Face-Off: Supply Chain Management Software

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Executive Summary

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Supply chain management (SCM) software traditionally deals with five distinct processes: plan, source, make, deliver, and return.

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While these functions have not changed, a number of market conditions and technology changes have coalesced in recent years to dramatically alter the role that SCM solutions play in the enterprise.

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Oracle Supply Chain Management Product
Oracle PeopleSoft Enterprise Supply Chain Management Product
i2 Technologies Supply Chain Solutions
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Today's economic climate has placed greater pressure on manufacturers, suppliers, and distributors to increase revenues and reduce costs. Simultaneously, the increased demand from customers for delivery, more product options, and higher quality has added to those pressures. Technology changes include increased use of Web services to enable collaboration among multiple tiers of the supply chain; evolution from application integration to process integration; improved supply-chain specific performance measurement tools; and event management software to monitor supply chain activities. Other concerns in today's SCM market include Electronic Product Code technology and the increasing use of Radio Frequency Identification (RFID), particularly in the retail arenas.

The SCM market is currently led by vendors who provide solutions as one component of their product portfolio, such as ERP vendors SAP, with its mySAP SCM suite, and Oracle, which offers a series of SCM solution. Oracle in particular has grown its line with the acquisition of PeopleSoft (and PeopleSoft acquisition J.D. Edwards), as well as the Oracle Retail offering, based on its purchase of Retek. Along with Oracle Retail, the company also offers the Oracle E-Business Suite SCM, PeopleSoft Enterprise SCM, and JD Edwards EnterpriseOne SCM suites. The space also includes specialty vendors, whose core offerings are SCM solutions. i2 Technologies is the leading vendor in the pure-play SCM space.

Description

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The supply chain comprises a set of processes conducted among a business' customers and trading partners, such as manufacturers and suppliers. In broad terms, these business processes include planning and execution functions that are designed to streamline the flow of information, goods, and services along the supply chain continuum. Planning functions can include processes ranging from sharing product designs among manufacturers and designers; forecasting product demand; deciding what to buy and where to buy it; scheduling manufacturing operations; planning how much inventory to hold; and planning transportation options. Execution functions ensure that all planning processes are met. They can include creating purchase orders; taking and managing customer orders; managing the movement of goods in a warehouse; and delivering goods to customers.

The Supply Chain Council (SCC) is an international organization comprised of hundreds of industry members. It has published the Supply Chain Operations Reference (SCOR) model (version 8.0 of SCOR was released in June, 2006), which simplifies the various processes making up the supply chain. The SCC describes the SCOR model as a "process reference model for supply-chain management, spanning from the supplier's supplier to the customer's customer." The model identifies and defines five key processes:

- **Plan--**Demand/supply planning and management, including balancing resources with requirements and establishing plans for the entire supply chain.
- **Source--**Sourcing for stocked, make-to-order, and engineer-to-order products, identifying and selecting supply sources when not predetermined.

- **Make--**Product execution of make-to-stock, make-to-order, and engineer-to-order, including scheduling of production activities, issuing the product, producing and testing of the package, staging the product, and releasing the product to deliver.
- **Deliver--**Order, warehouse, transportation, and installation management for stocked, make-to-order, and engineer-to-order products, including all order management steps from processing customer inquiries and quotes to routing shipments and selecting carriers.
- **Return--**The return of raw materials and the receipt of returns of finished goods, including all return steps from source and managing return business rules and performance.

Technologies and processes for supply chain management continue to evolve from traditional static, intra-enterprise planning, optimization, and execution functions toward a more inter-enterprise, collaborative approach. Crucial points of comparison among SCM solutions include their collaborative capabilities, which are a function of application and process integration; breadth of product portfolio; availability of business intelligence tools; and the vendor's vertical market focus. In today's market, vendors who have roots in planning and optimization software, such as i2 Technologies, continue to play an important role, although traditional ERP providers, such as SAP and Oracle, have become the real market leaders.

Product Market Drivers

Many companies today compete based on the efficiency of their supply chains. Current market conditions include an economic climate that requires revenue increases and concurrent cost reductions, as well as intensified customer demand for tailored products with on-time, rapid delivery. In order to meet these increased competitive and market pressures, more efficient management of the supply chain has become critical for success in sectors such as manufacturing.

SCM changes over the past several years have helped supply chain participants meet their economic goals of increased revenue and reduced costs, while concurrently improving responsiveness to customers. Some of these changes have included a stronger reliance on the Internet to enable inter-enterprise collaboration among all supply chain participants; an extension of application integration to include workflow-based process integration that crosses enterprises and functions; and an influx of performance measurement tools to help evaluate supply chain performance.

Collaboration among supply chain participants has existed for quite a while. It was initially focused around functional silos. The increased growth of the Internet and the emergence of Internet standards such as XML (eXtensible Markup Language), SOAP (Simple Object Access Protocol), WSDL (Web Services Description Language), and UDDI ((Universal Description, Discovery, and Integration) have extended that collaboration. As a result, today's supply chain participants can collaborate, share data, and even open selected company data files of supply chain partners to enable more efficient order tracking and vendor-managed inventory, among other benefits. New portal technology provides the access medium to enable much of the collaboration and data visibility among business partners. This collaboration can range from the sharing of product designs among designers and manufacturers in order to ensure that a designed product can be efficiently manufactured; to collaboration with suppliers to ensure that they have the capacity and raw materials to meet delivery schedules; to the sharing of forecast data among suppliers, planners, sales staff, and even customers for creation of more accurate demand forecasts.

Other standardization attempts and newer technologies promise additional improvements in SCM. Chief among these is Electronic Product Code (EPC) technology GS1, a non-profit standards organization formerly known as EAN International, and the Uniform Code Council (UCC) have entered into a joint venture called EPCglobal with

the goal of driving global adoption of EPC technology across multiple industries. The organization has ratified its UHF Generation 2 specification, a protocol describes capabilities required to meet needs set by end users and is intended for use as a base platform for products to be built.

Tighter process integration is becoming increasingly important to ensure that supply chain processes are streamlined in order to meet rising market demand. Business process integration extends the concept of application integration down to the process level, and also extends that integration beyond the enterprise to link suppliers and customers. The increased reliance today on process integration means that applications automatically connect to other applications (whether inside the enterprise or outside) and execute the functions necessary to complete a specific business process. This means, for example, that as part of product requisition, the supplier file may be verified to ensure that a product is or will be available when required; the requisition is placed and sent to the supplier; a purchase order is cut; payment is made when the product arrives; and a quality management function is performed to ensure that the product meets specifications.

Improved supply chain-specific business performance measurement tools represent another result of competitive market forces. Today, many SCM vendors offer complete performance measurement product suites with data warehouses that collect, aggregate, and store data from a variety of supply chain participants, and from the enterprise's back-end systems, as necessary. Some vendors offer a balanced scorecard as part of their business intelligence suite. The scorecard is a strategic management tool that integrates financial and non-financial aspects of the business in order to help enterprises understand the relationships between strategic goals and tactics, and to recognize how strategic goals relate to one another. It also shows the progress of strategic objectives. Analytic applications can evaluate the warehoused data, using pre-defined and pre-integrated supply chain-specific metrics to help strategically and operationally measure supply chain performance. These measures can include factors such as evaluation of supplier on-time delivery or payment; spend analysis on procured goods; and assurance that inventory costs are meeting strategic corporate goals.

The latest technology to impact SCM product development is RFID. This term encompasses any technologies using radio waves to identify people or objects. Although RFID has been around since the 1970s, it was until recently impractical for many commercial applications, due to its expense and limitations. The most common method of identification uses information, such as a serial number, stored on a microchip attached to an antenna, which allows the chip to transmit data to a reader. Together, the chip and the antenna are called an RFID tag or transponder. The reader digitally converts the radio waves so that the data is usable by computers. RFID is touted as the ultimate SCM solution, but it is not without its limitations. Implementation costs can be substantial and a return on early investments can be far off in the future. There is no doubt, however, that RFID will drive business process changes. These changes have already begun: retail giant Wal-Mart has mandated that its suppliers must implement the use of RFID tags on some (so far) products sent to it, while technology giants, such as NCR, have also increased their focus on developing RFID-based software and frameworks. Most of the leading SCM solutions available on the market today include support for RFID in their product offerings.

Solution Set

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Enterprises selecting supply chain management tools and applications should consider the following key differentiating characteristics:

- **Systems Specifications--**What operating systems, servers, and databases are supported for implementation and integration?
- **Electronic Collaboration Solutions**--Does this product provide inter-enterprise and intra-enterprise collaboration? Does it support Internet-enabled communications among an enterprise's internal personnel, business partners, and customers throughout an extended supply chain?
- **Process Integration--**Does the vendor endorse the concept of integrating business processes both internally and among trading partners? This concept extends the idea of collaboration beyond mere application integration to the concept of automatically completing an entire business process -- or example, all processes included in the Prospect to Pay function.
- **Interoperability/Ease of Integration--**Does this product conform to open standards? How well does the product integrate with other applications within an enterprise? How easy is it to integrate with applications outside the enterprise?
- **Standards Compliance--**Does the vendor map its solutions to the SCOR model? This model is widely adopted, since it simplifies all the processes comprising a supply chain.
- **Flexibility--**Does the product provide both functional breadth and depth?
- **Customer Relationship Applications--**Does this product provide customer relationship-enhancing features that improve the enterprise's overall business process effectiveness?
- **Industry Focus/Vertical Markets--**Does this toolset enable the enterprise to implement quicker time-to-benefit supply chain implementations by meeting industry-specific characteristics and marketing needs?

Face-Off

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Table 1 compares the key differentiating features of the solutions from the leading vendors in the supply chain management software market; SAP, Oracle, and i2 Technologies.

Table 1. *Face-Off of Leading SCM Solutions*

Criteria	SAP mySAP SCM	Oracle E-Business SCM	i2 SCM
Systems Specifications	Windows NT and 2000; Sun Solaris; IBM pSeries, iSeries, and S/390; Linux. DB2 for AIX, Informix OnLine and Oracle for UNIX environments. MS SQL Server, Informix Online, Oracle for Windows environments. DB2 for iSeries	Hewlett-Packard HP-UX; Sun Solaris; IBM pSeries; run-time version of Oracle 8i or 9i data base	Windows NT/2000; Sun Solaris; IBM pSeries and iSeries; HP-UX. Open DBMS platform supports (SQL, ODBC, JDBC); C++, Java

Electronic Collaboration Solutions	Very good, and improving	Very good	Good--relatively immature, but improving
Process Integration	Very good	Very good	Not a strong process integration vision yet
Interoperability/ Ease of Integration	Good and improving	Strong within its own family of front- and back-office applications	Moderately strong, but remains a challenge
Flexibility	Improving; traditionally a non-flexible system, but it is making great strides to improve	Very strong, except it requires a run-time Oracle database	Strong--more breadth than depth
Customer Relationship Applications	Yes	Yes	Yes
Industry Focus/Vertical Markets	Aerospace and defense; automotive; banking; chemicals; consumer products; defense and security engineering; high tech; higher education and research; industrial machinery and components; insurance; service providers; media; mill products; mining; oil and gas; pharmaceuticals; postal services; public sector; retail; railways; telecommunications; utilities; and wholesale distribution.	Airlines, automotive, communications, consumer goods, high tech, industrial, manufacturing, life sciences, and the public sector.	Aerospace and defense, automotive and industrial, consumer goods, energy and chemicals, high tech, metals, pharmaceuticals, retail, telecommunications, and utilities.

Analysis: Strengths & Limitations

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Each of the product suites are highly regarded in their functionality and breadth of applications, but integration capability, strength of e-collaboration functionality, availability of strong performance management tools, and the targeted industries being served by each are key differentiating factors.

mySAP Supply Chain Management

SAP gained its reputation as a provider of robust, full-featured ERP solutions for multi-national companies, and it has gained the same reputation in the SCM market. As part of its mySAP Business Suite, mySAP SCM segments its functions into categories of planning, execution, coordination, and collaboration. It also provides a set of supplier relationship and execution capabilities, which combine to offer one of the most comprehensive solutions in the market.

The mySAP SCM offering, based on the company's NetWeaver platform, enables adaptive supply chain networks by providing planning and execution capabilities to manage enterprise operations, as well as visibility, collaboration, and RFID technology.

The planning component starts at the strategic network design phase by modeling complex manufacturing environments and optimizing network design based on cost. Demand Planning supports collaboration among supply chain participants to arrive at a consensus-based demand schedule. Supply Planning plans optimal material through the supply chain after synchronizing demand with other constraints including sourcing, production, and distribution functions. Manufacturing Planning enables creating production plans across various production locations, including those of subcontractors. A Transportation Planning function helps choose appropriate carriers and optimizes loads for those carriers. The execution capabilities are as strong as the planning functions and accommodate the strategic and tactical functions for procurement, order management, and warehouse and transportation management.

To complement its SCM applications, SAP also offers good collaborative capabilities via its Enterprise Portal, which is a component of its technological infrastructure. The portal functions as an access point that aggregates data from supply chain participants and distributes it based on pre-defined roles. The portal also accommodates access via mobile devices.

The latest release of mySAP SCM added new industry-specific functionality, enhanced demand-driven fulfillment networks, and the ability to link service and product supply chains. The latest release includes new forecasting and replenishment for retail operations, new project-management capabilities in SAP Advanced Planning and Optimization, and new supply network collaboration capabilities that support Kanban and distributed manufacturing.

Oracle Supply Chain Management

Like SAP, Oracle has a long-standing tradition as a leader in the ERP market with strong manufacturing, financial, and human resources applications. Also, like SAP, Oracle has invested heavily in its applications suite and its infrastructure. It has complemented its ERP portfolio with a solid supply chain management suite that satisfies planning and execution capabilities, as well as a good CRM portfolio and a strong vertical market focus that targets the transportation, communications, consumer packaged goods, high tech, manufacturing, and government markets. Two of Oracle’s most compelling advantages are its large ERP installed base, into which it can sell its SCM solutions, and its major position in the database management market, which gives it the opportunity to optimize its applications for its Oracle 10*g* database.

With its acquisition of PeopleSoft, as well as smaller acquisition such as retails software company Retek, Oracle is consolidating a variety of application markets, including SCM. The PeopleSoft acquisition in particular has given Oracle a respected SCM solution. The company currently offers four SCM suites, which are outline in Table 2 below.

Table 2. *Oracle SCM Suites*

Product	Targeted Industries	Organization Size	Products
Oracle E-Business Suite SCM	Aerospace/Defense; Automotive; Chemicals; Consumer Products; High Technology, Industrial Manufacturing; and Life Sciences.	Large- to Mid-sized enterprises.	Advanced Procurement; Logistics; Maintenance; Manufacturing; Order Management; Product Lifecycle Management; Supply Chain Execution; and Transportation Management.
PeopleSoft Enterprise SCM	Automotive; Chemicals; Consumer Products; Downstream Oil and Gas; Industrial Manufacturing; Life Sciences; Natural Resources; and Public Sector.	Large- to Mid-sized Enterprises.	Activity-Based Management; Billing; Demand Planning; eBill Payment; Engineering; Flow Production; Inventory; Inventory Policy Planning; Manufacturing; Order Management; Performance Management Warehouse; Product Configurator; and Supply Chain Warehouse.
JD Edwards EnterpriseOne SCM	Automotive; Chemicals; Consumer Products; Downstream Oil and Gas; Industrial Manufacturing; Life Sciences; Natural Resources; and Public Sector.	Mid-Sized to Small Businesses.	Customer Order Management; Logistics; Manufacturing; and Supply Chain Planning.
Oracle Retail	Retail.	Large- to Mid-Sized Enterprises.	Oracle Retail Advanced Inventory Planning; Oracle Retail Supply Chain Optimization; Oracle Retail Value Chain Collaboration; and Oracle Retail Warehouse Management System.

The company's SCM solutions are part of its Project Fusion, in which the company will meld the best features of each solution into one comprehensive system. Fusion will support a user's ability to upgrade to the integrated product, whichever platform they had been previously using. Combined with its own E-Business Suite SCM and the PeopleSoft SCM assets, Oracle has enhanced its already lofty status in the SCM space.

Although not a major limitation, in that Oracle's database is widely used, Oracle's entire application suite requires a runtime version of the Oracle RDMS. While this is a strength for any enterprise that has standardized on Oracle, because the Oracle SCM applications are optimized to run on its own data base, many prospective customers may find this all-or-nothing approach too restrictive. The company has also pledged to support rival databases, an offering to the customers it has gained via acquisition over the past year.

i2 Technologies i2

i2 Technologies is one of the top pure-play vendors in the SCM space. While the company has faced its share of problems over the past few years, such as legal troubles, falling revenues, and a US Security and Exchange Commission investigation, the company has continued to maintain a sharp image among its customers and the market as a top player in the space. However, since i2 is one of the few vendors left who SCM solutions as the core offering, larger vendors such as SAP and Oracle have been able to sell their evolving SCM solutions into their large installed bases of back-end solutions. The company's SCM suite include products that are designed to meet customers' business needs around five optimizations, which are:

- Revenue and Profit Optimization.
- Spend Optimization.
- Production Optimization.
- Fulfillment Optimization.
- Logistics Optimization.

The company's suite include products in Supplier Relationship Management, Supply Chain Management, Demand Chain Management, Service Parts Management, and Transportation. These applications accommodate good collaboration among all tiers of the supply chain in the planning and execution processes spanning the design, source, buy, make, and fulfill processes. The i2 multi-tier collaboration product is still relatively immature, however, and consequently has not achieved widespread adoption. i2 is one of the few SCM vendors that offers a strong content management function designed to facilitate the sourcing, buying, and selling of MRO-type products and services.

i2's Internet architecture and the suite provide enterprises with a strong infrastructure for e-commerce marketplace construction. This infrastructure supports i2 applications, third-party and legacy applications, and best-of-breed components to a wide range of applications. The i2 platform provides good standards support, complying with Java 2 Enterprise Edition (J2EE), the J2EE Connector Architecture, XML, RosettaNet, EDI, and the standards from the OAG (Open Applications Group). The support for these standards enables strong inter-application integration and the management of collaboration among business partners. An application integrator tool comes pre-loaded with the software to facilitates integration to i2 APIs that support links to i2 and non-i2 applications. In addition, i2's support for the Java Authentication and Authorization Services enables a single sign-on capability. The i2 Network Services offering is a hosted subscription service that extends the i2 software to public and private trading exchanges, enabling collaboration among supply chain participants via the Internet.

The company has a strong vertical market focus designed to satisfy industry-specific supply chain requirements. Its areas of concentration include high-tech, such as the semiconductor and electronics industries; aerospace

and defense; automotive; pharmaceuticals; consumer packaged goods; retail; and telecommunications. As part of its SCM upgrade, i2 added a variety of new and enhanced capabilities to its industry-specific templates to streamline processing and to accommodate better performance measurement. These enhancements included pre-packaged role-based workflow processes and stronger integration capabilities.

i2 continues its tradition of offering strong capabilities in the supply and demand planning and optimization areas. The introduction of supplier relationship management functions has strengthened its ability to help organizations strategically and tactically manage their procurement and sourcing functions. And the availability of Transportation and Distribution applications offer good supply chain execution capabilities. i2 still lacks the ability to compete aggressively against the strong ERP players, however, due to its lack of a back-office suite. It also has not yet developed an integrated approach for real-time event management across its product suite, and has no native business intelligence tools to evaluate performance along the supply chain.

Recommendation

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The integration of Oracle's and SAP's supply chain management solutions with their respective ERP offerings make them superior choices to i2's software for many enterprise environments. This differential widens when factoring in the relative corporate stability of Oracle and SAP, contrasted with i2's recent difficulties. Supply chain solutions need to integrated tightly and smoothly with ERP systems to be fully successful; arguably, they will not even be functional without such integration. Organizations should therefore evaluate supply chain management solutions and ERP systems together, planning on establishing ERP functionality as the first major phase in the implementation and supply chain management as the next phase.

An organization that currently has a serviceable ERP system should prefer a supply chain management solution from that same developer. Before choosing a solution, it is important to define the scope of the project. An organization may elect to automate only portions of its supply chain, or only certain functions within the entire process. An overly broad project may be too large to succeed. Most supply chain management companies, Oracle and SAP included, offer individual products for particular functions, such as demand planning. If a limited-purpose tool such as this will meet an organizations needs, a solution like this will offer better return on investment because it will not be as burdensome to implement and will be used to greater effect.

Prospective users should ensure that any supply chain management solution supports intra-enterprise and inter-enterprise collaboration among all supply chain participants. This not only guarantees visibility across the entire supply, but also enables a finer granularity of planning because input from a variety of sources can be factored into planning algorithms. Process integration is another factor that is becoming increasingly important. This type of integration ensures that cross-functional and inter-enterprise processes can be executed seamlessly and securely, while ensuring that all business rules are adhered to and appropriate business partners are part of the process.

Users should also evaluate the degree to which business performance measurement tools are integrated across the entire product suite, and determine whether they have the capability to link to legacy and third-party applications to ensure that all appropriate data is part of the analysis. Many SCM vendors are also offering balanced scorecards and pre-integrating business analytics applications with key performance indicators to support the strategic and operational measurement of supply chain activities. Finally, users should carefully review the vertical industry focus of vendors to ensure that if industry-specific processes and measurements are

necessary, the vendor supports them.

About the Author

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