a combination of advanced technologies.

INPUT

- The office is staffed with six FEs who perform maintenance at the customer's facility and at a local depot.

- The response to customer calls is within two days.

Product	$3,500	1.0
Maintenance Philosophy	2 days	3.4
Number of FEs	6	0.7
Geographics	One office	0.8
Growth	None	0.3
Technology	Combos, 80% mechanical	5.2
AVERAGE		1.9

- This business has an average of 1.9, which places it on the low end of a medium scale system.

- Since no growth is anticipated and the change in the business does not appear dramatic, it is possible that either a small or medium scale system is appropriate.

4.   MULTINATIONAL CORPORATION

- This example is a multinational corporation performing its own maintenance on high technology products with an average sale price of $100,000.

- The product technologies are combinations using technology only one to two years old and are less than 10% mechanical.

- This company provides field service from 450 worldwide locations with a maintenance force of 1,700 FEs and a forecasted growth to 2,300 FEs in three years.

INPUT

- Response to customer requirements is a combination of on-site maintenance (24 hour coverage) and a response time of less than 2 hours from off-site (24 hours, 7 days maintenance).

Product	$100,000	9.5
Maintenance Philosophy	On-site to 2 hrs	10.3
Number of FEs	1,700	9.9
Geographics	450 locations	9.7
Growth	35%	5.7
Technology	Combos, 1-2 years	9.6
AVERAGE		9.12

- The average of 9.12 places this company in the high range of a very large scale system.

- While this type of system would satisfy current information requirements, the position and the anticipated market for the company's products require serious consideration for use of a highly sophisticated system. Worldwide growth and non-U.S. domestic gains are the major decision factors.

INPUT

IV NEW SYSTEM IMPLEMENTATION

.

IV   NEW SYSTEM IMPLEMENTATION

A.   SELLING THE BENEFITS

- An effective information system enables the field service organization to meet objectives and contribute to a company's success.

    - A field service information system plan, if it is to be sold to general management, must show benefit to the organization's corporate goals.

    - The major selling points of any new or enhanced information system are the efficiency gains in:

        . Labor.

        . The reduction in capital requirements for expansion and operation (cost of money).

        . Customer satisfaction that retains and increases business.

- Once approved by general management, the new system faces a crucial test that may be harder to pass than the selling of the concept.

- The major obstacle areas are:

INPUT

- Changeover and implementation.

- Field management/FE reaction.

- Customer reaction.

- Measurement of (immediate and long-term) benefits.

B.   CHANGEOVER AND IMPLEMENTATION

- The implementation and changeover from an old to new system can range from a disaster to transparency.

    - Even an elementary information system cannot be implemented without problems.

    - The changeover from one information system to another (and the majority of changeovers will be complicated) must be planned and staged to have minimum impact on the present system.

- Old and new information systems must be operated in parallel until the new system is stable.

- Although parallel operation is expensive, premature dependence on the new system would cause disasterous results if problems are not found early.

C.   FIELD MANAGEMENT/FIELD ENGINEER REACTION

- People resist change.

INPUT

- Any changes that can affect personnel efficiency will be welcomed by management but viewed with suspicion by labor. FEs may view the information system as a means by which management will require him to do more work.

- The selling of the changes to management are relatively easy when compared to the acceptance of the new information system by the FE. However, success dictates that the FE must be sold and the main selling points are reduction in paperwork, reduction in administrative details, and availability of individual performance statistics.

- An effective information management system enables field service management to determine the status of a particular problem with a high degree of accuracy.

D.   CUSTOMER REACTION

- Unless the information management system requires new customer interaction, the customer's initial reaction is minimal to nil.

- However, if the new information management system improves customer support, it can be used as a sales tool with existing and new accounts.

E.   MEASUREMENT OF BENEFITS

- Both the immediate and long-term benefits should be measured.

  - Reliable data has immediate value when the information system is replacing a function where data was unreliable or late.

- 33 -

-       Field managers, having gained trust during the parallel operation phase, use the information to correct immediate problems.

-       Future trend forecasting enables the handling of small problems before they become major disasters.

● Some of the benefits that can be measured are:

-       Reduction in expenses per FE.

-       Increase in service revenue per FE.

-       Reduction in call lengths (MTTR).

-       Part utilization (inventory turns).

INPUT

SUBSCRIPTION PROGRAMS: Designed for clients with a continuing need for information about a range of subjects in a given area. All subscription programs are fixed fee and run on a calendar year basis:

- Planning Service for Computer & Communications Users - Provides managers of large computer/communications facilities with timely and accurate information on developments which affect today's decisions and plans for the future.

- Small Establishments Service - Analyzes and forecasts small establishments' (<500 employees) use of office, communication, and computer services and products. Applications requirements and economics are emphasized.

- Computer Services Market Analysis Service - Provides market forecasts and business information to software and processing services companies to support planning and product decisions.

- Computer Services Company Analysis and Monitoring Program - Provides immediate access to detailed information on over 2,000 companies offering software and processing services in the U.S. and Europe.

- Field Service Planning Information Program - Provides senior field service managers with basic information and data to support their planning and operational decisions.

MULTICLIENT STUDIES: Research shared by a group of sponsors on topics for which there is a need for in-depth "one-time" information. A multiclient study typically has a budget of over $100,000, yet the cost to an individual client is usually less than $10,000. Recent studies specified by clients include:

- Maintenance Requirements For The Information Processing Industry

- Value Added Network Services

- IBM Series/1 Analysis

CUSTOM STUDIES: Custom studies are proprietary to a client. Fees typically range from $10,000 to over $50,000 and are a function of the extent of the research work. Examples of recent assignments include:

- Survey Fortune 500/50 companies to determine plans for distributed data processing.

- Compare the internal charges for EDP services in a large company to those of commercially available services.

- Determine the market potential for an associative Relational Data Base Management System Processor.

- Conduct the 1979 ADAPSO Survey of the Computer Services Industry.

- Analyze the opportunities and problems associated with packaging terminals and/or minicomputers with remote computing services.

ABOUT INPUT

THE COMPANY

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international consulting firm. Clients include over 100 of the world's largest and most technically advanced companies.

UNITED STATES, West Coast
2471 East Bayshore Road
Suite 600
Palo Alto, California 94303
(415) 493-1600
Telex 171407

UNITED STATES, East Coast
Park 80 Plaza West-1
Saddle Brook, New Jersey 07662
(201) 368-9471

UNITED KINGDOM
INPUT Europe
Airwork House (4th Floor)
35 Piccadilly
London, W.1.
England
01-734-2156
Telex 269776

AUSTRALIA
Infocom Australia
Highland Centre, 7-9 Merriwa Street
P.O. Box 110, Gordon N.S.W. 2072
(02) 498-8199
Telex AA 24434

ITALY
PGP Sistema SRL
20127 Milano
Via Soperga 36
Italy
Milan 284-2850

JAPAN
Overseas Data Service Company, Ltd.
Shugetsu Building, No. 12-7 Kita Aoyama
3-Chome Minato-Ku
Tokyo, 107
Japan
(03) 400-7090