

(Enterprise—Chopra & Meindl)

What Will Drive the Enterprise Software Shakeout?

(BY-LINE)

Sunil Chopra and Peter Meindl

(BY-LINE INFO)

Sunil Chopra is the IBM Distinguished Professor of Operations Management and Information Systems at Northwestern University's Kellogg School of Management. Peter Meindl is a supply chain consultant and is working on his PhD at Stanford University. Chopra and Meindl are the authors of *Supply Chain Management: Strategy, Planning, and Operation* (Prentice-Hall).

(EXECUTIVE SUMMARY)

[to come]

(CARRY-OVERS)

Enterprise Software

(IN LINES)

[to come]

(MAIN TEXT)

The enterprise software landscape is undergoing a significant and dramatic evolution. An unprecedented flow of venture capital had not only increased the number of software companies, but also led to the proliferation of entire categories of software and the expansion of software product lines. The recent downturn in technology spending has

since caused many software companies to cease operations or merge with other firms. Some entire software categories, in fact, are well on their way to extinction.

What drives this evolution of enterprise software—the software that manages all transaction data within an enterprise and its supply chain, and provides decision support using this data? Why are some categories of software companies headed for a profitable long-term future while others find themselves on the endangered species list? Certainly a wide variety of factors affect the natural selection of software companies. We propose, however, that the main drivers of the enterprise software evolution are the three main groups of extended supply chain processes, what we call macro processes. Going forward, the successful software companies will have a clear focus on those supply chain macro processes. The failures, on the other hand, will not.

Certainly, this evolution matters greatly to those companies providing the software. But why should software users be concerned with what's taking place? The reason is that enterprise software supports supply chain wide decisions that have become increasingly important to business success. By understanding the evolution, businesses can gain insight into how they can best use enterprise software to make the right decisions and become more competitive.

The Macro Processes

The emergence of extended supply chain management (ESCM) has broadened the scope of decision-making for supply chain professionals. It has expanded from trying to optimize performance within the division or business unit, then throughout the enterprise, and now across the entire supply chain, which includes trading partners both upstream and downstream. This broader scope underscores the importance of incorporating all of the supply chain processes in decision-making activities. From an enterprise's perspective, all extended supply chain management processes can be categorized into three main areas: processes focused downstream, processes focused internally, and processes focused upstream. We use this classification to define the three macro

processes as follows:

- Customer Relationship Management (CRM): Processes that focus on downstream interactions between the enterprise and its customers.
- Supply Chain Management (SCM): Processes that focus on internal operations within the enterprise. Note that we are adopting the software industry's definition of supply chain management, which generally refers to operations conducted *within* the enterprise. This is in contrast to our definition of extended SCM (ESCM), which encompasses the entire supply chain and includes all three macro processes (CRM, SCM, and SRM).
- Supplier Relationship Management (SRM): Processes that focus on upstream interactions between the enterprise and its suppliers.

These macro processes rest on a transaction management foundation (TMF), which includes basic enterprise resource planning (ERP) and its components such as financials and human resources, database, storage, security, infrastructure, and integration software. TMF software is the infrastructure that enables the three macro processes to function and to communicate. The relationship between the three macro processes and the transaction management foundation are depicted in Exhibit 1.

Why Focus on the Macro Processes?

As the performance of an enterprise becomes more closely linked to the performance of its supply chain, companies need to intensify their focus on these macro processes. While improving internal processes is important, it's not enough. The goal should be to increase the total profitability of the supply chain, which can also be referred to as the supply chain surplus. Extended supply chain management is not a zero sum game wherein one player in the supply chain increases profits at the expense of another. Rather, it's a positive sum game where supply chain partners can increase their overall level of profitability by working together. Thus, to increase the supply chain surplus (and therefore their firm's own profitability), firms must expand their scope beyond their

enterprise and think in terms of the extended supply chain processes of customer relationship management, supply chain management, and supplier relationship management.

Macro Processes and the Software Evolution

As the continued downturn in technology spending accelerates the evolutionary pressure, we see a distinct pattern emerging on the enterprise software landscape. The majority of survivors have focused on helping their customers improve their macro processes as opposed to simply acting as information intermediaries in their customers' supply chains. Many surviving firms have crossed over into more than one macro process, whereas others have carved out a niche within a single macro process. But the common thread among the survivors—and those best positioned to thrive in the future—is that they focus on one or more of the macro processes. This pattern of success promises to continue going forward, further differentiating between the winners and the losers.

Failure to pay attention to the macro processes has already claimed a number of casualties. Two good examples are the B2B marketplaces and the software companies providing the marketplace software that proliferated in 1999 and 2000. These marketplaces concentrated on creating whole new entities within the supply chain rather than on improving the performance of the three key macro processes. This misplaced focus was a key contributor to the downfall of marketplaces.

The software firms behind the marketplaces have had a similarly difficult time. In fact, the two major players, Ariba and Commerce One, lost well over 95 percent of their peak market capitalization. To survive, these companies have since moved away from being marketplace providers to becoming providers of macro process focused software. Both Ariba and Commerce One, for example, now focus almost exclusively on the supplier relationship management macro process.

ERP is another example of a software category being transformed by the evolution

toward macro processes. ERP software has successfully improved data integrity within the supply chain. But in and of itself, data integrity provides little value. Data integrity has value only to the extent that it improves decision-making. This is where the three macro processes enter the picture. Companies obtain real value from ERP when these systems are used to improve decision-making in the three macro processes. Every major ERP player now realizes this, and is developing new products accordingly.

In the discussion below, we offer examples of software companies that have successfully targeted the macro process. Continuing the pattern of the past two years, the winners in the enterprise software space will be those firms dedicated to improving the performance of their customers' macro processes. Software providers that don't do this will continue to struggle. This dynamic will produce a much more consolidated landscape with virtually all enterprise software falling into one of the three categories. Certainly, there will always be a need for software in the transaction management foundation. However, the real competitive advantage will come from solutions that enhance performance of the three macro processes.

The Software Winners within a Macro Process

Three factors will determine the winners *within* a group of software firms focused on the macro processes: (1) functional performance, (2) integration with other macro processes, and (3) strength of the firm's ecosystem.

Functional performance is important because it gives customers the capabilities to create a competitive advantage. In addition to its raw functional performance (for example, being able to optimize both price and supply in an integrated fashion), the software must be easy to use. Some software has advanced functionality but is very difficult to use. As a result, the advanced functionality is rarely utilized. Software providers that offer lower levels of functionality but with greater ease of use can effectively deliver more "usable" functionality to customers—and thereby gain a competitive advantage.

The ability to *integrate* is important to users for a variety of reasons. Applications that are easy to integrate are generally easier to get running and producing value. Further, applications that integrate across the macro processes provide even greater value because they enhance decision-making across the entire supply chain rather than just within an enterprise. Thus, software firms that offer a full line of integrated solutions in all three macro processes have competitive edge.

Finally, a firm's *ecosystem*--the network of software partners and, more importantly, systems integrators and installed base—is a key factor in selling and implementing software. Firms that work well with implementation partners and build up large groups of customers trained on their solutions construct a highly defensible position. For another provider to come in and capture their business would require a solution so superior that it would justify the significant retraining and reintegration required.

The Three Macro Processes

With these success factors as a backdrop, we now can examine each of the macro processes, their key segments, the major players, and their future prospects. (Exhibit 2 summarizes the three macro processes.

Customer Relationship Management

Customer Relationship Management (CRM) embodies those processes that take place between an enterprise and its customers downstream in the supply chain. The goal of the CRM macro process is to generate customer demand and facilitate the transmission and tracking of orders. Weakness in this process results in lost demand signals and poor customer experiences because orders are not processed and executed effectively. Key processes under CRM include:

- *Marketing*: Marketing processes center on such issues as which customers to target, how to target them, what products to offer, how to price products, and then

how to manage the actual campaigns targeting customers. Successful software vendors in this space provide analytics that improve the marketing decisions on pricing, product profitability, and customer profitability, among other functions.

- *Sell*: The sell process focuses on making an actual sale to a customer. It includes providing the sales force with the information needed to make the sale and then executing the actual sale. Executing the sale may require the sales person (or the customer) to build and configure orders by choosing among a variety of options and features. The sell process also requires functionality that enables users to quote due dates and access information related to a customer order. Successful software providers have targeted sales force automation, configuration, and personalization to improve the sell process.
- *Order Management*: The process of managing customer orders as they flow through an enterprise is important both for the customer to track an order and for the enterprise to plan and execute order fulfillment. This process ties together demand from the customer with supply from the enterprise. Traditionally, order management software has been handled by company legacy systems or has been a part of an ERP system. Recently, new order management systems have emerged with additional functionality that provides visibility across the numerous order management systems that typically exist within a company.
- *Call/Service center*: A call/service center is often the primary point of contact between a company and its customers. The center helps customers place orders, suggests products, solves problems, and provides information on order status. Successful software providers have helped improve call/service center operations by facilitating and reducing work done by customer service representatives, often by allowing customers to do the work themselves.

The above CRM processes are crucial to the supply chain because they cover the interactions between an enterprise and its customers. The customer needs to be the

starting point in any efforts to increase the supply chain surplus. The reason: all demand, and therefore all revenue, ultimately arises from the customer. Accordingly, the CRM macro process is the starting point for improving supply chain performance. In this regard, it's important to note that CRM processes--and CRM software--must be integrated with internal operations to optimize performance. Too often, companies operate with their customer-focused units independent of their internal operations. For effective supply chain management, CRM must be closely integrated with the internal operations.

CRM software has been the fastest growing category of the three macro processes, and is now the largest. Software providers in this space have successfully improved the CRM processes themselves. But they have more work to do to improve integration between CRM and the internal operational processes. Their future success will be partially driven by how well their solutions help customers achieve the necessary integration.

The CRM software landscape consists of three categories of companies: the best of breed winners, the best of breed start ups, and the ERP players. This space is currently dominated by Siebel Systems, the sole winner in the best of breed category. However, Siebel faces serious competition both from best of breed start ups that emphasize functional expertise and from the ERP players, such as SAP, Oracle, and PeopleSoft that provide a powerful integration story and strong ecosystems.

Siebel provides a combination of superior functionality and a good ecosystem for a best of breed player. However, it lacks the ability to integrate across all three macro processes. The ERP players lag somewhat on functionality but can successfully compete with their integration and ecosystem strengths. Small best of breed CRM providers will face a difficult future given the strength of the best of breed winner and the attention that the ERP players are devoting to this space. Their only chance is to develop functionality that is currently lacking in other solutions in the hopes of gaining some advantage. Pricing and revenue management, in particular, holds considerable promise in this regard. But in any case, it will be a difficult task for the small best of breed players.

Supply Chain Management

Supply chain management, according to the definition set forth earlier, is focused on operations *internal* to the enterprise and includes all processes involved in planning for and fulfilling a customer order. The specific SCM processes are as follows:

- *Strategic Planning*: The goal of this process is to plan resource availability across the supply chain network. Strategic planning decision focus on where to locate plants and warehouses, what type of facilities to build, and what markets to serve from each facility. Although these decisions are made infrequently, their impact on supply chain performance can be huge and may be felt for years. Successful software providers now offer the functionality to analyze strategic plans under uncertain future environments.
- *Demand Planning*: This set of processes helps users forecast customer demand and make demand-management decisions on such critical activities as promotion planning. Successful software providers will enable users to develop a demand plan that accounts for marketing and promotional efforts.
- *Supply Planning*: This is the real heart of SCM--and in many respects, it is the heart of extended supply chain management. The supply planning process takes as input the demand forecasts generated by demand planning and the resources made available by strategic planning. It then produces an optimal plan to meet this demand with the resources available. Supply planning software typically provides factory planning and inventory planning capabilities.
- *Fulfillment*: Once a plan is in place to supply the demand, it must be executed. The fulfillment process links each order to a specific supply source and means of transportation. The software applications that typically fall into the fulfillment

segment are transportation and warehousing applications.

- *Field service*: After the product has been delivered to the customer, it eventually must be serviced. Service processes focus on setting inventory levels for spare parts as well as scheduling service calls.

Because the SCM macro processes aim to fulfill demand that is generated by the CRM processes, the two need to be closely integrated. When forecasting demand, interaction with CRM is essential because these applications touch the customer and provide the most data and insight on customer behavior. Similarly, the SCM processes must be tightly integrated with the SRM macro process. Supply planning, fulfillment, and field service all are dependent on suppliers--and therefore the SRM processes. It is of little use for your factory to have the production capacity to meet demand if your supplier cannot supply the parts needed to make your product. Order management, a part of CRM, must integrate closely with fulfillment and become an input for effective demand planning. In short, the emphasis needs to be on integrating across the macro processes.

Software providers have been successful in helping users improve decision-making within their SCM processes. However, they've been less successful in integrating SCM with CRM and SRM processes at both the organizational and software levels. While future opportunities are likely to arise partly in improving each SCM process, the biggest gains lie in improving integration with CRM and SRM.

As with CRM, today's supply chain management landscape consists of three categories: the best of breed winners, the best of breed start ups, and the ERP players. Unlike CRM, however, there is no clear leader in this space. The two best of breed winners, i2 Technologies and Manugistics, are the SCM pioneers and current functional leaders. However, start-ups with superior functionality as well as ERP players have been making inroads into their leadership position. In fact, one ERP player, SAP, claims to have captured the top SCM revenue spot away from i2.

Though the best of breed SCM players lead in functionality, they lack strong integration and ecosystems. The ERP players, with their advantages of an integrated product and strong ecosystems, are working to make their functionality more competitive. Unlike the CRM space where Seibel has a large functionality lead over the ERP providers, the functionality gap in the SCM space between the best of breed players and the leading ERP providers is smaller and shrinking. As a result, an ERP provider such as SAP has the potential to dominate this space.

To stay competitive, best of breed leaders will have to relentlessly improve functionality while providing acceptable levels of integration and ecosystem. Some of the smaller SCM players will remain viable by developing new functionality. The most successful will likely target customers in specific industries that depend heavily on advanced functionality.

Supplier Relationship Management

SRM includes those processes focused on the interaction between the enterprise and suppliers that are upstream in the supply chain. There is a natural fit between SRM and SCM macro processes, as supplier constraints are a critical component of SCM planning. The major SRM processes include:

- *Design Collaboration:* The goal of this process is to jointly design (with suppliers) products that have positive supply chain characteristics such as ease of manufacturability and commonality across several end products. Examples of design collaboration include the sharing of engineering change orders between a manufacturer and its suppliers and the creation of bill of material cross-reference databases. These practices eliminate the costly delays that occur when several suppliers are concurrently designing components for the manufacturer's product and enable the reuse of previously designed parts. Effective collaboration at this stage can create huge value because about 80 percent of product cost is determined at the design stage. Successful SRM software facilitates such

collaboration.

- *Source:* The source process qualifies suppliers and helps in supplier selection, contract management, and supplier evaluation. By carefully analyzing how much it spends with its different suppliers, companies can often find significant improvement opportunities. With this data, they can evaluate suppliers across several key criteria including lead time, reliability, quality, and price. This evaluation helps improve supplier performance and aids in supplier selection. Contract management is another important part of sourcing, as many supplier contracts have complex details that must be tracked. Source software helps companies more effectively evaluate supplier performance and manage contracts.
- *Negotiate:* Negotiations with suppliers involve many steps, starting with a request for quote (RFQ). The negotiate process also may include the design and execution of auctions. The goal of this process is to negotiate an effective contract that specifies price and delivery parameters in a way that best matches the enterprise's needs. Negotiate software automates the RFQ process and the execution of auctions.
- *Buy:* The buy process executes the actual procurement of material from suppliers, and includes the creation, management, and approval of purchase orders. Buy software automates the procurement process and helps decrease processing cost and time.
- *Supply collaboration:* Once an agreement for supply is established, the buyer and supplier can improve supply chain performance by collaborating on forecasts, production plans, and inventory levels. The goal of collaboration is to ensure a common plan across the supply chain. Collaboration software should facilitate collaborative forecasting and planning in a supply chain.

Organizations can greatly improve supply chain performance by effectively integrating

SRM processes with appropriate CRM and SCM processes. For example, incorporating customer input gained through CRM processes can greatly improve the SRM process of product design. Similarly, inputs from SRM processes such as sourcing, negotiating, buying, and collaborating are key to producing and executing an optimal SCM plan.

In the SRM space, the youngest of the three macro processes in terms of software development, there are four groupings of competitors. In the best of breed category of SRM-focused firms, there are two groups--one focused on design collaboration, the other on procurement. Leading design collaboration firms include Agile and Matrix One. The leading procurement firms are Ariba and Commerce One (those marketplace leaders discussed earlier that have since switched their focus to a macro process). The third group are the best of breed SCM vendors that have crossed over into SRM. Companies such as i2 and Manugistics fall into this category. The fourth grouping consists of the ERP players that have moved up into the macro processes. SAP is the largest SRM player among them and the one that has made the biggest commitment to this space.

Because the SRM space is so young, the solely SRM-focused players have not had a chance to develop large functional leads, and their ecosystems are virtually nonexistent. They find themselves battling it out with the much larger SCM and ERP players and their superior integration and ecosystems. Without some breakthrough functional advantage, it's unlikely that many SRM best of breed players will survive on their own. Therefore, we see the future SRM landscape dominated by one or two SCM players and one or two ERP players. SAP appears to be the most likely bet given the success it has already achieved in the other macro processes.

The Transaction Management Foundation

The transaction management foundation that underlies the macro processes is the historical home of the largest enterprise software players. In the early nineties, when ERP systems were rapidly gaining popularity, few software applications focused on improving decision-making, let alone enabling the extended supply chain management

processes. Instead, the emphasis was on building the transaction management and process automation systems that would become the foundation for future decision-focused applications. These systems excelled at automating simple transactions and processes while creating an integrated way of storing and viewing data across the division, and sometimes the enterprise.

The huge demand for these systems during the 1990s resulted in the ERP players becoming the largest enterprise software companies. SAP was (and continues to be) the market leader. Other powerful players included Oracle, PeopleSoft, JD Edwards, and Baan. Eventually, ERP sales slowed and one of the Big 5, Baan, ceased to exist as an independent company.

The transaction management foundation imparts real value only when it improves decision-making across the supply chain. For this reason, most of the recent growth in enterprise software has come from companies focused on improving decision making in the three macro processes. This has set the stage for an emerging trend: the realignment of the ERP companies into CRM, SCM, and SRM providers. We expect this development to gain momentum over the next few years as more and more of the ERP companies' revenues come from applications in the macro processes.

The big ERP players enjoy an inherent advantage over the best of breed providers because of their ability to integrate across the three macro processes through the transaction management foundation. In our opinion, ERP firms that focus on integrating across the macro processes while developing good functionality in one or more of those processes will occupy a position of strength. Still, as the sidebar on page XX notes, there are several paths open for others to successfully compete against the ERP giants.

Extracting Full Value

Assessing the current and future landscape, we believe that the three extended supply chain macro processes—SRM, SCM, and SRM--will continue to drive the evolution of

enterprise software. As this happens, software firms focused on these macro processes will capture a larger share of the total enterprise software market and will become much more successful than those focused elsewhere. For these providers, functionality, the ability to integrate across macro processes, and strength of ecosystems will be the keys to their success.

For users of enterprise software, the lessons center on the importance of the macro processes in creating competitive advantage. In selecting and deploying enterprise software, users should maintain a laser focus on the solutions that will improve the performance of their macro processes. Software vendors that can demonstrate their ability to improve functionality within a macro process or integration across macro processes will be the vendors of choice. Ultimately, all users should aim to improve the alignment between their extended supply chain macro processes and the capability of the enterprise software deployed. Only then can full value be extracted from enterprise software.

(SIDEBAR—Paths)

Different Paths to Success

One might conclude from our analysis that it will be difficult for anyone to compete against the big enterprise software companies given their lead in functionality, integration, and ecosystems. However, we believe that there are two paths that could potentially lead a company to success. The first is through providing superior functionality-- whether it be specific functionality needed by a particular industry or an application that allows users to more easily take advantage of existing functionality. This path holds potential for start-ups that could add significant value to enterprise software.

The other path to success is via an integrated product. Certainly, start-ups will have difficulty garnering the resources to build an integrated product across CRM, SCM, and SRM. However, a large software company with tremendous resources and a history of pulling disparate products into an integrated package could pull it off. Microsoft is the one company that comes to mind. It certainly has taken note of the size and growth of the enterprise software market, and has made some significant moves in this space. Microsoft has made two enterprise software acquisitions of more than \$1 billion and is showing more signs that this will be a key focus area going forward.

Even with these acquisitions, however, Microsoft is not yet a significant player in the supply chain macro process space. To date, it has targeted only small companies here, leaving the large customers and the large revenues to the companies mentioned above. However, given Microsoft's tried-and-true strategy of going in on the low end and expanding upward, it will be a powerful force to be reckoned with on the enterprise software landscape.