Market Research

Evaluation of Internet-enabled Supply Chain Management Solutions

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Abstract

The ability of eSCM applications to cut costs and produce expeditious return on investment, which is confirmed in this study, provides sufficient incentive to implement them. In just one example, a $15.4 billion discrete manufacturing company that invested $12.5 million in 2000 to enable SCM for the Internet reduced cost of goods sold by $148.6 million in one year.

Despite cost savings, this survey uncovers a surprising reality: in contrast to expectations that the bulk of eSCM transactions would be moved online soon after implementation, in fact, the proportion of transactions moved online each year following deployment was very slow–less than 50% online after two years. The report examines a strategic eBusiness approach to accessing the fuller benefits of eSCM.

In this study, INPUT analyzed eSCM deployment benefits, issues, barriers, and solution. Issues covered in this report include:

- Ability and limitations of new technology to reduce barriers to individual user implementations
- Examination of expected and actual costs/benefits associated with eSCM implementations
- Distinction between tangible and intangible benefits behind eSCM applications and solutions
- Forecast of eSCM market for 2000-2005.

This report underscores an often misunderstood distinction between Internet-enabled Supply Chain Management (eSCM) ***applications*** and eSCM ***solutions***. *Applications* perform functionally specific tasks, and without back-end system integration can fail to deliver significant added value. *Solutions* provide broader end-to-end capabilities, and link applications with front- and back-end systems. With more extensive integration, solutions deliver more value by leveraging business intelligence and enabling interactive, inter-business process.

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I

Introduction

A
Scope and Objectives

The primary objective of this report is to evaluate implementations of Internet-enabled Supply Chain Management (eSCM) solutions in enterprise environments. The analysis clarifies an often misunderstood distinction between modular eSCM *applications* and complete end-to-end eSCM *solutions*. Buyers of eSCM applications often expect the benefits to be consistent with eSCM solutions, the study found.

The study seeks to separate these issues and identify the extent of benefits associated with each type of implementation: *application vs. solution*. The analysis provides useful insights for buyers of eSCM products/services for setting expectations, resolving implementation issues, and obtaining the most value for the investment. eSCM product/service vendors also benefit from insights to buyer expectations and implementation issues. These issues, as well as actual solutions from survey respondents, are discussed in detail in Chapter II.

Further objectives of the study were to:

- Analyze buyer expectations and benefits sought from eSCM
- Evaluate implementation issues that can retard "uptake" of eSCM
- Assess impact of implementation on operations
- Study facilitation and integration of enterprise-wide connectivity to front-end systems
- Examine trade-off between risk and cost savings
- Estimate the size and growth of Internet-enabled and electronic supply chain management markets

- Issues covered in this report include:
- Ability and limitations of new technology to reduce barriers to user implementation
- Examination of costs and benefits associated with implementation
- Extent that the distinction between standard SCM and eSCM become an anachronism

In a related report, INPUT evaluated Internet-enabled Customer Relationship Management applications. In this study, there is concern with a parallel set of issues, including user acceptance, integration and cost. These issues related to Internet-enabled CRM are covered in Chapter IV of that report. Additional related reports are identified in section E of this chapter.

B
Methodology

eSCM buyers and vendors of eSCM products/servers were interviewed for this report.

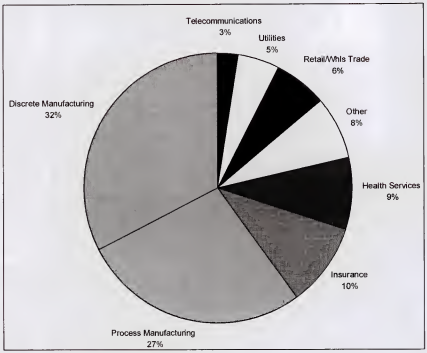
User interviews.
This report is based on telephone interviews with 80 U.S. companies and organizations, all of which either use or plan to implement eSCM applications by year-end 2000. Companies at different points along the supply chain were included in the study: suppliers (or sellers of goods/services in a supply chain), and enterprises (of buyers of goods/services in a supply chain). For example, a major U.S. pharmaceutical company would be a "buyer," and a chemical manufacturer would be a "supplier" to that vertical market.

By categorizing supply chain participants as "buyer" or "supplier," it is possible to assess industry-specific issues, as well as issues related to position along an industry supply chain. INPUT conducted surveys during in the second quarter of 2000. Most interviews were conducted with CIOs at U.S. companies in discrete manufacturing, process manufacturing, insurance, health services, retail, telecommunications, utilities and other industry segments. A number of government agencies also were included in the study.

The breakdown of respondents by industry sector is shown in Exhibit I-1.

Exhibit I-1

Distribution of Respondents by Industry Sector

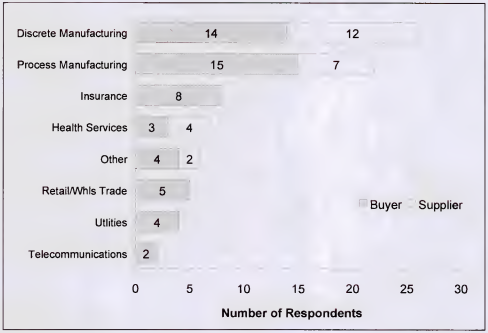


80 Respondents *Source: INPUT*

Within each industry, the breakdown of respondents by buyer and supplier categories for that segment is shown in Exhibit 2.

Exhibit I-2

Distribution of Respondents as Buyers and Suppliers



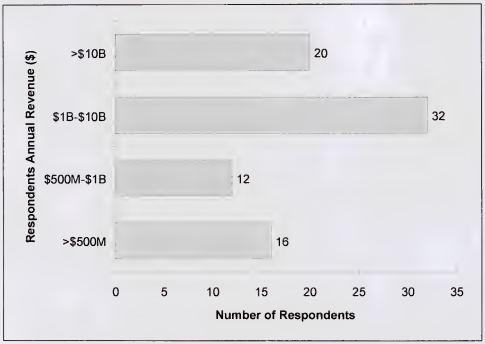
Respondents: 55 Buyers, 25 Suppliers *Source: INPUT*

More than 66% of respondents are categorized as buyers, while about 33% are suppliers. Despite the fact that supplier companies greatly outnumber buyer companies in the real world, purchases of eSCM software were more frequent in the supply chain "buyer" group. This detail should not be overlooked, as this explains in part respondents' expectation to cut procurement costs as a results of eSCM software purchases. With easily attainable cost reductions, as well as the resources for implementation, buyers are excellent eSCM prospects. These systems, then, were implemented for the primary purpose of cutting cost from pre-existing supplier relationships.

Nearly two-thirds of the respondents represented organizations reporting 1999 annual revenues in excess of $1 billion. Larger enterprises tend to purchase software packages than develop the software and provide the services themselves. The breakdown of respondents by size is shown in Exhibit I-3.

Exhibit I-3

Respondent Distribution By Company Size



80 respondents *Source: INPUT*

Respondents were asked a series of questions relating to their experience with or planned implementation of eSCM solutions. Respondents were also asked about integration with company systems, benefits expected from implementation, barriers blocking implementation, and quantification of improvements resulting from implementation of eSCM. Respondents were typically IT professionals, with titles including CIO, VP of IT, and Director of Applications.

Vendor interviews

Leading eSCM vendors also were interviewed for this study. Vendors were asked to describe their eSCM solution(s), mix of direct to channel sales, pricing, product differentiators, ease of integration and common sales obstacles. Vendor profiles are included in Chapter V.

C
Primary Findings

The primary findings from user surveys about implementation of eSCM contained in this report include:

- *Importance of integration to eSCM projects.* Although respondents rated the task of integration more important than Internet-enabling by a margin of 35 percent, they cited integration as a top issue retarding uptake

- *Benefits sought.* Survey respondents placed much greater emphasis on tangible benefits, primarily cutting costs, than intangibles, including improved access to information, increased productivity, and reduced time to complete tasks.

- *Despite immediate returns, broader benefits blocked.* Respondents realized immediate access to cost savings, equaling a 200-300 percent return on investment. In contrast to expectations that the bulk of eSCM transactions would be moved online soon after implementation, in fact, *the proportion of transactions moved online each year following deployment was very slow–less than 50% online after 2 years.*

- *Distinction between eSCM Applications and Solutions.* Although respondents reported implementing end-to-end solutions more frequently than modular applications by a margin of 2 to 1, they failed to implement end-to-end capability.

- *Barriers to implementation.* Without full system integration and training, full implementation is retarded, and results are restrained dramatically. Fuller implementation involves empowering people and enabling business processes for a new way of working.

- *Value proposition unknown.* Alarmingly few respondents could quantify the value proposition to their organization – only 7 of 80 respondents cited measurable results, and none of the respondents were aware of the level of cost savings sought.

- *User budgets.* The application deployment alone consumed a large share of the total eBusiness budget, despite the fact that services will represent more than 60 percent of the total eSCM market over the five year forecast period.

D
Report Structure

Chapter I – Introduction

Chapter II – Executive Summary

Chapter III – eSCM Solutions and eBusiness

Chapter IV – Evaluation of Internet-enabled Supply Chain Management

Chapter V – Implementing eSCM Solutions

Chapter VI – Market Forecast

Chapter VII – eSCM Vendors

Appendix A – User and Vendor Questionnaires

E
Related Reports

The New Electronic Business Services Industry

Leading Electronic Business Vendors

Evaluation of Internet-enabled CRM Solutions

The Future of Internet-enabled ERP solutions

Electronic Business Market Forecast, 1998-2003

Evaluation of SAP service Providers, 1999 (Europe, U.S.)

Database Server Effectiveness and Total Cost of Ownership

Evaluation of Electronic Commerce in Manufacturing

Evaluation of Electronic Catalogs

Evaluation of Enterprise Application Solutions, Germany

Evaluation of Business to Business Electronic Commerce

Impact of Electronic Commerce on Enterprise Applications

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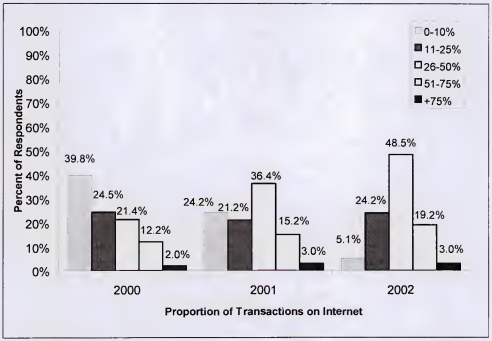
II

Executive Summary

Our survey uncovered some surprising results from companies that were implementing eSCM. In contrast to expectations that the bulk of supply chain transactions would be online soon after implementation, in fact, the proportion of transactions moved on-line each year following deployment was very slow—less than 50% online after two years. Exhibit 1 shows the transfer of supply chain transactions online each year following deployment.

Exhibit II-1

On-line Supply Chain Transactions



Source: INPUT

Yet, despite this low initial volume, savings are often immediate. For example, a leading U.S. pharmaceutical company that spends about 55%

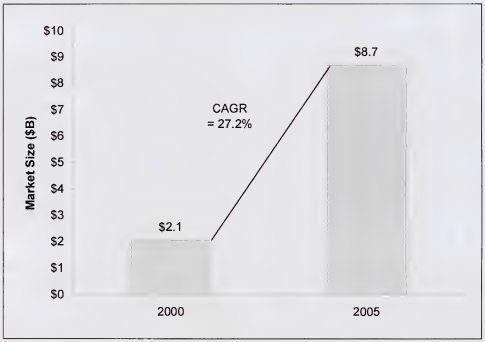
of revenue on COGS, saved about $25 million in 1Q 2000 (assuming cost-cutting of 5% on only 10% of transactions and a $10 million investment in SCM implementation). Buyers and vendors alike identifed cost-cutting as the single highest priority of implementation projects.

Leading companies also are enabling SCM applications for the Internet to leverage relationships with suppliers and partners positioned at various points along business-to-business supply chains. Additionally, respondents sought to improve access to information, increased productivity, and cut time from processes. By 2005, the market for Internet-enabled supply chain management (SCM) applications is expected to reach $8.7 billion.

The market forecast is shown in Exhibit 2.

Exhibit II-2

U.S. Market for eSCM Applications



Source: INPUT

This study uncovers the hidden truth behind promised cost savings, as well as a number of other expectations, issues and barriers inhibiting more robust results. The primary findings from user surveys about implementation of eSCM contained in this report include:

- *Importance of integration to eSCM projects.* Although respondents rated the task of integration more important than Internet-enabling

by a margin of 35 %, they cited integration as a top issue retarding uptake.

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- *Distinction between eSCM Applications and Solutions.* Although respondents reported implementing end-to-end solutions more frequently than modular applications by a margin of 2-to-1, they failed to implement end-to-end capability.

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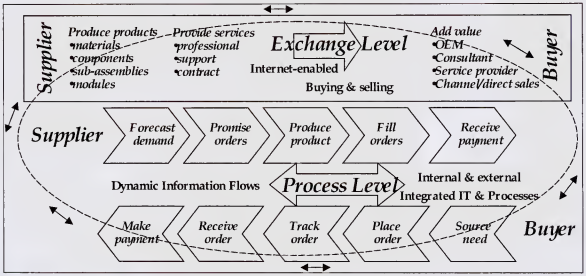
- *User budgets.* The application deployment alone consumed a large share of the total eBusiness budget, despite the fact that services will represent more than 60 % of the total eSCM market over the 5-year forecast period.

For purposes of this report, INPUT developed a supply chain information model to depict the flow of information in business-to-business electronic SCM transactions.

Exhibit 3 shows the exchange and process information levels, which trace the flow of information about goods and services through a supply chain.

Exhibit II-3

Supply Chain Information Levels



Source: INPUT

In INPUT's supply chain information model, there are two primary information levels: the exchange level and the process level. The exchange level contains purchasing, selling, promising, and related information. This level captures information about the goods and services that are bought and sold.

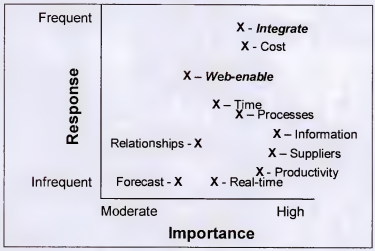
The process level contains information representing operational business processes – planning, scheduling, billing, tracking, managing, fulfilling, sourcing, and so forth. The process level is critical for electronic SCM, as it is here where business intelligence resides. Integrated information can unlock knowledge about company relationships with suppliers, customers, partners, and the enterprise itself. Full access to this multi-directional, multi-form information enables enhanced strategic decision making capability. This value proposition is confirmed in the study results.

eSCM captures information representing the goods and services flowing through a supply chain. Enabling SCM for the Internet speeds up the information flow. Integrating with other enterprise applications and systems enables dynamic, real-time access to information and intelligent decisions derived from this information. This makes it possible for companies to perform meaningful assessments about product demand, production capacity, plant expansion, availability of resources, sourcing options, inventory levels, and many other issues based on a more complete view into (and through) the supply chain.

In the study, respondents were asked to rate the importance of integration and web-enabling. One of the key tenets of this analysis is that integration would rate an important task. Of respondents, 7 of 8 considered it of significant importance, while 2 of 3 considered web-enabling important. The relative importance and frequency of these tasks is shown, together with the ranking benefits expected from implementation, in Exhibit 4.

Exhibit II-4

Implementation Tasks and Benefits



***Tasks**; Benefits* *Source: INPUT*

To "do business in Internet time," businesses must invest not only in functional applications, but also in infrastructure and in redefining how business is done. This year, thousands of enterprises will undertake eSCM projects. This analysis shows that ROI from eSCM implementations depends largely on the objectives of the project: the degree to which the project aims to cut costs and build operational efficiencies. Projects based on tangible benefits alone, such as cost, will receive pay-back of two to three time their investment, attractive returns indeed.

Far greater returns and longer-term impacts are possible, however, for projects that set out to measure progress in terms of intangible benefits, such as reduction in days' sales outstanding, productivity, and customer satisfaction. With this approach, projects will achieve benefits that extend beyond simple cost cutting to increased productivity and the ability to generate new revenue sources.

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III

eSCM Solutions and eBusiness

A
Emergence of eSCM

Not surprisingly, having the ability to "do business in Internet time" consumes a considerable amount of an enterprise's time and resources today. Without doubt, many enterprises adhere to the belief that technology tears down barriers between business partners and increases productivity – and the business of managing the supply chain is no exception. For B2C and B2B alike, customers are demanding the experience of real-time account access and instantaneous information updates. Indeed, enabling the supply chain for the Internet has become an imperative, and numerous products and services are available to enable the supply chain to operate in Internet time.

Despite the range of excellent products on the market, no single vendor can deliver a complete, end-to-end supply chain solution. Companies such as Ariba, Commerce One, Manugistics, and several other vendors, offer superior supply chain functionality in their respective eSCM applications. Instead, the business of eSCM will be accomplished through joint efforts of applications and service providers that can not only deliver the needed functionality but also integrate systems and empower people. Business processes will be redefined, and a new way of working will emerge.

By the end of the decade, supply chain constituents ("suppliers" and "buyers") will have optimal access to instantaneous business intelligence that extends from one end of the supply chain through to the other. eSCM solutions will provide end-to-end supply chain capability in which business processes work seemlessly throughout all dimensions of the supply chain.

To "do business in Internet time," businesses must invest not only in functional applications, but also in infrastructure and in redefining how business is done. This year, thousands of enterprises will undertake eSCM projects. This analysis shows that ROI from eSCM

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Despite easy access to immediate cost savings, this report also addresses a surprising reality: in contrast to expectations that the bulk of eSCM transitions would be moved online soon after implementation, in fact, the proportion of transactions moved on-line each year following deployment was very slow-less than 50% on-line after two years.

This analysis underscores an important distinction between Internet-enabled Supply Chain Management (eSCM) applications and eSCM solutions. eSCM applications enable functionally for specific supply chain functions, such as monitoring inventory levels and buying supplies. Indeed, eSCM projects can cut costs from the procurement process, as confirmed by the study. eSCM solutions, in contrast, produce higher returns and longer-term intangible benefits from implementation, including increased customer satisfaction, reduced days' sales outstanding, and more.

This study focuses on understanding the cause and effect underlying the barriers to fuller implementation, and includes practical solutions to issues encountered in actual projects.

B
Evaluation of eSCM Applications and Solutions

In this survey of companies implementing eSCM, respondents were asked to identify expected benefits, unanticipated issues, unforeseen barriers, and actual results of eSCM project deployments.

On the whole, users and vendors tended to agree that the main purpose of Internet-enabling SCM is to cut costs out of the procurement process. Further, the report identifies and assesses additional benefits that produce value for an entity beyond the direct effect of saving time and money. By evaluating these intangible benefits, additional sources of efficiencies surface that at the same time reveal hidden truths to unlocking the fuller potential of eBusiness.

Respondents identified issues and barriers blocking implementation. These "symptoms" signaled deeper root causes. One issue identified involves the extent to which the application was integrated with front- and back-end systems. It is INPUT's belief that end-to-end eSCM solutions require intense integration efforts that leverage business intelligence throughout the business "supply chain." Full integration means putting all inventory on-line and offering all customers this channel, for example, while more restrained use merely places selected items online for some customers.

Users confirmed INPUT's premise that integration is an essential element of full implementation, although the expected benefits discussed later in the report tell another story. Despite emphasis on its importance by survey respondents, the study shows that integration is not being done to the extent needed. In fact, 87.5% of respondents rated integration "highly" important, which means a rating of 4 or 5 on a 5-point scale. While this result is not completely unexpected, at the same time only 65% rated web-enabling at the same level of importance. Reducing procurement cost is the driving factor, but planning also must include an appropriate budget for integration.

Another important issue uncovered in the study – training, or the absence thereof – greatly affects results. Many respondents said they hadn't planned adequately for training, especially training for the new way of working after deployment. Integration and training issues are related–in practice, training is important to the execution of new or modified business rules adopted in the application(s) implemented. It is the business rules that make up a company or define a partnership. Whether a company selects custom or shrink-wrapped applications, business rules must be modified. People and processes present the greatest implementation challenge.

Principal Findings

Leading companies are rapidly adopting eSCM solutions. INPUT surveyed 80 companies that have in 1999 or will in 2000 implement eSCM. These companies are reducing costs and expect to achieve some of the additional benefits associated with implementation. And while users rated integration an important issue, the survey found that ***training, especially training associated with changing business rules, was rated the most important issue blocking deployment by users.***

This study confirms the premise that reducing cost is the primary motivating factor for adopting eSCM, as the cost savings alone easily justify the investment. And as a greater proportion of supply chain transactions move online, these savings continue to increase. In the study, two of three respondents cited cost savings as a key benefit associated with electronic SCM applications. While cost cutting is essential, this report shows that ***implementing for cost reduction, without concern for integration and training, actually limits the savings that are attainable.***

Beyond cost savings, companies also can gain greater access to important data about their customers, suppliers, and operations. They can save time, reduce waste, and improve productivity. Companies can extend access in a controlled manner to their customers, suppliers and other business partners, and integrate information flows into corporate systems. Further, they can readily form or join industry or specialized on-line exchanges. That survey respondents rated these benefits as important as the need to reduce cost, tells an important part of the complete story. ***Indeed, it is through full enterprise integration that cost savings can be unlocked and business intelligence can truly be accessed.***

The extent of possible cost savings, the additional benefits of integration, and the training issues all provide insight into the emergence of electronic business. Each of these issues will be discussed in greater detail in later sections of this chapter.

C
INPUT View of eSCM Solutions & eBusiness

INPUT model of eSCM

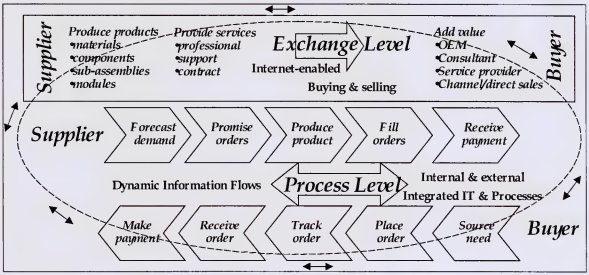
This report assesses eSCM implementation projects by enterprises across a number of different industry segments. Despite vendor claims to the contrary, eSCM applications provide primarily front-end system functionality for purchases of goods and services between "suppliers" and "buyers." In contrast, eSCM solutions facilitate dynamic, multi-directional information flows regarding accounts, inventory, production, shipping, and other business elements of SCM.

For purposes of this study, INPUT developed a broad model to illustrate the flow of information about goods and services through a supply chain. The model is divided into 2 primary levels: the exchange level (buying and selling), and the process level (the business of SCM). eSCM applications provide the vertical functionality, while integration enables end-to-end capability.

INPUT's Supply Chain Information model is shown in Exhibit 1.

Exhibit III-1

Supply Chain Information Levels



Source: INPUT

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bought and sold. The process level contains information representing operational business processes – planning, scheduling, billing, tracking, managing, fulfilling, sourcing, and so forth. The process level is critical for electronic SCM, as it is here where business intelligence resides. Integrated information can unlock knowledge about company relationships with suppliers, customers, partners, and the enterprise itself. Full access to this multi-directional, multi-form information enables enhanced strategic decision- making capability. This value proposition is confirmed in the study results.

Another important distinction to make is the difference between Internet-enabling and eBusiness. Internet-enabling simply puts applications and/or tools up on the Internet and allows interactivity. eBusiness, on the other hand, operates with or without the Internet – over VPNs, LAN, as well as the Internet and other media. The primary difference is interconnectivity, not the medium – eBusiness is the linking of data, applications, systems, infrastructure, people and processes.

Further, eSCM captures information representing the goods and services flowing through a supply chain. Enabling SCM for the Internet speeds up the information flow. Integrating with other enterprise applications and systems enables dynamic, real-time access to information and intelligent decisions derived from this information. This makes it possible for companies to perform meaningful assessments about product demand, production capacity, plant expansion, availability of resources, sourcing options, inventory levels, and many other issues based on a more complete view into (and through) the supply chain.

Assessing Integration and Training Issues

eSCM integration involves complex and extensive efforts, as confirmed by vendors and buyers in this study. The reality of eSCM, as with any form of eBusiness, is that it changes the way business is done. Whether an eSCM solution is implemented out of the package or customized for a specific purpose – the rules defining how business is done need to change. In the first instance, a company essentially adopts the business rules contained in the software and wraps its business processes around a predetermined set of rules. In a custom implementation, vendors create a unique set of business rules designed around a company's needs. In either case, there is change, and a new way of working is created. Users emphasized the importance of these issues in the survey. eBusiness, then, changes the way people and processes work.

INPUT Definitions of eSCM and eBusiness

INPUT defines eBusiness as the embedding of information technology with business processes. Electronic SCM is a subset of electronic business

in which supply chain management capability is enabled for the Internet (or other electronic media) and integrated into the enterprise's business processes.

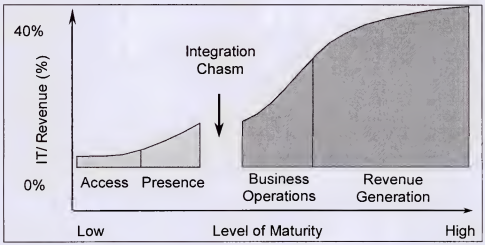
Implementing eSCM and eBusiness is an evolutionary process. It begins with the establishment of Web access and presence, which may include loading a company's product or services catalog on the company web page and setting up purchasing capabilities. More mature, integrated electronic SCM implementations move toward more advanced functionality. This could include instantaneous order confirmation, or views by authorized channel partners into stock levels and sourcing options; up, down and through the supply chain in real-time.

eSCM, as a subset of eBusiness, follows a similar adoption cycle as eBusiness. In the cycle, an enterprise first establishes Web access and presence. This step requires a nominal increase in IT spending, which typically runs from one to ten percent of revenues in the traditional IT model. As enterprises implement more mature stages of eBusiness, the key ingredient is integration with front- and back-end systems. Crossing this chasm requires considerable IT investment (ranging from 10 to 40% of revenues), but offers long-term, strong returns.

INPUT's model for eBusiness adoption is shown in Exhibit 2. The exhibit shows the extent of Internet-enablement at each phase of the e-business adoption cycle.

Exhibit III-2

Electronic Business Adoption Cycle



Source: INPUT

This chapter provided an overview of primary study findings, the study design, INPUT's approach to eBusiness, and essential definitions. The next chapter presents the survey results, analysis, and background data.

IV

Evaluation of Internet-enabled Supply Chain Management

A
Evaluation of eSCM

This analysis included a survey of 80 medium- and large-sized enterprises that have implemented or plan to implement Internet-enabled supply chain management tools and/or applications for the Internet. A majority of enterprises interviewed expect to reduce costs as well as realize additional, intangible benefits. Despite the fact that cost savings were evident, the analysis shows that a number of factors can restrict the full potential of benefits that are possible. This is due in part to the slow pace at which transactions move online, as well as the unanticipated need (and cost) for training and back-end system integration.

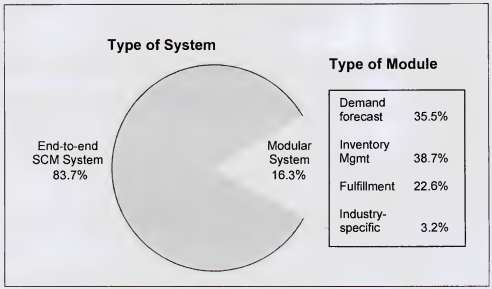
The hidden truth behind promised cost savings – without full scale integration, adequate infrastructure, and business design, the full potential of eSCM solutions is an impossible task. Breaking through these barriers, though more expensive by any measure, unlocks a far greater potential for stronger, long-term returns.

In this study, respondents were asked to describe the type of solution implemented. They also were asked to identify and rate the importance of the benefits they sought from Internet-enabling SCM, and their satisfaction with these benefits. Respondents identified barriers to implementation, type of system selected, and vendor preferences. Finally, respondents were asked to quantify improvements attributed to eSCM.

The type of system selected by respondents for implementation – either modular or end-to-end – is depicted in Exhibit 1. The module type selected is also shown. For modular systems, respondents indicated one or more module types.

Exhibit IV-1

Implemented eSCM Systems by Type



Source: INPUT

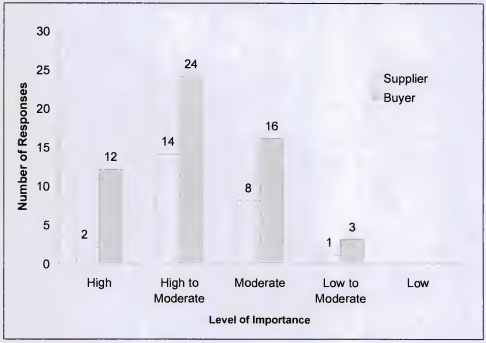
Buyers reported selection of modular systems at a much greater rate than suppliers. Of buyers, 24% reportedly selected modular systems, compared to 8% of suppliers. Overall, about one in six respondents selected modular systems. From these figures, it is clear that users set expectations on par with implementation of end-to-end eSCM solutions. The measure of their success falls contrary to these expectations. Instead, the study finds that although results are good, they are re-trained from stronger returns and limited to application-specific functionality.

Ninety-five percent of respondents surveyed rated eSCM as important (moderate or above, based on a scale of 1 to 5, where 1 is low, 3 moderate, and 5 high). Of those surveyed, 65% rated eSCM at high or moderately high levels of importance, and 30% indicated a moderate rating. Only 5% rated the importance below a moderate level. Suppliers and buyers rated the importance at nearly the same levels, at 64% and 65% respectively.

The importance of Internet-enabling SCM to respondents, segmented by supply chain buyer and supplier, is shown in Exhibit 2.

Exhibit IV-2

Importance of Internet-enabling to Suppliers and Buyers



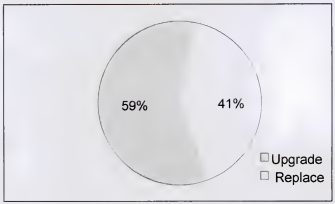
80 Respondents *Source: INPUT*

The distribution of responses for buyers and suppliers follows a similar pattern.

Of the companies surveyed, 59% are upgrading existing systems, while the remainder, 41%, are replacing them with new systems. This can be explained in part by the extent of ERP projects that had already been completed.

Exhibit IV-3

Decision to Upgrade or Replace Legacy Systems



Source: INPUT

The next section, section B, presents expected benefits from eSCM in aggregate: suppliers and buyers grouped together. Section C breaks out these results into their respective categorizes. From this segmented view, key issues associated with an enterprise's position on a vertical or industry supply chain can be analyzed. For example, a pharmaceutical company (a buyer) may have a different set of issues than a chemical manufacturer (a supplier).

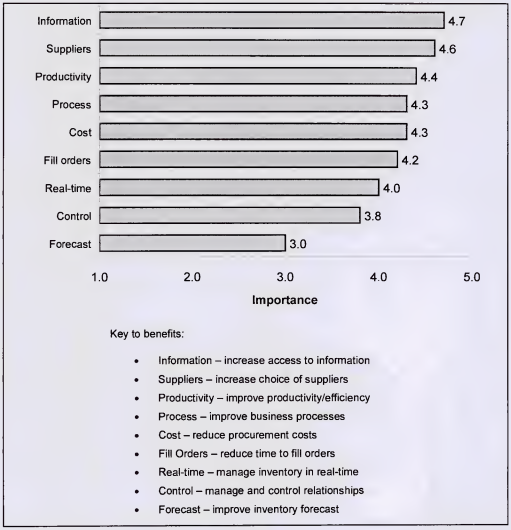
B
Broad View of Benefits from eSCM

Respondents were asked to identify benefits expected from implementing eSCM solutions. Despite the fact that more than half of survey respondents cited reduction in procurement costs as an important benefit, it ranked fourth (tie) in importance.

Information sharing, suppliers, productivity and process ranked first, second and third (see benefit descriptions below). Fewer than 20 % of respondents cited any other benefit, and all benefits are shown in order of importance in Exhibit 4.

Exhibit IV-4

eSCM Implementation Benefits



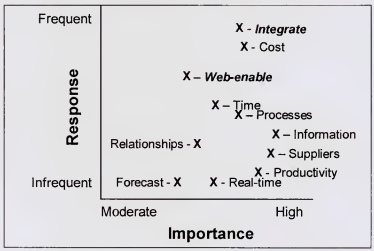
Source: INPUT

Of the top five benefits named by respondents, three pertain to information relating to operations – information, productivity, and processes. Taken together, these information-based benefits received mention by nearly one-third of survey respondents. Despite the number of respondents listing cost as the top benefit, the ranking tells another story – changing the way a company work, as defined by business rules and processes was at least equally important.

Additionally, respondents were asked to rate the importance of integration and web-enabling. One of the key tenets of this analysis is that integration would rate an important task. Of respondents, 7 of 8 considered it of significant importance, while 2 of 3 considered web-enabling important. The relative importance and frequency of these tasks is shown, together with the ranking benefits expected from implementation, in Exhibit 5.

Exhibit IV-5

Implementation Tasks and Benefits



Tasks; Benefits *Source: INPUT*

Cost and integration were mentioned most frequently and rated most important, as shown above. Information, suppliers, and productivity were the top three ranked benefits by importance. Also, time and processes were important. Surprisingly, improving inventory forecast rated low in importance and frequency, which could be explained by the proportionately smaller number of suppliers responding to the survey. Nonetheless, this benefit can be related to increased access to information, which ranked higher.

The following list shows additional benefits identified by two or fewer respondents in order of importance.

Additional benefits:

- Improve customer satisfaction
- Integrate with suppliers
- Reduce time to market
- Comply with industry standards
- Reduce product waste
- Increase sales
- Reduce strain during peak production
- Manage cost
- Reduce complexity of procurement channels
- Reduce mistakes
- Reduce wasted man time
- Streamline purchasing

Of the desired benefits, respondents cited a number of improvements achieved as a result of implementing eSCM solutions. It is INPUT's view that buyers and vendors alike need to gauge the success of eBusiness implementation by improvements in key business analytics. For example, a company can monitor the impact of implementation on cost of goods sold. Other indicators that can be useful include time to promise order, inventory waste, percent of revenue spent on IT, on-time order completion, and so forth. As companies implement eBusiness applications, it is vital to not only gauge the elimination or reduction of a specific problem, but also to measure the total effect on the company.

Alarmingly, only 7 of 80 respondents could cite any measurement used to gauge the success of the implementation. Unless a company's vital signs are monitored throughout the process, a problem that was supposed to "go away" could easily reincarnate as another set of problems. A hidden truth of eSCM projects: an enterprise could be in the same spot or worse following implementation than before it started. Again, it is essential to monitor the "point of pain," as well as the vital signs of the company.

Metric improvements cited by respondents in the survey are shown in Exhibit 6, by industry segment.

Exhibit IV-6

Cited Improvements by Industry Segment

Industry segment	Improvement	From	To
Other – Government Agency	Time to confirm orders	3 days	1 hour
Health Services	Time to receive product information	1 day	real-time
Process Manufacturing	Time to track order	not possible	real-time
Process Manufacturing	Time to receive stock level report	1 week	2 hours
Process Manufacturing	Time to receive order confirmation	2 hours	2 minutes
Discrete Manufacturing	Time to process order receipt	10 days	7 days
Discrete Manufacturing	Supplier response time	2-3 days	several hours

Source: INPUT

Of the improvements cited, most related to saving time in completing business processes. If there were any direct cost savings, they were either not reported, or unknown, despite the weighting of their importance to deployment.

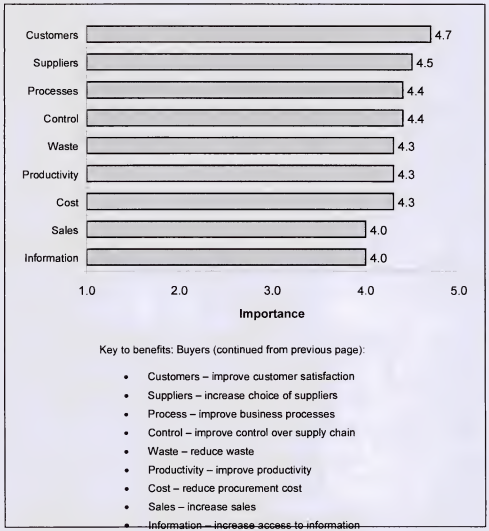
C
Buyer and Supplier View of Benefits

This section segments responses into two categories: suppliers and buyers. Respondents were asked to rate the importance of benefits sought from eSCM on a scale of 1-5, with 1 being a low rating, 3 moderate, and 5 high.

Exhibit 7 shows the importance of benefits to "buyers."

Exhibit IV-7

Importance of Benefits to Buyers



55 Respondents *Source: INPUT*

Although benefits associated with customers and suppliers were rated highly by buyers, these issues were mentioned by less than 8% of

respondents. Improved control rated moderately high (4.4) in importance and received 14 mentions (25% of respondents). The most frequently mentioned benefit, costs, rated moderately high (4.3) in importance.

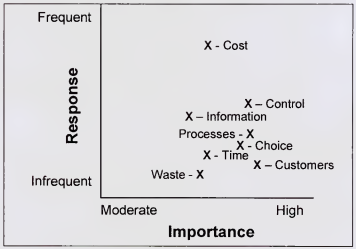
Improved access to information was rated 4.0 in importance, and was mentioned 12 times, or by 21% of respondents. Although business process improvement received a moderately high importance rating of 4.4, fewer than 10% of respondents made mention of it.

Buyers rated cost most important. Although statistically there is little significant difference in the importance of each benefit – all were important. However, the tangible benefit of cost was cited with high frequently; while other intangible benefits were mentioned with little frequency.

The relative importance of buyer benefits is shown in Exhibit 8.

Exhibit IV-8

Benefits to Buyers



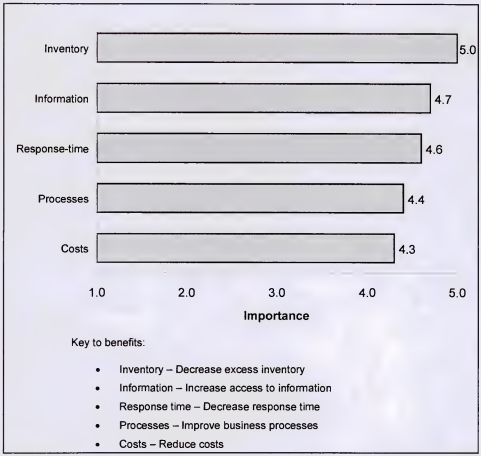
Source: INPUT

Benefits receiving both high mention and high importance ratings include: reducing procurement costs, improving control of the supply chain, increasing access to information, and decreasing procurement lead time. Improved customer satisfaction and widened base of suppliers received high performance ratings, but received mention by three (or 5%) and four (or 7%) of respondents, respectively.

Exhibit 9 shows the average importance ratings of benefits to Suppliers on a five point scale.

Exhibit IV-9

Importance of Benefits to Suppliers



Source: INPUT

Suppliers placed greater importance on process than cost (although with less frequency), while buyers ranked process well behind cost. One-third of suppliers mentioned access to information, compared to 21% of buyers. Information access rated seven points higher among suppliers than buyers.

Clearly, suppliers placed greater importance on some of the intangible benefits associated with eSCM implementations, while buyers emphasized the tangibles. Indeed, eSCM applications will accomplish a moderate level of savings for buyers, and this benefits suppliers as well (buyers are their customers).

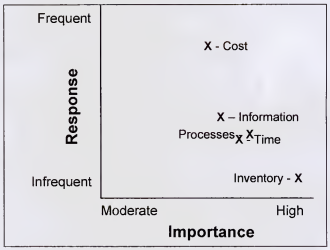
INPUT predicts that a second wave of eSCM implementations that leverage investments in eSCM applications into more complete eSCM solutions will follow over the next 2-3 years. As illustrated by vendors such as submitorder.com, functional applications (including eSCM) will be

packaged and integrated, to provide more robust solutions that enable business processes for the new economy.

Exhibit 10 shows the relative importance of benefits to suppliers.

Exhibit IV-10

Benefits to Suppliers



Source: INPUT

Suppliers and buyers rated the importance of improved business processes at the same level of importance, but 33% of suppliers mentioned it compared to 9% of buyers. Cost was mentioned most frequently by suppliers at 16 of 25, or 64% of respondents, and suppliers and buyers rated it at the same level of importance.

This section discussed the benefits sought from Internet-enabling SCM. While respondents rated Internet-enabling of high importance, they disagree on the reasons. Taken together, the most important issues for respondents relates to information access, productivity and business processes, while the most frequently mentioned benefit relates to procurement costs. That companies view these factors – primarily cost reduction - as important speaks to interest in the larger rewards from eBusiness, namely full-scale revenue generation.

In the next section, INPUT presents survey results concerning integration issues associated with eSCM.

D

Importance of Internet-enabling and Integrating for eSCM

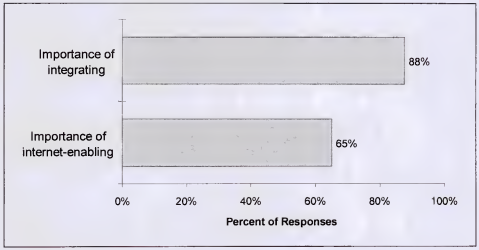
eSCM can involve Internet-enabling as well as integrating SCM applications. It also can involve a more complex set of integration tasks involving infrastructure, networks, and systems. Respondents were asked to rate the importance of each task for successful implementation.

Of survey respondents, 87.5% rated integrating supply chain applications with legacy systems as highly important. By comparison, 65% rated linking SCM applications to the Internet at the same level of importance. This means that 35% more respondents rated integration highly important than Internet-enabling. Along with cost and training, integration ranked highest among respondents. Despite marketing efforts that focus on the cost reductions, respondents said that integration is equally important.

Exhibit 11 shows the percent of survey respondents that indicated a high or moderately high level importance for integrating business processes and Internet-enabling supply chain management applications. COMMENT:...

Exhibit IV-11

Highly Important Implementation Tasks*



80 Respondents *Source: INPUT*

** Includes users rating 4.0 – 5.0 on a 5 point scale, where 5 is high, 3 moderate, and 1 low importance*

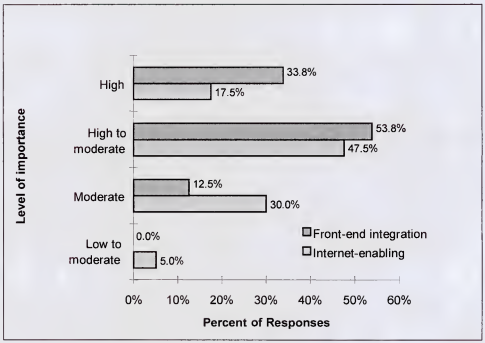
eSCM can be performed via the Internet, as well as on other media including VPNs, LANs, and other networks, but it does not necessarily mean Internet exclusively. Integration exceeds the medium in

importance, as illustrated in INPUT's eBusiness adoption cycle in Chapter III, Section C. End-to-end implementation is possible only through an intense integration effort that leverages business intelligence throughout the business "supply chain." Full integration means putting *all* inventory on-line *and* offering all customers this channel, for example, while more restrained use merely places *select* items online for *some* customers.

Exhibit 12 shows the responses provided by each survey participant concerning the importance of integration and web-enabling SCM applications for eBusiness.

Exhibit IV-12

Importance of Implementation Tasks for eSCM



80 Respondents *Source: INPUT*

Of organizations surveyed, 70 rated integration with front-end systems of high, or moderately high, importance while 52 rated enabling these applications for the Internet at this level of importance.

These findings underscore the importance of business process integration, which INPUT views as critical to eBusiness. Web presence and Internet access are important to building eBusinesses, but on their own they cannot produce the same level of benefit as integration of business processes. Electronic supply chain management produces greater benefits when organizations connect business processes throughout the supply

chain than when they merely link information about the exchange of products/services over the Internet.

Effective implementation is evidenced by the dramatic time savings achieved by several respondents. One respondent in the process manufacturing industry indicated that previous to implementation, the company was not able to track orders. By linking exchange and process information, this was not possible in real-time. As a result, the company realized cost reductions of almost 5 times its annual investment in eSCM solutions in the first year. As the company moves an increasing share of its supply chain transactions to the Internet, these savings will be even greater.

Approximately the same proportion of supply chain "buyers" placed high levels of importance on process integration as "sellers" within a supply chain, or 89% and 84% respectively.

The greater the extent of business process integration, where IT becomes inextricably part of the process, the greater the benefits to organizations that implement electronic supply chain management. The results presented in this chapter set out the expectation a group of buyers had that deployed eSCM applications in 1999 and 2000. The next chapter contains an analysis of the implications, uncovering the hidden truths impeding broader access to these expected benefits.

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Implementing eSCM Solutions

A
Satisfaction with eSCM

The previous chapter presented expected benefits from eSCM implementations, as well as data about types of projects and issues associated with buyer and supplier segments. In this chapter, user responses on satisfaction with system types are presented. Also, users identified and rated the importance of issues impacting the implementation of eSCM within their organization, and provided commentary on how they overcome these implementation barriers. Finally, user budgets are reported and assessed.

Overall, respondents reported similar satisfaction levels with modular and industry-specific systems than with end-to-end systems. Satisfaction with modular and industry-specific systems on the whole was rated moderately high with a score of 4.11, while satisfaction with end-to-end systems was rated moderately high at 4.06. Industry-specific systems, selected by only one survey recipient, was rated highly important when evaluated on its own with a score of 5.0. When industry-specific systems are excluded, modular systems rated 4.08.

Exhibit 1 shows satisfaction with eSCM System types.

Exhibit V-1

Satisfaction with Installed System Type

System Type	Satisfaction Rating
End-to-end	4.06
Modular, when industry-specific type is excluded	4.08
Modular & industry-specific, when both are included	4.11

Source: INPUT

Within modular and industry-specific system types, buyers rated industry-specific types at the highest level of satisfaction, while suppliers rated satisfaction with inventory management highest.

While these are statistically not meaningful, (in fact the ratings are virtually the same), we think it shows that there is misunderstanding about implementation of SCM applications and SCM solutions. Buyers expecting a complete eSCM *solution* instead received a functionally-specific eSCM application. The distinction is important – a complete solution integrates systems, applications and business intelligence to perform the business of the enterprise; while applications merely perform specific business tasks, often integrated only with front-end Web pages.

This forecast includes IT outsourcing, Business Process Operations outsourcing, and transaction processing.

Over the last few years, Business Process Operations (BPO) has become increasingly accepted by a wide variety of companies in various industries. Over the period, 2000-2005, INPUT forecasts a long-term growth rate of 29% for a market expected to grow during the period from $12.5 billion to $45 billion.

Exhibit 2 shows satisfaction with system type installed.

Exhibit V-2

Satisfaction by system and module type

Source: INPUT

The results bear little statistical relevance, but again, reveal important customer expectations of modular and end-to-end implementations. The greater the degree of system customization and modularity, the greater the level of satisfaction by the user. Users should be wary of one-size fits all solutions, either end-to-end or modular. This will vary by situation, but respondents replaced existing systems 41% of the time. This number is surprisingly high, given the level of investment in Enterprise Resource Planning (ERP) over the past 3-5 years.

In any case, buyers need to be aware of the impact on the organization no matter what type is deployed. INPUT recommends asking the following questions before proceeding:

- Will the solution fix the business problem, or simply shift a pre-existing condition to another point along the supply chain?
- How will implementation affect the way people and processes in the organization work, and how do I best plan for this?

- Is training included in the project?

Other important factors include the company's current infrastructure and legacy systems, and how well a new solution set will integrate to achieve measurable benefits. Depending on the state of legacy systems, users may need to weigh the option of outright replacing these systems.

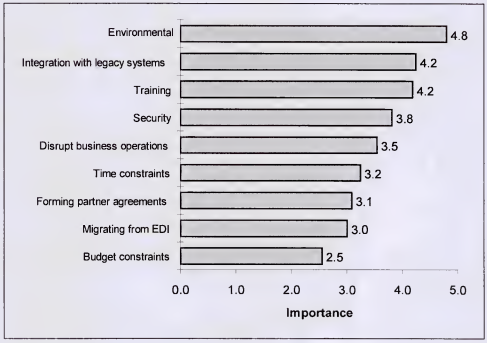
B
Barriers to Implementation

This section identifies the barriers impeding implementation, or the hidden truths blocking expected benefits. Nonetheless, companies that encountered these issues did not regard any as insurmountable. With adequate resources, especially for integration and training, these can be overcome. Vendors and buyers alike responded with similar issues during implementation. The following exhibits show these issues, as wells as the "solutions" provided by survey respondents.

Exhibit 3 shows issues affecting implementation, and the extent to which enterprises viewed the issues as barriers retarding "up-take" within the organization.

Exhibit V-3

Issues Affecting Implementation (or Retarding Up-take)



Source: INPUT

Although mentioned more infrequently, environmental issues were considered to have a greater impact on implementation. These included the need to adapt business rules, inertia to change from suppliers, escalating procurement costs, out of control operations, and loss of suppliers. In one case, a respondent indicated that at first, many of the people involved were reluctant to adopt the new systems. The respondent explained, that "eventually, they were able to see that eSCM saves a lot of time and money, which in turn benefits them."

Most respondents indicated that, while they encountered barriers to implementation, these issues were not insurmountable. Respondents were asked to explain the difficultly in areas that were rated to have a higher degree of impact. For those issues that have a high level of impact on implementation, respondents were also asked to describe how they worked through these issues. Additional information about the issues and "fixes" are presented in the following paragraphs.

Training Issues

Training was the most diffucult issue. Fifty percent rated training as a highly important issue (4 or higher), and fully 90% rated this issue of at least moderate importance (3 or higher). Specific aspects of training that presented difficulties and the fixes cited include the following shown in Exhibit 4:

Exhibit V-4

Training Issues and Solutions

Training Issues	Training Solutions
• "Problematic, due to the number of different systems that changed as a result of adjustments to the SCM process."	• "Will be done incrementally."
• "Training was complex as it needed to be offered to all links within the supply chain."	• "Drew up new training guidelines."
• "User training was not a problem, we spent additional time and resources training systems administrators."	• "Training was tackled at departmental level."
• "Training is still an unresolved issue. People are now beginning to get used to new ways of working."	• "On-line help manuals were published to aid self supported learning."
• "Training was always expected to be a big problem. "	• "Outsourcing."
• "Was not planned carefully and resulted in some key staff not receiving training."	• "User training was not a problem, we spent additional time and resources training systems administrators."
	• "New guidelines for use of systems put in place."
	• "Distributed new training manuals to different sites and to partners."
	• "We had to spend a lot of time planning and implementing this."
	• "Training will be completed as part of a larger training initiative."

Source: INPUT

Integration Issues

Integration proved to be complex, and in many cases required more time, human resources, and budget than expected. Respondents provided the following list of issues and fixes, shown in Exhibit 5.

Exhibit V-5

Integration Issues and Solutions

Integration Issues	Integration Solutions
• "Multitude of different platforms made this difficult."	• "Outsourced (several mentions)."
• "Integrating systems with other members of the supply chain was difficult."	• "Integrating systems with other members of the supply chain was difficult but we achieved this by forming an integration team made up of engineers from each company involved."
• "The integration caused some downtime."	• "The integration caused some downtime, but backup procedures were used for several days."
• "Integration was difficult, as we always have leading edge technology and are often the first to try out new things."	• "Brought in additional staff."
• "Integration was just complex and required careful planning."	• "Completed in stages to minimalize disruption."
• "Integration was difficult due to lack of experience within the company. We used external consultants."	
• "Integration took longer than expected."	
• "Along with training, this required the most attention, but it was not insurmountable."	

Source: INPUT

Security was another important issue encountered by respondents, which was rated at a moderate level of importance. No specific issues or fixes were provided, however.

Although the remaining issues were not rated of significant importance, the issues and their fixes are instructive. The remaining issues mentioned by respondents are shown in Exhibit 6 on the following page.

Exhibit V-6

Environmental Issues and Solutions

Other Issues	Other Solutions
Disrupting operations	
• "Working patterns were disrupted… not business."	• "Looked to minimalize disruption and pre-warn business units so that different procedures could be temporarily adopted."
• "Negotiated carefully with others in our supply chain… biggest problems came from those within the company."	• "Phased implementation to minimize business disruption."
• "Integration resulted in changes to business processes that lead to minor disruption. This was inevitable."	• "We knew that training and business disruption were going to be issues and they were written into plans."
Forming partnering agreements	
• "Some partners were a little difficult to negotiate with… but this was the responsibility of other departments."	• "Amended to account for new way of working."
• "Getting contracts drawn up just took a lot more time than expected and we are still in the process."	• "Contracts were drawn up with partners, specific to each supplier."
	• "Contracts with non complying suppliers will not be renewed."
	• "Web - enabled contracts have been specially drawn up."
	• "Some partnering arrangements had to be changed, others reorganized to fit in."
Time constraints	
• "Project ran past deadline."	• "Tight control was required over implementation time."
	• "The time scales were set around other business targets which we successfully achieved."
Budgets	
• "Budgets were set too low initially."	• "Once reviewed, more realistic budgets were set."

Source: INPUT

It is important to note the recurrence of several threads running through each of the issues. These include: the need to learn new ways of working, the complexity of integration, the budgetary requirements for eBusiness, and the connection between IT function and business strategy. Although the list of issues presented in this section is rather lenghthy and some of the fixes to overcome the issues complex, users indicated that none of these issues were insurmountable.

C

Slow Movement of Supply Chain Transactions to the Internet

Internet-enabling supply chain transactions can generate an immediate 200-300% return on investment. For an enterprise with significant procurement costs, implementing a supply-chain management (SCM) solution is not a difficult decision to make. And for companies still looking for the first dollar of return from millions of dollars invested in ERP, an incremental investment in SCM solutions can be an attractive option.

For example, the cost of goods sold (COGS) for a leading U.S. automaker runs at about 80% of revenues, or roughly $30 billion for the quarter ending June 2000. Assuming that electronic SCM can reduce COGS by a mere 5% in only 10% of transactions, the manufacturer could easily save $150 million in the first quarter. This more than offsets the annual investment of $50 million, or more, for a project of this size. Savings can easily reach $3 billion annually within two years based on shaving 5% off only one-half of annual COGS.

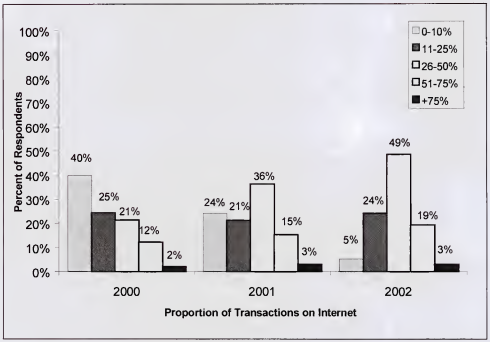
In another example, a leading U.S. pharmaceutical company that spends about 55% of revenue on COGS, saved about $25 million in 1Q 2000 (assuming cost-cutting of 5% on only 10% of transactions and a $10 million investment in SCM implementation).

As shown in Exhibit 7 below, two-thirds of respondents said that they will process less than 25% of their supply chain transactions on-line within 2 years of implementing electronic SCM. About one in five will perform 26 - 50% of the supply chain transactions on the Internet, and only one in ten will do more than 50%. Companies in the survey implemented (or will implement) eSCM in 1999 and 2000.

Exhibit 7 shows the proportion of supply chain transactions on-line by year.

Exhibit V-7

On-line Supply Chain Transactions



Source: INPUT

Unless an end-to-end approach is adopted to implement the applications, upgrade the infrastructure, train the people, integrate the systems, and link information, the full extend of cost-savings will not be realized. For this to happen, business strategy and IT function must be linked closely. ESCM creates a new way of working, and attains intangible – as well as tangible – benefits.

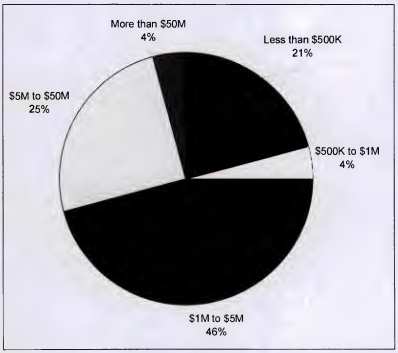
D
eSCM and eBusiness Budgets

Perhaps the most revealing question asked of respondents concerns the budgetary expenditures for eBusiness and to implement eSCM. Nearly half of users responding to this part of the survey reported eBusiness budgets ranging from $1 million to $5 million. Another 25% spent between $5 million and $50 million.

Exhibit 8 shows eBusiness budgets by size in 2000 for respondents that provided this information.

Exhibit V-8

eBusiness Budgets, 2000



25 Respondents *Source: INPUT*

eBusiness

Of those responding, the average amount budgeted in 2000 was $12.7 million, and the median amount was $2.6 million. Amounts ranged from $120,000 to $170 million.

In 1999, actual eBusiness budgets averaged $12.1 million, with a median actual budget of $2.5 million. Spending in 1999 ranged from $100,000 to $148 million.

In 2001, average spending is expected to increase to $14.1 million and a median amount of $2.8 million. The range is expected to be from $150,000 to $200 million.

eSCM

Respondents budgeted an average of 56% of their eBusiness budget on Internet-enbaled SCM from 1999 to 2001, with spending ranging from 10% to 100% of the total eBusiness budget.

In 2000, this spending ranged from $50,000 to $25 million, with an average amount of $3.3 million. The median amount was $1.3 million.

In 1999, spending on eSCM averaged $3.3 million, with a median amount of $1.1 million. In 2001, the average spending is expected to reach $3.5 million and the median $1.5 million.

A summary of budget figures for 2000 is presented in Exhibit 9.

Exhibit V-9

eBusiness and eSCM Budgets, 2000

	Ebusiness	ESCM
Average	$12.7 million	$3.3 million
Median	$2.6 million	$1.3 million
Range – low	$120,000 - $170 million	$50,000 - $25 million

Source: INPUT

These findings are intended to provide typical spending levels for eBusiness and eSCM, as all of the respondents had SCM systems already in use and were implementing eSCM. These figures, and the respective year-to-year growth figures, do not provide enough information to draw broad conclusions about market growth in this area, because non-users were not included in the study. The market forecast, presented in the next chapter, is only partially derived from this source. The next chapter discusses the market forecast in greater detail.

Another view of eBusiness spending is eBusiness budget by company size. Companies with revenues in excess of $10 million spent an average of $34.8 million on eBusiness, and a median amount of $13.3 million. Spending ranged from $3.8 million to $170 million.

Companies with revenues between $1 billion and $10 billion spent an average of $2.4 million, and a median amount of $2.5 million. The range was from $840,000 to $4.4 million.

Companies with revenues between $500 million and $1 billion spent an average of $875,000, and a median amount of $875,000. Spending ranged from $600,000 to $1.8 million.

Companies with revenues of $500 million or less spent an average of $520,000 on eBusiness, a median amount of $143,000, and range of $120,000 to $2 million.

Exhibit 10 shows eBusiness spending by company size.

Exhibit V-10

eBusiness Spending by Company Size, 2000

Company Revenue	Average Spending	Median Spending	Spending Range
>$10B	$34.8M	$13.3M	$170M-$3.8B
$1B - $10B	$2.4M	$2.5M	$840K-$4.4M
$500K - $1B	$875K	$875K	$600K-$1.8M
<$500K	$520K	$143K	$120K-2M

80 Respondents *Source: INPUT*

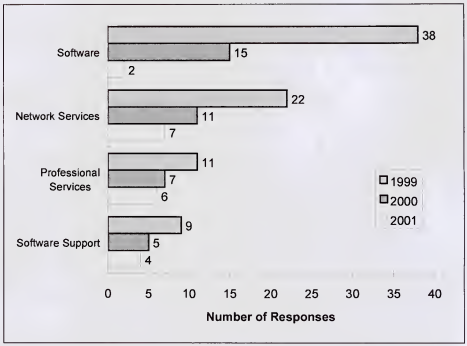
Respondents were also asked about additional, unexpected expenses required for implementation. Nearly half of respondents mentioned software expenses that were greater than expected in 1999.

The additional expense reported by respondents underscores the disconnect between expected end-to-end solutions and actual applications implemented. Despite the fact that a majority of respondents planned end-to-end solution implementations, the fact that additional expenses were for software tells a different story. The proportion of expenses spent on software and professional services would be more equally divided if more complete solutions were implemented. That a majority of total (planned plus additional) funds were spent on software indicates applications, not solutions.

Additional expenses reported by users are shown in Exhibit 11.

Exhibit V-11

Additional Expenses By Type and Year



80 Respondents *Source: INPUT*

Although software applications consumed a greater proportion of initial spending on eSCM, this represents less than 40% of the total 5-year market forecast for eSCM solutions. Services, including training, integration and hosting, comprises the bulk of overall spending.

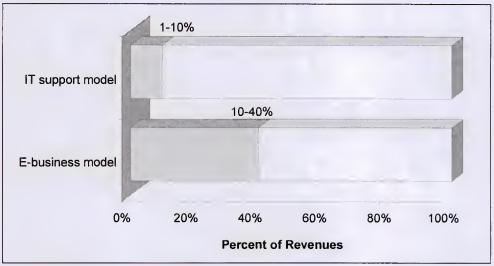
E
Measuring eBusiness Competency

eBusiness spending levels, while they are an important benchmark, in themselves provide limited information about the *effectiveness* of an eBusiness implementation. In the previous chapter, INPUT reported on a number of measured improvements that respondents attributed to eSCM. These metrics are much more useful by comparison because they are highly specific and relate directly to the business objectives of that entity. This leads to an important question: *By what univeral measure can the effectiveness of eBusiness implementations be evaluated?*

In INPUT's view, one such measure is the IT budget as a percent of revenue. In eBusiness, IT spending increases from the traditional IT support model, where spending ranges 1-10%, to the new eBusiness model, where spending is 10-40% of revenue. This fundamental shift, which can provide a quick test of eBusiness Competency, is shown in Exhibit 12.

Exhibit V-12

eBusiness Competence: IT Costs as a Percent of Revenue



80 Respondents *Source: INPUT*

For purposes of this analysis, it is important to note that eBusiness spending did not exceed 1% of revenue, but ranged from 0.1% to 0.9% of revenue. Although eBusiness spending represents only a fraction of total IT spending, it is significant that none of the budgets exceeded even 1%. Spending per employee in 2000 ranged from $20 to $1,200. For eSCM, spending per employ ranged from $12 to $1,200. The respondent spending $1,200 per employee in 2000 spent 100% of the eBusiness budget on

eSCM. The proportion of revenues spent on IT is only one of many factors that measure eBusiness competency.

eSCM applications implemented follow the more traditional IT support model. The new economy shifts a greater protion of spending to IT: as eBusiness capabilitiy is added and does the busines of the enterprise, this new way of doing business will by necessity consume a greater portion of available resources.

VI

Market Forecast

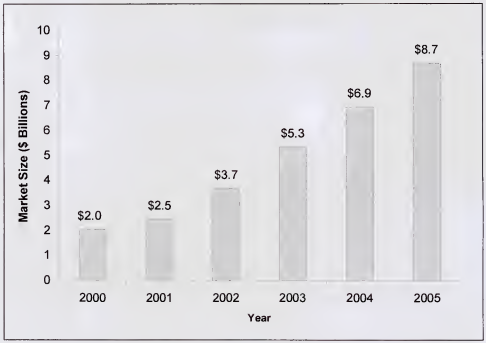
A
Market for eSCM Applications

The market for eSCM will grow from $2 billion in 2000 to $8.7 billion in 2005. Much of this growth will result from continued growth in software licensing as more companies adopt eSCM, and from increased growth in services. The services market for eSCM, now about half that of software licensing, will surpass licensing in 2002-2003. In the five-year forecast period, eSCM services represent more than 60 percent of the total eSCM market.

As shown in Exhibit 1, the U.S. market for eSCM applications will grow to $8.7 billion in 2005.

Exhibit VI-1

U.S. Market for eSCM Applications



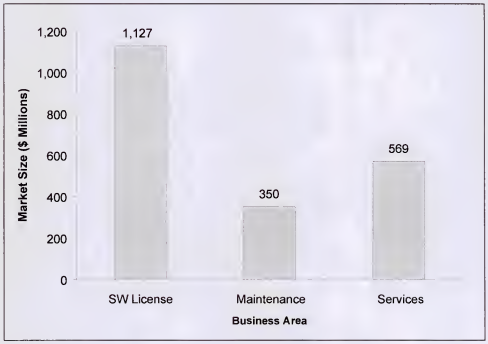
Source: INPUT

Integration services will make up an increasing share of the total market, as companies will shift from applying applications to integrating end-to-end solutions.

In 2000, the distribution among market categories of software licensing, maintenance, and services is shown is Exhibit 2.

Exhibit VI-2

U.S. Market for eSCM, 2000



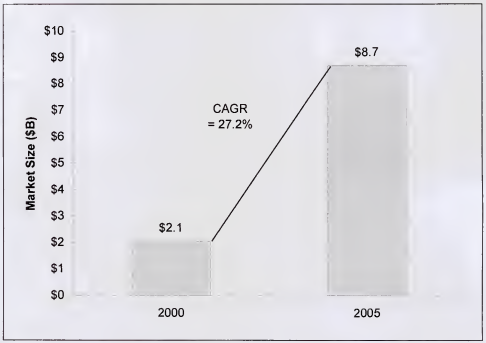
Source: INPUT

It is important to note that in 2000, a majority of the market is taken up by applications alone. By the end of the five-year forecast period, services will consume more than 60% of the total eSCM market.

The CAGR for the eSCM market is 27.2% over the five-year period 2000-2005.

Exhibit VI-3

U.S. Market for eSCM Applications, 2000-2005



Source: INPUT

B
Trends in the Market

The emergence of eBusiness is transforming the way we do business. Leading companies are implementing Internet-enabled CRM and SCM applications to enhance customer and supplier relationships. As these applications become more robust and more fully integrated, the transition to eBusiness will advance significantly. Important trends in the eSCM world include:

- Implementation tends to mobilize from the top of the channel, close to the customer, and then down and through the supply chain to suppliers, subplants and other second-tier companies.
- Demand for hosted solutions will increase rapidly, as customers will demand this as an alternative to licensed software.
- The market will shift from applications to solutions.

C
Conclusions

Despite immediate cost savings, the full potential of eSCM will not be realized without appropriate resources or extensive integration and training. The primary conclusions drawn in this report include the following:

- *Importance of integration to eSCM projects.* Although respondents rated the task of integration more important than Internet-enabling by a margin of 35%, they cited integration as a top issue regarding uptake.

- *Benefits sought.* Survey respondents placed much greater emphasis on tangible benefits, primarily cutting costs, than intangibles, including improved access to information, increased productivity, and reduced time to complete tasks.

- *Despite immediate returns, broader benefits blocked.* Respondents realized immediate access to cost savings, equaling a 200-300% return on investment. In contrast to expectations that the bulk of eSCM transactions would be moved online soon after implementation, in fact, *the proportion of transactions moved online each year following deployment was very slow–less than 50% online after 2 years.*

- *Distinction between eSCM Applications and Solutions.* Although respondents reported implementing end-to-end solutions more frequently than modular applications by a margin of 2 to 1, they failed to implement end-to-end capability.

- *Barriers to implementation.* Without full system integration and training, full implementation is retarded, and results are restrained dramatically. Fuller implementation involves empowering people and enabling business processes for a new way of working.

- *Value proposition unknown.* Alarmingly few respondents could quantify the value proposition to their organization – only 7 of 80 respondents cited measurable results, and none of the respondents were aware of the level of cost savings sought.

- *User budgets.* The application deployment alone consumed a large share of the total eBusiness budget, despite the fact that services will represent more than 60% of the total eSCM market over the five-year forecast period.

To tap the full benefits of electronic SCM, requires a view of the company and its constituents from an end-to-end perspective. It is important to

assess the impact of a solution on the entire supply chain before proceeding. Otherwise, the problem may simply shift from one point along the supply chain to another.

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VII

eSCM Vendors

A
Ariba

Ariba

1565 Charleston Road
Mountain View, CA 94043
U.S.A.
Telephone: +1-650-930-6200

Web address: www.ariba.com

1999 Revenues: $45.4 million.
Established: 1996

SCM and related offerings:

Ariba Buyer. Formerly Ariba Operational Resource Management System, Ariba Buyer is an e-procurement application designed to reduce costs, eliminate efficiencies and speed transaction flow from end-to-end.

Ariba Marketplace. Market enablement application that bridges buy-side and sell-side applications.

Ariba Dynamic Trade. An integrated auction and exchange application for dynamic trading mechanisms including auction, reverse auction and bid/ask exchanges.

Ariba Commerce Services Network. End-to-end service for buyers, suppliers and market makers.

INPUT Analysis

Widely recognized for its Ariba Buyer application, Ariba has taken a number of steps recently to stay on top of the eSCM market. The company formed strategic partnerships earlier this year with IBM and i2, cementing its position as the leading eSCM vendor in the industry. Other moves, including integration partnerships with EDS and TIBCO and hosting services with CoveHarbor, position the company well to provide end-to-end eSCM solutions.

Ariba's partnerships with Unisys, webMethods, Fourth Shift, and Unibex merit attention as well. The strategy involves diversifying applications across the range of business functions tied into supply chain management, as well as providing infrastructure support. Key customer acquisitions include the government's General Services Administration (GSA), Sabre, Lucent, Kaiser Permanente, states of Michigan and California, John Deere, and rooster.com.

B
i2 Technologies, Inc.

i2 Technologies, Inc.

1 i2 Place
11701 Luna Road
Dallas, TX 75234 U.S.A.
Telephone: +1-469-357-1000

Web address: www.i2.com

1999 Revenues: $571.1 million
Established: 1992

SCM and related offerings:

RHYTHM Supply Chain Management Suite. eSCM software for demand planning and fulfillment.

TradeMatrix. eMarketplace software for eSCM exchange transactions.

INPUT Analysis

The strategic acquisition of Aspect this year added critical customer care functionality to i2's software functionality. With customers ranging from Coca Cola and Eastman Kodak to U.S. Marine Corps and Enron, i2 has captured market share in the Fortune 500 as well as dotcom segments.

The company is expanding into the hosted services market via its relationship with IBM Global Services.

C
Manugistics

Manugistics

2115 East Jefferson Street
Rockville, MD 20852 U.S.A.
Telephone: +1-301-984-5000

Web address: www.manugistics.com

1999 Revenues: $152.4 million

Established: 1986 as Scientific Time Sharing Corp. (STSC)

NetWORKS Suite. eSCM software for planning, scheduling, order commitment, and fulfillment.

INPUT Analysis

Grabbing key wins in the second half of 2000, Manugistics revived itself from poor performance in first half of 2000. CEO Greg Owens strategically positioned the company as a solutions provider through a number of industry partnerships, including a recent announcement to acquire systems integrator Talus Solutions. Key customers include: Avnet, Compaq, Exel Logistics, Nokia, Target Corporation, Timberland, The Limited, Unilever and Wal-Mart.

Appendix

A
User Questionnaire

A. Company profile and current usage of SCM software.

1. What is your role in the organization?

   - Please indicate the applications or business areas for which you are responsible. (e.g. SCM, ERP, all eBusiness, all IT, other)

   - How are your supply chain functions (e.g. Planning, Supply, Fulfillment, etc.) organized within your company and how many people are dedicated to them?

2. Please describe your organization.

   - What size is your organization?

     ___Large ___Medium ___Small (check one)

     _____1999 Revenue ($US) _____Number of employees

   - Where is your company located?

     __US & outside US __US-wide

     __US in the following region(s) __ NE __ SE __ SW __NW __ Central)?

   - In which vertical industry do you do business?

__Apparel	__Electronics	__Transportation
__Automotive	__Insurance	__Services
__Banking/Finance	__Manufacturing	__Cross-Industry
__Chemicals	__Medical	__Other_____
__Education	__Telecomm	

- Is your organization a "Supplier" or a "Buyer"? (This question is to determine the organization's role on the "buy-side" of e-commerce.)

___ Supplier/Distributor ___ Buyer/Service Provider/Enterprise/Mftr

What materials/components do you supply/buy? _____

_____

B. Current use and importance of the Internet for Supply Chain Management.

3. Do you currently use a supply chain management (SCM) system?

____Yes ____No

If "yes," GO TO QUESTION 4

If "no," ASK
Do you plan to use Internet-enabled supply chain management within the next year? (This question is to determine if the Internet makes SCM attractive to non-users)

____Yes ____No

If "yes," GO TO QUESTION 4.

If "no," GO TO QUESTION 22.

4a. Which of the following supply chain management software modules are you using (do you plan to use)?

___All (complete system)

___Demand Planning (forecast)

___Supply Planning (inventory, distribution, procurement, logistics)

___Demand Fulfillment (orders)

___Other _____

4b. Which system(s)/vendors do you use (plan to use)?

Name of product/vendor_____

5. On a scale of 1 to 5 (1 being low and 5 high) how important is Internet-enabling SCM to your organization? Why is this important (or not important)?

___ Importance

Comment _____

_____

6a. Is your supply chain management system (or module) enabled for the Internet?

___ **Yes** ___ **In Process** (IF 6a IS "YES" OR "IN PROCESS" GO TO Q7)

___ **No** (IF 6a IS NO, GO TO QUESTION 6b)

6b. When (year and/or quarter) do you plan to do this? _____

IF 6b IS "NO PLANS," THEN GO TO

7. For which modules are you implementing (do you plan to implement) this?
   - ___All
   - ___Demand Planning (forecast)
   - ___Supply Planning (inventory, distribution, procurement, logistics)
   - ___Demand Fulfillment (orders)
   - ___Other _____

8. **In what way is (or do you anticipate) Internet-enabling serving as a catalyst to change in your organization?**

Comment _____

_____

C. **Implementation of Internet-enabled Supply Chain Management (SCM).** This part of the interview covers implementation at your organization.

9. **Do you plan to (or did you) upgrade your legacy SCM system, or replace it?**

___Upgrade ___Replace

10. Please indicate on a scale of 1 to 5 (1 being low and 5 high) the importance of integrating your SCM applications with "front-end" systems and why this is important (or not important).

___ Importance

Comment _____

_____

11. What proportion of your supply chain transactions by value take place over the Internet now, and what proportion do you estimate in 1 year? In 2 years?

Now	*In 1 year*	*In 2 years*
_____All	_____	_____
_____Demand Planning	_____	_____
_____Supply Planning	_____	_____
_____Demand Fulfillment	_____	_____
_____Other _____	_____	_____

12a. On a scale of 1 to 5 (1 being low and 5 high) how important is implementation (of eSCM) to your company's ability to join or form an on-line trading exchange, and why this is important (or not important).

___ Importance

Comment _____

_____

12b. Which on-line exchange(s) is your organization part of (or does your organization plan to join), if any.

Name of exchange or industry segment _____

Comment _____

_____

D. Benefits sought from and satisfaction with Internet-enabled Supply Chain Management

13. What are (or were) the key benefits you seek from Internet-enabling your SCM capability, and the importance of the benefit? (1 being low importance, 5 high importance)

Benefit Sought	Importance of benefit (1 to 5)

(e.g. reduce stock outs, improve customer satisfaction, improve demand forecasts, shorten production cycles, on-time fulfillment of orders, etc.)

Comment _____

_____

*****IF NOT ALREADY USING (OR NOT ALREADY IN PROCESS OF IMPLEMENTING) eSCM, SKIP TO QUESTION 16*****

14. Could you quantify any improvements in any of the following areas due to Internet-enabling your supply chain applications?

Metric (measurement)	Before Internet-enabling	After Internet-enabling

(e.g. Cost of Overhead, Length of Production Cycle, Sales Volume, Time to Fulfill Orders, Level of Customer Satisfaction, Ability to Customize, etc.)

Comment _____

_____

15. How satisfied are you with the Internet enabling of each of the following capabilities?

SCM capability/module	Implemented (Y/N)	Satisfaction (1-5)
All		
Demand Planning		
Supply Planning		
Demand Fulfillment		
Other _____		

How would you like to see Internet-enabling improved in the future?

Comment _____

_____

E. Issues/barriers for Internet enabling SCM

16a. Have you encountered barriers to enabling SCM for the Internet? How important were they? (1 being low importance and 5 high – if 4 or 5, see "how was this problem fixed?" below)

Barrier to Internet-enabling	Importance of barrier (1 to 5)

(e.g. allocating necessary budget/time resources, integrating with legacy systems, migrating from EDI system, forming partner agreements, training staff, interrupting business operations, etc.)

Comment _____

_____

16b. If you indicated high importance (4 or 5), how was this problem fixed?

Comment _____

_____

17a. Have you encountered any significant risks that are forestalling you from Internet-enabling your SCM capability, and how significant are these risks? (1 being low significance, 5 high significance.)

Risk	Significance of risk (1 to 5)

17b. If you indicated high risk (4 or 5) what would have to change to make this a risk worth taking?

Comment _____

_____

F. Cost to Internet-enable Supply Chain Management.

18a. What is your current expenditure to Internet-enable SCM? What do you expect to spend this year and next year?

_____1999 _____2000 _____2001

18b. What percent of your total eBusiness budget is this?

_____1999 _____2000 _____2001

18c. Are there (or were there) additional investments needed to implement? What were they (what are they)? (Indicate amount where possible or check category)

	In 1999	In 2000	In 2001
Software	_____	_____	_____
Software Support	_____	_____	_____
Professional Services	_____	_____	_____
Network Services	_____	_____	_____
Other_____	_____	_____	_____

19. What steps do you expect to take in the next year to improve value for money from Internet-enabled supply chain management capabilities?

_____

_____

20. As I mentioned, we will be sending you an executive summary of this data as part of a Buyer's Guide. Who would you say is the most appropriate decision-maker in your organization to receive this complimentary guide? Would you have the email address for this person?

Name/Title: _____

Phone #: _____

Email Address: _____

21. Would you be interested in taking part in some of our upcoming research or could you refer us to your CIO?
___ You may call me again

CIO: _____ Phone: _____

Thank you for your time and consideration.

*****END INTERVIEW*****

FOLLOW UP QUESTION TO "NO" ANSWERS TO QUESTIONS 3 OR 6 ONLY

22. If "no plans" to use ESCM, why do you have no plans?

Comment _____
_____

23 What would have to change before you considered Internet-enabling your SCM capability?

Comment _____
_____

END INTERVIEW

B
Vendor Questionnaire

A. Brief profile of Vendor Company & Product for eSCM

1. (Assuming this is the best person to discuss Internet-enabling SCM modules/systems.)

   - What is your role? Please indicate the market areas for which you are responsible.

   - How is your supply-chain management offering organized and how many people are dedicated to it? How is SCM linked to ERP if at all?

2. What modules or systems do your customers buy to Internet-enable their SCM capability?

   __All __Demand Planning (forecast) __Demand Fulfillment (orders)

   __Supply Planning (inventory, distribution, Procurement, logistics)

   __Other _____

   Comment

   _____

   _____

   _____

B. Typical Customer for Internet enabling SCM capability

3. Please describe the profile of your typical customer...

   - Large, medium or small companies? _____

   - Geographic or regional area. US/outside US, NE, SE, SW, NW, Central? _____

   - Vertical Industry? (Mfg., Transportation, Utilities, Telecommunications, Retail, Wholesale, Banking/Finance, Insurance, Medical, Services, Education, Government, Cross-Industry, Other? _____)

   - Typical job title/function of the buyer (Exec. Manager, IT v. LOB v. Other function)? _____

Comment_____

_____

4. Is there typically one buyer representing a vertical supply chain, or does each company in the chain buy separately? _____

Comment

_____

_____

_____

5. Are your customer's direct users or Outsourcing IT services vendors (ISP/ASP)? (i.e. product only, product or service directly, through reseller)

Comment _____

_____

6. What are the typical terms and conditions (who takes responsibility for hosting, implementation, licensing, upgrading?_____

Comment _____

_____

6b. Is the typical customer upgrading or replacing legacy systems? _____

Comment _____

_____

D. Market outlook and characteristics for eSCM

7. What year-over-year revenue growth (%) did you attain in 1999? _____, and what would you expect to achieve in 2000? _____

Comment_____

_____

8. What is your estimate of typical customer total costs to Internet-enable SCM?

___<$100K ___$100-500K___$500k-1M ___>$1M

9. What is the typical duration of the installation cycle?

____<1 mo _____ 1-3 mos. ___, 3-6 mos. ____ > 6 mos.

10. Would you say that installing your primary software application is of high, medium or low complexity? _____

D. Integration of Supply Chain Management Software Offerings

11. To what degree does your Internet SCM software integrate with other IT systems, for example, CRM, ERP (accounting, payroll, HR), etc. Please rate on a scale of 1 to 5 (1 being to a low degree and 5 high) _____

Comment_____

_____

12. What other software or service does your typical customer need to buy?

Type Software/Service	*Typical Buyer*
_____	_____
_____	_____
_____	_____
Other _____	_____

E. Satisfaction with your company's Internet enabling SCM product.

13. What advantages does your software have compared to the closest competitor, and what are the key reasons for these advantages?

	Advantage	Effect
1)	_____	_____
2)	_____	_____
3)	_____	_____

14. In what ways is your software vulnerable to competitors? What is your company doing to address this?

	Issue	Effect
1)	_____	_____
2)	_____	_____
3)	_____	_____

15. What are your most common sales obstacles?

1) _____

2) _____

3) _____

16. Who would you say are your primary competitors?

1) _____

2) _____

3) _____

F. Conclusion and Follow-up

17. As I mentioned, we will be sending you an executive summary of this data as part of a Buyer's Guide. Who would you say is the most appropriate decision maker in your organization to receive this free guide? Would you have the email address for this person?

Name/Title: _____

Phone #: _____

Email Address: _____

18. Would you be interested in taking part in some of our upcoming research or could you refer us to your CIO? ___ You may call me again

CIO: _____ Phone: _____

Thank you for your time and consideration.