

PROGRAM MANAGEMENT
IN SYSTEMS INTEGRATION

INPUT

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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.

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Abstract

This report focuses on program management, the discipline that vendors agree is essential for participation in the systems integration market. As prime contractors with responsibility for the implementation of complete solutions, systems integrators must possess the management personnel and systems to manage a diverse set of skills and development and integration processes.

This report examines program management throughout the entire systems integration process—from business acquisition through integration and test. The role of the program manager is examined as are the tools and methodologies that are employed.

It provides vendors' as well as buyers' views of the systems integration process and program management. Results of a vendor survey of current program management tools, processes and capabilities are included. Buyers' assessment of vendors' program management capabilities and satisfaction with systems integration are also presented. Conclusions are drawn about program management, program managers, and the evolution of this important discipline. Recommendations for both vendors and buyers are provided.

This report contains 124 pages and 74 exhibits. It was prepared as part of INPUT's Systems Integration Program.



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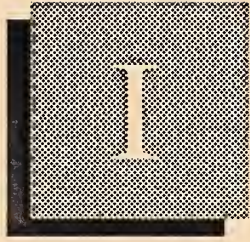
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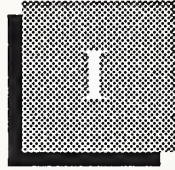
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Introduction





Introduction

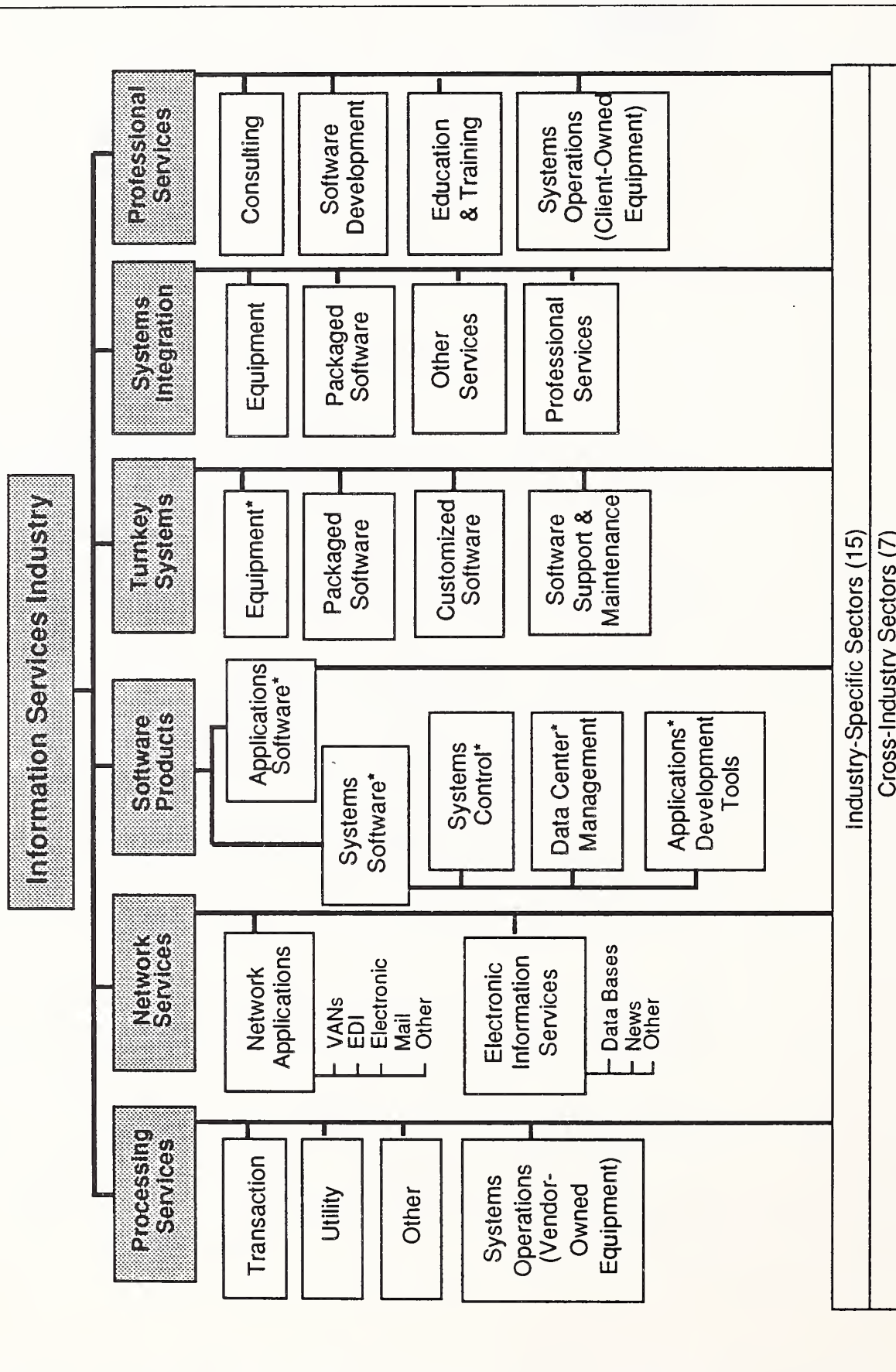
The emerging market opportunities for systems integration (SI) have forced vendors in virtually all segments of the information services industry to re-evaluate their positions in the market, and determine if and how they should participate. While on some fronts the debate continues as to whether systems integration is, in fact, a new service or just another delivery channel, vendors are selling and users are buying more information systems hardware and services under the systems integration umbrella.

INPUT believes that the phenomenon of SI market growth, represents a fundamental change in the industry that will continue to have broad-ranging impact. To examine this phenomenon, INPUT has conducted research on the nature of SI projects, buyer issues, and vendor approaches to systems integration. In 1987, INPUT developed its first market forecast for SI, and has incorporated systems integration as a major delivery mode in its 1988 and 1989 market forecasts. Exhibit I-1 shows the positioning of the SI market relative to the other delivery modes in the information services industry.

This report focuses on both user/buyer and vendor responses to questions about the importance and effectiveness of the "Program Management" systems that are being used to manage systems integration implementation. Growth, or lack of growth, in this market will be determined by vendors' ability to manage the implementation process and successfully deliver solutions to their clients that meet their mutually-agreed specifications. Program management is the basic management process that ties together all of the components and activities in a systems integration implementation, and is the key ingredient that will determine success or failure.

EXHIBIT I-1

Information Services Industry Structure
1989



Source: INPUT

*Broken out by PC/Workstation, Minicomputer, and Mainframe segments

A**Objectives**

The primary objectives of this report are to research and analyze the program management approaches used by vendors in systems integration engagements, and to assess results as viewed by the SI user community. To meet these objectives, the report contains detailed discussions on:

- The evolution and background of program management systems
- The overall process of systems integration from business acquisition through project implementation, transition training, and systems operation and maintenance
- A comparative analysis of the approaches used by vendors to manage the implementation of systems integration projects
- The users' view of the effectiveness of vendor program management processes
- Determination of superior approaches, if any, to program management that increase the probability of success

In addition to the primary objectives there are several secondary objectives:

- Examine the role that the program manager plays in the business acquisition process and the impact of this role on both closing the sale and successful implementation
- Analyze the degree to which vendors use methodologies and tools to propose and implement systems integration projects, and how effective they are in these processes
- Examine the extent to which vendors request and buyers insist that they be involved in the systems integration implementation process
- Identify the sources of program manager candidates and how they are measured and motivated

B**Scope and Methodology****1. Scope**

This report focuses on the domestic U.S. commercial market. There is, however, information presented that reflects the activities and developments in the federal and Canadian markets.

This report focuses on the program management processes used by vendors to manage the implementation of systems integration projects,

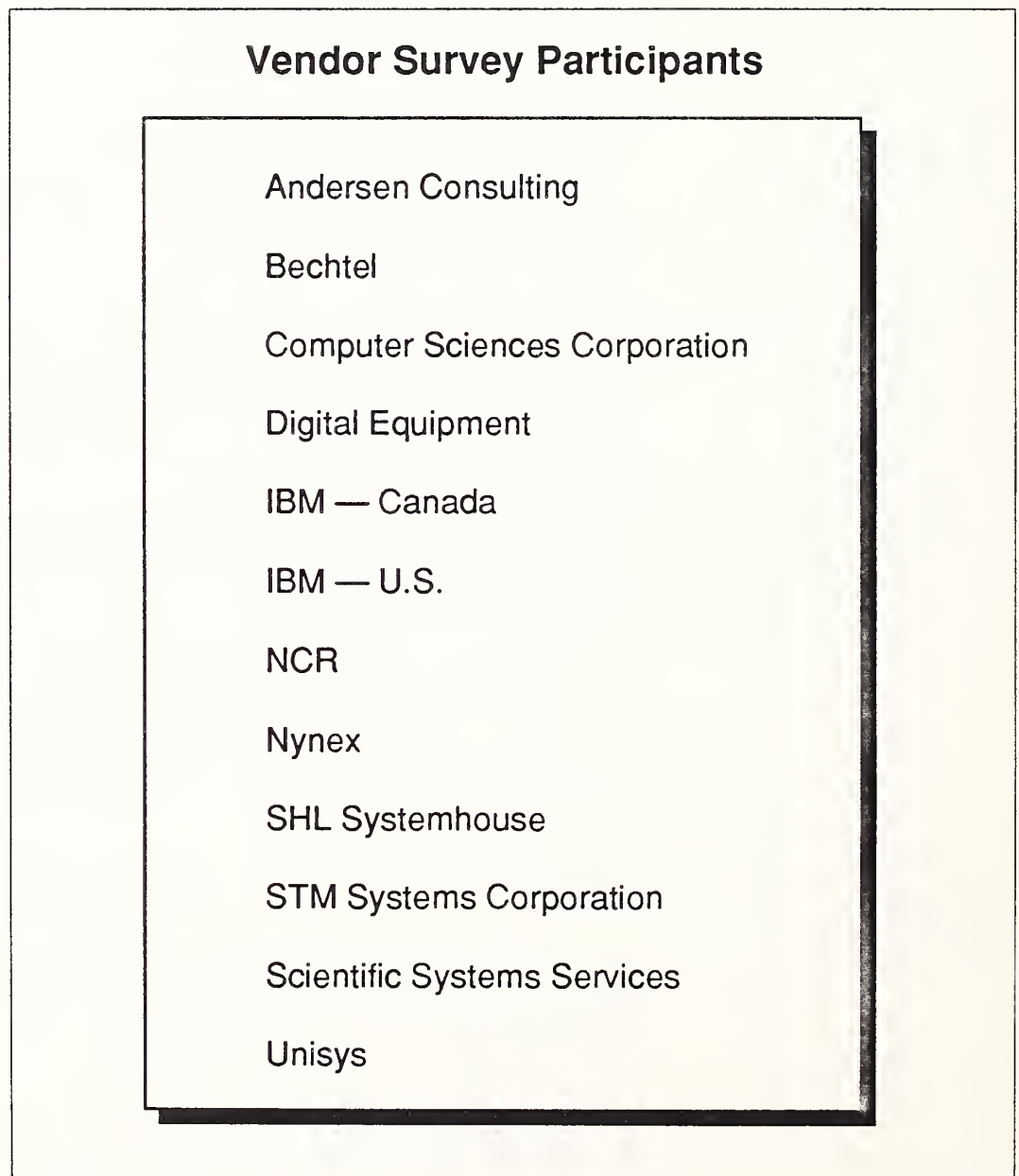
and not on how the actual development and integration activities are performed.

2. Methodology

Information used in this analysis was obtained from two primary sources and a number of secondary sources. The primary sources of information are described below.

- Twelve systems integrators from 11 firms were surveyed as shown in Exhibit I-2. Three of the integrators were Canadian-based and the remainder were U.S. companies. Key contacts at each vendor were identified and the questionnaire was mailed to the interviewee. In some cases responses were completed or clarified over the telephone.

EXHIBIT I-2



- Twenty-two systems integration user/buyers were surveyed in depth through telephone interviews. Respondents to these questions were identified and selected using INPUT's data base of known systems integration contracts. INPUT has identified over 500 potential systems integration engagements, has validated well over 50% of these, and has extensive information on over 130. This data base provides a qualified source of users and buyers.

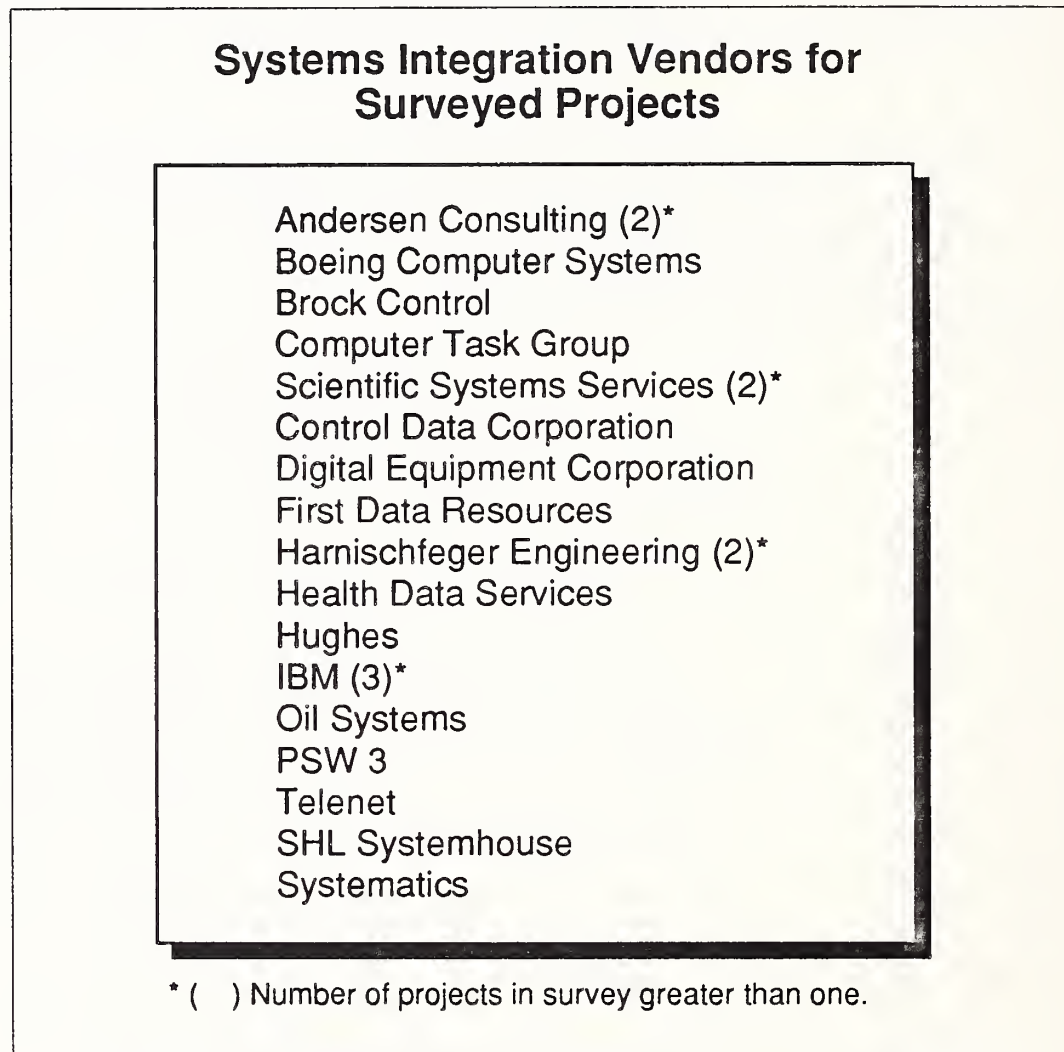
INPUT guaranteed the surveyed user/buyer respondents anonymity, so they are not identified in this report. The programs that were surveyed were from seven vertical industries and covered a fairly broad range of applications as shown in Exhibit I-3.

EXHIBIT I-3

Industry	Application
Banking	Commercial banking
Discrete manufacturing	Warehouse automation (2) Telemarketing Computer integrated manufacturing Paperless factory
Federal	Air traffic control Network
Medical	On-line hospital system
Process manufacturing	Automated plant control Data center consolidation Warehouse control
Services	Satellite network
State and local government	Supercomputer network Family assistance Uniform education reporting Eligibility system Computer-aided dispatch (2) Cost recovery
Utilities	Energy management

Seventeen vendors were identified as the prime contractors on the twenty-two projects examined. See Exhibit I-4. Five of the systems integrators that were identified in the user/buyer survey were the prime contractor on nine of the programs that were surveyed.

EXHIBIT I-4



The distribution of contract size in this research is depicted in Exhibit I-5.

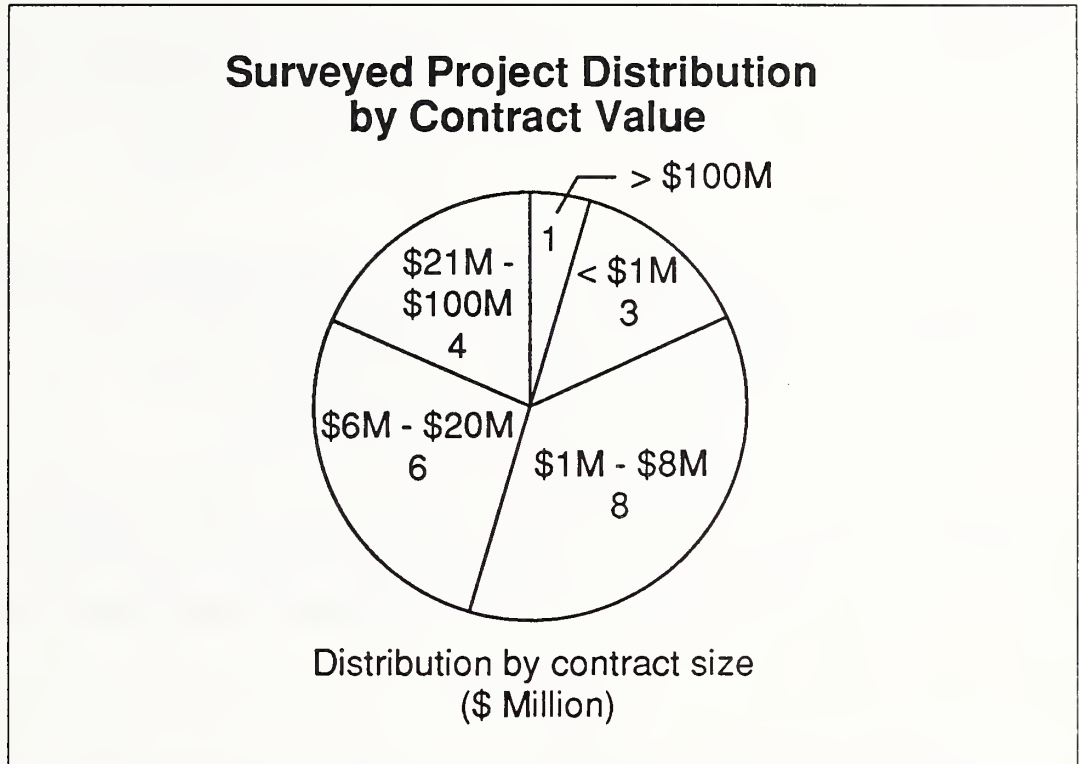
INPUT contacted the Project Management Institute and Performance Management Association as part of the research for this project. Both of these organizations have many local chapters and encourage and communicate advances in program management technology.

C

Systems Integration and the Industry Structure

Prior to 1987, INPUT forecasted the systems integration market as part of the professional services delivery channel. Because of its growth and importance as a delivery channel for hardware and software products as well as professional services, in 1987 INPUT established systems integration as a separate major delivery mode in its information services industry forecast.

EXHIBIT I-5



Systems integration as a delivery mode provides a channel for equipment, packaged and custom software, and the full complement of professional services, from business consulting to education and training. INPUT's annual forecast of SI user expenditures includes monies for all of the products and services delivered through SI contracts, and excludes them from other delivery modes to avoid double counting.

D**Definitions**

The focus of this report is on program management systems, a discipline that is used to manage all of the facets of a large complex program. For one to understand program management as it applies to SI, it is first necessary to understand how INPUT defines systems integration.

1. Systems Integration

A business offering that provides a complete solution to a complex information system, networking, or automation requirement through the custom selection and implementation of a variety of products and services, where information products and services exceed 50% of the contract value. See Exhibit I-6.

2. Systems Integrator

A business entity responsible for overall management of a system integration contract and the single point of contact and responsibility to the buyer for delivery of the specified system function and performance on schedule and at the contracted price.

EXHIBIT I-6

Systems Integration Definition

- A business offering
- Complete solution to complex requirement for:
 - Information systems
 - Networking
 - Automation
- Custom selection and implementation of products and services

A systems integrator will perform, or manage others who will perform, most or all of the following functions:

- Needs analysis
- Specification development
- Conceptual and detailed system design and architecture
- System component selection, modification, integration and customization
- Custom software design and development
- Custom hardware design and development
- Systems implementation, cut-over, test and evaluation
- Life cycle support including:
 - System documentation and user training
 - System operation and/or management
 - System maintenance
- Financing

- Subcontractor management
- Program management

3. Program Management

Program management, as used in the context of systems integration, is the process used by the vendor to manage the development and integration of all of the components of a major system solution as described above. Program management, like systems integration, is terminology that has evolved from the federal market, where the developments of defense systems and then major information support systems were identified as program development and management activities. The term program management tends to be broader than the term project management, and can encompass all of the activities in a systems integration program from needs analysis through life cycle support.

4. Other Definitions

Throughout this report there are many references to systems integration capabilities. These capabilities consist of tools, skills, and technical resources that are required to execute systems integration contracts. To ensure consistency of interpretation, definitions for some of these capabilities are provided here:

- Consulting Services—Project front-end feasibility studies, business analysis, and/or hardware, software, network technology selection, and trade-off analyses
- System Design—Design of the systems solution based on a set of requirements
- Integration and Test—The process of combining all of the components of a system and then testing them to ensure that they work together properly
- Information Systems Equipment—Processors, storage and related peripherals, including mainframe, mini and microcomputers
- Telecommunications Equipment—Telecommunications devices, e.g. controllers, switches, multiplexors, network control systems and PBXs
- Software Development—Custom software design, coding and testing
- Applications Software Packages—Vendor-provided “off-the-shelf” applications packages delivering functional capability unique to a particular industry or cross-industry need

- **Systems Software Packages**—Vendor-provided systems control programs for information processing and communications equipment
- **Network Management**—Operation, monitoring, and control of a communications network as a systems operation service
- **Systems Integration Methodology**—“Life cycle” methodology used by a systems integration vendor to define, develop and manage the implementation of a systems integration program
- **CASE (Computer-Aided Systems Engineering)**—Application of computer-based technology to the information systems specification, design and programming process

E

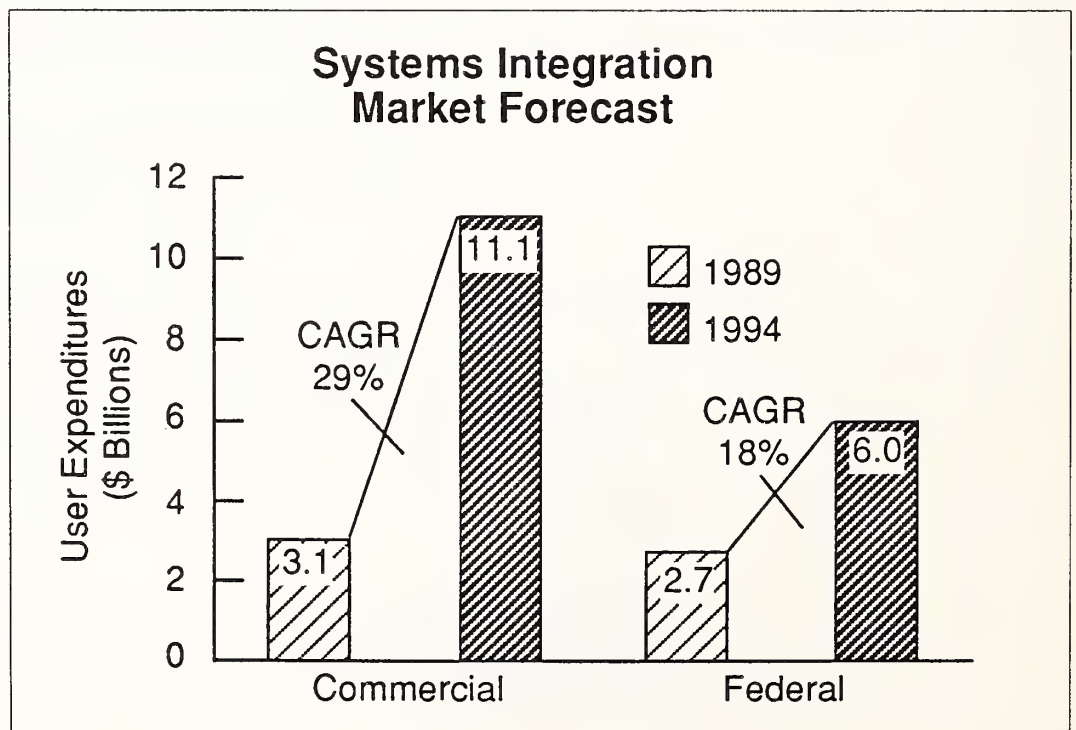
Synopsis of the SI Market Forecast

1. Total Market—Federal and Commercial

INPUT forecasts the total market for SI to grow to \$17.1 billion in 1994 from a 1989 base of about \$5.8 billion. This represents a compound annual growth rate (CAGR) of 24%, the fastest for any of the six major information services delivery modes. In total, systems integration accounted for about 6.2% of the 1989 industry revenue of \$94.0 billion, and will represent about 9% of 1994's \$192.0 billion information services industry market.

The commercial SI market is growing more rapidly than the federal market. See Exhibit I-7. There are a number of driving forces fueling this growth:

EXHIBIT I-7



- There is a rising demand for connectivity on all levels within most U.S. industries. The demand occurs at the network, data, and applications levels for systems that in many instances have operated independently in the past.
- There is also a major rebuilding of infrastructure. Independent networks and processing centers built in the 1970s and early 1980s are being combined into single network structures with multiple processing nodes to support corporate-wide data bases and integrated application functions.
- Operational executives (end-user managers) are increasingly in command of their own systems development strategies. Lacking in-house resources and with limited technical capability, they are turning to SI vendors to implement the solution.
- Finally, applications are growing increasingly complex, taxing the capability levels of many in-house systems organizations. The use of SI offers the opportunity to overcome the complexity issue by seeking solutions outside, and transferring the increased risk associated with this complexity to external vendors.

While the federal government market's growth rate of 18% is less than that of the commercial market, it still offers opportunities over the next five years. Today the federal government represents the single largest industry market sector. A number of factors will continue to stimulate growth, despite restraints on federal spending related to the deficit.

- There is mounting demand in both the defense and non-defense components of the federal government for productivity improvement. That demand is expected to be translated into new systems requirements and development.
- Furthermore, there continues to be a shortage of qualified technical staff in the federal arena. Controlled "head counts", limited career opportunities, and lower wages work against the federal government in retaining the already scarce resources required to do sophisticated systems implementations. The tendency will continue for agencies to buy solutions from outside the government.
- Another factor pushing the federal government toward the use of integrators is the desire to share implementation risks. The use of SI places the majority if not all of the responsibility for success on the vendor, reducing exposure internally.
- Finally, the administration is supporting the move to make major technological upgrades. Most federal installations, particularly in the defense segment, have not seen an influx of new technology since the

end of the Vietnam War. Major upgrades in processing and network capability will be required over the next several years.

2. Industry Segmentation

The commercial SI market is divided by INPUT into 15 major vertical industry sectors as shown in Exhibit I-8.

EXHIBIT I-8

Industry Sector	1989	1994	CAGR 1989-1994 (Percent)
Banking and finance	320	1,332	33
Discrete manufacturing	780	3,510	35
Education	72	175	20
Insurance	165	610	30
Medical	210	610	24
Process manufacturing	133	330	20
Retail distribution	185	930	38
Services	40	134	28
State and local government	465	1,382	24
Telecommunications	150	385	21
Transportation	133	310	19
Utilities	220	785	29
Wholesale distribution	132	300	18
Other	82	250	25
Federal government	2,710	6,047	18

Overall, the forecast paints a rosy picture for systems integrators, almost regardless of their selected markets. The question of how successful a vendor will be, however, will have much to do with how it selects, approaches, and meets the competition in its targeted industry sectors and how effectively it manages the implementation of the programs it wins.

F**Report Structure**

The remaining chapters of this report are organized as follows:

- Chapter II, the Executive Overview, provides a summary of the contents of the entire report.
- Chapter III of this report, The Systems Integration Process, describes the phases of the systems integration process and briefly introduces the importance of program management to each of them.
- Chapter IV, Vendors' Program Management Processes, describes how vendors organize, assign responsibility and use program management in a systems integration program, based on the results of the vendor surveys.
- Chapter V, Buyers' Experience with Program Management, describes buyer/user views of the importance of program management and their experience interacting with system integrators' program management systems.
- Chapter VI, Conclusions and Recommendations, presents INPUT's conclusions and recommendations regarding the need for program management, the important elements of these systems, and how to implement and use them successfully.

The Appendixes contain:

- Appendix A: A partial list of definitions which should be useful in understanding the contents of this report.
- Appendix B: The vendor and user questionnaires used to obtain the primary research information used in this report.

G**Related INPUT Reports**

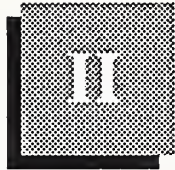
Recent INPUT reports relevant to the systems integration area include:

- *Systems Integration Forecast and Trends, 1989-1994*
- *Systems Integration Competitive Analysis*
- *Commercial Systems Integration, Western Europe, 1988-1993*
- *Systems Integration Buyers Issues Report, 1988*
- *Commercial Systems Integration Implementation*
- *Federal Systems Integration Market*
- *CASE Market and Opportunities, 1988-1993*



Executive Overview





Executive Overview

This report focuses on the management processes that are employed in systems integration programs. Systems integration is an approach to installing complex systems that was introduced to the commercial market for the first time just a few years ago. Today, based on the number of projects that have been completed, it appears to be a success—yet there continues to be concern as to its viability based on a few well-publicized “failures” that have attracted an inordinate amount of attention.

For the market growth to continue, it is essential that the vendor community employ sound management procedures to reduce the risk inherent in these projects, and to complete them on schedule and within budget. It is equally important that buyers and users recognize the importance of program management, how to evaluate vendors capabilities in this area, and their own responsibilities in successfully managing their systems integration programs.

The objective of this report is to present a current and accurate analysis of the critical factors in managing these complex programs, and the techniques, methodologies, processes and tools that vendors are currently using to support systems integration implementation.

A

The Systems Integration Marketplace

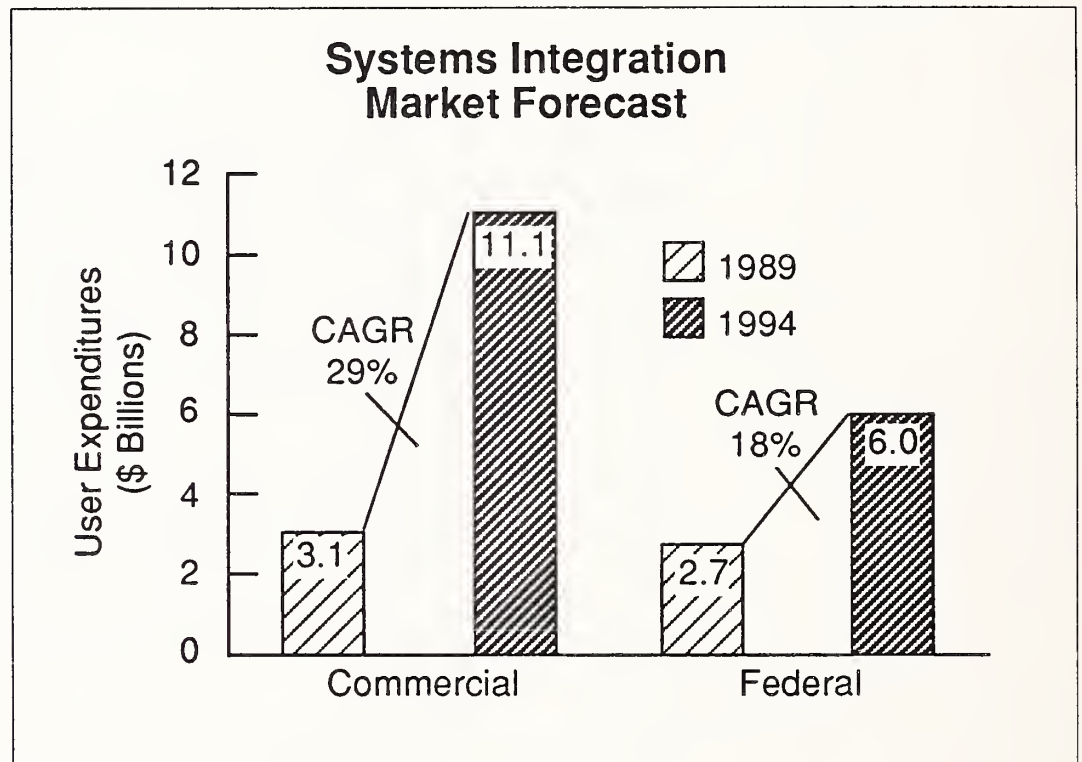
INPUT defines systems integration as a business offering that provides a complete solution to a complex information system, networking, or automation requirement through the custom selection and implementation of a variety of products and services. To be included in this definition, over 50% of the products and services must be information industry products and services.

A systems integrator is defined as a business entity that is responsible for overall management of a systems integration program, and is the single point of contact and has responsibility to the buyer for the delivery of the specified system function and performance on schedule and at the contracted price.

In the early 1980s, INPUT recognized the commercial systems integration market as one of the major growth opportunities in the information services markets. INPUT has been tracking systems integration since then and has published a number of research reports examining this market from both a buyer's and a vendor's perspective.

The commercial (i.e., non-federal) market will be almost double the size of the federal market by 1994 as shown in Exhibit II-1. Detailed forecasts of 15 vertical industry sectors, as well as discussion of the systems integration market characteristics and trends, are contained in the *Systems Integration Forecast and Trends, 1989-1994* report.

EXHIBIT II-1



B

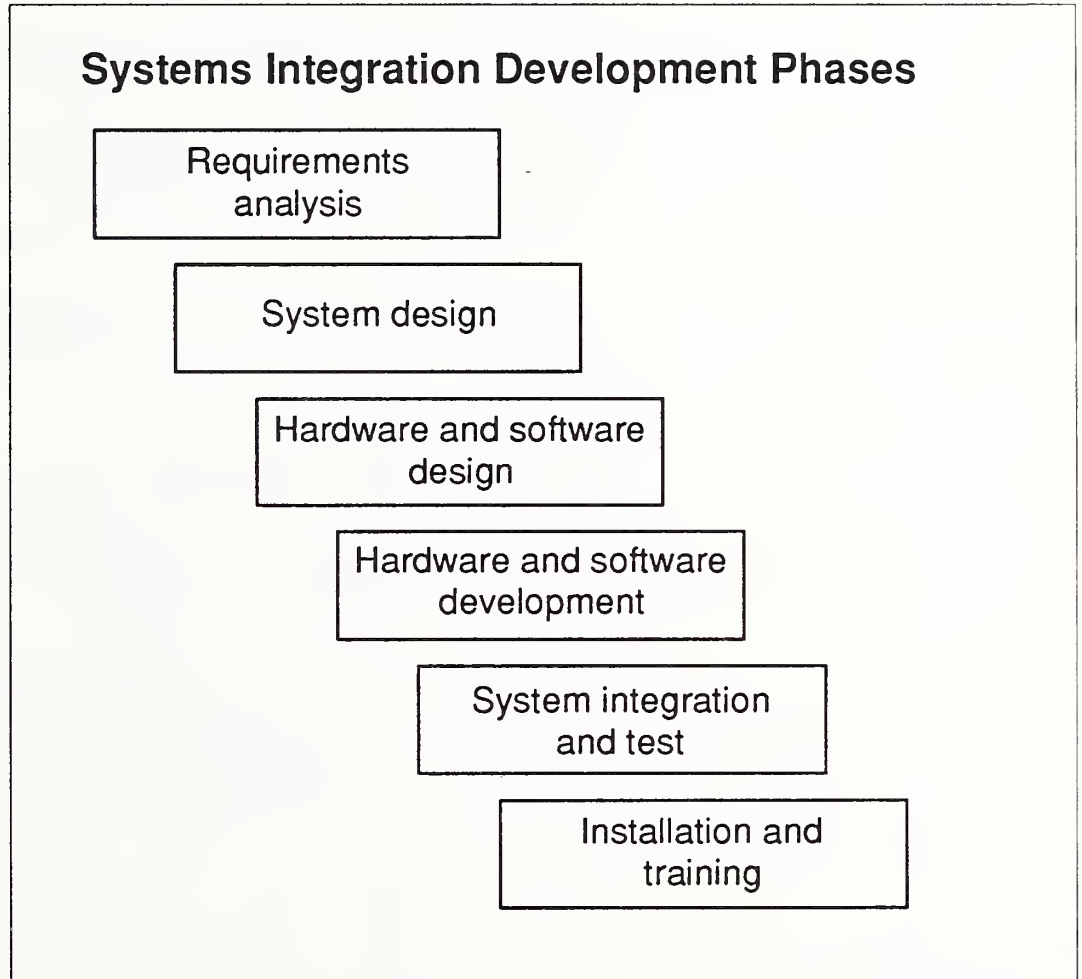
Program Management

While the two major systems integration markets, federal and commercial, are dissimilar in some respects, they also possess many similarities. One of these similarities, the program management processes, is the subject of this report.

Program management is defined in this report as the process used by the systems integration vendor to manage the development and integration of all of the components and activities of a major system solution. This can encompass all of the tasks from requirements analysis through installation and training. It also includes managing the integration of many activities that require multiple technical and business disciplines. The major development activities of a systems integration project are identified in Exhibit II-2. The disciplines and skills required to implement

these activities include hardware and software engineering, systems architecture, systems engineering, integration and test, administration, financial control, contracting, maintenance, and in some cases, systems operation skills to run the system.

EXHIBIT II-2



C

Vendor Program Management Processes

All of the 12 vendors that participated in this survey state that they have a formal program management system and, with minor exceptions, its use is required on all systems integration programs. Important vendor program management characteristics, summarized in Exhibit II-3, include:

- Involving the program manager early in the business acquisition process will pay dividends to both the buyer/user and the vendor. All of the vendors surveyed said they followed this practice, yet 41% of the buyers/users said the practice was not followed on their project. Regardless of the statistics, the vendors believe it is valuable to have the program manager actively participate in the proposal process. It allows him to actually develop or approve the architecture, schedule, and pricing—all areas that he will have to manage during the performance phase of the project. From the buyer's perspective, early contact with

EXHIBIT II-3

Program Management Characteristics

Vendors:

- Require qualified program managers
- Involve program managers in the proposal process
- Employ tested processes and practices

the program manager will provide confidence in the program manager's experience and industry and application knowledge.

- Vendors employ tested processes and practices. They include:
 - Risk analysis and risk management must be practiced throughout the systems integration process, from client qualification in the business acquisition process through final integration and test. The program manager needs a full set of approaches and tools in this area. This report identifies many of these tools and techniques.
 - A complete, written, detailed program specification is a necessity. It provides a definition of what the client expects, and provides a "base line" for the program. The impact of change requests on schedule and cost are measured against this base line.
 - Communication is identified by both vendors and users/buyers as the single most important factor in successful program management. Both vendor and user must work at enabling free and open communication among all of the parties involved in the project.
 - Management of an SI project entails many decisions that involve both client and vendor. Most vendors prefer a single point of client contact with decision-making authority, and recommend this to their clients. Buyers recognize this too, and usually establish an interface organization of their own volition well ahead of the vendor's recommendation.
 - Rigorous change control processes are absolutely essential and should be defined in the program contract.

- One of the reasons for having the program manager in the proposal process is to ensure that he agrees with the plans and schedules he will eventually have to implement. One of the easiest ways to get into trouble with a systems integration program is to establish unrealistic plans and schedules.
- A clear set of specifications addresses the client's written expectations, and open and honest communication addresses the unwritten ones. Knowledge of the client's industry and business operations also assists in ensuring that there is a complete understanding of the customer's expectations. Front-end consulting and study contracts that address user needs analysis are also extremely valuable in understanding the client's expectations.
- Systems development and integration consists of a number of activities that are executed by information industry professionals to complete a systems integration contract. It is important to capture these activities as repeatable processes, to improve the productivity of those who perform them, and to improve the ability to manage projects to completion. Some vendors have integrated these processes into an end-to-end systems integration methodology. INPUT believes that the discipline that this provides, particularly when CASE techniques are included, will significantly improve vendor productivity and competitiveness.
- Last, but most important, is a qualified program manager. As the systems integration market continues to expand, well-trained, experienced, and competent program managers will become a rare and precious commodity. Vendors need to ensure that they have programs in place to adequately compensate, motivate, and challenge them.

D

Buyers' Experience

The buyers surveyed agreed with many of the vendor findings and also added additional insight to the study. Exhibit II-4 summarizes their views and is described below:

EXHIBIT II-4

Buyers' Experience Summary

- Buyers generally satisfied
- SI driven by lack of resources and skills
- User organizations are predominant buyers
- Tools and methodologies not too visible

- Buyers/users of all twenty-two of the programs studied evaluated the solution provided by the vendor as successful. Twenty of the respondents were satisfied with the vendor they used to the extent that they would use the same vendor again; two would not. All of the respondents would use systems integration again should the need arise. Systems integration as measured in this research is successful, and INPUT has confidence that this market will continue its rapid growth.
- Systems integration is being driven by a lack of skilled and available resources. INPUT believes that this environment will continue and in fact be exacerbated as information systems needs grow. As the competition for professional skills heats up, information services firms will have an advantage. They generally have an earlier look at advanced technology, more opportunities for development challenges, less maintenance than in-house organizations, and provide real career opportunities to top positions in firms that are at the billion-dollar revenue level.
- This study identifies that, as INPUT has forecasted, users are becoming much more involved in the buying decisions and the interface to the vendor during the implementation process. In the programs that were examined in this research, the user organization was more involved in establishing specifications and was the buyer interface more often than the internal IS organization.
- In many of the programs examined, the buyer/user was not familiar with the tools or methodologies employed by the vendor, and many buyers did not think the tools were either important or effective. INPUT believes that the industry should expend effort to improve this image through education and some degree of tool standardization. This will not only benefit vendors through improved program performance, but should also provide standard tools that internal client organizations can use to improve their own productivity and success.

E

Recommendations— Vendor

Vendor recommendations that were concluded from this study are summarized in Exhibit II-5 and include:

- Vendors should continue to build their business consulting skills. Business consulting will play an increasingly important role in winning systems integration awards and managing successful SI programs. The easiest way to develop an understanding of the client's business and to reach agreement on a reasonable set of program expectations is through participating in the front-end needs analysis. Vendors with business consulting credentials and those that participate in requirements contracts would seem to have an advantage both in winning and performing SI contracts.

EXHIBIT II-5

Vendor Recommendations

- Build business consulting skills
- Encourage process and methodology improvements
- Challenge and motivate program managers
- Examine CASE

- Vendor management should encourage the development and enhancement of systems development and management processes. Well-documented and repeatable processes provide essential discipline, reduce risk, and improve program performance. Integrating these processes into an overall SI methodology will provide additional management benefits and be perceived by buyers as a competitive advantage.
- SI vendors should examine and evaluate Computer-Aided Systems Engineering (CASE) tools and methodologies for inclusion in their systems integration development activities. As a repeatable methodology, CASE has applicability in systems integration to improve productivity and mitigate risk.
- Vendor management should ensure that incentive programs and career paths are designed to challenge, motivate and keep qualified program managers. There is a shortage of qualified program managers and there will be increased competition for the competent ones.

F**Recommendations—
Buyer**

Buyer recommendations are summarized in Exhibit II-6 and include:

- The buyer must ensure that the program specifications are complete if he expects the program to provide the solution he is seeking and to be completed on schedule and within budget. The buyer may develop the specifications or may choose to have a vendor develop them, either as a standalone contract or as part of the proposal process. Regardless of how they are developed, detailed specifications become the basis for the contract and should be agreed on before implementation is initiated.

EXHIBIT II-6

Buyer Recommendations

- Insure specifications are complete
- Evaluate vendor program management credentials
- Include change provisions in contract
- Actively participate, foster communications

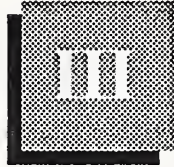
- Buyers should insist that vendors describe their program management systems as part of the proposal and consider them as important in their evaluation criteria. The buyer should also investigate the vendor's prior SI experience in the buyer's industry. When the vendor has an effective program management system and has employed it in the buyer's industry, the buyer's job is easier and the odds for successful performance are much more favorable.
- The buyer and vendor should reach agreement on how change will be introduced and managed during program implementation. Changes will occur and the process to manage it should be documented as part of the contract, describing how changes will be requested, sized, and agreed on.
- The buyer organization, including executive management, must actively participate in all phases of the SI program. Design and implementation of a major systems solution cannot be delegated to a vendor or to an in-house information systems organization. SI programs often introduce significant change to the organization and it must be prepared to assimilate this change. Buyer management must establish its own internal interface to the vendor to manage the day-to-day implementation problems and questions and to introduce the solution to the users. Most importantly, management must encourage and insist on clear and open communications among all of the parties participating in the program.

INPUT believes that the systems integration market is healthy and will continue its growth into the decade ahead. Effective program management systems will be essential to this growth.



The Systems Integration Process





The Systems Integration Process

Vendors' ability to manage the implementation of systems integration programs will be the most important factor in the growth and success of this market.

The twelve vendors who participated in this study were asked what they believed to be the most important factors in the successful management of a systems integration program. The results of that query are summarized in Exhibit III-1, which includes all factors that were mentioned by more than one vendor.

EXHIBIT III-1

Factor	Number of Vendor Mentions
Communications	5
Adequate specifications	4
Project plan and schedules	4
Well-disciplined program manager	4
Repeatable methodologies	3
Adequate staffing	2
Understanding clients needs and goals	2
Milestones	2
Management of customer expectations	2
Change management	2

As in many other fields that require vendor and client interaction, communication between the parties was ranked number one. Other factors that were identified by a single vendor include: good system architect, closed loop feedback management system, comprehensive work breakdown structure, alternative solutions for risk areas, well-defined acceptance criteria, and user involvement and commitment. These factors will be discussed in more detail in Chapters IV and V of this report.

This chapter provides an overview and introduction to the program development process. It is important to examine the overall systems integration process from identification of the customer's needs and requirements through the training and transition to the new system, to truly understand the role of program management and the program manager. The first section of this chapter describes the various phases of the SI process, the second section focuses on the various steps that are included in performing the actual system development and implementation.

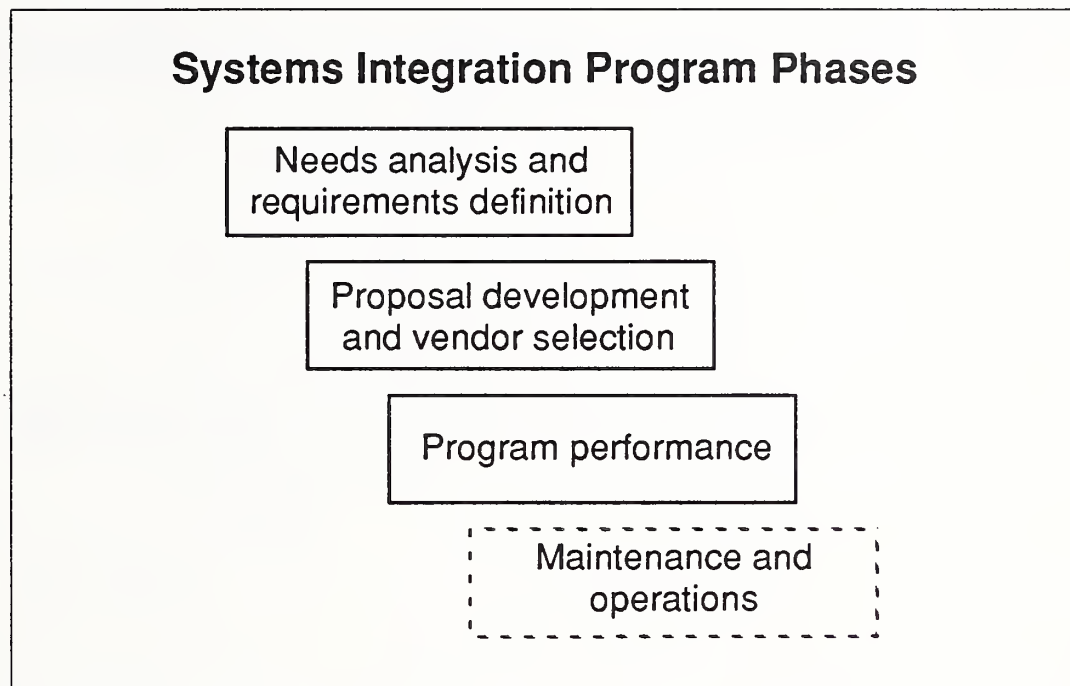
A

The Systems Integration Process

The major steps of acquisition and implementation of a major information support system through a systems integration firm are identified in Exhibit III-2. They include:

- An initial phase of any SI program is identification of user needs and the requirements of the future system. This activity can be completed by the client or by a professional services firm under a requirements definition contract. It can be defined as a part of the proposal, or as the first stage of a systems integration contract. Most often this phase is a separate activity where the results will be incorporated in the requirements that are identified in a request for proposal (RFP). Federal requirements definitions are generally prepared through the first two alternatives, defined by the client or through a separate requirements contract. Commercial programs requirements definition may be developed through any of the alternatives mentioned above. When the contract is finally awarded and before the system is implemented, it is extremely useful for the program manager to understand both how this process was performed and its results, and if possible, to have participated in the process.
- Once the RFP is issued, the vendor develops a proposal that addresses the defined requirements and specifications. The vendor proposal usually includes functional specifications, design specifications, a proposed system architecture, and implementation schedule and cost commitments. The cost commitment is often fixed-price, and the schedule implies staffing and skill levels that the vendor must plan to satisfy, either with his own or subcontractor personnel. The proposal will often commit the vendor to customer-required or vendor-specified

EXHIBIT III-2



acceptance criteria and procedures. This phase also includes proposal evaluation and vendor selection, activities that are performed by the client.

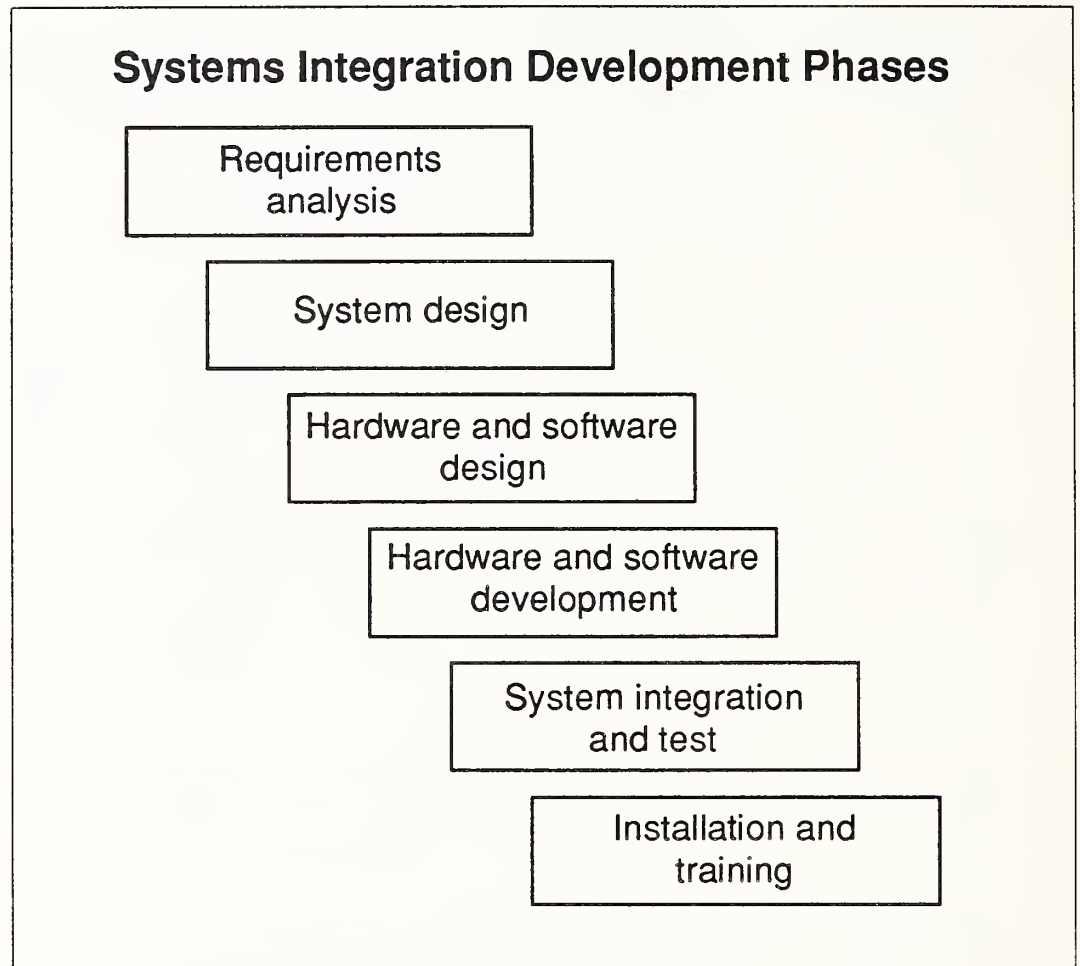
- The performance phase is where the actual hardware and software acquisition, software development, integration and installation activity occur. Here the program management system must meet the commitments that were promised in the proposals. The program management system must identify and track all of the activities in the program to ensure that the system is delivered as promised in the proposal both on schedule and at the cost that was established when the proposal was developed. Integration and test of the system are included in this phase, as well as acceptance testing. The acceptance test may have to satisfy a set of predetermined test criteria that were identified in the contract. This area will be discussed in more detail in Section B of this chapter.
- An additional optional program phase, maintenance and operations, is also identified in Exhibit III-2. Maintenance of equipment is often included as part of the original contract. Systems operation is an option that may also be selected.

B

The Development Process

Exhibit III-3 provides more detail of the performance phase of the systems integration program process. Some of the activities identified may have been begun or completed as part of the proposal or an earlier design contract. In addition, many programs do not require hardware design or development, as they can be accomplished with standard hardware products. The exhibit identifies a number of program activities that

EXHIBIT III-3



require unique skills and the knowledge of a number of diverse disciplines. Included are hardware and software engineers, systems architects and systems engineers, integration and test specialists and training and maintenance personnel. It is the role of the program manager, using program management disciplines, to orchestrate how these skills and activities will be scheduled and managed to provide a solution that satisfies the user's requirements and is accomplished within the cost and schedule constraints established in the proposal phase. The combination of discipline, knowledge and leadership skills required of a program manager is a rare commodity.

Few vendors, if any, have all of the skills and resources required to implement many of the complex systems that their clients request. They must go outside of their own firms to acquire unique or more cost-competitive skills from subcontractors to satisfy their clients specifications. This introduces an additional level of complexity, as the program manager must also have the ability and management support tools to integrate the subcontractor's products and skills into the final solution. In fact, on large programs a new position, the subcontractor manager, has been added to the program management team.

Most systems integration vendors and large information systems organizations are developing and using processes and tools to assist in managing this complex set of steps and processes. Some vendors have or are developing methodologies that bring the individual processes and tools together into an integrated process.

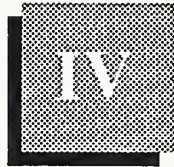
These processes and repeatable methodologies, supported by a standard set of tools, will become essential to successful program implementation.

The following chapters examine, from both the vendor and buyer perspective, the management systems, processes, methodologies and tools that are used to manage the activities described in this chapter.



Vendors' Program Management Processes





Vendors' Program Management Processes

This chapter examines how the vendors that participated in this research implement program management disciplines. The first section, program management in the business acquisition process, focuses on the role of program management in the buying phase of the systems integration cycle. Section B provides a detailed discussion of how vendors apply program management disciplines in the performance phases. Section C focuses on obtaining and retaining good program managers. Finally, Section D summarizes the findings of the vendor view of program management.

A

Program Management in the Business Acquisition Process

The vendor's business acquisition approach establishes the foundation for the implementation process and has a strong bearing on whether the program will be a success. The decisions and commitments that are made during this phase of the program will shape the client's expectations and establish a basis for how the client will measure success when the program is complete. Therefore, most vendors have established processes and procedures to identify and qualify systems integration opportunities and to develop responsible and profitable responses.

1. Opportunity Identification and Qualification

All of the vendors surveyed indicated that they have established processes for identifying and qualifying systems integration opportunities. Exhibit IV-1 summarizes these approaches. Smaller professional services companies that lack broad market coverage, and firms with a business process change focus, seek out specification and study project contracts that have the potential of growing into full-scale systems integration projects. Firms with particular vertical market or technical expertise target opportunities where their experience will provide them with an advantage over competition. Federal integrators identify federal programs that match their capabilities early in the budget cycle and carefully track them through the approval process. These same federal

EXHIBIT IV-1

**Business Acquisition
Opportunity Identification**

- Specification and study contracts
- Target marketing
- Track federal programs

integrators admit that they are frustrated by the lack of the same type of information in the commercial market and are struggling to identify qualified commercial opportunities.

Many of the vendors surveyed have established review or screening processes to qualify opportunities. See Exhibit IV-2. One firm requires that an executive review each RFP to determine if the firm should bid or not, while others have established review boards or committees to provide technical and business assessments. Computer systems vendors tend to depend on their vertical industry marketing organizations to determine if the company should bid.

EXHIBIT IV-2

**Business Acquisition
Opportunity Review and Screening**

- Technical review boards
- Executive review of all RFPs
- Formal screening committees
- Industry marketing screening
- Quantitative commitment analysis
- Competitive assessment

Vendors also employ analytical approaches to assist in the qualification process. Some have developed quantitative approaches to assist in the bid/no bid decision. These focus on areas such as customer commitment to the project, competitive assessments of technology, skills, products, cost and price, as well as assessing risks associated with all aspects of the program.

Regardless of the approach used, every vendor attempts, through the qualification process, to improve its odds of winning and to reduce the cost of bidding and proposal.

2. The Proposal Process

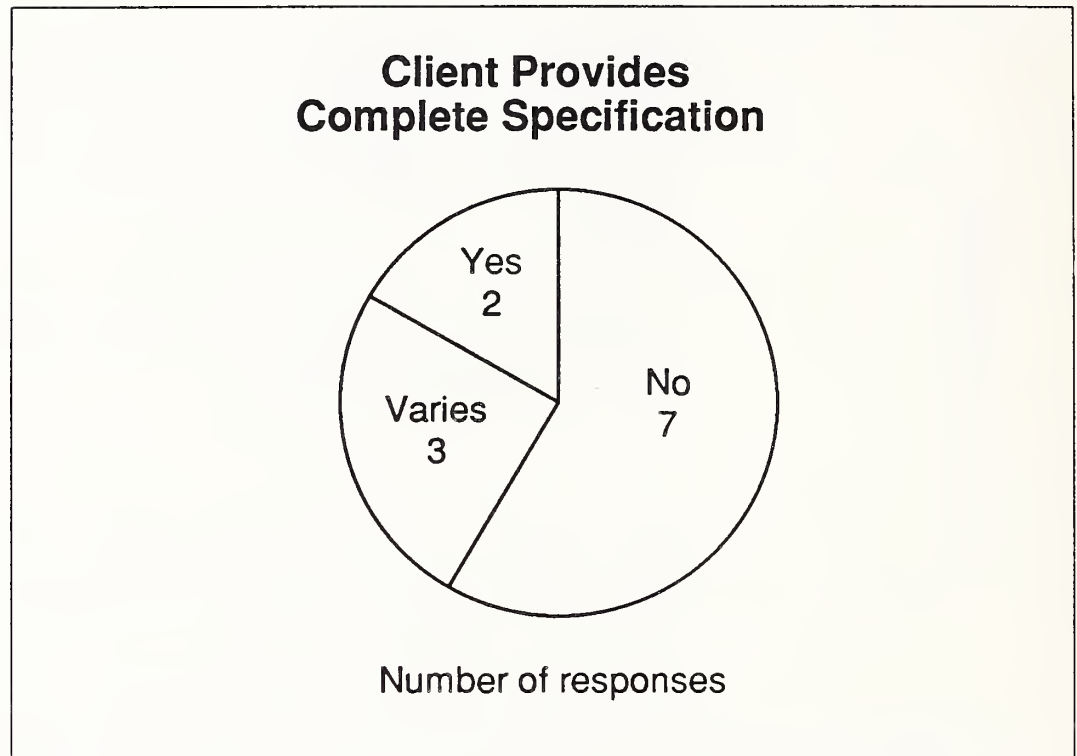
Once positive opportunity qualification is complete, the vendor develops a proposal that is both competitive and responsive to the customer's requirements. Proposals for systems integration not only respond to the customer specifications, but also become the blueprint for vendor implementation. How effectively this step of the buying process is executed often determines the success or failure of the client's project and the ultimate profitability of the vendor's business proposition. The proposal represents, to the client, the vendor's understanding of the client's requirements, and the vendor's proposed solution, usually at a fixed price, to the client's business problem.

Unfortunately, the vendors studied said the client's specification, the foundation for a successful proposal and implementation, is seldom complete when the bid solicitation is submitted to the selection vendor(s). Exhibit IV-3 shows that only two of the twelve vendors surveyed indicated that their prospective clients generally have a complete specification for the system they seek. The remainder generally receive incomplete specifications, thus making their proposal preparation even more difficult. It should also be noted that federal clients generally provide a much more complete functional/performance specification than commercial customers do and, in fact, the two vendors who indicated that they generally receive complete specifications do a lot of business in the federal market.

There are a several alternatives that vendors employ to obtain a complete specification. Sometimes they attempt to establish a separate contract to develop the specifications, or in other cases they offer to develop the specification with the customer as part of the proposal process.

In addition to the risk inherent in an incomplete specification, there are a number of other risks associated with systems integration programs, many of which can be identified in the proposal process. All of the vendors surveyed indicated that they employ risk mitigation practices in

EXHIBIT IV-3



the proposal process to reduce the impact of known risks in the implementation process. These risk mitigation features are identified in Exhibit IV-4. They include:

- When specifications are inadequate or incomplete, vendors sometimes recommend that the program be divided into separate phases to reduce the risk for both parties. The latter phase(s) are not proposed or contracted until the initial specification phase is completed.
- Formal approval processes with required sign-offs by pre-identified functional, staff and executive management are common. They insure that each of the major functional and staff disciplines recognize and agree to the risk in their area of expertise.
- Vendors often have to include bonding in their proposal to protect the client against non-performance by the vendor. Vendors also need to consider property damage and mal-practice insurance.
- Systems integration bids often include development risk. The bidding strategy may require that risk be taken when pricing these activities. The teaming arrangement should insure that all of the vendors recognize and are willing to share this pricing risk.
- When there is technical risk in a proposal, vendors will examine alternative solutions that may be used as a fallback if there is problem implementing a new technology.

EXHIBIT IV-4

**Proposal Process
Risk Mitigation Features**

- Separate contract phases
- Management approval processes
- Insurance and bonding
- Partner risk sharing
- Alternate solutions
- Assumption documentation
- Color team reviews

- In cases when inadequate information is provided in the RFP, or there are other unknowns, it is a good practice for the vendor to document all of the assumptions that were made in the preparation of the proposal.
- A commonly used approach in proposal development is the use of color team reviews. These teams are selected experts, not on the proposal team, who perform independent reviews of the proposal. The most common color teams are red and green, with red reviewing the proposal to ensure that it satisfies the statement of work and specifications, and green examining costing and pricing to ensure that it is complete and competitive.

The vendors also indicated that there are a number of additional areas that need attention at proposal time to reduce the vendor's implementation risk during the performance phase. They are identified in Exhibit IV-5 and include managing the client's written and unwritten expectations, and insuring that the statement of work, contract terms and conditions, and change management process are well understood and agreed to by all parties, including the client buyer and user. Vendors also agree that it is important to ensure that end-user personnel have concurred with the program deliverables.

3. Program Manager Involvement

Most vendors attempt to get the program manager involved in the proposal process. In this study, ten of the twelve vendors indicated that their program managers participated in the proposal process. See Exhibit IV-6. The program manager's responsibilities ranged from reviewing and

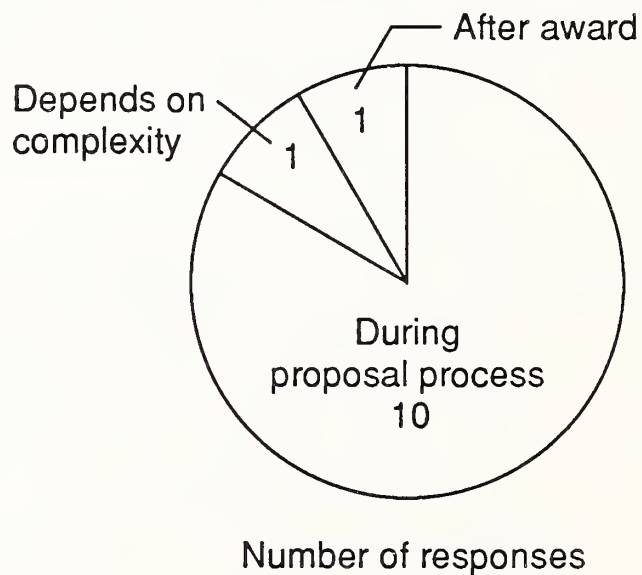
EXHIBIT IV-5

Proposal Process Other Factors That Impact Program Management

- Setting client expectations at reasonable levels
- Availability of right resources to complete proposal
- Customer user personnel concurrence
- Statement of work
- Terms and conditions
- Change control mechanisms

EXHIBIT IV-6

Systems Integration Program Manager Assignment



approving architecture, staffing, and terms and conditions; to preparing schedules, system design and configuration; and being the proposal manager.

The decision to include the program manager in the proposal process is a difficult one for some vendors to make, as program implementation skills are a precious resource. Yet most vendors agree that the odds of successful implementation are increased when the program manager is implementing a proposal that he/she authored.

The majority of the vendors studied agree that the ability to manage the performance phase of an SI program effectively depends on how completely program management disciplines are considered during the proposal process. Completing the business acquisition process thoughtfully, and including the program manager in it, should pay handsome dividends when the time comes to manage the implementation process.

B

Program Management Systems

1. Background and Differences

All of the vendors that INPUT interviewed for this study had established formal program management systems, and all but four required its use on all programs. See Exhibit IV-7. Bypassing the system was permitted for study contracts or contracts smaller than \$100,000 by three firms, and one firm allowed the program manager to make the decision as to whether or not to use the system. While these exceptions provided the program manager with more flexibility, the vendors indicated that projects were less likely to be successful when the formal PM system was not used.

All but one of the companies surveyed had designated an individual or internal organization responsible for establishing program management processes and procedures. Generally these individuals or groups had high organization visibility; depending on organization size, they reported to the company president, the business unit manager of systems integration, or division or corporate staff heads. In all but one company the program management system was well documented, was included in the company's operating procedures, and had a formal feedback and documentation procedure in place. Nine of these firms also teach their PM system in scheduled internal classes.

The PM systems in the companies studied had been in place a varying number of years, based on the company's experience in managing large projects, as seen in Exhibit IV-8. One firm's PM system has been evolving since 1955, shortly after it entered the federal SI business.

As would be expected, companies with federal SI experience tend to have more experience with program management. This experience is generally transferable to the commercial market, and most vendors feel that a program management system developed for the federal market can be modified for commercial use. The major modifications are in the areas of unique federal requirements that are neither appropriate nor applicable to commercial contracts.

EXHIBIT IV-7

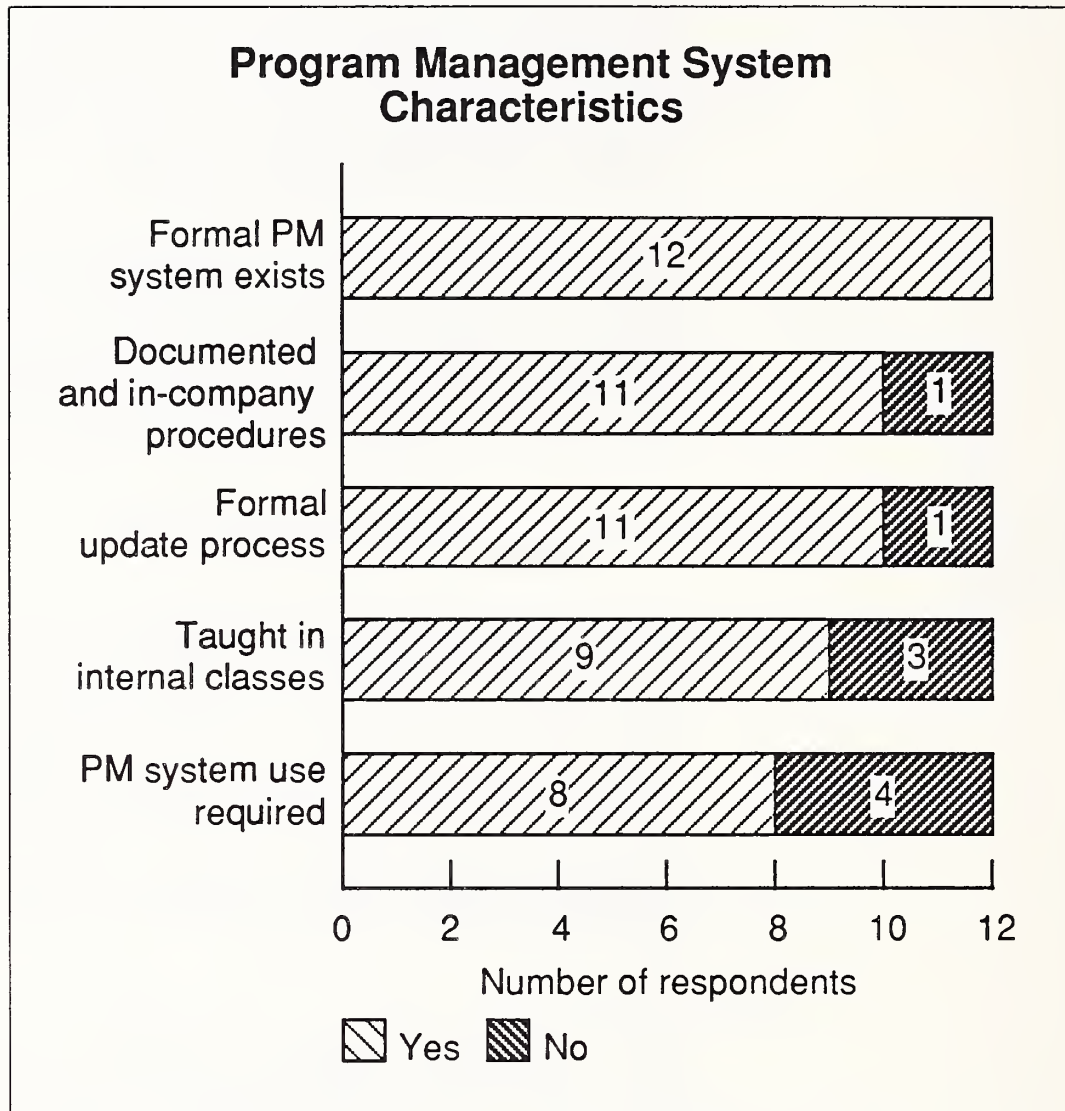
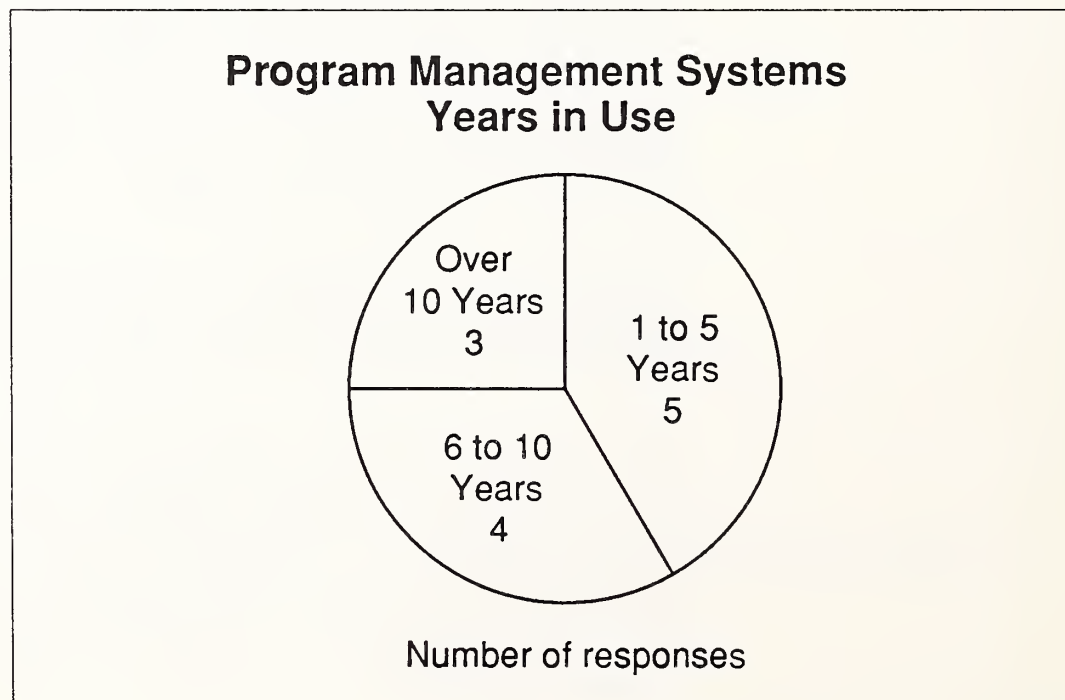


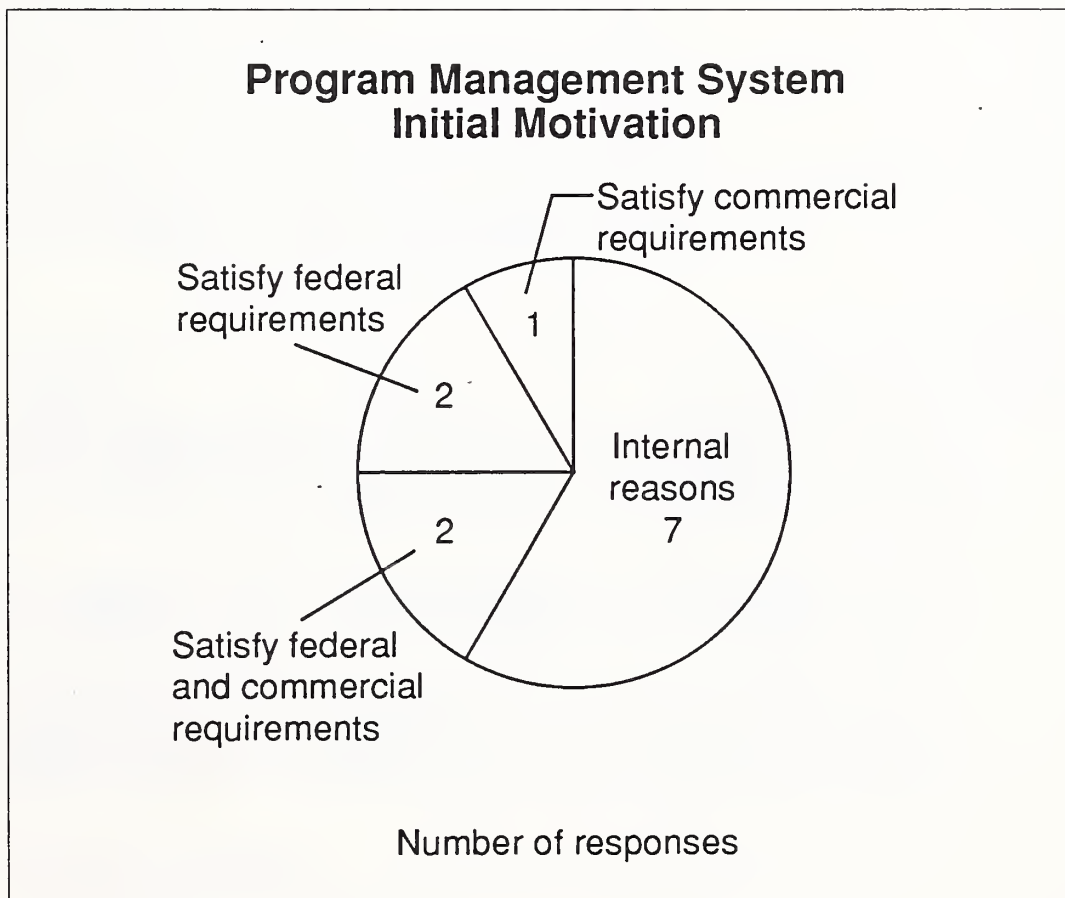
EXHIBIT IV-8



Conversely, those vendors that have built program management systems for the commercial market find that they need to be modified by adding the federal unique reporting capabilities, if they are to be used in the federal market. While this observation may seem obvious, it is important, as commercial customers are generally unwilling to pay for the additional program management controls the federal government requires. If, however, these reporting requirements are ignored on a federal program, the vendor may be cited for noncompliance with the terms and conditions of the contract or federal regulations.

The major reason that vendors develop program management systems is not to satisfy client reporting or contract requirements, but rather to satisfy their own internal management needs. This is illustrated in Exhibit IV-9. Management of seven of the twelve vendors surveyed insisted that these systems be established to “improve internal control”, to “improve profitability”, to “improve internal efficiency” or “as a result of a major failure”.

EXHIBIT IV-9



The clear message is that these systems are not developed primarily to meet customer requirements, whether the customer be federal or commercial, but rather to provide internal management controls that will allow the vendor to operate efficiently and profitably. They also provide the management techniques and processes necessary to manage the risk that is inherent in a fixed-price environment.

Most vendors believe that the management of systems integration programs in different industries or for different applications does not provide enough unique requirements to have different program management philosophies or techniques. The differences that do exist across applications or industries are in understanding requirements, developing specifications, and in selling, proposing and winning the business, not so much in program management and delivery.

Vendors who participate in the federal SI market emphasize that there are significant differences in the management of development, production or maintenance projects, and that special management procedures must be used in development projects. They also note that development projects must stress creativity with high customer interaction, production projects stress quality control and internal discipline, and maintenance projects stress responsiveness and operational understanding.

2. Program Management Organization and Responsibilities

Vendor systems integration implementation organization philosophies vary. See Exhibit IV-10. In the sample INPUT surveyed, 25% of the vendors use dedicated program staffs for each program, with all of the program resources assigned directly to them, 17% of the vendors employ a small program nucleus using resources from functional organizations, and the remaining 58% use both organizational structures, depending on the size and nature of the program.

EXHIBIT IV-10

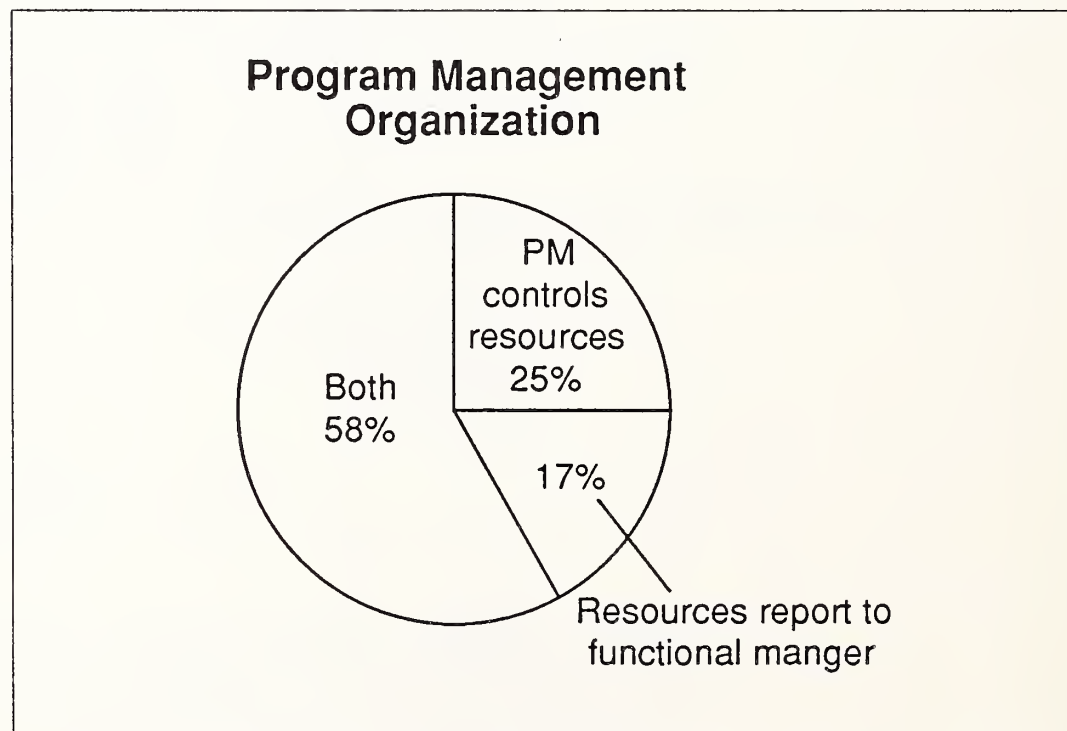
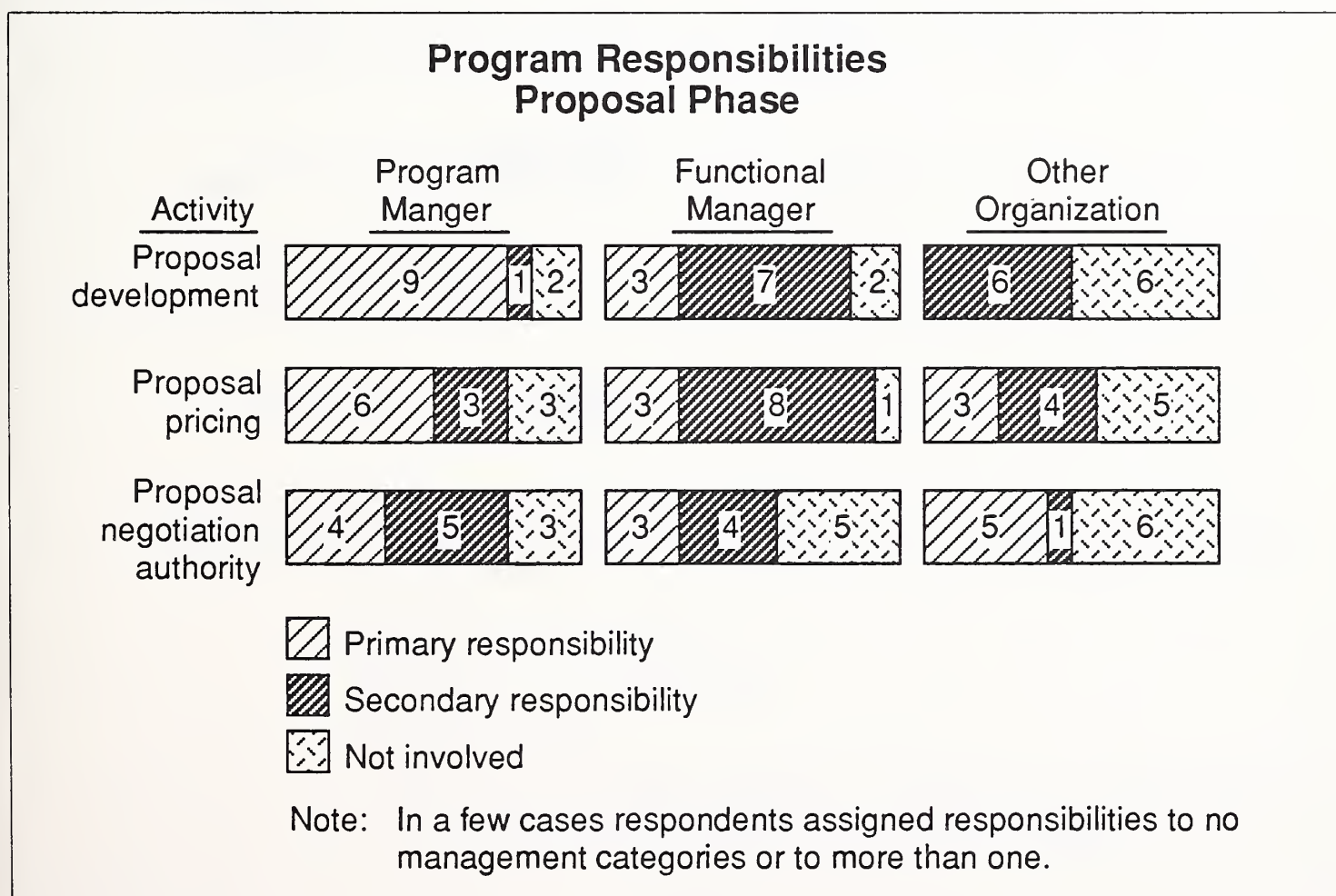


Exhibit IV-11 through Exhibit IV-13 identify how the sample of vendors assign the major program management responsibilities among program managers, functional managers, and other organizations. The three exhibits deal with different areas of program responsibility: the proposal phase, implementation management, and interface and reporting. The management group with primary and secondary responsibility for each of the systems integration activities in these areas is identified in these exhibits. For this analysis functional organizations were defined as systems engineering, software engineering, hardware installation and test, etc. Other organizations include finance and planning, legal, business practices, executive management, etc.

In most vendor organizations, the program manager is responsible for the majority of the systems integration activities. This begins with the proposal process which is illustrated in Exhibit IV-11. This again reinforces the notion that most vendors believe that when the program manager is involved in the sales process, not only is the sales process more successful, but the implementation is as well, as the implementer installs what he sold.

EXHIBIT IV-11






This exhibit also illustrates that six of the vendors assign the program manager pricing responsibility; however, proposal negotiation authority is spread, with the other organization (presumably executive management), most often responsible for this activity.

Exhibit IV-12 identifies program responsibilities in implementation areas of program planning and technical management. All but one vendor assign the program manager with the responsibility for establishing the program organization and they all make him responsible for developing the program plan.

EXHIBIT IV-12

Program Responsibilities Implementation Management

Activity	Program Manager	Functional Manager	Other Organization
Establish program organization	11 (Primary), 1 (Secondary)	1 (Primary), 7 (Secondary), 4 (Not Involved)	1 (Primary), 11 (Not Involved)
Establish program plan	12 (Primary)	7 (Secondary), 5 (Not Involved)	2 (Secondary), 10 (Not Involved)
Staffing and personnel authority	8 (Primary), 3 (Secondary), 1 (Not Involved)	4 (Primary), 4 (Secondary), 4 (Not Involved)	2 (Secondary), 10 (Not Involved)
Technical Discipline Management:			
Systems engineering	8 (Primary), 3 (Secondary), 1 (Not Involved)	4 (Primary), 4 (Secondary), 4 (Not Involved)	1 (Primary), 11 (Not Involved)
Software engineering	5 (Primary), 6 (Secondary), 1 (Not Involved)	7 (Primary), 1 (Secondary), 4 (Not Involved)	1 (Primary), 11 (Not Involved)
Hardware development	3 (Primary), 4 (Secondary), 5 (Not Involved)	5 (Primary), 1 (Secondary), 6 (Not Involved)	1 (Primary), 1 (Secondary), 10 (Not Involved)
Integration and test	8 (Primary), 3 (Secondary), 1 (Not Involved)	4 (Primary), 4 (Secondary), 4 (Not Involved)	1 (Primary), 11 (Not Involved)
Subcontractor management	11 (Primary), 1 (Not Involved)	1 (Primary), 5 (Secondary), 6 (Not Involved)	3 (Secondary), 9 (Not Involved)

-  Primary responsibility
-  Secondary responsibility
-  Not involved

Note: In a few cases respondents assigned responsibilities to no management categories or to more than one.

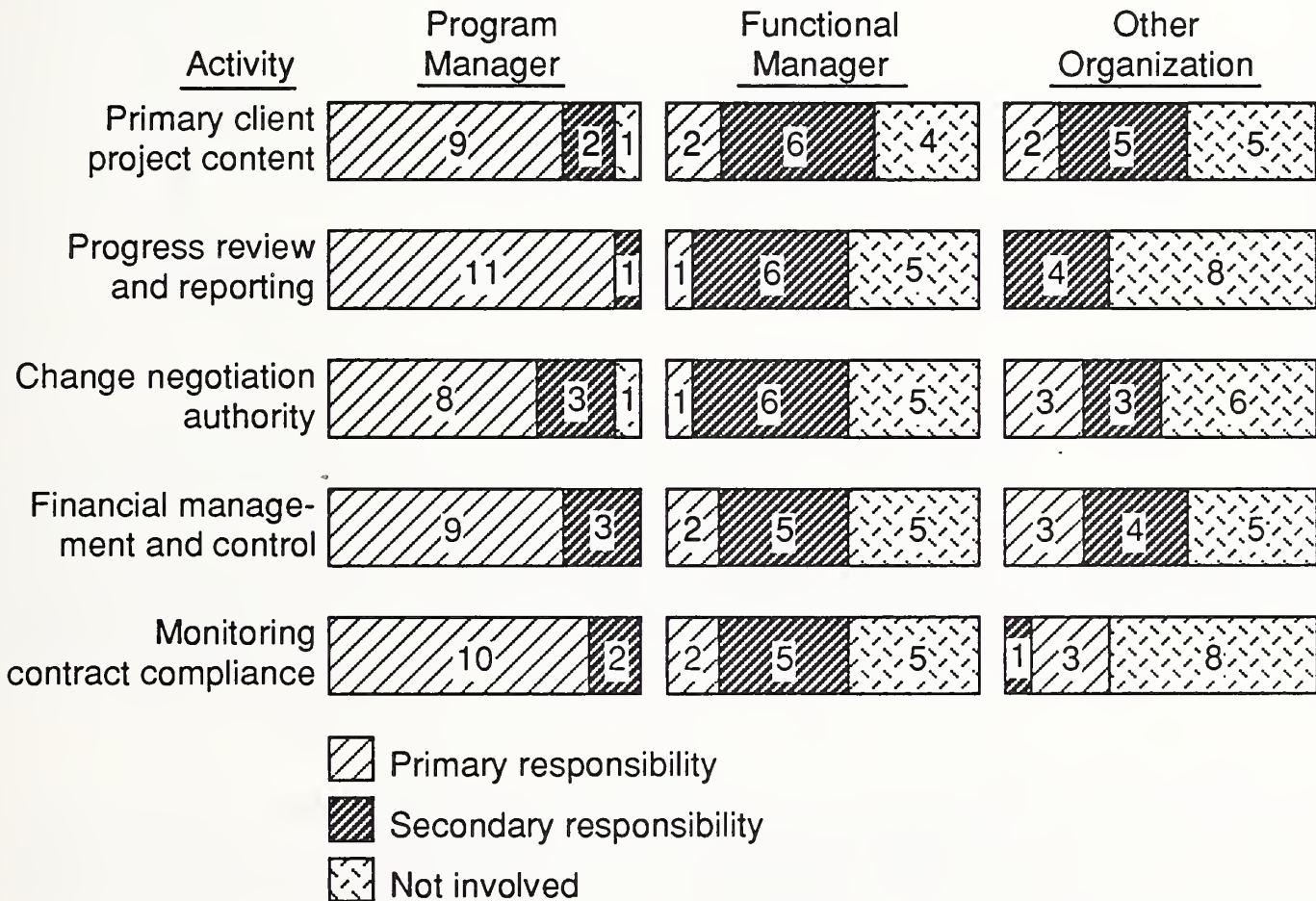
Responsibility for the management of the technical disciplines was split between program and functional management. Systems engineering and integration and test are most often assigned to the program manager. This appears to reflect management's desire for the PM to have the broader program design and final integration responsibility. The less program dependent disciplines of software engineering and hardware development, on the other hand, are most often assigned to functional management.

Exhibit IV-13 illustrates the assignment of responsibilities in the areas of interface and reporting. Some vendor organizations with large national sales coverage have experienced basic conflicts regarding customer satisfaction responsibility. Does it lie with the salesman or the program manager? Vendors who have this conflict should resolve it early in SI process, before the proposal, if possible. The one accounting firm in our survey avoids this conflict by establishing the partner in charge of the client relationship as program manager.

Most vendors assign the program manager primary responsibility for managing the interface and reporting responsibilities. Authority for change negotiations and financial management and control are in some cases the responsibility of other organizations, most likely financial or executive management, since these decisions have a significant impact on overall program profitability.

EXHIBIT IV-13

Program Responsibilities Interface and Reporting



Note: In a few cases respondents assigned responsibilities to no management categories or to more than one.

3. Elements of Successful Program Management

The three major measures of a successful program are identified in Exhibit IV-14. The client considers the program successful if the solution is provided on a mutually agreed-upon schedule, at the agreed-upon price, and with the functions that will meet the users' requirements. From the vendor's perspective this means insuring that there is mutual agreement about the cost, the scheduled completion date, and the detailed technical specifications, both at the time the contract is signed, and as a result of any specification changes that occur during implementation.

EXHIBIT IV-14

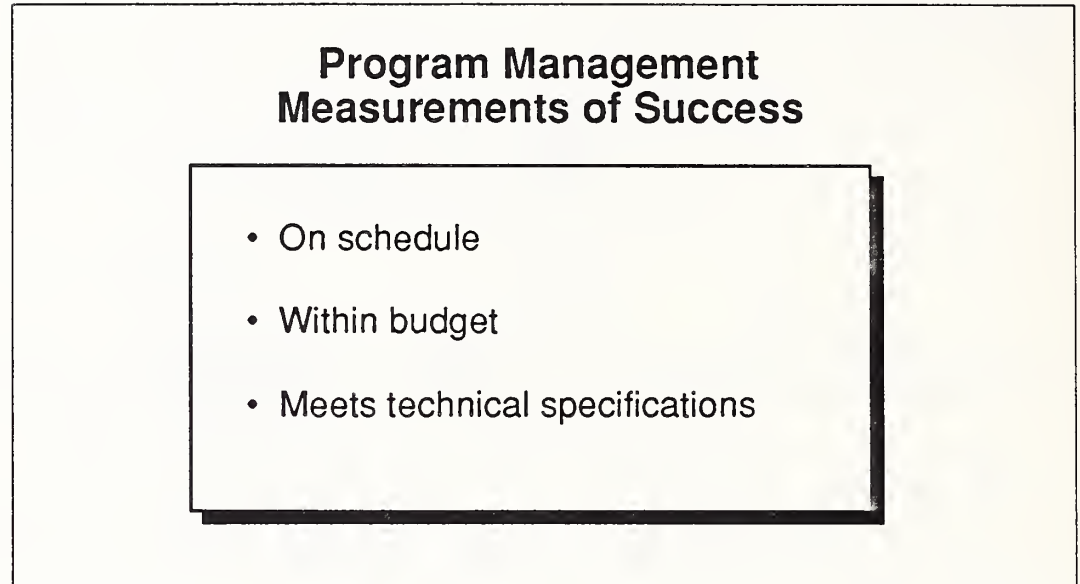


Exhibit IV-15 identifies the three factors that vendors consider most important to the successful management of the technical solution of a systems integration program. First, a detailed specification is important for the technical success of a SI program. A thorough understanding of the customer's business needs driving those technical specifications was considered equally important. This attests to the importance of business consulting in the overall SI process. INPUT believes that vendors who do front-end consulting will clearly have an advantage, not only in winning business, but in successfully implementing it.

The third technical management success factor, which will be discussed in more detail later in this chapter, is having and using a rigorous change control system that provides a vehicle for identifying, sizing, and gaining vendor and client agreement to change.

The factors that are most likely to cause failure in the technical management of an SI program are incomplete technical specifications or specifications that are continually moving as a result of what one vendor described as "creeping scope." Most of the well-publicized systems integration failures are a result of client and vendor inability to reach agreement on program scope, or on a firm set of specifications. It is absolutely essential that the vendor and the client establish this "base line" of understanding. The base line then becomes the reference point from which changes are requested, sized, and priced, and schedule impact measured.

EXHIBIT IV-15

Major Technical Management Factors

Success

- Well written, detailed, structured, consistent specifications and sign-off (4)
- Understanding the customer's business needs (4)
- Rigorous change control system (3)

Failure

- Incomplete technical specifications (6)
- Not containing program scope (3)

() Number of vendors identifying factor

Exhibit IV-16 identifies the factors that most impact the schedule of a systems integration program. Most mentioned by SI vendors is the need for a realistic plan, one that identifies all of the elements of the implementation, that ties them together into a logical work flow, and that identifies dependencies. The second factor is a measurement technique that effectively tracks progress. One common approach for accomplishing this is establishing identifiable milestones that provide a means of quantifiable progress measurement.

The vendors also identified the importance of having a reasonable schedule, one that is achievable. Too often the desire to win the contract or satisfy customer requirements results in the establishment of unrealistic schedules. Including the program manager on the proposal team, which was discussed earlier, should help in this area. Few good program managers are likely to propose schedules that they cannot personally meet.

The final factor listed by the vendors is accurate schedule estimates. These generally result from understanding the complexity of the activities in the program and employing good estimating tools and techniques.

EXHIBIT IV-16

Major Schedule Management Factors

Success

- Realistic plan (5)
- Measurement technique/milestones (3)
- Reasonable schedule (2)
- Accurate estimates (2)

Failure

- Not controlling scope (4)
- Poor or optimistic estimates (3)
- Unrealistic customer schedule (2)

() Number of vendors identifying factor

The three factors most likely to result in poor schedule management are creeping scope, poor or overly optimistic estimates and unrealistic customer demands. In the high stakes game of fixed-price contracts, it is often more prudent to walk away from an opportunity than bid to an unrealistic schedule or a program with a scope that is a moving target.

Vendors' views of cost management factors are identified in Exhibit IV-17. They include three that have already been identified and discussed: adequate requirements definition, realistic program plans, and rigorous change control systems. Two additional important cost management factors identified are a cost tracking and monitoring system, and a set of completion and acceptance criteria.

For cost management success the program has to be structured so that activities can be identified, budgets established for each activity, and then costs allocated to these activities as the work is accomplished. This "work break-down structure" is essential to successful cost tracking and monitoring.

EXHIBIT IV-17

Major Cost Management Factors

Success

- Adequate requirements definition (4)
- Tracking and monitoring system (4)
- Realistic program plan (2)
- Completion/acceptance criteria (2)
- Change control (2)
- Financial reserves (2)

Failure

- Creeping scope (2)
- Poor planning and estimations (2)
- Lack of detailed specification (2)

() Number of vendors identifying factor

Another protection against cost overruns is to establish completion and acceptance criteria as part of the original contract. Completion criteria identify precisely what deliverables have to be installed, and acceptance criteria identify the work that the system has to perform to meet the contract specifications. If these criteria do not exist, it may be impossible to prove when the project is complete, and the client may either refuse to pay or demand that additional functions be added to the system.

Vendors also use financial reserves to protect against cost overruns. The vendor establishes a should-cost model based on the estimated schedule, cost, and proposed technology, and then adds a protection factor or reserve to cover the risk and potential problems in the program.

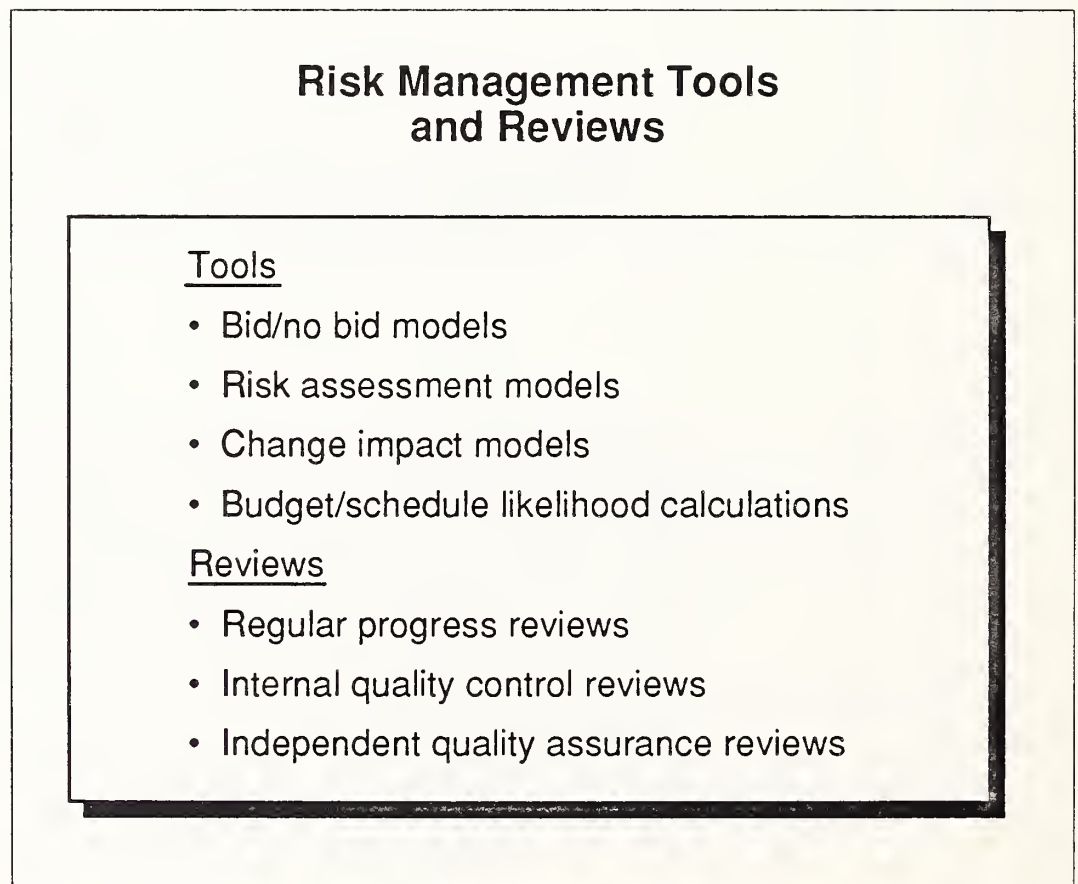
The factors that were identified most often as causing failure in managing program cost are also listed in Exhibit IV-17. They have already been identified and discussed as either technology or cost factors.

4. Risk Management

Most system integration programs contain a significant amount of risk. The vendor is committed to provide the technical solutions promised, on schedule and at the agreed cost. There are two important disciplines that can assist in fulfilling these commitments. They are the use of risk management techniques, and a rigorous change management system.

The majority of the vendors surveyed for this report employ formal risk management techniques on systems integration projects. Some of these are identified in Exhibit IV-18. They include both tools and processes. Examples of the tools range from a bid/no bid model to proprietary models used by one vendor to assist in identifying and assessing risks in planning, design, implementation and overall management of a program. Other tools include models to assess the impact of changes, and calculations to assist in determining the likelihood of meeting schedule and cost objectives.

EXHIBIT IV-18



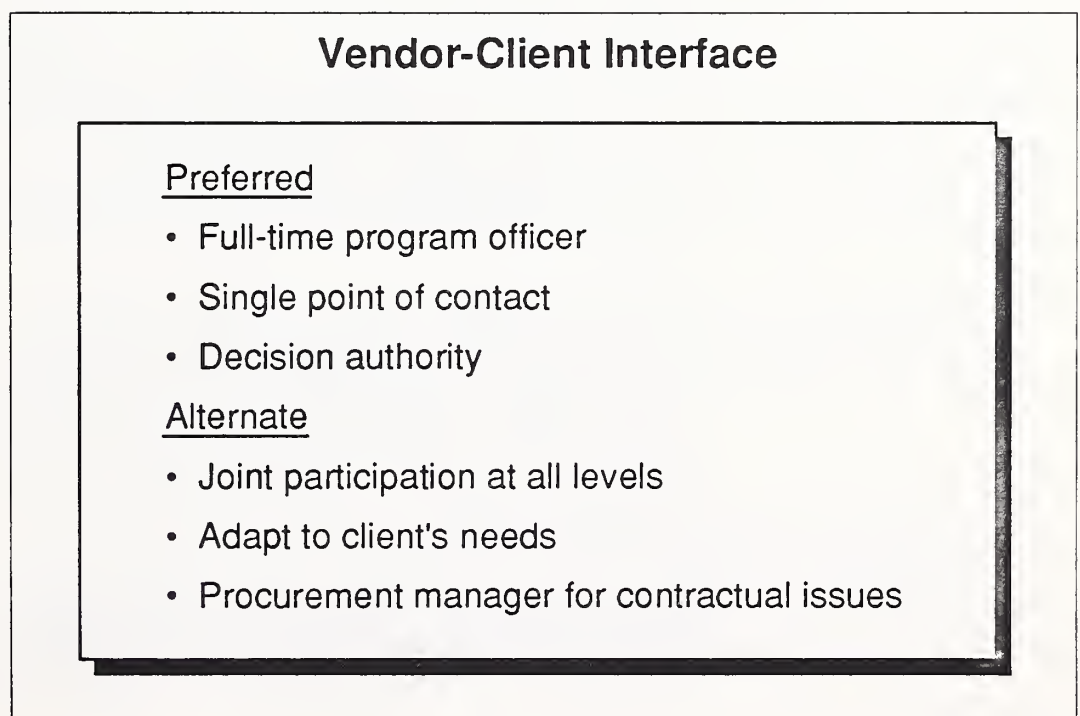
In addition to the models described above, reviews are also excellent vehicles for providing management with either regular or one-time assessments of the status and the risk position of an SI program. These reviews range from regular internal and external management reviews to special audits. Examples of the latter are red and green team reviews (described earlier in this chapter), implemented during the proposal process, and ongoing internal quality control and independent external quality assurance reviews. The employment of reviews by the vendor provides an effective vehicle for communicating status and risk within the vendor organization.

5. Program Communications and Change Management

In the discussion of overall systems integration success factors in the previous chapter, communication was the factor most often mentioned as contributing to overall program success. Successful negotiation of changes to the specifications, schedule, or costs are dependent on understanding, agreement, and communications among all of the parties involved in the program through an effective change management system.

Ten of the twelve vendors surveyed recommend preferred interface structures to their clients. These recommendations are summarized in Exhibit IV-19. Most vendors ask the client to provide a single point of contact, someone who will serve as a dedicated program officer. They recommend that this individual also have the authority to make program-related decisions. On federal programs, vendors also ask for a procurement manager who has the authority to make decisions regarding contractual issues.

EXHIBIT IV-19



Two other views of vendor-preferred client interface are presented in the exhibit. Integrators that provide systems integration as a logical follow-on to business consulting focused on managing business change, prefer client contact at all levels of the business, rather than a single point of contact. This approach obviously gets all levels of the organization involved and committed to the changes that are being implemented. The second view presented by one SI vendor was that it would adapt its interface to the client's needs. This response, perhaps appropriate to hardware sales and installation support, may be much less effective when profitability is based on professional services activities that are based on a defined effort at a fixed price. The dominant response to the client interface question, particularly from professional services-focused and experienced organizations, is a single full-time client contact who has decision-making authority.

The importance of communications to successful systems integration cannot be emphasized too often. Vendor-internal, vendor-subcontractor and vendor-client communications are not only important to the overall management of the program, but also serve as important risk management tools. Exhibit IV-20 identifies the three major topics that need to be communicated among these three groups. They include program status, necessary actions, and proposed and agreed-on program change. These are the basic areas that can and will impact cost, schedule, and delivered function, and therefore there must be complete understanding and agreement on them.

Vendors employ a variety of techniques to communicate among the program participants. As would be expected, all vendors employ reviews and reports to communicate within their own organizations and with clients. For internal communications, most vendors require regular reports on a weekly basis, and a monthly interval seems to be preferred for formal reviews. Monthly steering committee meetings were identified as a means for communications between vendor and client, and one vendor includes subcontractors in these meetings. Another interesting approach to communications, employed by one vendor, is a newsletter that communicates the status, actions and changes to the program and is distributed among all of the parties involved in the program.

In addition to reports and reviews, marketing or sales representatives can be important in vendor-client communications. Hardware and telecommunications firms usually have a large sales force that is responsible for the day-to-day contact with the customer. The sales personnel responsible for customer satisfaction should be included in communications to and from the client.

Some vendors assign an individual or individuals the responsibility of being the subcontractor manager(s), particularly in large projects. The subcontractor manager becomes the single focal point for all subcontractor

EXHIBIT IV-20

Program Communications

Topics

- Status
- Actions
- Change

Vehicles

- Periodic reports
- Periodic reviews
- Newsletters
- Subcontractor manager(s)
- Program workbooks
- Marketing representatives
- Informal communications

tors, and is responsible for communicating with and managing the relationship with them. This is a full-time job in very large programs. It requires a special set of skills. Some vendors have special training programs to prepare individuals for these responsibilities.

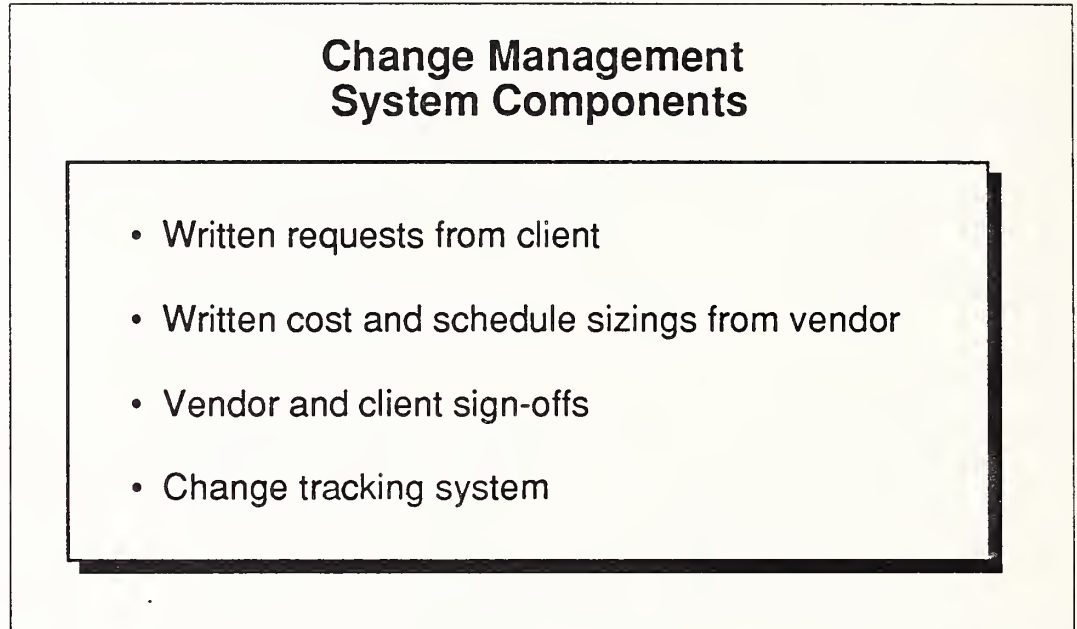
Program workbooks or program books are also used as communication vehicles. They serve as a central repository for all program documentation, including status, action, and changes, as well as an audit trail for the complete program. When kept properly updated, these documents provide a common point of reference for all parties involved in the program.

Informal communications play an important role in successful systems integration implementation. A continual dialogue between all parties involved—vendor, subcontractor and client—is essential to successful systems integration program implementation.

Failure to manage changes to the program baseline, as discussed earlier, is a common cause of program failure or dissatisfaction. Change will almost always impact function, cost and/or schedule. It is therefore fundamental to good program management to have an effective system to manage and control the introduction of change and to understand its

impact on the three parameters just mentioned. All of the vendors surveyed indicated that they employ change management disciplines that include the first three elements identified in Exhibit IV-21, and most also have formal change tracking systems.

EXHIBIT IV-21



The change management system must include a formal change requesting process. Methods to accomplish this range from basic processes that require that all requests be provided in writing by the client's authorized program manager, to more comprehensive approaches. An example of the latter, employed by one vendor, includes the ability to request changes on two levels: exploratory, where only rough sizing is requested; or firm, where a firm commitment is provided.

The second fundamental element of change management systems is a written response from the vendor, which includes sizing the cost of the change, and the impact that it will have on the overall program schedule. It is a good practice to examine alternatives to these changes and to assess the risk that the changes introduce. Both considerations should be included in the cost/schedule sizing process. Some vendors use models and automated tools to assist in this area.

The third step of the change management system is to get both vendor and client sign-offs showing that the changes will be implemented. Some vendors and clients have established formal change review boards to determine if the proposed changes should be approved.

Finally, once approved, vendors generally establish change tracking systems to ensure that the change is introduced and incorporated into the program. Automated tools are available and often used for change tracking.

6. Methodologies and Tools

All vendors have established processes for managing the various activities of program management, and use automated tools to assist in the management of these processes. While the processes are relatively standardized, there appears to be no set of preferred or standard tools. Vendors rate their satisfaction with tools from “Helpful—getting more useful” and “limited utility” to “very effective”. INPUT was somewhat surprised by the lack of standard tools and learned that in some companies, different tools are used in different divisions. Of the ten vendors that identified tools they used to support program management activities, no single tool was mentioned as being used by more than one vendor. This phenomenon is further supported by the large number of internally developed and proprietary tools and methodologies.

The categories of program management tools are identified in Exhibit IV-22. Four vendors indicated that they have systems integration methodologies that span the entire process from requirements definition to systems implementation. Examples of these are SHL Systemhouse’s System Integration Life Cycle and Andersen Consulting’s FOUNDATION. These internally developed and proprietary processes include design and analysis tools, project control, estimating and reporting systems, change management systems, and the use of CASE tools to provide an integrated programming environment.

EXHIBIT IV-22

Program Management Tools and Methodologies

- Life cycle methodologies
- Development methodologies
- Schedule and event tracking
- Budgeting and budget tracking
- Change management and tracking
- Trouble reporting and tracking
- Communications
- Computer-aided systems engineering (CASE)

Most of the vendors do not have a totally integrated SI methodology, but employ many standalone processes and tools that perform many of the elements included in the integrated methodologies. Tools such as electronic mail were also mentioned as valuable in improving communication within the program team.

It was somewhat surprising that only three vendors mentioned computer-aided systems engineering (CASE) products and tools in this discussion. While the question asked of the vendors was addressing program management tools and methodologies, one would expect that more vendors would reply that CASE would provide measurable productivity enhancements that would assist in estimating, scheduling and managing program implementation. This was not true, however, which leads INPUT to believe that the majority of these integrators are not heavily using CASE technology.

There are a large number of internally developed and proprietary tools and methodologies in use by SI vendors as demonstrated in Exhibit IV-23. Some proprietary products were developed externally, and some of the internally developed products are not proprietary. None of the tools or methodologies used was mentioned more than once by a vendor.

EXHIBIT IV-23

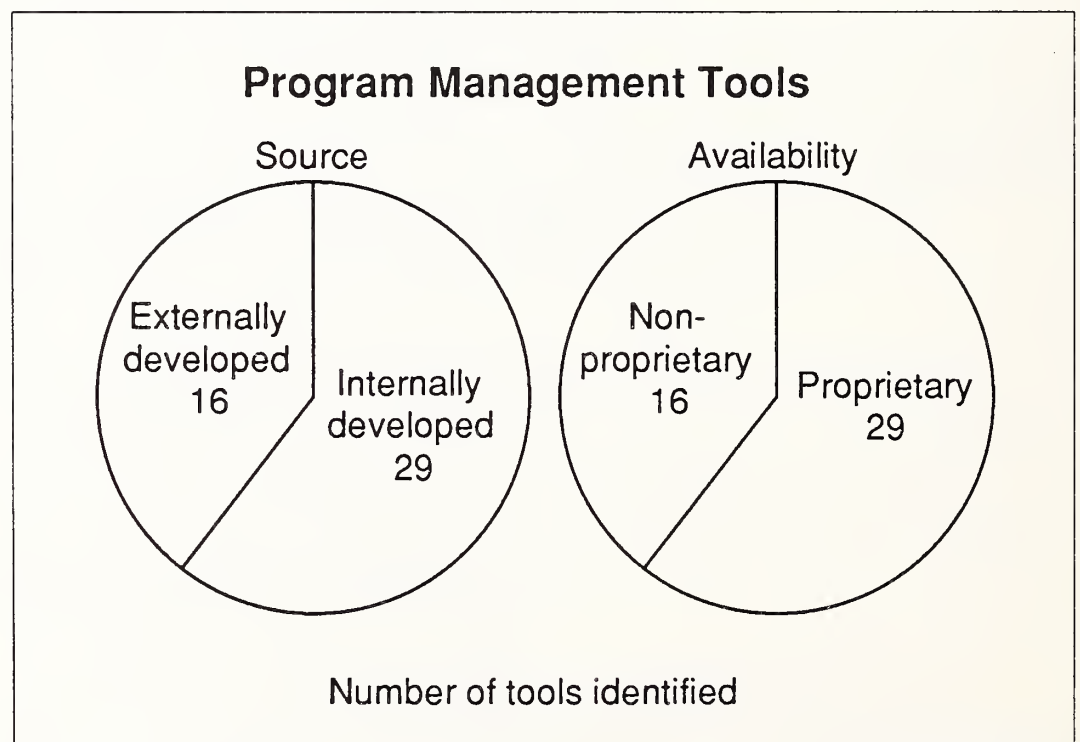


Exhibit IV-24 summarizes the discussion of tools and methodologies. These products and capabilities are clearly focused on productivity and successful implementation, yet tools such as CASE don't appear to be broadly implemented. When total life cycle methodologies are imple-

mented, they are being promoted effectively to provide a competitive advantage. Finally, while common processes are being used to manage program activities, there appears to be no industry standardization in the area of tools and methodologies. This is most likely a result of the perception that this area can in fact provide the competitive advantage just mentioned. The lack of industry standardization may also restrict the transfer of personnel from one firm to another, or from one development and implementation methodology to another.

EXHIBIT IV-24

Program Management Tools and Methodologies Summary

- Focus on productivity and effectiveness
- Used to promote competitive advantage
- Limited use of CASE
- No industry standards

C

Systems Integration Program Managers

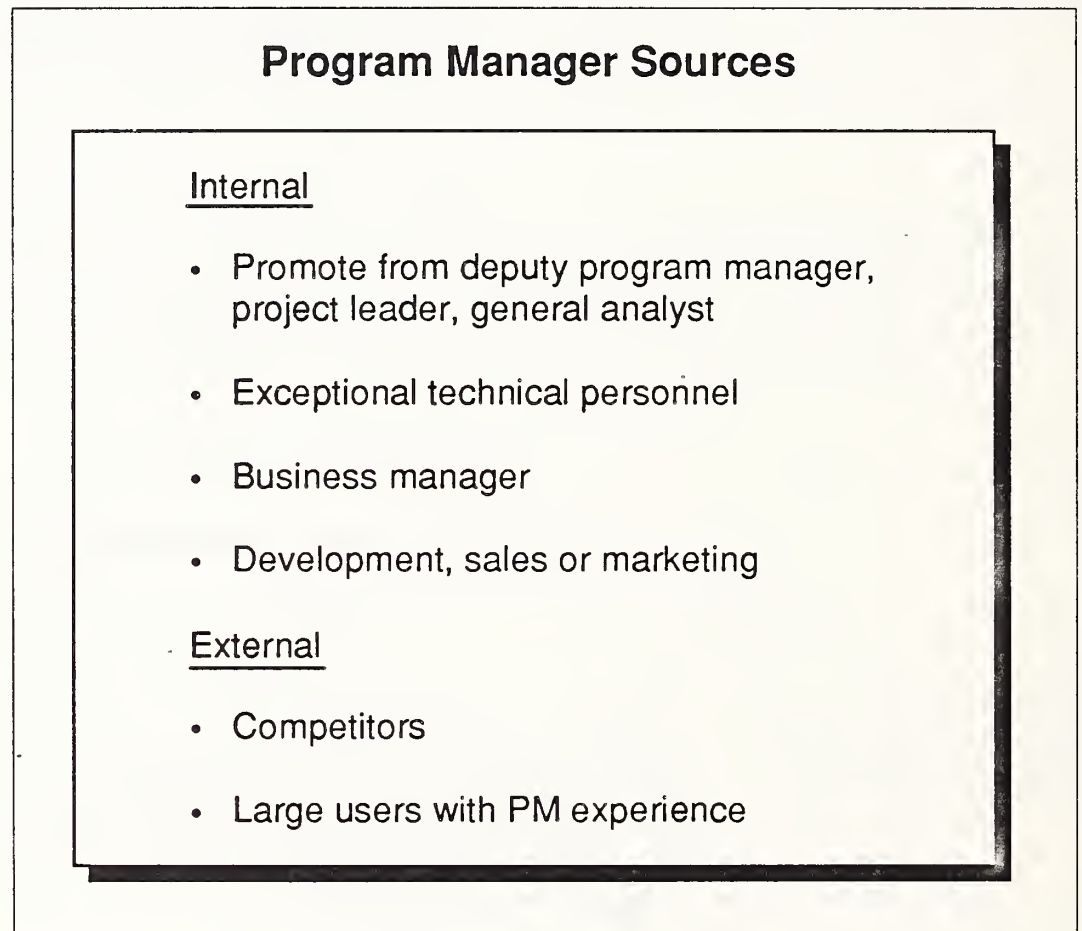
Qualified and experienced program managers are a limited resource in most systems integration firms. The growth of the systems integration market will depend on the success of current and future programs, and that success will depend on the competence and availability of program managers.

As new firms enter the SI market, they will need to develop the program management disciplines and processes described in this report to be successful. But without good qualified program managers to manage the implementation of the disciplines and processes, they will fail.

The job of program manager requires a varied set of skills. It requires an individual who has a blend of business, technical, and if possible, functional skills. The business skills are required to control cost and schedule, as well as to resolve personnel and staffing issues. Technical skills are required to understand and manage complex technical issues, and functional skills are important in understanding both the client's application and industry requirements. Finding and employing individuals with all of these skills is indeed a challenge.

Exhibit IV-25 identifies the major internal and external sources that the surveyed vendors identified for program managers. Organizations that have significant systems integration experience, generally companies with a strong professional services background, are able to develop their program managers from former deputy program managers, project or task leaders, or from general analysts. Other internal sources for program managers are business managers: some firms, particularly hardware vendors without SI experience, are converting individuals with hardware or software development or marketing and sales experience into program managers.

EXHIBIT IV-25



External sources for program management include competitors and large information systems users with program management experience. Most vendors who hire from the outside look for senior consultant level personnel with over ten years of experience in program implementation.

Seven of the eleven vendors who responded to questions regarding program manager education have formal internal education programs which range from project management classes to a full multi-year curriculum on the company's system integration methodology. Professional services companies generally offer more comprehensive training, most

likely because they recognize that qualified professionals are their life-blood. They also tend to have well-defined career paths and use more advanced methodologies and tools such as CASE to motivate and retain qualified professionals.

Program managers are measured by program success. Most are measured on program completion on schedule, within budget and the customer satisfaction level. Some are also measured on technical progress versus cost at intermediate milestones. One hardware firm measures its program managers based on revenue, expense and profit; partners in accounting firms are measured on client service and satisfaction, quality and profitability.

Exhibit IV-26 indicates how the firms in the survey compensate their program managers. In the interview sample it was equally split between base salary only and base salary plus incentives. In the case of the accounting firm, compensation was based on the profitability of the partnership.

EXHIBIT IV-26

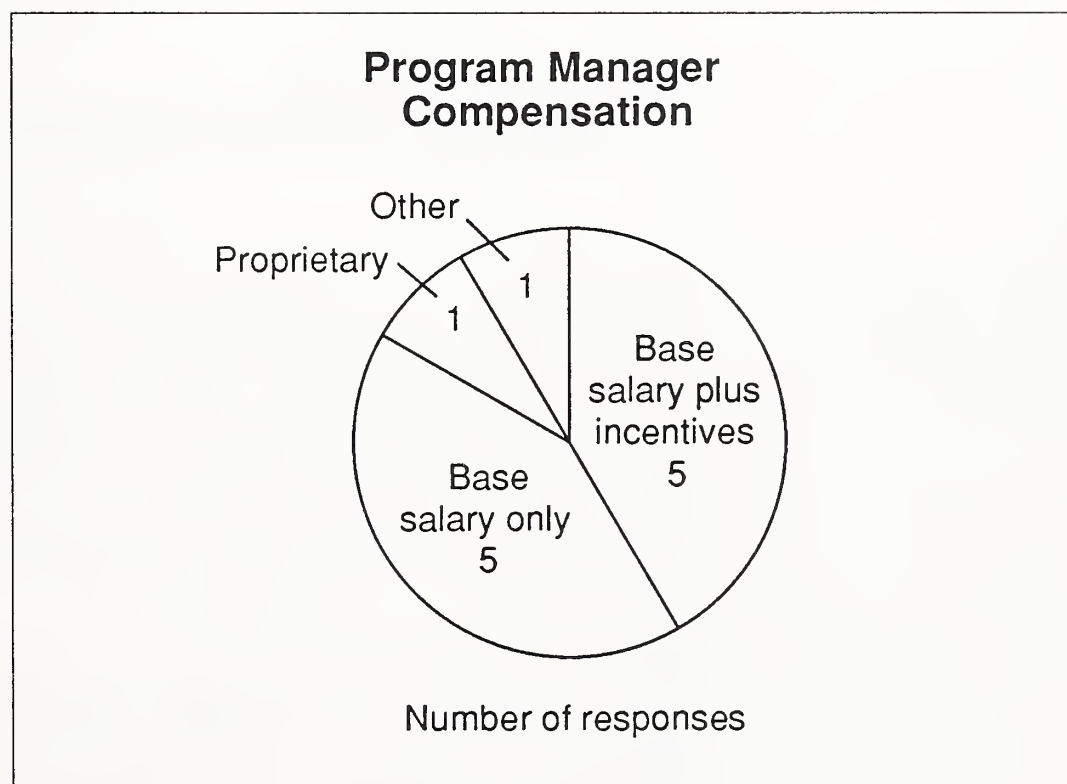


Exhibit IV-27 summarizes program manager incentives identified in the survey. Program manager incentive bonuses were about equally split between being based on business unit profits and on direct program-related accomplishments. The latter was related to completion on time and within budget, either for the entire program or at pre-identified milestones. Other incentives that were not directly compensation-based

include: promotion, challenge, awards, attendance at recognition events, and in one case, the opportunity to remain employed.

EXHIBIT IV-27

Program Manager Incentives

Compensation-based

- Business unit profits
- Completion on time and below budget
- Cost and schedule milestones

Other

- Promotion
- Challenge
- Awards
- Recognition

D

Vendor Program Management Summary

Exhibit IV-28 is intended to briefly summarize program management from the vendor's perspective by identifying three of the most important areas identified in this chapter. Clearly the first rule that should be followed is to attempt to include the planned program manager in the business acquisition process. He or she should manage the proposal or at least have some formal responsibility in approving the architecture and establishing the cost and schedule. This improves the odds of having a satisfied client as well as bringing the program in on time and at a profit.

The essentials of program management include a number of tested processes and practices. An adequate set of program specifications and effective communications among the vendor, its subcontractors and the client are proven essentials. From both a vendor and client point of view, a single customer interface with decision-making authority will help keep the program on schedule; and a rigorous change control system is one of the best insurance policies against surprises in cost and schedule. Realistic plans and schedules are essential and are most likely to be achieved if prepared by the program manager. It is also extremely important to manage the customer's expectations and to develop and use repeatable sets of management processes and methodologies. Finally

and most important, well-trained and experienced program managers are essential for successful systems integration programs. Vendors must motivate and compensate this rare resource to retain it and keep it sharp and effective.

EXHIBIT IV-28

Program Management Summary

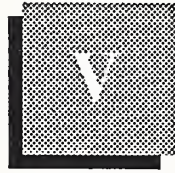
Vendors:

- Involve program managers in the proposal process
- Employ tested processes and practices
- Require qualified program managers



Buyers' Experiences with Program Management





Buyers' Experiences with Program Management

A

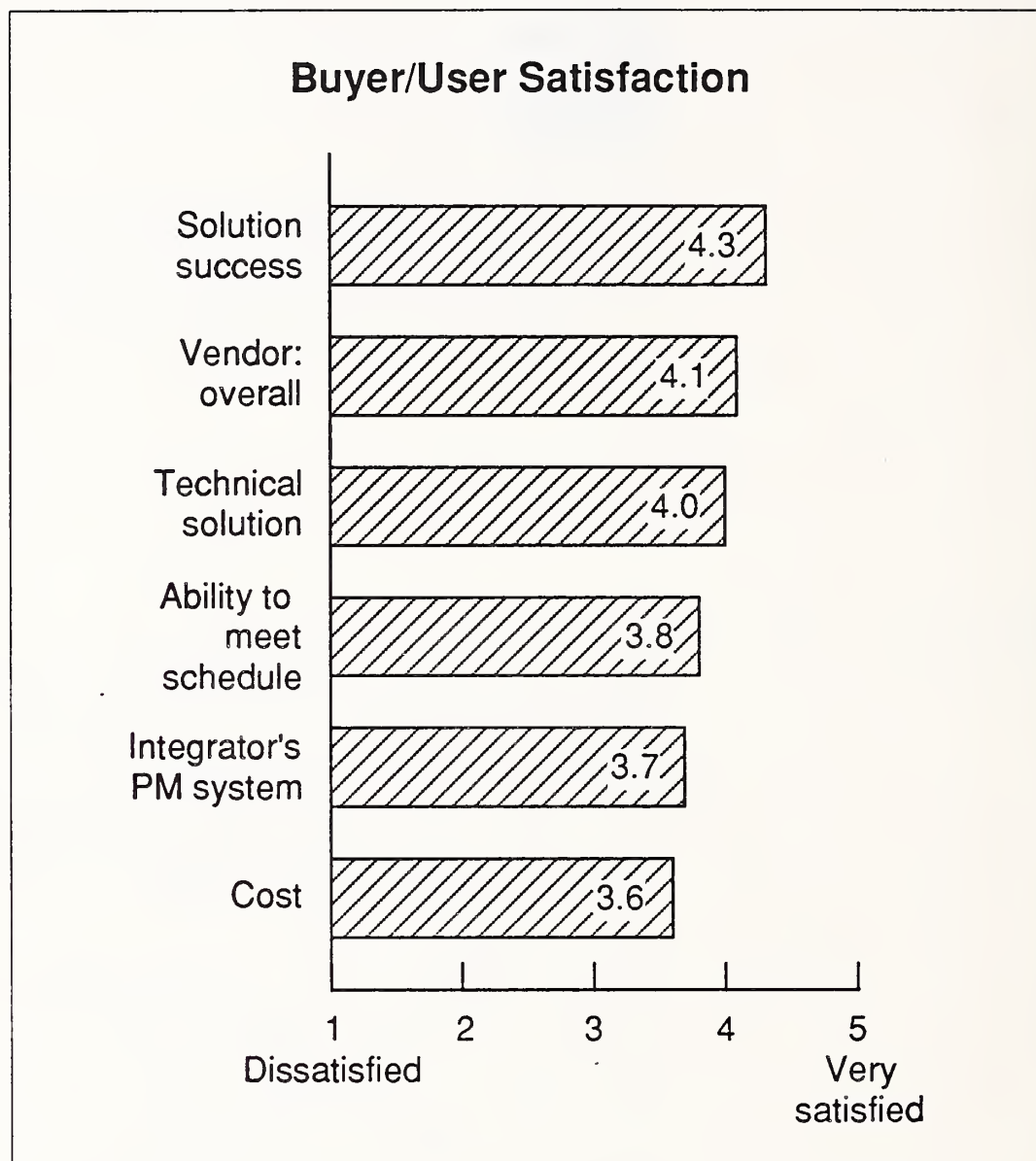
Introduction

INPUT's survey of systems integration user projects indicates that, despite some stories of major SI failures, buyers are generally satisfied with their experiences with SI vendors. The results, demonstrated in Exhibit V-1, indicate that SI buyers are most satisfied with overall solution success, and least satisfied, although not overly so, with the cost of the solution. In all cases the buyers said that should the need arise, they would use a systems integrator again.

These results speak well for systems integration and would lead the reader to believe that systems integration is a total success. However, two of the respondents in INPUT's survey stated that they would not re-use or recommend the integrator used on their project. They were the least satisfied with their overall solution and were totally dissatisfied with the vendor's ability to meet schedule. They also were not very satisfied with their vendor's program management system.

This chapter presents results of the survey of SI user/buyers on the importance and effect of program management on their project through the acquisition and implementation processes. It examines the importance of program management systems to project implementation and proposal evaluation. It identifies responsibilities within the buying organization, and interfaces that are established with the vendor. This chapter provides insight into how buyers view their role in the systems integration process.

EXHIBIT V-1

**B****Vendor Selection and Interface**

User departments in many organizations are recognizing the need for new or improved information systems. Yet INPUT's user study indicates that there are frequently inadequate internal resources and skills to develop and implement the needed solutions on the required schedules. See Exhibit V-2. Organizations that appear to have one or more of these difficulties are turning outside to systems integrators and other sources to obtain the solutions they want.

Not only are users deciding to use an integrator, but often they become the major interface with vendors during the bid solicitation and evaluation processes. Exhibit V-3 demonstrates that in the majority of the projects studied, the user alone or in conjunction with another organization was the major interface during the proposal and evaluation process.

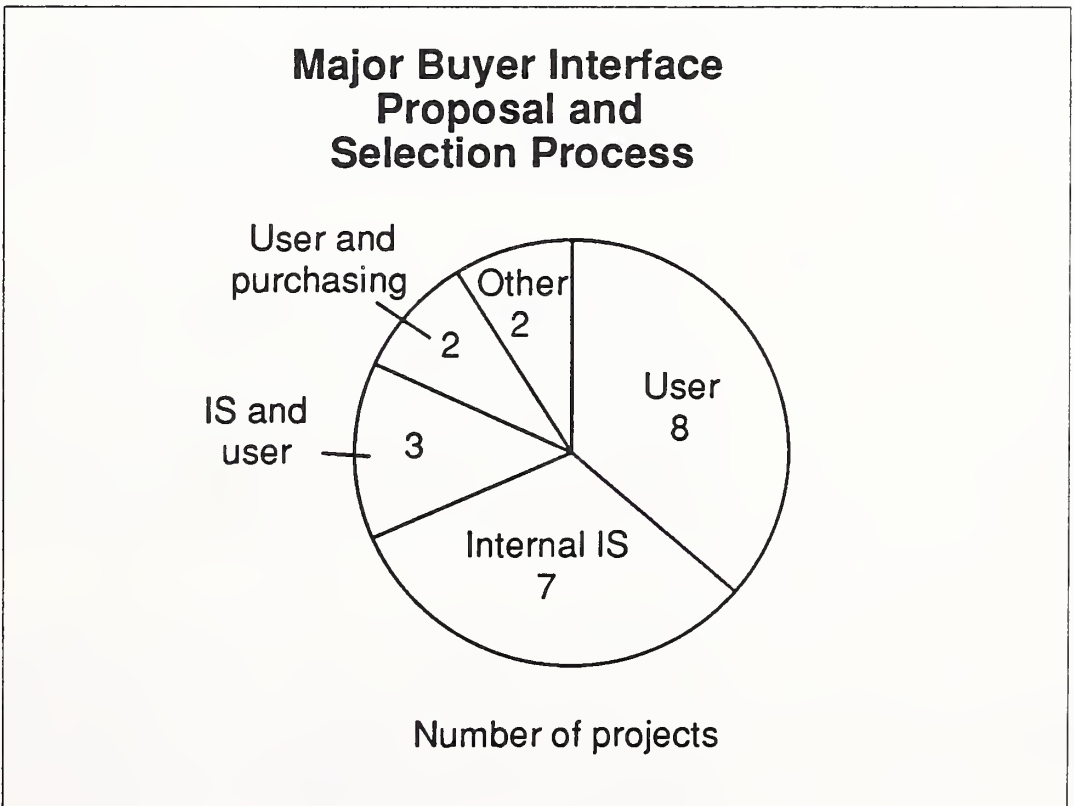
EXHIBIT V-2

Reasons for Using Systems Integration

Reason	Number of Mentions
Internal resources not available	17
Skills not available internally	16
To get job done faster	8
Contractor assumes responsibility	2
Difficult to get job done in state service	1
To integrate multiple vendors' products	1

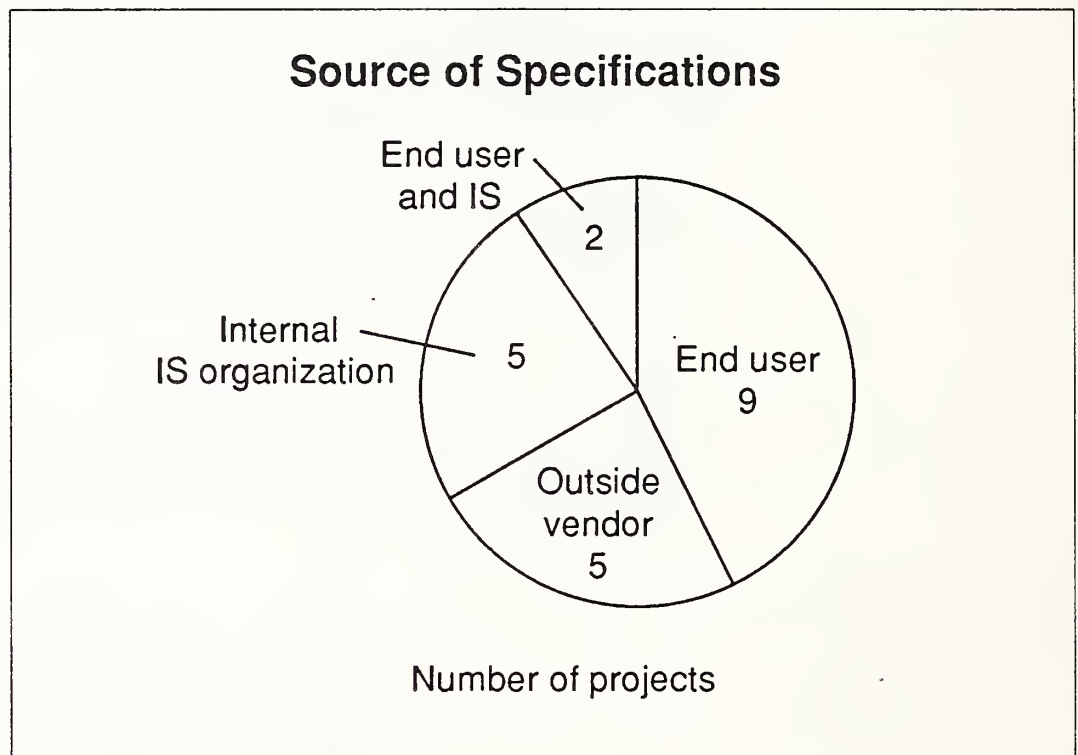
This contrasts to 45% of the projects where the internal information systems organization had or shared the proposal interface and evaluation responsibility.

EXHIBIT V-3



Development of the program specifications has also become a responsibility of the user organization, rather than the internal IS organization. See Exhibit V-4. In the sample, 82% of the respondents claimed that they included a specification or statement of work with their request for proposal. The IS organization was the source of this specification in slightly over one quarter of the projects. In another quarter of the projects, the specifications were developed by an outside vendor under a separate contract. The remainder of the specifications were developed by the user organization alone or with the IS organization.

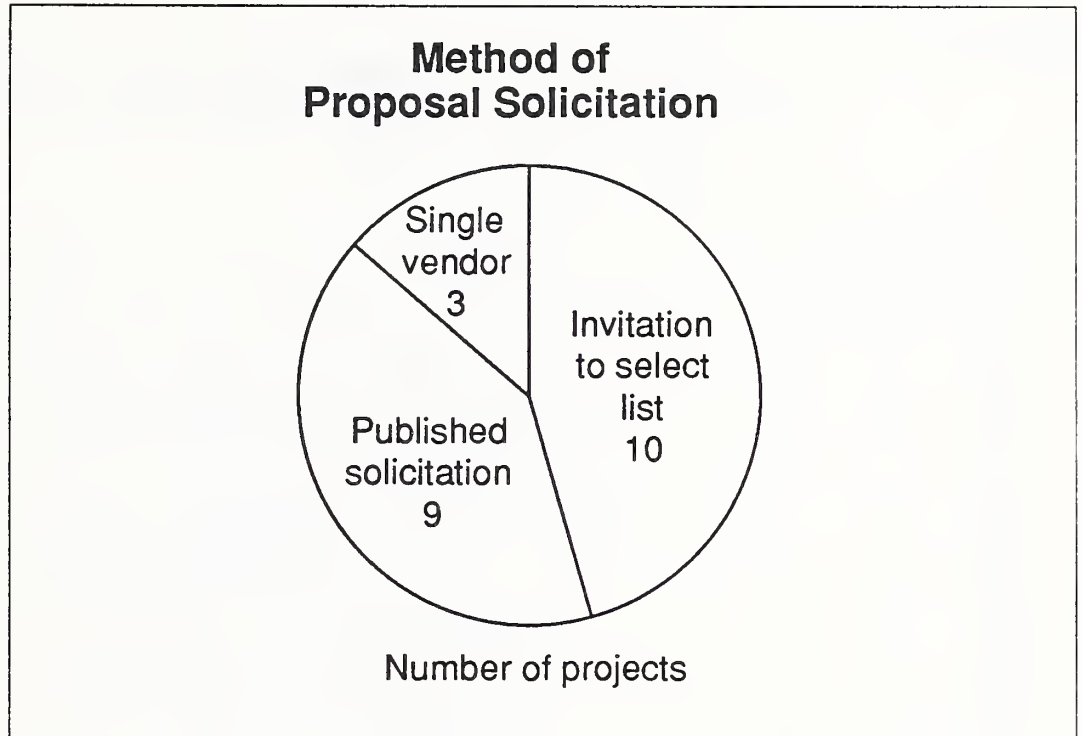
EXHIBIT V-4



It is interesting to compare the user response, that in 82% of the programs a specification was provided, to the vendors' view (Exhibit IV-3) that only 18-35% of the cases they bid on included complete specifications. It appears that specifications provided by the buyer are often inadequate for vendors to confidently design a solution and develop a proposal. This area needs to be resolved, through a common understanding of a minimal set of specifications, to improve the number of program successes and overall user satisfaction levels.

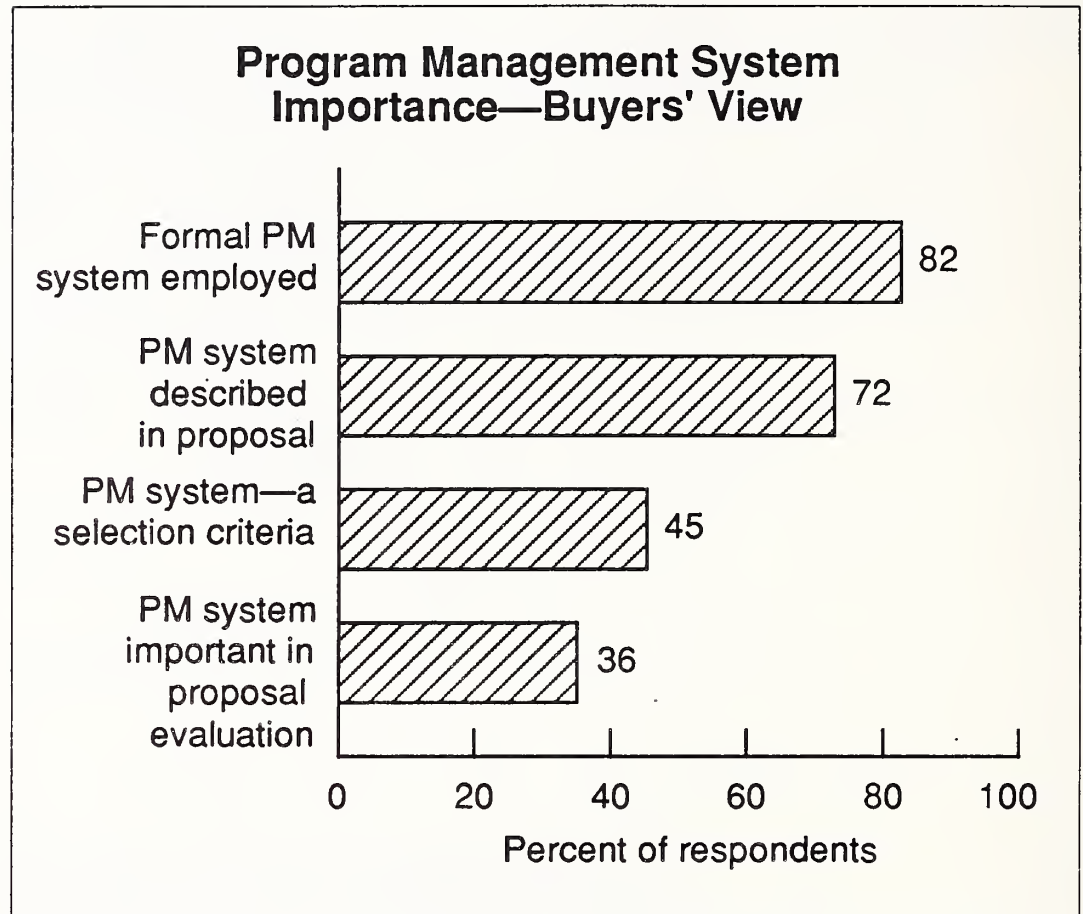
The data in Exhibit V-5 emphasizes the need for vendors to sell and promote their capabilities to users, since commercial customers generally do not publish bid solicitations to the vendor community. In only two of the non-government programs in the study were bid solicitations published. In 10 of the 22 projects, the bid invitation was offered to a select list of vendors, and in three cases only a single vendor was invited to propose.

EXHIBIT V-5



Both vendors and buyers are beginning to recognize the importance of the vendor's program management system to the success of the project, although in 18% of the projects surveyed, users claimed that the vendor did not have, or did not know if the vendor employed, a formal program management system as shown in Exhibit V-6. The Exhibit also shows that most vendors are describing their program management systems in detail as part of their proposal process. In nearly half of the projects, the PM system was a factor in the selection, and in over one-third of the projects it was a very important evaluation criterion.

EXHIBIT V-6



C

The Program Management System

As shown in Exhibit V-7, there were no overwhelming success factors mentioned by respondents. Generally, buyers' views are consistent with the vendors' responses in Chapter IV, except that some users and buyers want the vendors' personnel on site. INPUT believes that it is natural for the buyer to want the vendor on site to improve communications and to give the buyer a definite sense of program progress.

EXHIBIT V-7

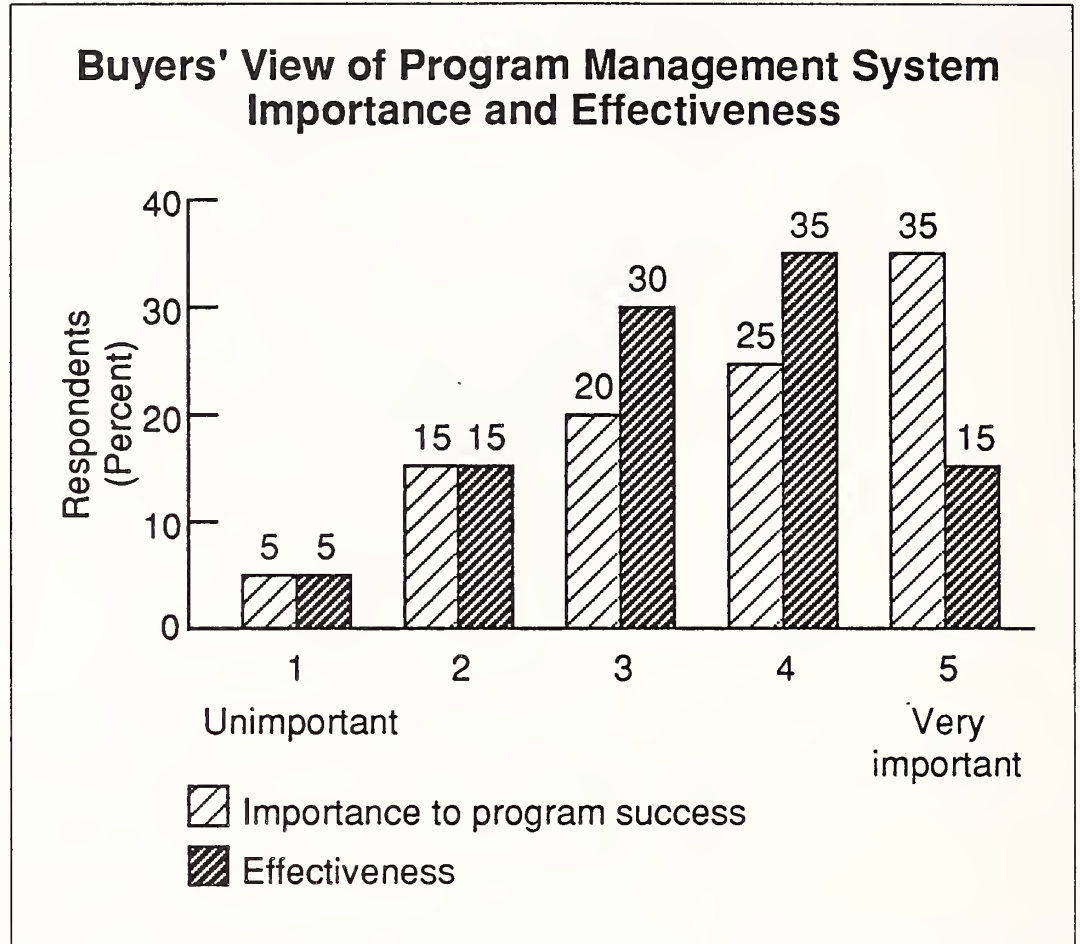
**Systems Integration
Management Success Factors
Buyer Perspective**

Reason	Number of Mentions
Open communications	6
Agreement on planned deliverables	4
Progress/problem tracking meetings	4
On-site personnel	2
Qualified program manager	2
Scheduling system	2
Control package/system	2
Vendor understands client's business	2

Buyers generally believe that program management systems are important to the success of their projects. This is demonstrated in Exhibit V-8. In those cases where the PM system was unimportant (rated 1 or 2), it was either because the vendor had no apparent PM system, or it was a case in which the client was dissatisfied with the vendor and would not use him again.

Exhibit V-8 also depicts the buyer's view of the effectiveness of the vendor's program management system. Buyers often thought that the PM system was not as effective as it was important to the success of the project.

EXHIBIT V-8



Buyers/users also identified the strengths and weaknesses of the vendors' program management systems. Some of their comments are presented in Exhibit V-9.

EXHIBIT V-9

Program Management System Buyers' Comments

Strengths

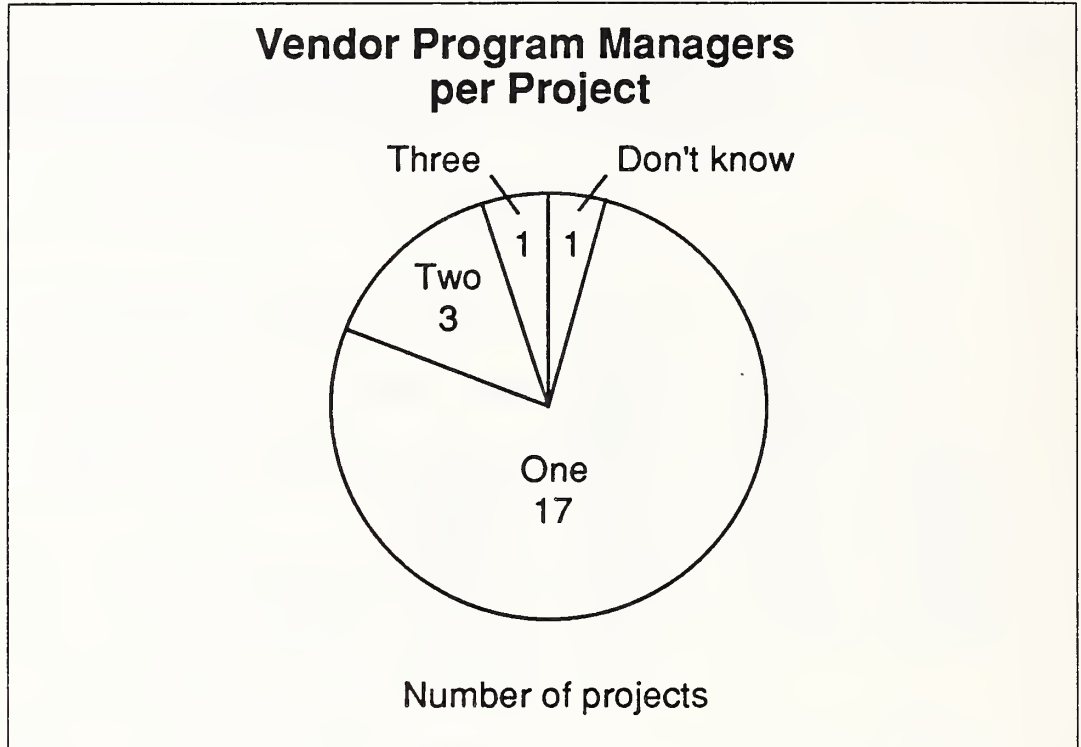
- Imposes management discipline
- Identifies potential problems early
- Identifies, reports and documents ongoing problems
- The documentation builds on itself
- Valuable communication tool
- Pushed to meet schedules, added resources to make up schedules

Weaknesses

- Did not show slippage, kept rescheduling
- Not all people resources available
- Many program managers
- The people using the system
- Inflexible
- Unrealistic schedules
- Poor communication skills

More than one program manager was assigned to only four of the twenty-two programs examined, and only one of those had more than two program managers. See Exhibit V-10. More occurrences of multiple program managers were anticipated, in view of the publicized lack of qualified program managers, and suggestions that some vendors use qualified

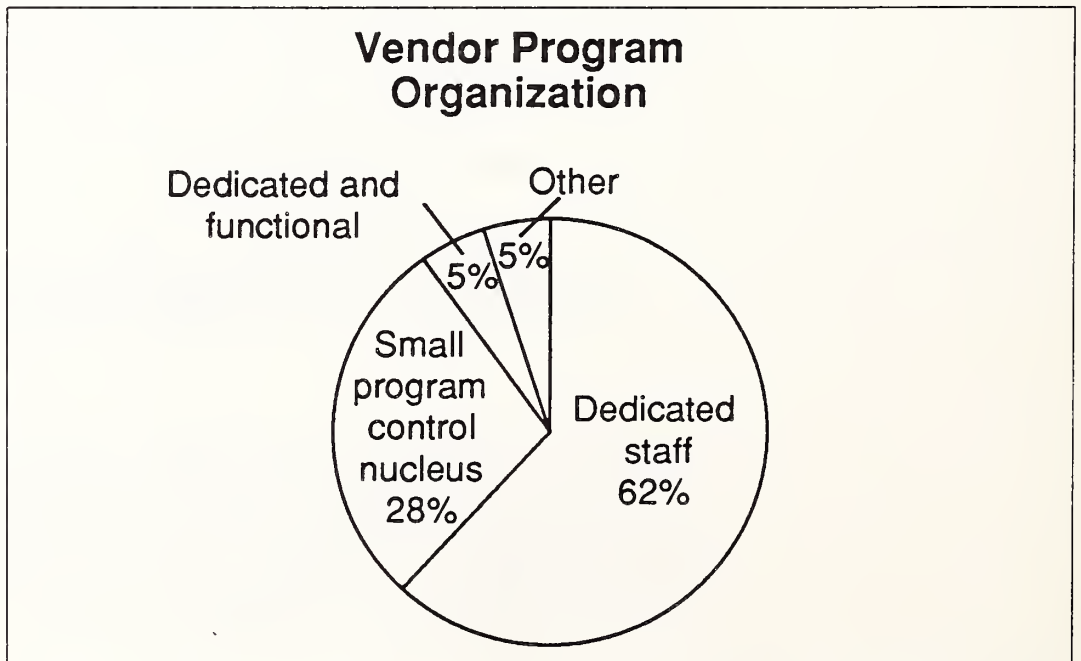
EXHIBIT V-10



program managers to sell and initiate programs, and then use less qualified personnel to manage implementation. In INPUT's sample this was not true and in only one case did the buyer find the second program manager less qualified than the first.

Most buyers indicated that the program implementation resources reported directly to the program manager rather than the program manager heading a small control nucleus, using resources from functional organizations, as shown in Exhibit V-11. This is reasonably consistent with the vendors' view that was presented in Exhibit IV-10.

EXHIBIT V-11



When asked their overall impressions of their vendor's program management system, 75% of the buyers felt that their vendor's system was similar to their own approaches on internally managed projects. All but one said the system interfaced well with their internal organization and management system. Sixty-seven percent of the buyers also responded that they would use or are considering using the vendor's program management approach for internal development projects. Overall, most vendors received good marks on the way they managed systems integration projects.

D

The Program Manager

A qualified program manager is a key element of successful systems integration implementation.

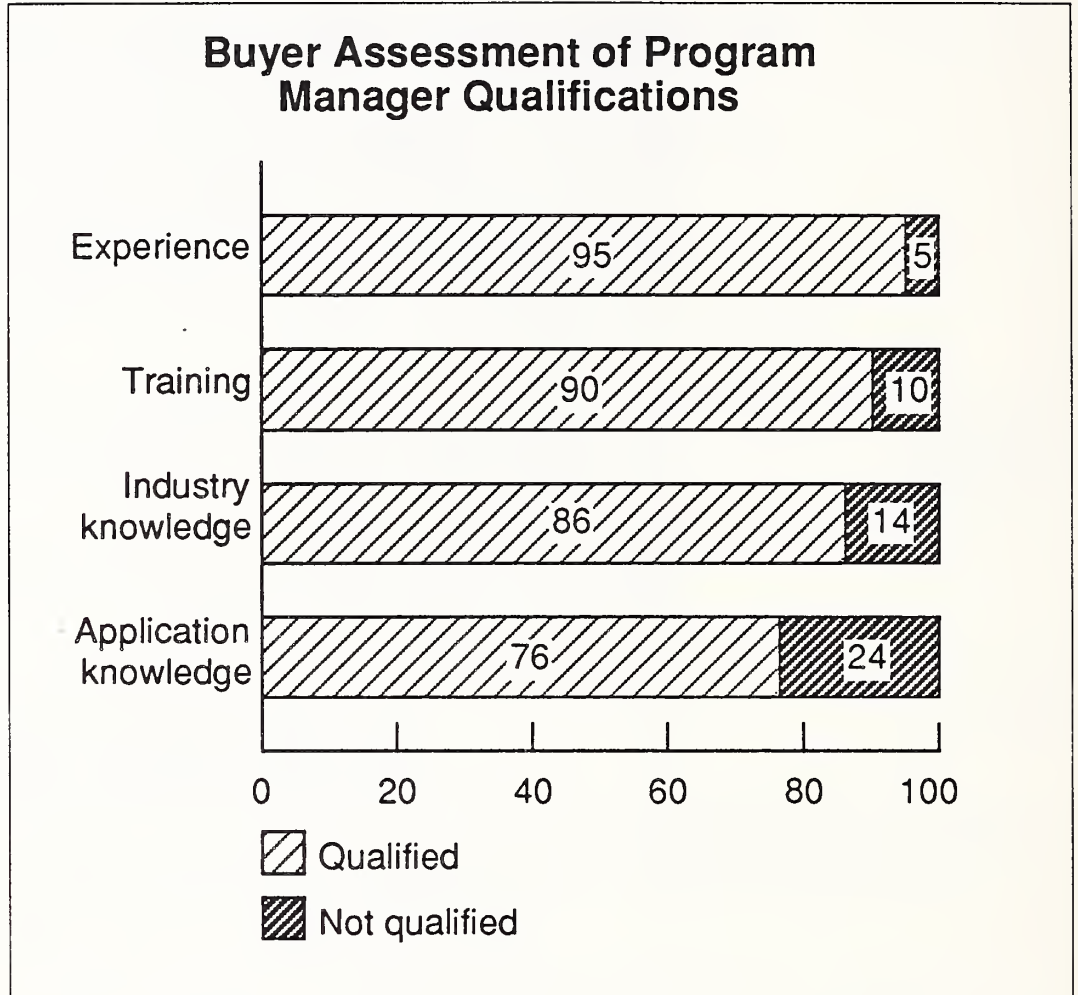
Exhibit V-12 indicates that buyers rate program management experience as the most important qualification.

EXHIBIT V-12



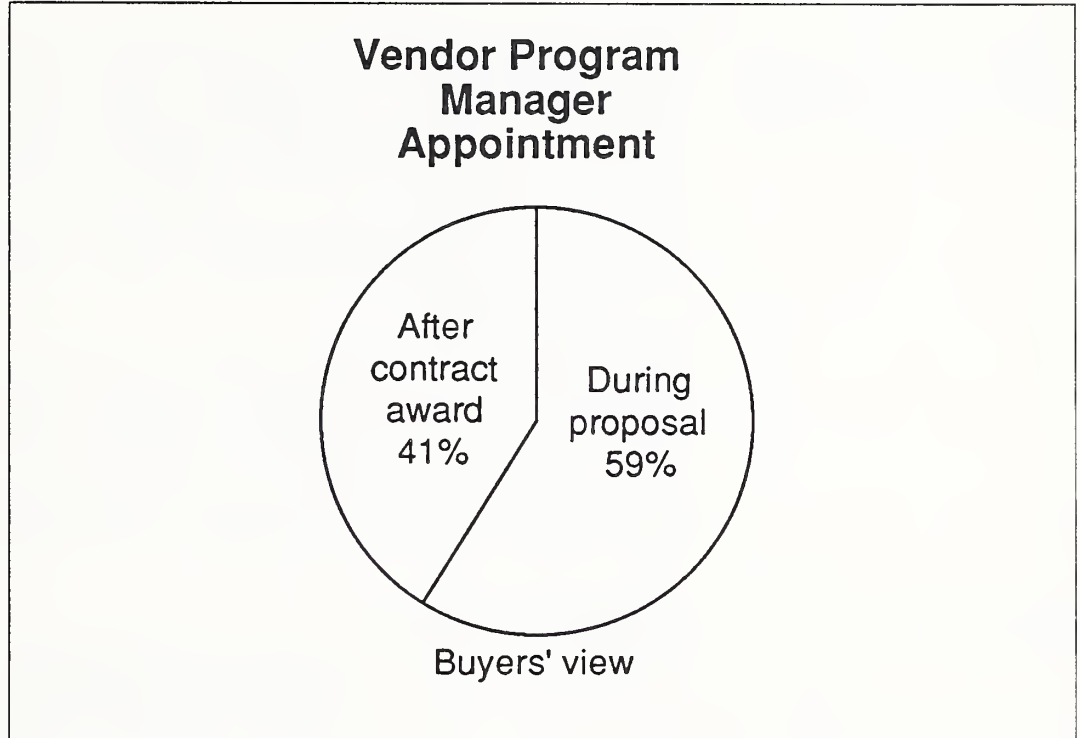
As seen in Exhibit V-13, the buyers in all but one case considered their program managers experienced, and in only two cases, not well-trained. In all of the cases examined, the program managers had either industry or application knowledge. This supports the view that vertical industry or application knowledge is important to successful participation in the systems integration market.

EXHIBIT V-13



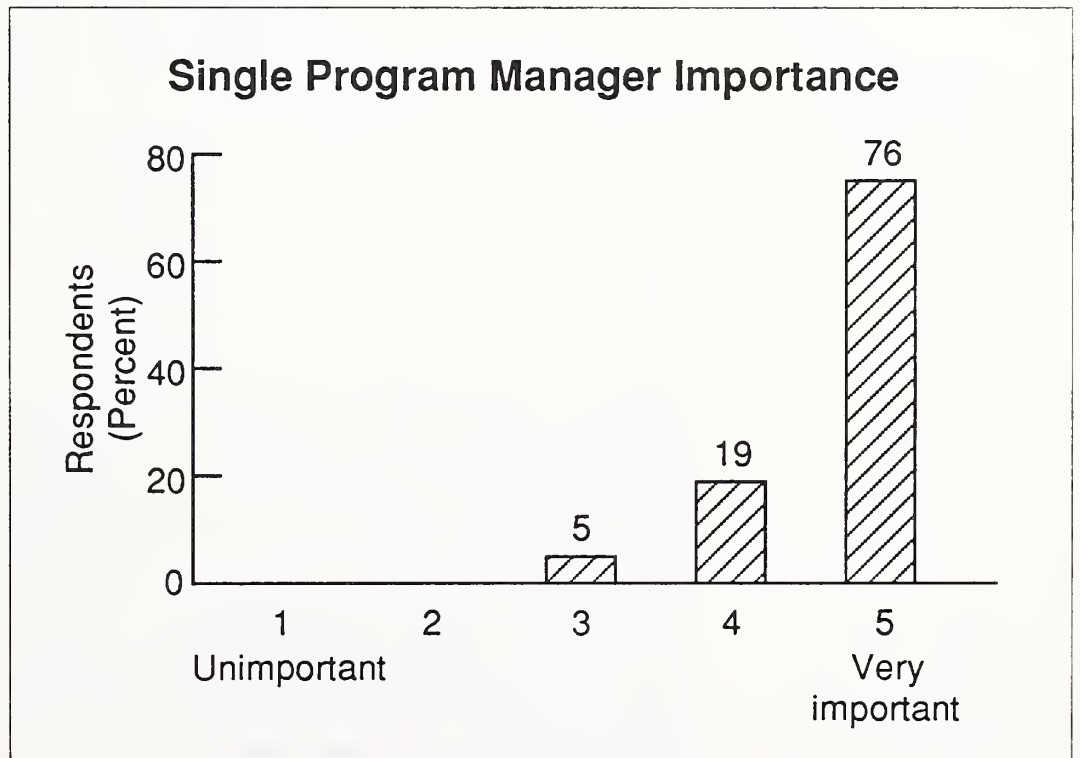
Buyers do not have the same perception of when the program manager is assigned as vendors do. Exhibit V-14 demonstrates that buyers believe that in 41% of the cases the program manager is not assigned until after the contract is awarded. This contrasts to the vendors' view that in almost 85% of their bids, the program manager is assigned early and participates in the proposal process (Exhibit IV-6). INPUT believes that this inconsistency is either because of a change in the vendors' approach to more program management involvement in new and future proposals, or because vendors responded how they prefer to operate, rather than how the realities of the market force them to operate.

EXHIBIT V-14



The importance of having a single program manager is shown in Exhibit V-15. All believe that it is important and over 75% think it is very important.

EXHIBIT V-15



E

Communication and
Change Management

All of the user/buyer organizations that participated in this study identified an individual or established an internal organization to act as the interface to the vendor during program implementation. The interface was in all cases initiated by the buyer and not at the recommendation of the vendor. This is interesting in view of the vendor responses reviewed in chapter IV, which indicate that vendors recommend a preferred buyer interface structure.

There is no preferred organizational reporting location for the buyer's interface to the vendor, shown in Exhibit V-16. This reinforces the notion that systems integration projects are often mission-critical and user initiated, thus executive and user management are more often involved in managing the project and vendor relationship.

EXHIBIT V-16

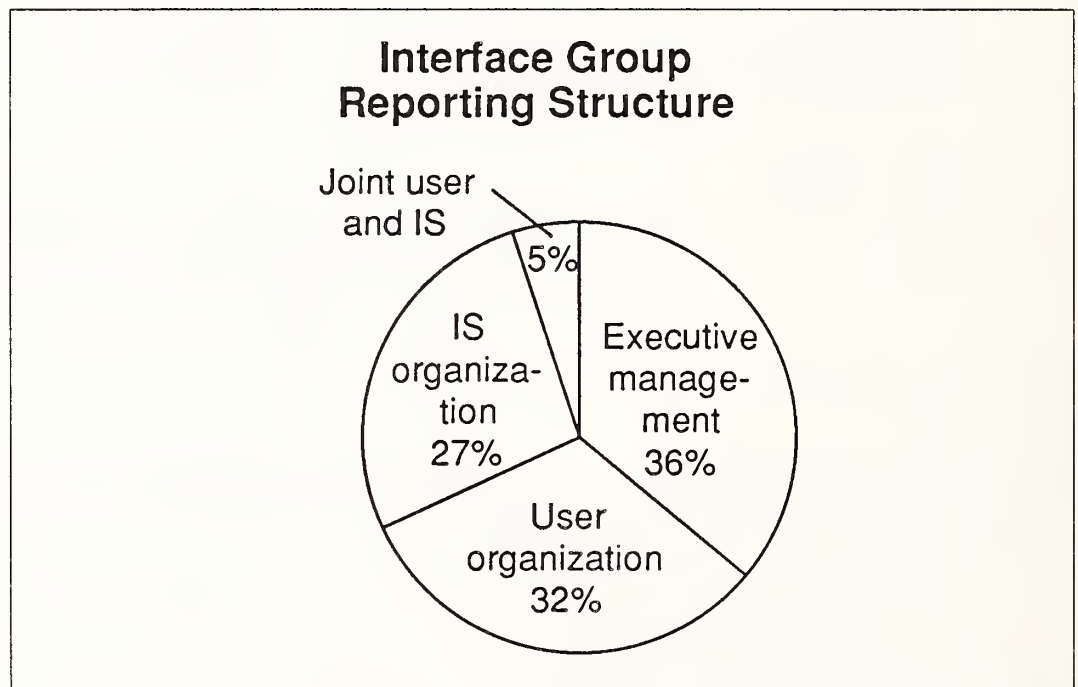
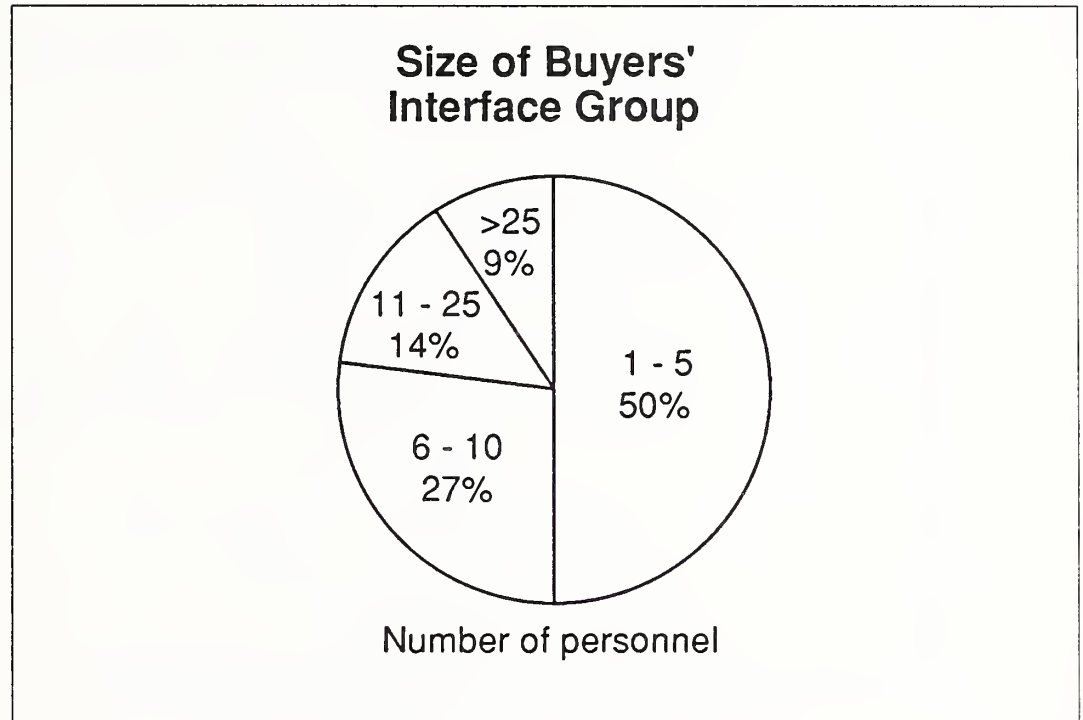


Exhibit V-17 shows the size ranges of the buyer interface groups. Most (77%) are relatively small with ten or fewer persons. The two projects with over twenty-five personnel in the interface were very different. The large multibillion dollar air traffic control system had an interface group of over 100, which is not unexpected given the size of the project. The other project however, was relatively small and was implemented by the vendor that looked for user interface at multiple levels because it was introducing change that had to be assimilated at all levels. INPUT believes that either a small interface group or a large one can be successful, and that the approach just described can be as effective, if not more so, than the ones where fewer users are involved in managing the change to the new system.

EXHIBIT V-17



The responsibilities of the interface groups can range from relatively narrow to extremely broad in scope. Exhibit V-18 demonstrates the range of responsibilities of the interface groups in the survey.

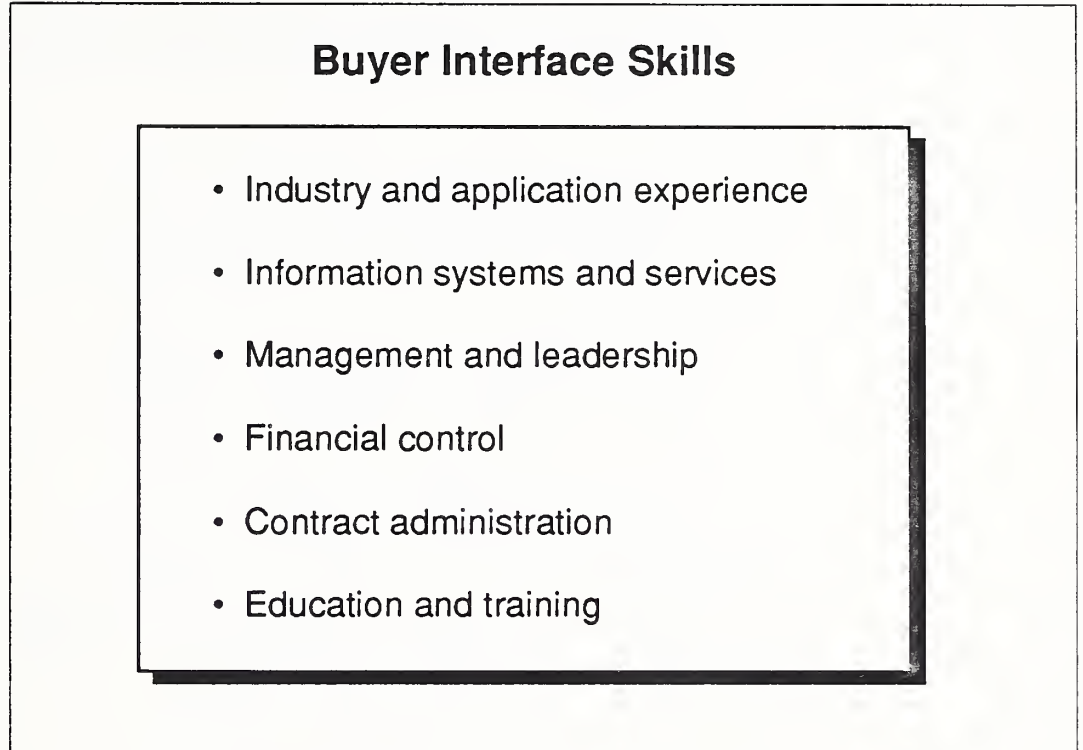
EXHIBIT V-18

Interface Group Responsibilities

- Requirements definition
- Vendor selection
- Vendor interface
 - Coordinate internal resources
 - Recommend, monitor and approve changes
 - Budget control
 - Contract administration
 - Problem tracking
- Acceptance
 - Design acceptance criteria
 - Application testing
 - Final acceptance
- Internal readiness
 - Site preparation
 - Coordinate relocation
 - Training, facilitate transition

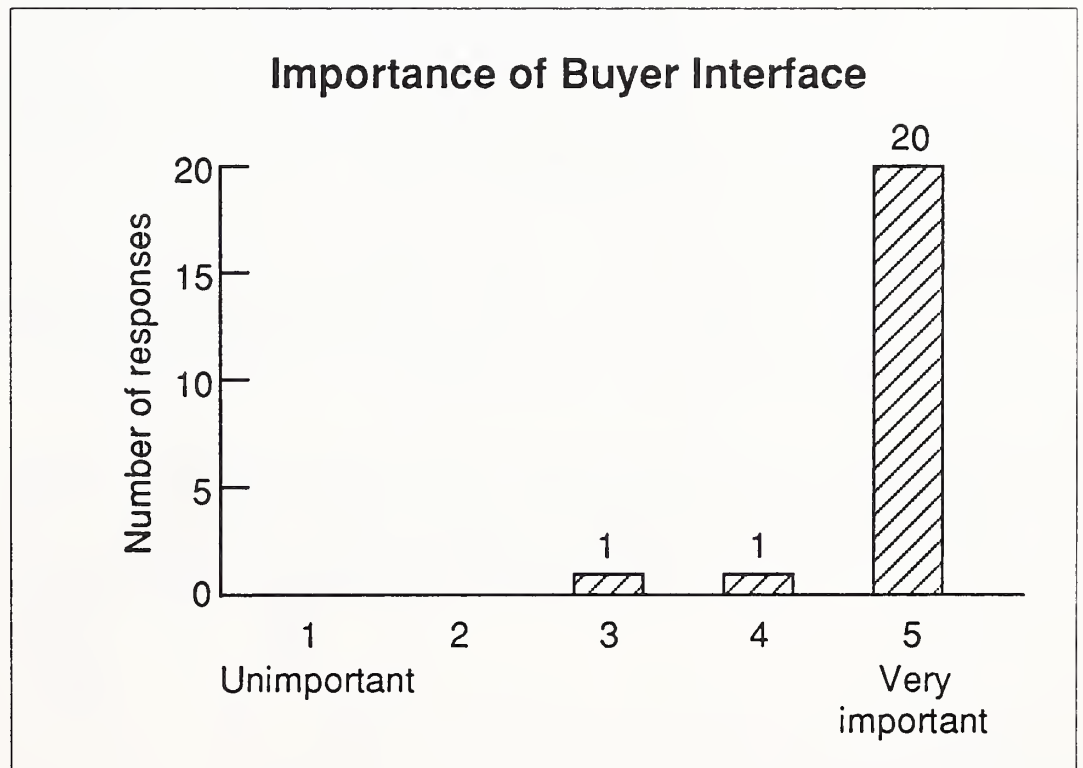
Exhibit V-19 identifies the types of skills that were included in the interface groups established by the buyers. The interface group clearly had to include knowledge of the end-users' requirements. As a result, interface groups in this sample included bankers, engineers, manufacturing personnel, and others, depending on the industry and application. Interface groups almost always included information systems and services skills ranging from program management to programming to data base management and other technical skills. Many of the interface groups included executive management to provide both decision-making authority and program leadership. In addition, financial and contracting skills were required to manage the financial and contractual relationships, and education and training skills were necessary to prepare the user and aid in the transition to the new system.

EXHIBIT V-19



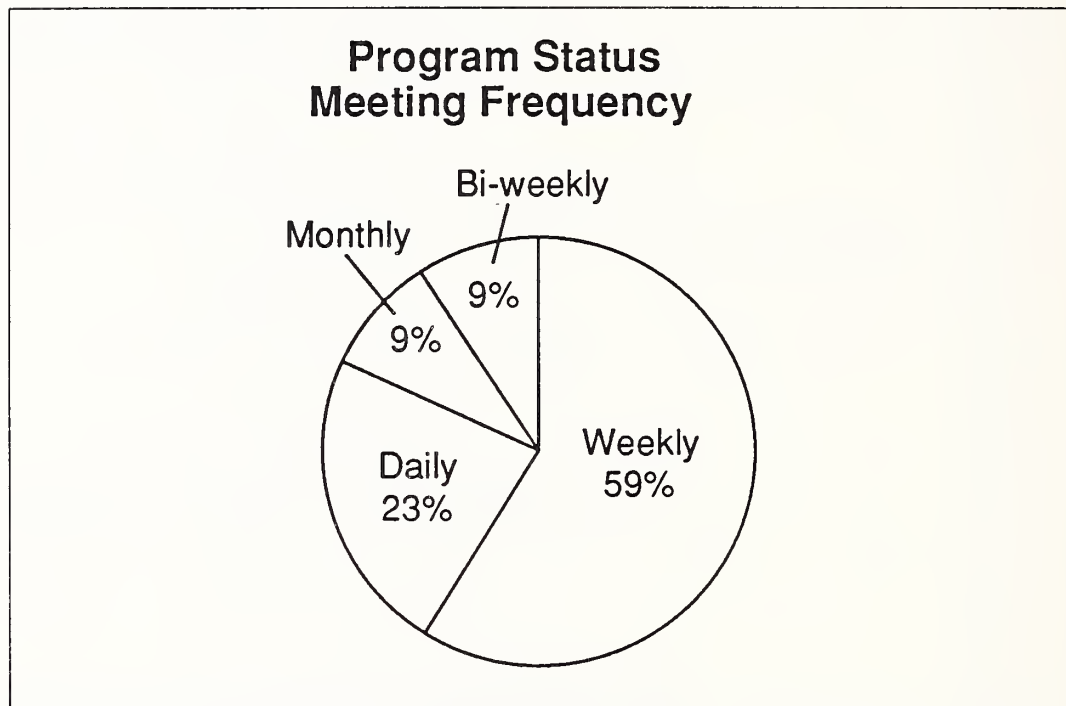
Buyers are almost unanimous in their view of the importance of an internal interface to the vendor as shown in Exhibit V-20.

EXHIBIT V-20



Program status reports were provided at regular meetings in all of the programs surveyed. The frequency of these meetings is shown in Exhibit V-21.

EXHIBIT V-21



Two other areas of importance, in communication between vendor and client, are interfaces to subcontractors and buyer management. Exhibit V-22 demonstrates that from the buyer's perspective the prime contractor needs to be directly responsible for subcontractor management. The vendor must maintain subcontractor control or most likely lose control of the program.

EXHIBIT V-22

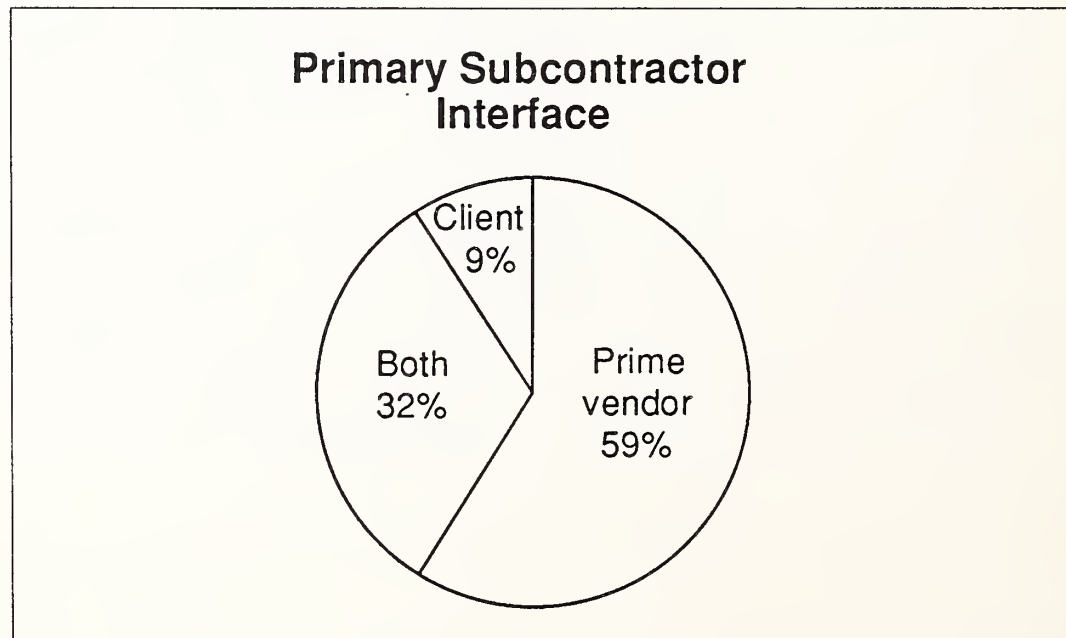
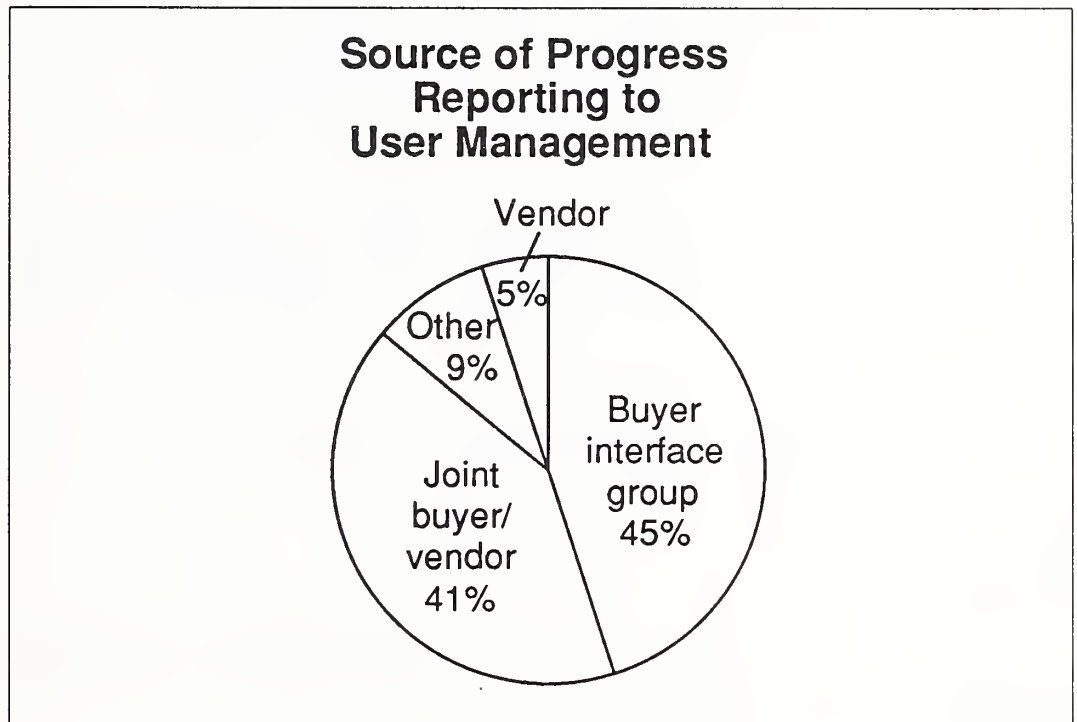


Exhibit V-23 identifies the buyers' view as the means of program progress reporting to user/buyer executive management.

EXHIBIT V-23



One other aspect of communication is change management. In 82% of the programs surveyed, the buyer stated that the vendor utilized a formal process system for requesting, communicating and gaining agreement to changes to the systems specifications. In two of these cases the system did not, however, assess the impact of the changes on cost and schedule. In two cases where the vendor did not have a formal change management system, the buyer stated that the buying organization had imposed a change management system on the vendor. While the vendors in the buyer sample were not all the same as those represented in the vendor survey, there is a minor inconsistency in that vendors unanimously state that they employ formal change management systems, but 18% of the buyers did not see that they implemented these systems on their projects.

Buyers agree that communication, as discussed earlier in this report, is the backbone of successful program management and systems integration. Vendor and buyer need to continue to focus on effective buyer-vendor interface and effective communication.

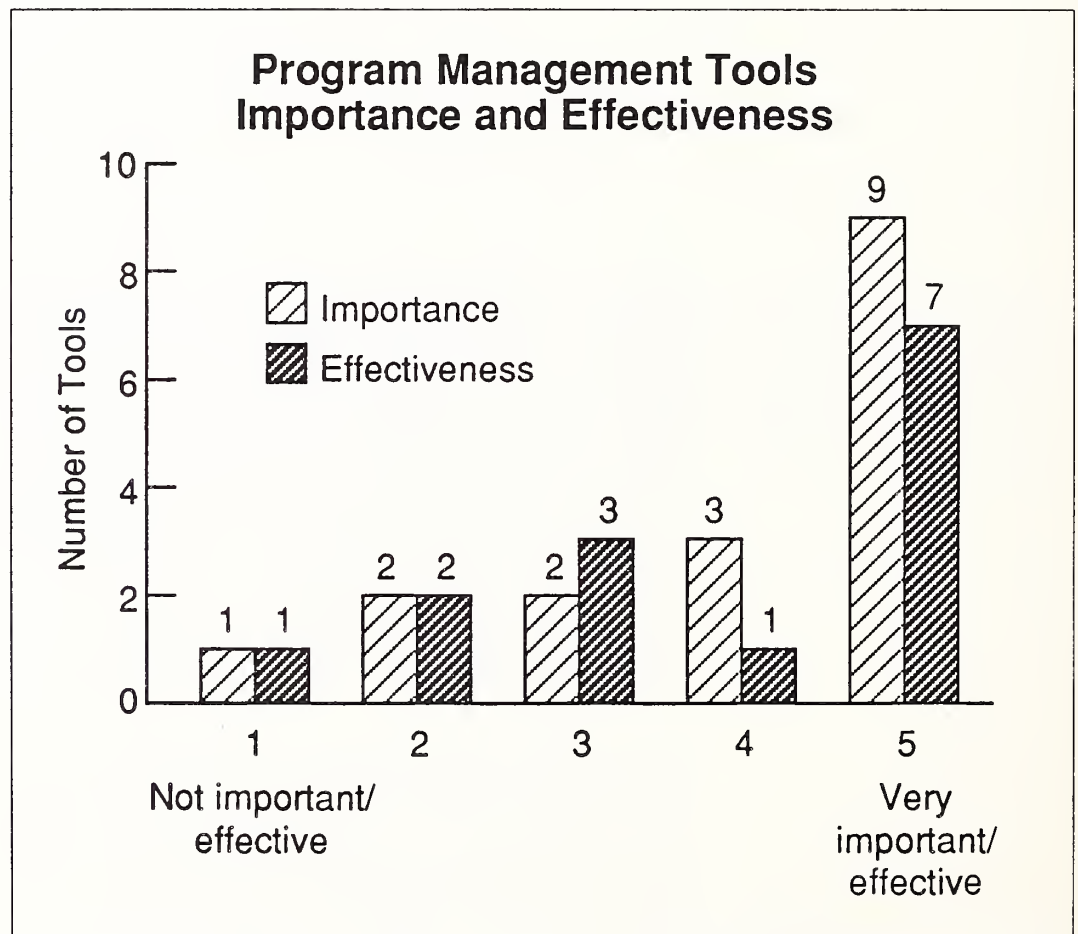
F

Tools and
Methodologies

While seventeen of the twenty-two respondents confirmed that their vendor used automated tools, only twelve knew much about the tools, and the majority of these were described as Gant charts for scheduling, and one as hand-generated schedules. Only seventeen tools were mentioned by the twenty-two respondents. As in the vendor survey, no specific tool was mentioned more than once.

Exhibit V-24 illustrates the respondents' view of the importance and effectiveness of tools. Only fourteen of the tools were rated as to their effectiveness. Only seven of the twenty-two buyers rated tools as of more than average importance, and only five ranked them above average in effectiveness. This does not correlate well with the vendors' view of tools. As mentioned in Chapter 4, the industry needs to develop standard methodologies and to adopt standard tools to manage the growth potential that exists in the systems integration market.

EXHIBIT V-24



G**Buyers' Experience
Summary**

Exhibit V-25 summarizes the buyers' experience with systems integration and program management. The buyers that INPUT surveyed are generally satisfied with the results of the solutions that have been implemented. The use of an integrator is driven by the lack of skilled personnel in internal information processing organizations. Buying power for the programs examined was more in user departments than in internal information processing organizations. As with the vendor survey, buyers recognize the importance of buyer-vendor communication and they have appointed internal interface individuals or groups to ensure that there is constant and clear communication with the vendor.

EXHIBIT V-25**Buyers' Experience Summary**

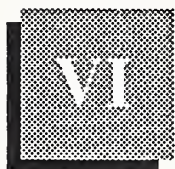
- Buyers generally satisfied
- SI driven by lack of resources and skills
- User organizations are predominant buyers
- Tools and methodologies not too visible

Program management systems are recognized as important to the success of the program, but in many cases these systems are similar to systems that the buyer already uses to control internal programs. Finally, the tools and methodologies that are highly touted by some vendors are not yet widely accepted or rated as effective by the buying community.



Conclusions and Recommendations





Conclusions and Recommendations

The purpose of this report was to examine the management process required to install systems integration projects. Throughout the report, INPUT has discussed the systems integration process from customer needs analysis through implementation, and the management processes and skills required to accomplish these activities on schedule and within budget.

A

Conclusions

1. Systems Integration Conclusions

Exhibit VI-1 summarizes the conclusions that can be drawn from this study regarding the systems integration market. They are:

- User organizations in this study were most often the buyers of systems integration. Of the SI programs that INPUT examined, the user organization was more often the major interface to the vendor, than any other internal organization, including IS. The user also was most often the source of specifications for the RFP.
- Buyers are using systems integration as a means of implementing internal system solutions because they lack skilled resources. Over 75% of the users surveyed employed SI because they did not have internal resources available. INPUT believes that this problem will be exacerbated as the information services companies compete more aggressively with internal IS for skilled information processing personnel.
- All of the buyers in this study rated their programs as successful, and only one was less than satisfied with the vendor's overall performance. Only two respondents would not use their integrator again or recommend it to another buyer. Buyers are therefore generally satisfied with SI as means for acquiring and implementing systems solutions.

EXHIBIT VI-1

Systems Integration Conclusions

- User organizations are often SI buyers
- SI driven by lack of skilled buyer resources
- Buyers are generally satisfied
- Buyer and vendor views of complete specifications vary
- Vendor business and industry knowledge is desirable

- Both vendor and buyers agree that one of the surest causes for systems integration program failure is the lack of vendor and client agreement on the precisely what the end product will be and how it will perform. Based on the responses in this study, it appears that many buyers define this issue as a lack of agreement on planned deliverables, while vendors define it as a lack of adequate specifications. INPUT believes that there is a significant difference between deliverables and specifications. While it is often useful to provide a set of functional specifications to the vendor so that the vendor can develop a creative approach to the buyer's needs, it is equally important that the approach be developed into a mutually agreed-upon set of system specifications before actual program development commences.
- Business and industry knowledge are important vendor attributes in the systems integration market. While this area was not the focus of this study, it became apparent in the responses to both user and buyer questions that it continues to be of significant importance in vendor selection.

2. Program Management Conclusions

The study conclusions regarding program management are indicated in Exhibit VI-2. They are:

- A well-documented, detailed and comprehensive set of program specifications is fundamental to successful program implementation and management. They identify the initial contract deliverables and then become the baseline against which requests for changes are applied and their impact measured.
- A qualified program manager is essential to successful SI implementation. Qualifications as ranked by the user respondents are: program management experience, program management training, application knowledge, and industry knowledge.
- It is important to understand the buyer's expectations, both written and unwritten, if an SI program is to be managed effectively. This requires not only a clear set of customer specifications, but also an open dialogue between vendor and client. Industry and application knowledge are important for understanding the customer's expectations.

EXHIBIT VI-2

Program Management Requirements Summary

- Adequate specifications
- Qualified program management
- Buyer expectations agreement
- Program manager continuity and early involvement
- Rigorous program management process
- Open communications
- Single client contact

- Involving the program manager in proposal development has been recognized as important to successful program management and customer satisfaction. All of the vendors surveyed in this study said they practiced this discipline, yet 41% of the buyers surveyed said the program manager was not identified until after the contract award.
- Fundamental to successful program management and implementation is use of a repeatable set of processes for major program management activities. These methodologies need to be employed in all areas of program development in implementation, for control of change management, and in basic vendor-client communications. The complexity involved in systems integration programs cannot be managed in a casual or on an ad hoc basis. Discipline is essential.
- Open communication between vendor and client is essential to successful program management. This study identifies a number of devices that are employed by vendors and buyers to keep the communication channels open. These range from scheduled periodic reviews and meetings to newsletters and the use of electronic mail. Communication is without a doubt the most frequently mentioned requirement for successful systems integration.
- The vendors surveyed generally agree that a single client contact who has the authority to make decisions regarding the project is extremely important to successful program management. Buyers agree.

B

Recommendations

1. Vendor Recommendations

Recommendations for vendors are summarized in Exhibit VI-3.

- INPUT recommends that vendors develop and expand business consulting skills. These skills will play an increasingly important role in winning systems integration awards and managing successful SI programs. Both vendors and buyers agree that two of the more important factors impacting the success or failure of a program are understanding the client's needs and goals, and managing the client's expectations. The easiest way to develop an understanding of the client's business and to reach agreement on a reasonable set of program expectations, is through participating in the front-end needs analysis. Vendors with business consulting credentials and those that participate in requirements study contracts would seem to have an advantage both in winning and performing SI contracts.
- Vendors should involve program managers in the business acquisition process. While the vendors that participated in this study all claim to involve the program manager early in the program, the user respondents do not support their claim. INPUT continues to believe that early

program management involvement will reap benefits to all of the parties involved in a systems integration program.

EXHIBIT VI-3

Vendor Recommendations

- Build business consulting skills
- Involve program managers in proposal development
- Build/improve development and management processes
- Examine CASE
- Challenge and motivate program managers
- Focus on risk management

- Vendors should continue to focus on developing and/or improving their processes for systems development and management. Well-documented, repeatable processes provide essential discipline that will improve success in all of the phases of program development. Repeatable processes also reduce risk. Connecting these processes into an integrated systems integration methodology should reduce program risk and will be perceived by the buyers as a competitive advantage.
- In conjunction with the development of repeatable methodologies, SI vendors should examine and evaluate CASE tools and methodologies for inclusion in their systems integration development activities. As a repeatable methodology, CASE has applicability in systems integration as a vehicle to improve productivity and mitigate risk.
- Vendor management should ensure that incentive programs and career paths are designed to challenge and motivate existing program managers. There is a shortage of qualified program managers, and there will be increased competition for the competent ones. Vendors should also ensure that programs exist to encourage qualified employees to consider program management, and that education programs are provided to develop existing program managers capabilities.

- This report includes a variety of references to risk assessment, risk mitigation and risk management. Systems integration, often a fixed-price offering, contains risk that must be controlled by the program manager. Vendors should ensure that risk is addressed in all steps of the systems integration process.

2. Buyer Recommendations

Recommendations for buyers are summarized in Exhibit VI-4.

- Throughout this report, the importance of a complete set of detailed and documented specifications has been emphasized. These are essential to the success of the program and the buyer's overall satisfaction with the resulting solution and use of a systems integrator. The user/buyer may develop the detailed specifications, or may choose to have a vendor develop them based on a set of broader functional specifications, either as a standalone contract or as part of the proposal process. Regardless of how they are developed, detailed specifications provide the basis for the contract and are essential before implementation is initiated.
- Buyers should insist that vendors include details of their program management system in the proposal. Users/buyers should consider them an important element in their evaluation criteria. When the vendor has an effective program management system, the buyer's job is easier and the odds of getting the job done on schedule and with the promised function are more favorable.

EXHIBIT VI-4

Buyer Recommendations

- Ensure specifications are complete
- Evaluate vendor program management credentials
- Include change provisions in contract
- Actively participate, foster communications

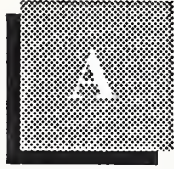
- One part of the buyer evaluation of vendors' program management systems should be to contact previous clients of the vendor to determine their satisfaction with the vendor's ability to manage systems integration contracts. The first-time user can also gain insight into the realities of the user's role in SI through these contacts. This should be a far more thorough job than just reference checking.
- Both buyer and vendor should understand how change will be introduced and managed during the course of the program. While no change is certainly preferred, the realities of systems development are that most programs will have some degree of change. The process should be documented, describing how changes will be requested, sized and agreed on, as part of the base contract.
- Finally, the buyer should not only insist on an open and continuing dialogue with the vendor, but must establish an environment within his own organization that encourages it.

Systems integration demand is real, buyers are buying and as indicated in this report they are generally satisfied with SI results. The overall success of this market is dependent on how effectively vendors and buyers work together to implement solutions. This report should assist both parties in understanding and implementing the program management processes and disciplines that are essential for success.



Appendix: Definitions





Appendix: Definitions

Appendix A contains the definitions used by INPUT to describe the information services industry.

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

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

A

User Expenditures

All user expenditures reported are “available” (i.e., noncaptive, as defined below).

Noncaptive Information Services User Expenditures—Expenditures paid for information services provided by a vendor that is not part of the same parent corporation as the user.

Captive Information Services User Expenditures—Expenditures received from users who are part of the same parent corporation as the vendor.

B**Delivery Modes****1. Processing Services**

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

- **Transaction Processing Services**—Updates client-owned data files by entry of specific business activity, such as sales order, inventory receipt, cash disbursement, etc. Transactions may be entered in one of three modes:
 - **Interactive**—Characterized by the interaction of the user with the system, primarily for problem-solving timesharing, but also for data entry and transaction processing; the user is on-line to the program/files. Computer response is usually measured in seconds or fractions of a second.
 - **Remote Batch**—Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements. Computer response is measured in minutes or hours.
 - **User Site Hardware Services (USHS)**—Those offerings provided by processing services vendors that place programmable hardware at the user's site rather than at the vendor's data center. Some vendors in the federal government market provide this service under the label of distributed data services. USHS offers:
 - Access to a communications network
 - Access through the network to the processing services vendor's large computers
 - Local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network
 - Significant software as part of the service
 - **Carry-in Batch**—Where users deliver work to a processing services vendor.
- **Utility Processing**—Vendor provides access to basic software tools, such as language compilers/assemblers, DBMSs, sorts scientific library routines, and other systems software enabling the users to develop their own problem solutions

- **Other Processing Services**—Include computer output microfilm, other data output services, data entry services, disaster recovery and backup services
- **Systems Operations (Processing)**—Also referred to as “resource management,” facilities management, or “COCO” (contractor-owned, contractor-operated). Systems operations is the management of all or part of a user’s data processing functions under a long-term contract of not less than one year. This would include remote computing and batch services. To qualify, the contractor must directly plan, control, operate, and own the facility provided to the user—either on-site, through communications lines, or in a mixed mode.

Processing services are further differentiated as follows:

- **Cross-industry services** involve the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but that cut across industry lines. Most general ledger, accounts receivable, payroll, and personnel applications fall into this category. General-purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or data base is designed for specific industry use, then the service is industry-specific (see below).
- **Industry-specific services** provide processing for particular functions or problems unique to an industry or industry group. Specialty applications can be either business or scientific in orientation. Examples of industry-specific applications are seismic data processing, numerically controlled machine tool software development, and demand deposit accounting.

2. Network Services

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

a. Network Applications

The network applications segment is composed of three subsets:

- **Value-Added Networks (VANs)**—VANs typically involve common carrier network transmission facilities that are augmented with computerized switching. These networks have become associated with packet-switching technology because the public VANs that have received the most attention (e.g., Telenet and TYMNET) employ packet-

switching techniques. However, other value-added data service features, such as store-and-forward message switching, terminal interaction, error detection and correction, and interacting with host computers, are of equal importance.

- **Electronic Data Interchange (EDI)**—EDI is application-to-application electronic communications between organizations, based on established business document standards.
- **Electronic Mail (E-Mail)**—Transmission of messages across an electronic mail network managed by a services vendor.

b. Electronic Information Services

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

3. Software Products

This category includes user purchases of applications and systems software packages for in-house computer systems. Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites.

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

There are several subcategories of software products, as indicated below.

a. Applications Software Products

Applications software products perform functions directly related to solving user's business or organizational needs. The products can be:

- **Cross-Industry Products**—Used in multiple-industry applications as well as the federal government sector. Examples are payroll, inventory control, and financial planning.
- **Industry-Specific Products**—Used only in a specific industry sector, such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting, airline scheduling, material resource planning, and insurance claim management.

b. Systems Software Products

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

- **System Control Products**—Function during applications program execution to manage the computer system's resources. Examples include operating systems, communication monitors, emulators, spoolers, and products that provide network control, library control, windowing, and access control.
- **Data Center Management Products**—Used by operations personnel to manage the computer system's resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, utilities, and capacity management products.
- **Applications Development Products**—Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include traditional programming languages, 4GLs, sorts, productivity aids, assemblers, compilers, data dictionaries, data base management systems, report writers, project control and CASE systems.

4. Turnkey Systems

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

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

Turnkey systems revenue is divided into two categories:

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

- **Cross-Industry Systems**—Systems that provide a specific function that is applicable to a wide range of industry sectors, such as financial planning systems, payroll systems, or personnel management systems.
- Revenue includes hardware, software, and support functions.

5. Systems Integration (SI)

Systems integration is a business offering that provides a complete solution to a complex information system, networking, or automation requirement through the custom selection and implementation of a variety of products and services, where information products exceed 50% of the contract value.

A system integrator is a business organization responsible for overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for delivery of the specified system function and performance on schedule and at the contracted price.

The systems integrator will perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed system design/architecture
- System component selection, modification integration, and customization
- Custom software design and development
- Custom hardware design and development
- System implementation, cutover, test, and evaluation
- Life cycle support, including:
 - System documentation and user training
 - System operation and/or management
 - System maintenance
- Financing

6. Professional Services

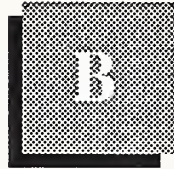
This category includes consulting, education and training, software development, and systems operations as defined below:

- **Software Development**—Development of a software system on a custom basis. It includes one or more of the following: user requirements definition, system design, contract programming, documentation.
- **Education and Training**—Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in operations, programming, and maintenance.
- **Consulting Services**—Information systems and/or services management consulting, project assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.
- **Systems Operations (Professional Services)**—This is a counterpart to systems operations (processing services) except the computing equipment is owned or leased by the client, not by the vendor. The vendor provides the staff to operate, maintain, and manage the client's facility.



Appendix: Program Management Vendor Questionnaire





Appendix: Program Management Vendor Questionnaire

Introduction: This questionnaire has been prepared by INPUT, a market research and consulting firm, to assist in performing a study of the program management disciplines being used by the leading SI vendors. It has been stated that one of the most important elements of successful system integration project implementation is the vendors program or project management capability. The purpose of the study is to determine if there are superior program management techniques that can applied to improve the success in SI implementation.

A

Business Acquisition Process

1. Does your organization have an established process for identifying and qualifying systems integration opportunities? _____ (Y/N)

If yes, please describe it.

2. Do you have a well defined process for preparing proposals in response to these opportunities? _____ (Y/N)
 - a. Is this process designed to mitigate risk in the performance phase of the proposed contract? _____ (Y/N)

- b. If yes, briefly describe some of the risk mitigation features of your proposal process.

3. Do your prospective clients generally have a complete specification for the system?

- a. If the specification is incomplete, do clients expect them to be completed:

- As part of the proposal process? _____
- As a part of the contract? _____
- or, other? _____

- b. Do these considerations have an influence on your ability to manage the program successfully? _____ (Y/N)

If yes, please explain.

4. Are there other activities or considerations during the proposal process that significantly impact successful program management?

B Program Management System

1. What do you believe are the most important factors in the successful management of a systems integration project?

2. Is there a single point of responsibility for establishing program management procedures and processes in your organization? _____ (Y/N)
- a. If not, how are program management procedures developed and/or controlled?
- _____
- _____
- _____
- b. If yes, to whom does it report?
- _____
- c. Where does operational responsibility for program management reside in the organization?
- _____
- d. Would you provide an organization chart that shows these functions? _____ (Y/N) If yes, return the organization chart with this questionnaire.

3. Do you have a formal or approved program management system? _____ (Y/N)
If no, how does your organization manage programs to completion?
- _____
- _____
- _____

If no to question 3, please go to question 9.

4. Is use of this program management system required on all programs?
_____ (Y/N)

- a. If no, describe the conditions when its use is not required.
- _____
- _____
- _____

b. When the system is not used are jobs more or less likely to be successful?
_____ (More/Less)

5. How long has your PM system been in place? _____ (Years)

6. Was it internally developed or was it acquired from outside? _____

If acquired outside, from whom did you acquire it?

Name of System _____

Developer _____

Location _____

7. Is the program management system:

a. Well documented? _____ (Y/N)

b. Included in the organizations formal instructions and procedures? _____ (Y/N)

c. Formally taught to PM personnel? _____ (Y/N)

d. Updated based on a formal feedback system? _____ (Y/N)

8. Was the system developed to meet Federal or commercial SI requirements, or for some other reason?

9. If your program management approach is federal or commercial based, can it be used easily in the other market? _____ (Y/N)

a. If yes, describe what makes it easily transferable.

b. If no:

Why not? _____

Have you established separate processes for federal and commercial?
_____ (Y/N)

Describe the differences in the two processes.

10. Have you found industry or application unique differences that require different program management philosophies or techniques? _____ (Y/N)

a. If yes to commercial industry variations (e.g. Manufacturing vs. Banking), please describe.

b. If yes to application or technology program management differences, please describe.

11. How effective, on a scale of 1 to 5 (with 1 representing ineffective and 5 representing highly effective), is your organization at managing programs to completion as defined in the original contract? _____

If not highly effective, please describe its weaknesses.

12. Program Manager

- a. When do you appoint the program manager? (during proposal process, after contract award)

- b. If during the proposal process, in what proposal activities does the program manager participate?

13. How do you typically organize your implementation resources to perform on a systems integration contract? Do you use a dedicated program staff with all program resources assigned directly to it _____ (Y/N) or a small program control nucleus using resources from functional organizations _____ (Y/N) or both _____ (Y/N)?

14. Management Responsibilities—Please indicate, with a “P” where program, functional or “other” management has Primary responsibility for the following list of activities. Indicate with an “S” those activities where a management group provides Support, but does not have primary responsibility. Functional organizations include Systems Engineering, Software Engineering, Hardware Engineering, Installation & Test, etc. Other management includes Finance and Planning, Legal, Business Practices, Executive Management, etc.

Activity	Program Manager	Functional Manager	Other Org.
a. Proposal development	_____	_____	_____
b. Proposal pricing	_____	_____	_____
c. Proposal negotiation authority	_____	_____	_____
d. Primary client project contact	_____	_____	_____
e. Establishing the program organization	_____	_____	_____
f. Establishing the program plan	_____	_____	_____
g. Staffing/personnel authority	_____	_____	_____
h. Technical discipline management & control	_____	_____	_____
• Systems engineering	_____	_____	_____
• Software engineering	_____	_____	_____
• Hardware development	_____	_____	_____
• Integration & test	_____	_____	_____
i. Progress review & reporting	_____	_____	_____
j. Change negotiation authority	_____	_____	_____
k. Financial management & control	_____	_____	_____
l. Monitoring contract compliance	_____	_____	_____
m. Subcontractor management	_____	_____	_____
n. Other (please describe)	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

C
Systems Integration Implementation Process

1. What are the factors that are most likely to cause a program to succeed or fail in the following areas?

- a. Meeting the technical specification

Success factors

Causes for failure

b. Meeting schedule dates

Success factors

Causes for failure

c. Meeting cost objectives

Success factors

Causes for failure

2. Communications

a. How does the program manager interface to and communicate with top management?

- b. How does the program manager interface to and communicate with subcontractors (external and internal)?

- c. How does the program manager interface to and communicate with the client?

- d. Is there a client interface structure that you prefer and recommend that your clients employ? _____ (Y/N). If yes, please describe.

3. Does your program management system include formal processes to:

- a. Request project specification changes? _____ (Y/N)
- b. Size the impact of changes on cost and schedule? _____ (Y/N)
- c. Communicate and obtain client and vendor agreement to specification changes? _____ (Y/N)
- d. Briefly describe these processes.

4. Do you employ formal processes for risk management? _____ (Y/N)

a. Briefly describe these processes.

5. Identify and describe the tools or methodologies you use for program management. Identify if they were developed internally (I) or externally (E), and if they are proprietary _____ (Y/N).

Tool	Description/Function	Source I/E	Proprietary Y/N
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Please comment on the effectiveness of any, or all, of these tools or methodologies.

D
Program Management Staffing

1. Where do you find good candidates for program managers?

a. Internally

b. Externally

2. What are the qualifications and minimum experience levels you expect in program management candidates?

a. Minimum requirements

b. Experience level

3. What training and education programs do you provide for program managers?

a. Entry level

b. Continuing

4. How do you measure, motivate and compensate program managers to bring programs in within specification, schedule and cost?

a. What do you measure?

b. Does your compensation plan for program managers include:

- Base salary _____ (Y/N)
- Performance-based incentive compensation _____ (Y/N)

c. If yes to incentive compensation, briefly describe:

d. What other incentives do you use?

5. How do you keep good program managers?

a. Continuing as program managers?

b. Career paths to other positions?

c. Please describe any other programs you use to retain program managers.

E**Systems Integration Background and Organization**

Note: Section E of this questionnaire is included to provide background and demographic data to assist in correlating responses. If you can not answer any of these questions please leave them blank and if possible, identify, in the blanks at the end of the questionnaire other individuals in the organization who might help us complete this section.

1. How many years has your company been offering systems integration services?
Federal _____ Commercial _____

2. Does your company/division, where SI is proposed and implemented, operate under a philosophy of strong central control or decentralized and delegated responsibility? Highly centralized, highly decentralized, or somewhere in between? _____

3. Where is the systems integration organization located within the company?
Separate Division _____ Subsidiary _____ or Matrixed _____

4. How large is your professional services staff? _____
 - a. What percentage of the staff is normally devoted to systems integration jobs?

 - b. What other professional services do you offer?

5. How many systems integration jobs do you normally have:
 - a. In the bid and proposal stage at one time? _____
 - b. In implementation at one time? _____

6. What is the typical size of systems integration jobs you bid on/perform? _____
(Total price for the solution including hardware and professional services)

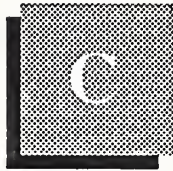
If you did not complete Section E please identify other individuals in your organization who may be able to provide this information in the spaces below.

Name	Title	Telephone Number
_____	_____	_____
_____	_____	_____
_____	_____	_____



Appendix: Program Management User Questionnaire





Appendix: Program Management User Questionnaire

Introduction: Hello, my name is _____ and I am calling from INPUT, a leading information services market research and consulting firm. We are conducting a research study of the program management disciplines being used in systems integration programs. It has been stated that one of the most important elements of successful system integration program implementation is the vendors program or project management capability. The purpose of the study is to determine if there are superior program management techniques that can be applied to improve the success in SI implementations or in any systems project.

We would like to invite you to participate in this research because we have been told that your organization has, in fact, been involved in a systems integration program. In return for your participation we will send you a summary of the study results.

A Systems Integration Project Verification and Characteristics

1. INPUT was told that your organization has used a systems integrator to install an information, automation or network-based system. Did the integrator assume total responsibility for delivering the system to your organization at a predetermined fixed-price? (Y/N) _____

If yes, continue interview. If no, terminate interview.

2. INPUT would like to gather some basic information about your company and this systems project to help us evaluate the effectiveness of the program/project management system. We would appreciate your cooperation in answering the following questions:

a. What Standard Industry Classification (SIC) code grouping is your organization in?

b. How many employees are there in the organization?

c. What are your annual sales?

d. What application was the integrator selected for?

3. Why did you decide to use an external integrator?

Check All That Apply

- a. Did not have internal resources available
- b. Did not have the required skills internally
- c. To get the job done faster
- d. Other (please describe)

4. Who in your organization was identified as the major interface to the integrator during the proposal and selection process?

Check One

- a. Internal information systems organization
- b. User organization
- c. Purchasing
- d. Other (please describe)

5. How did your organization go about finding system integrator(s) to address this requirement?

Check One

- a. Published a bid solicitation to all interested parties _____
- b. Sent an invitation to a select list of vendors _____
- c. Invited a response from a single vendor _____

6. Was there a specification or statement of work included with the invitation?
(Y/N) _____

7. Who developed the specification?

Check One

- a. Your end-user organization _____
- b. Your own central data processing/
information systems organization _____
- c. The systems integrator developed the
specification as part of his proposal _____
- d. An outside vendor developed the specification
under a separate contract _____
- e. Other (please describe) _____

8. What was the overall cost of the project including hardware and software and professional services?

- a. Less than \$1 million _____
- b. \$1 - 5 million _____
- c. \$6 - 20 million _____
- d. \$21 - 100 million _____
- e. Over \$100 million _____

9. Which systems integrator did you select to implement your project?

B**Managing the Implementation Process**

10. From a buyer's perspective, what do you believe are the most important factors in the successful management of a project by an external systems integrator?

11. Did the systems integrator you selected for your system have a formal program management system that he employed during implementation? (Y/N) _____

12. Did the vendor describe this program management system to you in detail?

Check One

- a. As part of the proposal process _____
- b. As part of the implementation process _____
- c. Was not described _____

13. Was your understanding of the integrator's program management system a factor in his selection by your organization? (Y/N) _____

If yes, rate on a scale of 1 to 5, how important it was in your evaluation model? (1 = unimportant, 5 = very important) _____

14. On a scale of 1 to 5, how important is/was the program management system to the success of your program? (1 = unimportant, 5 = very important) _____

15. How effective, on a scale of 1 to 5 (with 1 representing ineffective and 5 representing highly effective) is/was the PM system that the integrator used for your project?

- a. What, in your opinion, were the strong points of their PM system?

b. What in your opinion were the weak points of their PM system?

16. Please assist us in understanding your assessment of the program management system by answering the following questions:

a. Was it similar to systems you use internally to manage large systems projects? (Y/N) _____

b. Did it interface well and work well with the way you are organized and manage your business? (Y/N) _____

If no, please explain why not.

c. Would/are you considering using this program management approach for internally developed projects? (Y/N) _____

d. Please explain why you would/would not use this system for internally developed projects.

17. How did the vendor organize his implementation resources to perform on your project?

Check One

a. Did they use a dedicated program staff with all program resources assigned directly to the program manager? _____

b. A small program control nucleus using resources from functional organizations? _____

c. Other (please describe) _____

C

Program Manager

18. To your knowledge, when did the vendor appoint a program manager to lead your project?

Check One

- a. During the proposal process _____
 b. After the contract was awarded _____
 c. Other (please describe) _____

19. Did you have the same program manager throughout the implementation of your project? (Y/N) _____

If no, how many program managers were there over the implementation period?

20. On a scale of 1 to 5, how important do you believe is assignment of a single program manager throughout implementation? (1 = unimportant, 5 = very important)

21. I will read you a list of program manager qualifications.

- a. Please rate the importance of these qualifications on a scale of 1 to 5 (1 = unimportant, 5 = very important)

	Importance 1 to 5	Qualifi- cations #1 Yes/No	Qualifi- cations #2 Yes/No
Program management experience	_____	_____	_____
Well trained in program management disciplines	_____	_____	_____
Knowledge of your industry	_____	_____	_____
Knowledgeable of specific applications	_____	_____	_____
Other (please describe)	_____	_____	_____

- b. Please indicate if the integrator's program manager was qualified in these areas (yes or no). (If more than one program manager, put most qualified in column qualifications #1 and least qualified in column qualifications #2).

D

Program Management Process

22. Did your organization identify an individual or establish an internal organization as an interface to the vendor? (Y/N) _____

- a. If yes, was establishment of this interface initiated by your organization or at the vendor's recommendation?

Check One

Us	_____
Vendor	_____

- b. If by the vendor, did your organization agree/disagree with the integrator's recommendations?

Check One

Agree	_____
Disagree	_____

c. Where did the interface group report in your organization?

Check One

Executive management _____

Information systems _____

The user _____

Other (please explain) _____

d. Briefly describe the responsibilities of this interface.

e. Briefly describe the activities performed by the interface group.

f. How many people are in this interface group? _____

g. What specific skills were in this group?

h. On a scale of 1 to 5, in your opinion, how important is/was the interface group to the success of your project? (1 = unimportant, 5 = very important) _____

23. Do you believe that the integrator's program management system included formal processes, to:

a. Request project specification changes? (Y/N) _____

b. Size the impact of changes on cost and schedule? (Y/N) _____

c. Communicate and obtain your agreement of specification changes? (Y/N) _____

d. Would you briefly describe these processes?

24. Communications

- a. How often did your organization meet with the integrator to discuss program status?

Check One

Daily

Weekly

Monthly

Other (please explain)

- b. Did the integrator deal directly with the subcontractors or did your organization have a role in interfacing with them?

_____ (Integrator/Us/Both)

If Us or Both, briefly describe your role in interfacing with the subcontractors.

- c. How was progress communicated to your management?

Check One

By the integrator

By your interface group

Jointly

25. Did the integrator use or appear to employ tools or methodologies to assist in managing the program? (Y/N) _____

If yes, do you know anything about the tools? (Y/N) _____

If yes, please describe each tool you recall, and provide me with your assessment of its importance and effectiveness. Use a scale of 1 to 5. (1 = unimportant, 5 = very important)

Tool	Description/function	Importance	Effectiveness
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

E

Program Results

26. On a scale of 1 to 5, how successful is the solution that that has been provided through the project we have been discussing? (1 = unsuccessful, 5 = very successful)

27. Briefly describe the impact of this solution on your organization.

28. On a scale of 1 to 5, how satisfied is your organization with the results of using a systems integrator? (1 = unsatisfied, 5 = very satisfied)

- a. Overall satisfaction with the integrator _____
- b. Satisfaction with the integrator's program management system _____
- c. Satisfaction with the integrator's technical solution _____
- d. Satisfaction with the cost of using this integrator _____
- e. Satisfaction with the integrator's ability to meet schedule _____

29. If the need arises again, do you believe that your organization would implement another system using a systems integrator? (Y/N) _____

If yes, with the same integrator? (Y/N) _____

30. If asked by another company, would you recommend the integrator you used on the project we have been discussing? (Y/N) _____

This concludes the questionnaire. Thank you for your responses. We will send you a copy of the study summary as soon as it is completed.

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.

Thank You.

1. Report title: **Program Management in Systems Integration** (SIM7)

2. Please indicate your reason for reading this report:

- | | | |
|---|---|---|
| <input type="checkbox"/> Required reading | <input type="checkbox"/> New product development | <input type="checkbox"/> Future purchase decision |
| <input type="checkbox"/> Area of high interest | <input type="checkbox"/> Business/market planning | <input type="checkbox"/> Systems planning |
| <input type="checkbox"/> Area of general interest | <input type="checkbox"/> Product planning | <input type="checkbox"/> Other _____ |

3. Please indicate extent report used and overall usefulness:

	Extent		Usefulness (1=Low, 5=High)				
	Read	Skimmed	1	2	3	4	5
Executive Overview	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Complete report	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Part of report (____ %)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. How useful was:

- | | | | | | |
|-----------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Data presented | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Analyses | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Recommendations | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5. How useful was the report in these areas:

- | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Alert you to new opportunities or approaches | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Cover new areas not covered elsewhere | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Confirm existing ideas | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Meet expectations | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6. Which topics in the report were the most useful? Why? _____

7. In what ways could the report have been improved? _____

8. Other comments or suggestions: _____

Name _____ Title _____

Department _____

Company _____

Address _____

City _____ State _____ ZIP _____

Telephone _____ Date completed _____

Thank you for your time and cooperation.

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