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2nd Line DISCRETE MANUFACTURING INDUSTRY

3rd Line

Spine: (1 Line) C/S APPLICATIONS - DISCRETE MANUFACTURING

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ADM400/02
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June 11, 1993

Dear Colleague:

Please find enclosed the report

Client/Server Applications in the Discrete Manufacturing Industry

This is provided through your participation in the *Client/Server Markets and Applications* service (formerly INPUT's *Downsizing Information Services Program*).

Data for this report was provided by INPUT's continuing interview program which identifies targets of opportunity for clients as well as trends in the market.

Please call me if you have any comments or questions.

Sincerely,

Dan Ryan
Client/Server Research

Enc.

Report Quality Evaluation

To our clients:
To ensure that the highest standards of report quality are maintained, INPUT would appreciate your assessment of this report. Please take a moment to provide your evaluation of the usefulness and quality of this study. When complete, simply fold, staple, and drop in the mail. Postage has been pre-paid by INPUT if mailed in the U.S.

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About INPUT

Since 1974, information technology (IT) users and vendors throughout the world have relied on INPUT for data, objective analysis, and insightful opinions to support their plans, market assessments and technology directions particularly in computer software and services. Clients make informed decisions more quickly and save on the cost of internal research by using INPUT's services.

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Many vendors leverage INPUT's proprietary data and industry knowledge by contracting for custom consulting projects to address questions about their specific market strategies, new product/service ideas, customer satisfaction levels, competitive positions and merger/acquisition options.

INPUT advises users on a variety of IT planning and implementation issues. Clients retain INPUT to assess the effectiveness of outsourcing their IT operations, assist in the vendor selection process and in contract negotiation/implementation. INPUT has also evaluated users' plans for systems and applications downsizing.

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VERTICAL MARKET ANALYSIS

Client/Server Applications in the Discrete Manufacturing Industry

Client/Server Markets and Applications Program

JUNE 1993

CLIENT/SERVER APPLICATIONS IN THE DISCRETE MANUFACTURING INDUSTRY

INPUT®

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

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Client/Server Markets and Applications Program (DSP)

Client/Server Applications in the Discrete Manufacturing Industry

DV1 • 426 • 1993

Table of Contents

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Exhibits

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Introduction

This is the first in a series of reports analyzing trends in client/server (C/S) applications by vertical industry. These reports are produced as part of INPUT's *Client/Server Markets and Applications* subscription service. Each report focuses on a single industry. Additional reports compare industries in their approach to client/server.

A
Objectives

This report addresses the following issues with regard to the discrete manufacturing industry sector.

- To what degree is the industry as a whole migrating to client/server architectures?
- Which applications are likely to be targeted for implementation over the next three years, and which ones are headed for a downsized client/server environment?
- Who is managing various aspects of the implementation or conversion of these applications? The central information systems function (IS), end-user management or its local IS function, or third parties?
- To what degree are industry participants looking to outside vendors for products and services?

B
Scope

The scope of this analysis is limited to the discrete manufacturing industry sector within the United States. Specifically, INPUT defines this industry sector as those industries with the two-digit SIC codes shown in Exhibit I-1.

EXHIBIT I-1

Discrete Manufacturing Industry Sector Definition

SIC Code	Description
23xx	Apparel and other finished products
25xx	Furniture and fixtures
27xx	Printing, publishing and allied industries
31xx	Leather and leather products
34xx	Fabricated metal products, except machinery and transportation equipment
35xx	Industrial and commercial machinery and computer equipment
36xx	Electronic and other electrical equipment and components, except computer equipment
37xx	Transportation equipment
38xx	Instruments; photo/mededical/optical goods; watches/clocks
39xx	Miscellaneous manufacturing industry

C
Methodology

Data for this analysis were taken from INPUT's applications data base. This data base is built from a continuous telephone interview program to gather information about companies' applications plans. The field interviewing process was initiated in January of 1993. Over 1,000 interviews have been completed to date.

The number of companies in the discrete manufacturing sample was 117. In some instances more than one interview was conducted per company. This was particularly true for extremely large firms such as General Electric and Ford, where interviews were conducted with multiple divisions. The total number of interviews was 158.

These 158 interviews were the primary source of data for this report, providing data on 207 different applications that would undergo implementation in the next two years. Additional information was drawn from secondary research sources and INPUT's library of information on discrete manufacturing.

Respondents identified the applications or projects they would be implementing over the next two years using their own terminology, rather than being required to categorize applications by some predetermined set of definitions. Once the survey was completed, INPUT analyzed the 207 project descriptions and coded them into 27 application types. The 27 types were then further grouped into application categories for purposes of this analysis. Exhibit I-2 provides definitions for the 27 applications or project types in alphabetical order.

EXHIBIT I-2

Definition of Discrete Manufacturing Application Types

Application Type	Description/Examples
CAD/CAM	Computer-automated design/computer-automated manufacturing
Customer Service	Customer inquiry management, hotline, service and support
Data Base Conversion	Conversion to a new data base environment; includes all platform levels. (Relational and distributed relational are categorized separately.)
Data Conversion	Projects to convert data
Desktop Software	Installation of workstation/PC software environments, such as spreadsheets, WP, business graphics, Windows, etc.
Engineering Graphics	Upgrades or conversions of engineering graphics environments
Financial Reporting	Financial reporting systems as opposed to transaction processing systems
Financial Suite Upgrades	Upgrade of the entire suite of financial applications
General Engineering	Engineering applications not otherwise uniquely identified
General Ledger	General ledger
Hardware Upgrades	Projects involving the upgrade of hardware to meet growing requirements or accommodate platform changes such as migration to client/server
Inventory	Inventory management, control, reporting
Logistics	Logistics management, control, reporting
Manufacturing Operations	Applications utilized directly in the manufacturing process, including time-card reporting
Manufacturing Planning	MRP, MRPII and other applications utilized in planning manufacturing operations

EXHIBIT I-2 (CONT.)

Definition of Discrete Manufacturing Application Types

Application Type	Description/Examples
Manufacturing Reporting	Applications utilizing manufacturing data bases and other information for reporting, quality management, etc.
Network Upgrades	Infrastructure projects to upgrade or modify some significant aspect of the data communications network, such as conversion to LAN and WAN environments
Order Entry/ Management	Order entry, order control, order processing, etc.
Other	Any application or implementation that could not be classified in a more specific category
Payable/Receivable	Accounts payable and/or accounts receivable
Payroll	Payroll processing
Personnel/HR	Human resources, benefits management, HR information systems, etc.
Purchasing	Purchase order processing, management, reporting
Rel./Distributed DBMS Conv.	Projects involving the conversion of traditional data base structures to relational or distributed relational data base systems such as Oracle, Paradox, Sybase, etc.
Sales Forecasting	Sales forecasting
Sales/Marketing Management	Sales management, market planning, advertising, etc.
Systems Software	Operating system conversions, not specifically identified with a given application single application. Migration to UNIX, etc.

Exhibit I-3 shows the grouping of the application types into application categories.

EXHIBIT I-3

Definition of Discrete Manufacturing Application Categories

Application Category	Application Type
Data Base	Data base conversion Rel./distributed DBMS conv. Data conversion
Engineering	Engineering graphics CAD/CAM General engineering
Financial	Financial reporting General ledger Payable/receivable Payroll Financial suite upgrades
IS Infrastructure	Desktop software Hardware upgrades Network upgrades Systems software
Manufacturing	Manufacturing operations Manufacturing planning Manufacturing reporting
Sales/Marketing	Customer service Order entry/management Sales forecasting Sales/marketing management
Other	Personnel/HR Purchasing Inventory Logistics Other

D
Organization

The remainder of the report is organized into three chapters:

- Chapter II, *Executive Overview*, provides a summary of the findings of this report.

- Chapter III, *Discrete Manufacturing Applications Trends*, discusses the key applications that will undergo conversion or re-implementation by discrete manufacturing firms over the next three years. It addresses such issues as:

  - Industry demographics
  - Target platforms and platform combinations
  - Near-term investment levels in applications development
  - Project management and control strategy
  - Analysis of the applications by application category

- Chapter IV, *Client/Server Directions in Discrete Manufacturing*, analyzes the data at a more detailed level, with particular emphasis on the role that client/server will play in discrete manufacturing applications over the next two years.

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Executive Overview

Discrete manufacturing is an industry in transition. A major re-engineering of all aspects of the industry's business has been in process for the past several years. This has resulted in ongoing major organizational, operational and systems re-engineering requirements.

The impacts in the systems area have been significant. The need to "re-invent" systems to meet new manufacturing and manufacturing management concepts coupled with the emergence of new "downsized" information technologies is stimulating a significant migration to client/server (C/S) architecture.

To gain a greater understanding of the depth and rate of this migration, INPUT analyzed data that were collected from 158 manufacturing organizations on 207 applications that are scheduled for implementation or conversion over the next two to three years. Respondents consisted of user managers, divisional or user IS executives, as well as managers and executives from corporate IS functions.

For purposes of analysis, the 207 applications were grouped into applications categories.

A
Expenditure Plans and Key Issues

The respondents planned to increase their spending over the next two years as follows:

- Total IS—8.8% per year
- Applications development—8.9% per year

Almost one third of respondents identified client/server migration as their major IS issue. Network integration, either at the platform or application level, was the second most frequently identified IS issue.

B

Applications Trends in Discrete Manufacturing

1. The Movement to Client/Server

According to the survey, investment in new or re-engineered IT applications in the discrete manufacturing sector will grow at about 9% per year over the next several years. A modest recovery in the manufacturing sector coupled with the continuing pressure of off-shore competition will drive this growth.

While interest remains high in controlling or managing information systems cost, data from the survey indicate that most firms feel they can accomplish the goal of regenerating the applications portfolio at a reasonable cost through the use of C/S technology.

- Respondents indicated that C/S implementation (and related activities) was the most important issue facing IS over the next two to three years. In fact, close to 30% of the respondents mentioned C/S or related activities as their primary issue.

- Of a total of 229 responses on target platforms for new applications, respondents indicated that workstation/PC (WS/PC) platforms would be utilized in implementing 102 (45%). Approximately 50% of all applications to be implemented will adopt some type of C/S architecture.

2. Approach to Managing Applications Development

The management of applications development in discrete manufacturing is clearly moving toward the user in terms of project direction and project staffing.

- 22% of the new implementations analyzed will be managed by user executives directly.

- 40% will be managed by IS functions under the direct control of user or divisional IS.

- Approximately 31% will be managed by the central or corporate IS function.

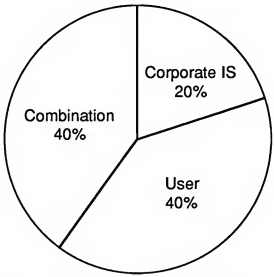
- The remainder (7%) will be managed by outside systems integrators or professional services organizations.

In addition to taking a greater role in the management activity, user or divisional organizations will also play a major role in accomplishing the implementation by providing professional staff to project teams, as shown in Exhibit II-1.

EXHIBIT II-1

Discrete Manufacturing

Source of Application Project Staffing



Proportion of Responses (205 Projects)

C

Key Client/Server Applications in Discrete Manufacturing

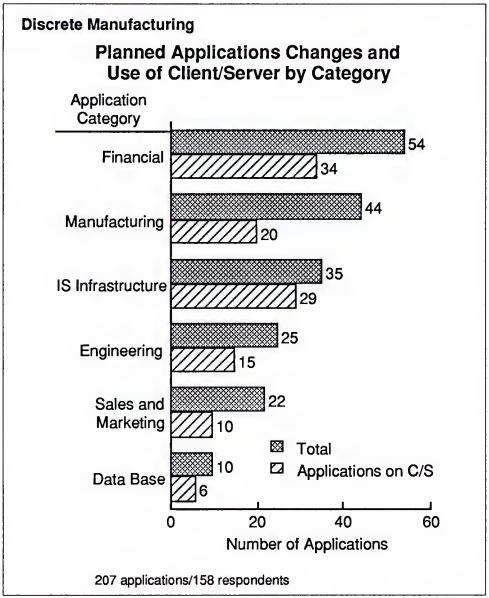
1. Client/Server Penetration by Application Category

Regardless of the application category, INPUT's analysis shows that C/S will play a major role in most new discrete manufacturing implementations, whether they are upgrades of the existing infrastructure, re-organization of data bases, or new applications.

Exhibit II-2 shows the distribution of applications by category, and the number of applications in each category that will be implemented using a client/server architecture. (*IS Infrastructure* applications represent responses where platform changes will be made.)

For virtually all major categories, over 45% of all manufacturing applications will be migrating to the C/S environment.

EXHIBIT II-2



2. Leading Applications for Client/Server Implementation

The key applications in these categories that will migrate to C/S over the next two to three years in discrete manufacturing will be:

- Manufacturing operations
- Financial reporting
- General ledger
- Desktop applications software
- Engineering graphics
- Order entry and management

These represent approximately 42% of all the applications cited for implementation and 55% of all the planned C/S implementations.

Discrete Manufacturing Applications Trends

This chapter presents a detailed analysis of the applications data base. The chapter is organized as follows:

- Section A analyzes the demographics of the sample population and discusses the characteristics of the survey respondents.
- Section B analyzes the general trends uncovered in the survey.
- Section C presents the breakdown of applications by class, target platform, management approach and resources that will be used to achieve implementation.

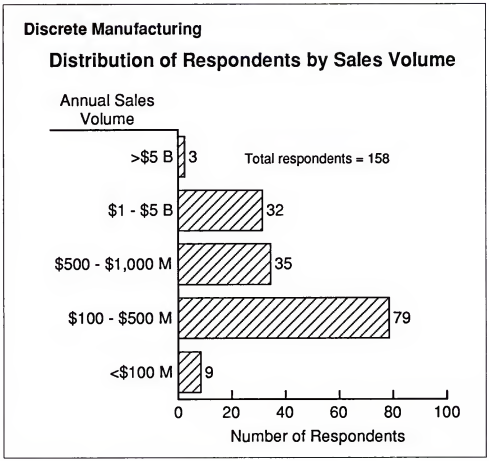
A
Characteristics of the Sample

1. Sample Size and Characteristics

The total number of companies interviewed was 117. The total number of interviews was 158 and 207 applications were analysed.

In general, the sample represents a cross section of manufacturing firms, including, on the high end, such firms as Xerox, Texas Instruments, General Dynamics, Ford Motor Company, Eastman Kodak, etc. The breakdown of respondents on the basis of annual company or divisional sales volume is given in Exhibit III-1.

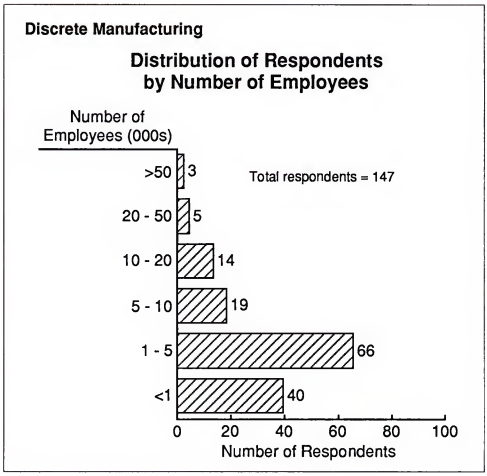
EXHIBIT III-1



The average annual sales volume for the entire sample was approximately $800 million.

The average number of employees was approximately 14,000, and the population was distributed as shown in Exhibit III-2.

EXHIBIT III-2



2. Characteristics of Survey Respondents

Although the surveys are targeted at end-user managers with direct responsibility for line or staff operations, respondents often referred interviewers to the information systems (IS) function for responses to all or parts of the survey. Consequently, respondents included members of the corporate IS function or divisional IS management as well as non-IS line or staff management. Exhibit III-3 gives the distribution of respondents by job class. The following definitions apply:

- *Line Manager* - A manager/executive responsible for line operations at a corporate or divisional level; e.g., vice president (VP) of manufacturing, VP of sales, director of product distribution, etc.
- *Staff Manager* - A manager/executive in charge of staff operations at a corporate or divisional level; e.g., VP of human resources, chief financial officer, director of purchasing.
- *IS Manager* - A manager/executive whose primary responsibility is the management of information systems activities at a corporate or divisional level.

EXHIBIT III-3

Discrete Manufacturing

Job Classification of Respondents

Job Classification	Proportion of Respondents (Percent)
Line Manager	8
Staff Manager	40
IS Manager	52

About 50% of respondents represented operating divisions and the remainder represented corporate functions.

Many of the line managers were unable to deal with questions regarding platform, but were familiar with their applications requirements. The IS executives filled in the gap with more information on platforms, overall spending, and general direction of the IS function.

B

General Trends in Discrete Manufacturing IS

The survey examined a number of key trends with regard to the evolution of old, and the development of new, applications over the next two years. It included examinations of:

- Anticipated changes in hardware and software platforms
- Expectation levels for IS spending
- Anticipated changes in the IS organization
- Major IS issues

1. Anticipated Changes in the Systems Environment

Respondents were asked to discuss specific changes that they anticipated in their systems environment over the next two years. Responses fell into the three categories described below.

- *Upgrades* - Forty-eight percent of respondents anticipated that upgrading existing systems would be the likely path for application migration rather than major platform change.

- *Increased/Decreased Standardization* - Movement toward increasing standardization in platforms and operating environments was predicted by 30% of respondents. Only 2% anticipated any decrease in the level of standards. Approximately 10% of those who see a strong trend toward C/S also see an improvement in standardization.

- *Migration to C/S* - The results of the survey indicate a strong migration to C/S as a company direction. In fact, 38% of the respondents indicated a general migration to C/S.

The conclusions are that C/S is a major directional force and that many firms anticipate moving in that direction without reducing and perhaps increasing the overall level of standardization.

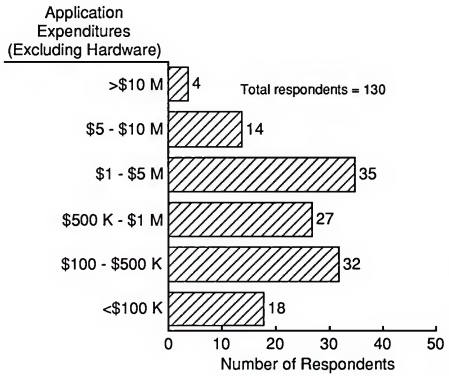
2. Expectation Levels for IS Spending and Applications Development

Exhibit III-4 shows the number of respondents as a function of the size of their anticipated annual investments in new or upgraded applications.

EXHIBIT III-4

Discrete Manufacturing

Expected Investment in Applications Development 1992-1994



Expenditure levels on applications development were higher than anticipated.

On the average, respondents estimated that spending on applications development and upgrades would increase by 8.9% per year for the next two years. Their estimates for total IT spending growth, including applications development and maintenance, averaged 8.8% per year. Essentially, they anticipate growth rate for applications and overall IT spending at a rate 2 to 3 percent higher than INPUT had anticipated.

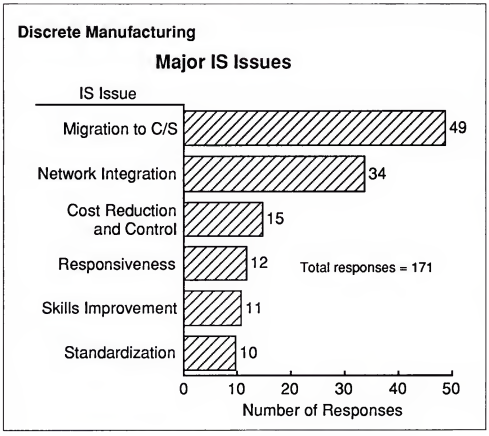
This increase in spending rate is a function of several factors:

- A gentle, but consistent recovery in the manufacturing sector
- A rush to improve competitiveness and productivity using technology

3. Major Information Systems Issues

A total of 150 of the respondents provided 171 responses on the key issues facing IS within their organizations. The data was then coded into categories for analytical purposes. Exhibit III-5 shows how the major categories compared in terms of number of responses.

EXHIBIT III-5



A brief explanation of each category follows.

- *Migration to C/S* - Planning for, implementing or downsizing to C/S technology
- *Network Integration* - Network integration itself or the integration of applications across a distributed network
- *Cost Reduction/Control* - Downsizing or distribution of existing staff or general budget reductions within the IS function
- *Responsiveness* - The ability of the systems environment to respond to changing application needs and user management information requirements
- *Skills Improvement* - "Retooling" in-house staff to deal with changing skill requirements brought on by new technology
- *Standardization* - Improved connectivity, the portability of applications across multiple platforms and the adoption of common standards for workstation/PC and network interfaces

Client/server and network and applications integration issues account for just under 50% of the total number of issues cited by respondents; and no other category even comes close, including cost reduction and control.

C
Discrete Manufacturing Applications Trends

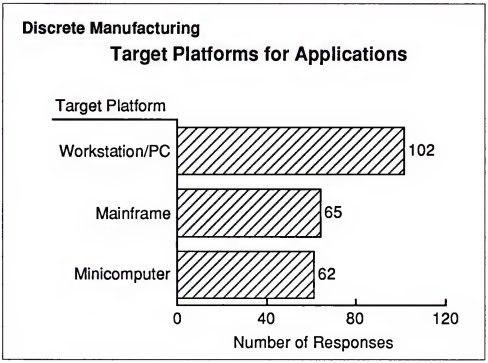
For each application identified, respondents were asked to provide information in the following areas:

- Target platforms
- Project leadership strategy
- Project staffing
- The use of software packages
- EDI utilization
- Outsourcing
- C/S and/or downsizing strategy

1. Target Platforms

Respondents were asked to indicate the primary target platform (C/S-workstation/PC, minicomputer, or mainframe) for each application. Multiple responses were permitted. Exhibit III-6 shows the response levels for each category and indicates that almost 50% of the applications to be developed over the next two to three years will utilize a workstation (WS)/PC-based platform strategy.

EXHIBIT III-6



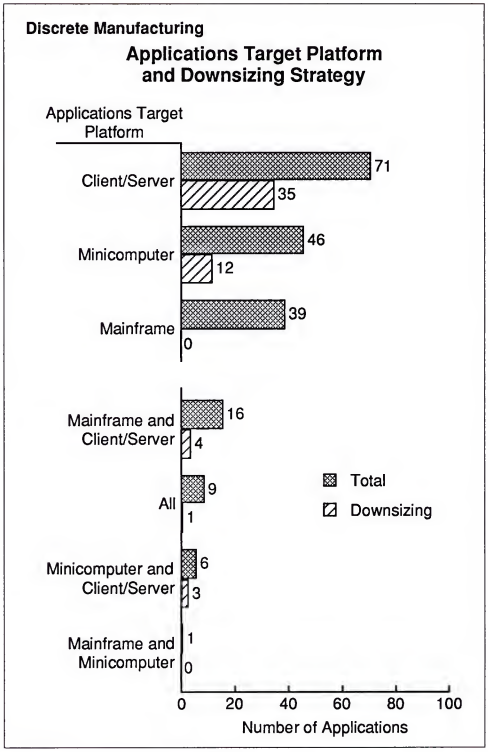
Target platforms were further analysed by the following categories.

- C/S Alone (workstation/PC, LAN-based platforms)
- Minicomputer alone
- Mainframe alone
- Combinations of mainframe and C/S architectures
- Combinations of minicomputers and C/S architectures
- Combinations of mainframe and minicomputers
- Combinations of all three platforms

The data was then cross-tabulated for applications in which respondents indicated that downsizing was a specific strategy for the application in question. The results appear in Exhibit III-7.

When downsizing is a specific strategy, the most frequent (64% of the applications) platform choice is a C/S architecture based on workstations and PCs. Out of the 71 applications utilizing C/S architectures approximately 50% will be implemented to meet a downsizing objective, whereas minicomputers alone will only be used approximately 25% of the time and mainframes alone not at all.

EXHIBIT III-7

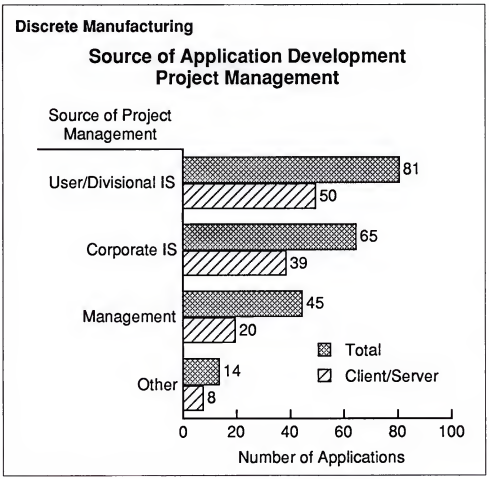


Nevertheless, neither the mainframe nor the minicomputer totally drop out of the downsizing picture. Mainframes will be involved in at least five of the downsizing implementations as part of the overall architecture and minicomputers in 20.

2. Project Management

The dominant role in project management for applications in the discrete manufacturing sector appears to be moving to user or divisional IS departments. Exhibit III-8 shows who will take responsibility for the management of 205 of the 207 applications projects covered in the survey.

EXHIBIT III-8



Some 45 or 22% of these projects will be implemented with end-user line or staff management assuming direct project management responsibility. Including the 81 projects that will be managed by user or divisional IS functions, the total proportion that will be implemented outside the corporate IS function jumps to 62%, confirming the trend toward more management of the applications development by the user.

The 14 projects in the "other" category will be managed by either systems integrators or, in three instances, by the consulting or development arms of the software firms providing the core applications software.

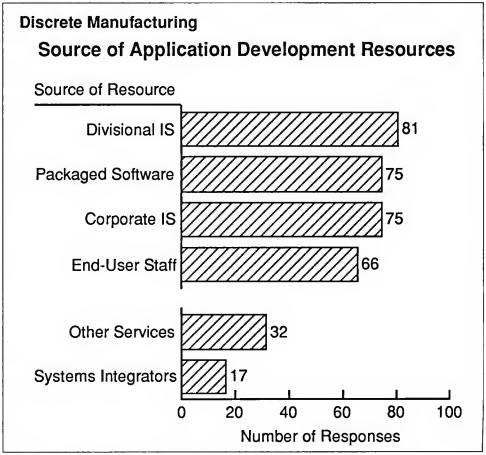
3. Sources of Development Resources

Regardless of who manages these development efforts, the firms surveyed will utilize a variety of resources to staff the implementations. INPUT asked respondents to indicate which of each of the following types of resources would be used to implement each application:

- *Divisional IS* - Systems professionals from organizational units within operating divisions
- *Corporate IS* - Systems professionals from the corporate IS unit
- *End-User Staff* - Professional staff from outside the corporate or divisional IS units. These would typically be professionals directly associated with ongoing management or use of the application being implemented.

In addition, respondents were asked to identify whether they anticipated significant use of software packages or outside professional services as part of the implementation. Multiple responses were permitted. Exhibit III-9 summarizes the responses.

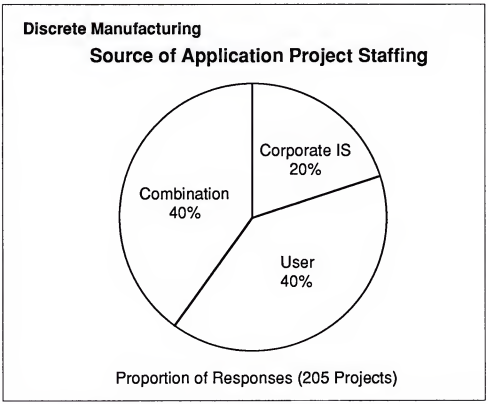
EXHIBIT III-9



This distribution emphasizes the significant role the users are beginning to play in developing applications. User staff will participate in just over 30% of all implementation teams, and user or divisional IS functions will be directly involved in just under 40% of the implementations.

As shown in Exhibit III-10, only a small proportion of the applications will be developed by corporate IS alone.

EXHIBIT III-10



4. Use of Software Products and External Resources

Over 36% of the implementations will make use of applications software packages. As might be anticipated, the applications being implemented predominantly by users reflect a higher proportion of use (45%) of packaged software than do those being implemented solely by the IS function.

To some degree the use of systems integrators and other outside services is lower than anticipated. Systems integrators will only be used in approximately 8% of the implementations, and other outside professional services (largely as part of in-house project teams) will be used in 15% of the implementations.

Client/Server Directions in Discrete Manufacturing

The preceding chapter addressed trends with regard to discrete manufacturing applications development. This chapter addresses the types of applications that will be implemented over the next two years and the role that client/server architecture will play in the implementations.

A
Client/Server Applications Analysis

1. Sample Summary

Exhibit IV-1 shows responses to key survey questions by application category.

An explanation of the column headings follows:

- *Number of Applications* is the total number of applications for each of the application categories.
- The *strategy* heading contains two subheadings, C/S and Downsizing. The C/S count by category indicates the number of applications within the category that will be implemented using a C/S architecture. The count under the heading "Downsizing" represents the number of client/server applications out of the total that are being implemented as part of a general downsizing strategy.
- The *platform* heading indicates the number of times that one of the three major platform classes was mentioned as the key implementation platform.

- The *resources* heading covers six sources of potential resources that will be employed as part of the implementation process. As was the case with the question regarding platform, more than one response per application was permitted.

- Finally, for each application, respondents were asked to indicate whether the application would utilize EDI. The last column gives a tabulation of those responses.

EXHIBIT IV-1

Discrete Manufacturer Implementation Plan by Application Category

Application Category	No. of Applications	Strategy		Platform			Resources						Utilizing EDI
		C/S - Downsizing	Downsizing	Client/Server	Minicomputer	Mainframe	Corporate IS	Divisional IS	User Staff	Systems Integrators	Oth. Outside Svcs.	Packaged Software	
Financial	54	34	21	28	13	22	25	15	18	4	6	29	16
Mfg. Operations	44	20	12	16	16	14	16	16	14	6	10	16	19
Infrastructure	35	29	10	25	9	8	10	19	11	3	4	11	14
Engineering	25	15	7	13	7	4	5	12	8	1	5	4	12
Sales/Marketing	22	10	5	10	6	7	10	10	8	3	4	9	13
Data Base	10	6	1	6	4	4	0	3	2	0	1	4	5
Personnel	6	2	2	2	1	3	2	1	4	0	1	1	2
Inventory	5	1	1	1	4	0	3	3	1	0	1	1	1
Purchasing	4	0	0	0	1	3	3	1	0	0	0	0	2
Logistics	2	1	0	1	1	0	1	1	0	0	0	0	2
Total	207	118	59	102	62	65	75	81	66	17	32	75	86

There are a number of observations that can be drawn from analyzing the summary data.

- A truly significant proportion (57%) of the 207 applications identified in the survey, are planned to migrate to some type of C/S architecture. This is probably higher for discrete manufacturing than it will for some other industries, such as banking and finance, to be surveyed later.
- Eighty-six applications or 42% will utilize EDI (electronic data interchange) in some form.
- As pointed out earlier, packaged software will play a dominant role in the implementation of 36% of the targeted projects.

2. Client/Server Applications by Category

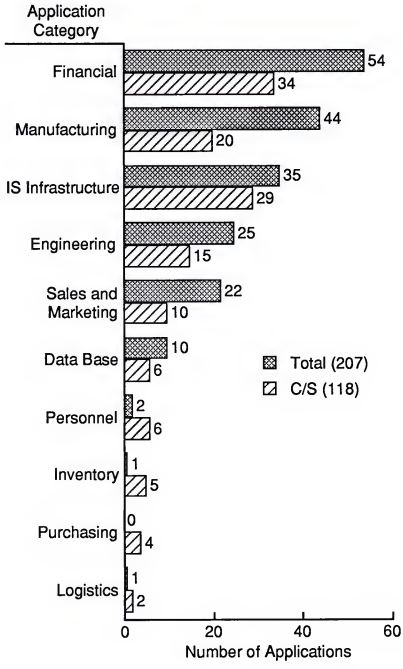
Exhibit IV-2 shows planned implementations by category compared to those that will use C/S architectures.

The third highest number of planned implementations is in the 'IS infrastructure' category. This will represent a significant investment over the next two years. This investment will be heavily weighted toward the installation of LANs (local-area networks) and WANs (wide-area networks) to support the new C/S applications portfolios, along with extensive upgrades to personal workstations to graphically oriented software.

EXHIBIT IV-2

Discrete Manufacturing

Planned Applications Development and Use of C/S by Category

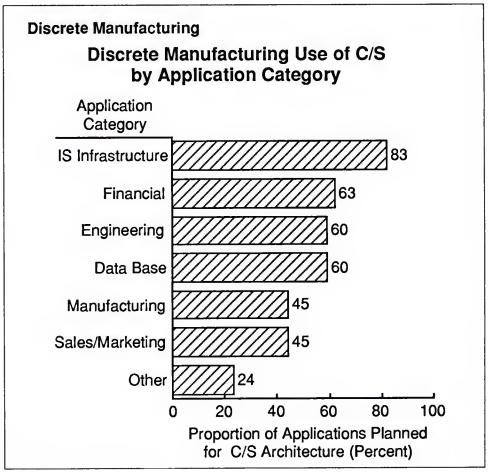


207 applications/158 respondents

Client/server architecture will play a major role in most application/project categories. The data base, engineering, financial, and infrastructure categories will all have C/S implementation rates equaling or exceeding 60%, as shown in Exhibit IV-3. The manufacturing C/S implementation rate is lower, but will probably increase in the future for two reasons.

- Proven, C/S-based, applications software packages for manufacturing are just coming onto the market.
- Some of the infrastructure projects identified in this survey are required in order to create the proper platform environment for upgrades to the C/S-based manufacturing software.

EXHIBIT IV-3



C

Propensity to Use C/S in Planned Applications

Exhibit IV-4 shows the number of each type of application identified for change in the next two years and the proportion of each type that will use C/S.

EXHIBIT IV-4

Discrete Manufacturing

Detailed Distribution of Planned Applications and Use of C/S

Application Category	Application Type	Number Apps.	Number C/S	Share C/S (%)
Financial	Financial Reporting	21	15	71
	General Ledger	13	7	54
	Payable/Receivable	7	4	57
	Payroll	6	2	33
	Other	4	4	100
	Financial Suite Upgrades	3	2	67
Total		54	34	63
Manufacturing	Manufacturing Operations	28	16	57
	Manufuacturing Planning	7	2	29
	Other	5	2	40
	Manufacutring Reporting	4	0	0
Total		44	20	45
IS Infrastructure	Desktop Software	12	11	92
	Hardware Upgrades	8	6	75
	Network Upgrades	6	5	83
	Systems Software	6	4	67
	Other	3	3	100
Total		35	29	83
Engineering	Engineering Graphics	12	6	50
	CAD/CAM	7	5	71
	General Engineering	4	2	50
	Other	2	2	100
Total		25	15	60
Sales/Marketing	Customer Service	2	1	50
	Order Entry/Management	10	4	40
	Sales Forecasting	2	1	50
	Sales/Marketing Mgmt.	8	4	50
Total		22	10	45
Data Base	Data Base Conversion	4	2	50
	Rel/Distributed DBMS Conv.	4	2	50
	Data Conversion	2	2	100
Total		10	6	60
Other	Personnel/HR	6	2	33
	Purchasing	4	0	0
	Inventory	5	1	20
	Logistics	2	1	50
Total		17	4	24
Grand Total		207	118	57

Finally, Exhibit IV-5 ranks the applications to be developed over the next two years by frequency of mention and shows the corresponding use of C/S.

EXHIBIT IV-5

Discrete Manufacturing

Ranking of Planned Applications for C/S

Application Type	Number Apps.	Number C/S	Share C/S (%)
Manufacturing Operations	28	16	57
Financial Reporting	21	15	71
General Ledger	13	7	54
Desktop Software	12	11	92
Engineering Graphics	12	6	50
Order Entry/Management	10	4	40
Hardware Upgrades	8	6	75
Sales/Marketing Mgmt.	8	4	50
CAD/CAM	7	5	71
Manufacturing Planning	7	2	29
Payable/Receivable	7	4	57

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