



E-supply chain management: an evaluation of current web initiatives

E-supply chain
management

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Abstract

Purpose – To provide an overview of E-supply chain management (E-SCM) initiatives, focusing on the evolution and technological drivers of moving to the web. This paper also provides a framework and analysis of current efforts in the automotive, financial services, retail, technology, and transportation sectors.

Design/methodology/approach – The paper uses a qualitative experimental design, case-study approach. Companies are compared across a variety of factors affecting E-SCM.

Findings – There is little evidence to support that the size of a firm's revenues correlate to the effectiveness of their E-SCM efforts.

Research limitations/implications – The research uses a limited number of companies. Additionally, the web sites were evaluated only to the extent which they were made publicly available.

Practical implications – An overview and discussion of E-SCM is presented. This paper also analyzes selected companies' current web initiatives in the automotive, financial services, retail, technology, and transportation sectors.

Originality/value – This paper uses an original framework to analyze E-SCM initiatives. Its conclusions would be of interest to individuals with a practical and research interest in E-SCM.

Keywords Supply chain management, Electronic commerce, Internet

Paper type Research paper

As technology has advanced, E-supply chain management (E-SCM) has become an increasingly important topic to businesses. With the emergence of the global economy, today's business environment is more competitive than in the past. Relationships throughout the supply chain are integral to a successful organization. Improved communications among trading partners can result in quicker diagnosis, feedback and solutions to inventory and customer service problems. Yet, there are still many difficulties faced by companies trying to effectively manage their supply chains. Perhaps the most critical issue in the evolution of supply chain management is the traditional mistrust and competition found throughout the supply chain.

Businesses today are faced with an increasingly price sensitive market due to the amount of product information available to the consumer. Improved technologies allow consumers to find numerous suppliers that can provide the desired wares. As a result the marketplace has become increasingly competitive. Companies are using telecom and internet technologies to reach out to their customers and provide a point of contact 24 hours a day, 7 days a week.



At the same time, the knowledgeable consumer is much more demanding. If a customer is not happy with a firm's performance, it has become easy to find a company that will provide the desired service levels. The web has made shopping alternatives easier than ever before. Businesses are faced with a consumer that is harder to please and requires more effort in keeping.

Furthermore, there has been great development in the areas of process improvement and quality levels. Yet, one dimension of these systems that can lead to tremendous increases in service is the amount of time needed before constructive feedback is received by the necessary personnel. The internet has become a convenient and effective means to communicate in, or very near, real-time.

For these reasons, E-SCM has received increased examination. The internet provides a real-time platform for information and feedback to be exchanged. The network avails itself to all with a connection, with minimal compatibility efforts.

The following paper will first provide a definition of E-SCM, continuing with the history and evolution of the practice. The benefits of E-SCM, as well as concerns with its implementation, will also be discussed. Next, the paper will focus on an evaluation of company initiatives through an evaluation of firm web sites. The methodology for the evaluation as well as an analysis of the findings will conclude the paper.

Definition

Table I illustrates a number of common definitions for E-SCM. It is apparent that supply chain management involves a firm's suppliers and customers, as well as the processes used to transfer a product or service from an order in inventory to delivery. An E-SCM must also integrate technology, especially the internet, in an effort to speed communication and information flow throughout the supply chain. The internet has allowed collaboration among supply chain partners to become automated, providing access to real-time information and fostering a communication-based network for businesses to operate throughout its supply chain.

E-SCM is also an attempt by companies to increase the efficiency of their supplier relations. With an emphasis on automated communication, E-SCM limits the amount of

Author	Definition
Hausman	The extended supply chain's activities in meeting end-customer requirements, including product availability, on-time delivery, and all the necessary inventory and capacity in the supply chain to deliver that performance in a responsive manner
Kulkarni	A network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers
Lee, Whang	The planning and execution of the front- and back-end operations in a supply chain using the internet
Narasimhan, Kim	The control of material and information flows, the structural and infrastructural processes relating to the transformation of the materials into value added products, and the delivery of the finished products through appropriate channels to customers and markets so as to maximize customer value and satisfaction

Table I.
Definitions of E-SCM

paperwork, filing, and record keeping needed. The system also allows for firms to implement JIT or similar inventory systems, furthering the operational efficiency.

E-SCM should not be confused with customer relationship management (CRM). While customers do make up part of the supply chain, E-SCM looks at the relationship between a firm and its customers in the context of value added procedures or services. CRM more closely examines the mining of the customer base for more productive and efficient results.

History and current status

Early efforts of supply chain management concentrated on the firm's internal processes and extended to supply chain partners that were most immediately affected by the firm's products and services. Accurate inventory management and delivery of product to consumers are examples of early supply chain management. Many of the early systems simply consisted of record keeping, with managers performing manual calculations. Technology provided a boost to supply chain management by automating calculations and providing efficient means of data storage. Likewise, as the adoption of computers increased, applications like MRP systems became available to assist the firm in accomplishing efficient operations.

Supply chain management evolved to include more suppliers, extending the reach of the supply chain. No longer were firms only interested in their own processes but also the quality of the materials in use, the on-time delivery of those materials, and customer follow-up. Suppliers became partners, as firms no longer made purchasing decisions solely on price, but rather searched for reliable, cost-efficient, high quality and longer-term relationships.

The evolution of the internet allowed information to be readily accessed. Firms began using networks to communicate order, inventory, and delivery schedules (Humphreys *et al.*, 2001). Many large firms required suppliers to participate in their supply chain programs in order to do business. The focus became finding business partners rather than solely doing a limited amount of business for short periods. Private networks, with cooperating firms utilizing like applications, were implemented. These networks were used to exchange logistic and inventory information, while also sharing relevant quality statistics (Anonymous, 2001). At this point, there still was not a focus on end-to-end supply chain management; the focus instead was simply looking at common interactions between partners.

Firms soon began to realize the possibilities of integrated management, using software and applications like ERP systems (Kulkarni, 2001). The systems integrated all of the previous systems, including sections for inventory control, customer relations, and financial bookkeeping. Data was entered in a consistent manner and middleware provided linkage, removing the islands of automation that plagued information systems of the past. Companies were able to provide faster answers to questions posed by supply chain partners. Information was more readily available and easily dispersed throughout the organization (Lee and Whang, 2001). In essence, firms no longer had to pose questions; they now had access to the answers and could make proactive decisions.

Industry specific web sites began to spring up, offering information on products and trading partners. Some internet exchanges even began offering linkages between supply chain partners. These sites offered price quotes, product specifications, and job

bids online (Anderson and Lee, 2001). In these cases, the supply chain became more community based, moving away from the internal looking supply chain management practices of the early days.

Many believe the future of supply chain management to be entirely virtual markets, with complete integration of ideas, information, and desires throughout the supply chain (Narasimhan, 2001). Customers become the sole designer of products and services and pull those products from the initial stages to final delivery.

Technological drivers

For many decades, intermediaries within a supply chain have used electronic data interchange (EDI). EDI allows for data to be electronically sent between different firms and different applications. The traditional architecture of EDI most typically required using a value-added network (VAN). The VAN provided the network and translation services necessary to EDI, converting the data from one system to another. This service was costly, and traditional EDI was cost-prohibitive for small and medium sized firms. Today, however, the public internet is replacing the costly VAN providers. Two technologies are driving this change: extensible markup language (XML) and virtual private networks (VPN) (Wang and Zhang, 2005).

XML is a markup language used to design web pages. Unlike hypertext markup language, XML is able to use tags that communicate specific meaning. This feature allows for data to be displayed in a variety of formats as well as being sent in real-time across the internet. Much like the VAN translation service in the past, XML allows for intermediaries to send data to and from different applications.

Perhaps the largest question of using the public internet to communicate confidential data is that of security. Traditionally, using a VAN meant leasing a secure, point-to-point network. The tradeoff, as mentioned above, was cost. VPNs use the public internet to send data, but create a secure connection using authentication methods in combination with encryption. When used in conjunction with XML, VPNs allow for data to be securely sent between different applications.

Benefits of E-SCM

There are many benefits associated with E-SCM, most centering on the speed and ability to communicate, the decreased costs of communication and carrying inventory, and customer service. Speed and ability to communicate can be seen throughout the supply chain. Firms keep track of their existing and needed inventory levels. E-SCM allows the supply chain partners to communicate those levels in real-time to increase their service levels (Lee and Whang, 2001). An example can be found by looking at Wal-Mart and Procter&Gamble. P&G is able to monitor the inventory levels of its products at Wal-Mart distribution centers. Doing so assures that a Wal-Mart store will never run out of a P&G product. At the very least, the system provides early warning signs when that product is running low (Koch, 2002). Also, P&G can now schedule their operations using Wal-Mart's inventory levels, providing more efficient operations and leaner inventory storage. The collaboration present with electronic supply chain management can go a long way in minimizing the "bullwhip" effect, the distortion of demand forecasts along a supply chain resulting from inaccurate or inadequate information (Grossman, 2004; Swaminathan and Sridhar, 2003).

A large benefit of E-SCM is the long-term relationships that are built along the supply chain. As firms open themselves, and their information, up to each other they are forced to align their own strategies and goals. By doing so, supply chains become committed to the end consumer. This long-term relationship also moves to stabilize processes, as firms can focus on their own individual core competencies, while outsourcing their remaining needs (Tapscott, 2001).

E-SCM decreases costs as well. By sharing information throughout the supply chain, a pull-based demand inventory system is created. Simply put, a customer places an order, which pulls the demand throughout the supply chain. Reduced inventory calls for lower warehousing and facility costs. The system also creates electronic triggers in the supply chain workflow, creating more reliable and efficient operations (Anonymous, 2000).

E-SCM also improves customer relationships by assisting the ability to anticipate, track, and respond to customer demand and reactions. E-SCM eliminates stock outs, encourages customer driven demand, and efficiency and tracking of delivery (Hausman, 2000). By being better able to serve customers, E-SCM has become an increasingly important way to retain sales.

Drawbacks of E-SCM

There are several issues to consider when implementing E-SCM. First, a firm must be committed to using the system, foregoing past methods of conducting business, such as phone, fax, and written record, and instead relying on the automated supply chain system. This applies to the firm's processes as well. Before implementing the e-system, the company must examine its methods of business and be sure that they are in alignment with the information system. Suppliers, too, must be convinced that E-SCM is right for them, and that the benefits will reach their organizations (Pender, 2001). Organizations that are serious in utilizing E-SCM must be sure to convey the benefits of the technology to all parties involved. The benefits can only be accrued through the accuracy of the data entered into and the consistent usage of the system. Without a true commitment from those involved there is little chance for success.

Another consideration is the true freedom of information throughout the supply chain. Using the Wal-Mart example again, P&G must have the point-of-sale information from Wal-Mart. In addition, P&G's suppliers require demand information to operate efficiently. In this case, the point-of-sale information from Wal-Mart reverberates down throughout the supply chain. By doing so, the supply chain can efficiently produce and distribute inventory. Yet, many companies show little trust in sharing actual data with other companies (Scalet, 2001). Some organizations guard company information for fear that it will end up in a competitor's hands. While such ideas have been found to harm efficiency, they are still common operating practices in many firms. There is comfort in relying upon oneself. By not opening up to the supply chain, firms do not take a chance of exposing a core competency to the marketplace. For a firm who derives a competitive advantage through its supply chain strategy, sharing its processes may even lead to the loss of that advantage. For many, threats of vertical integration or disintermediation are very real. By maintaining total control of their internal processes, a firm can decrease these outside competitive risks. However, the tradeoff is a less than optimally efficient supply chain network.

There are practical reasons why firms may be reluctant to embrace the benefits of E-SCM. Many of these benefits are unevenly balanced across the supply chain. Large OEMs directly receive many of the benefits while smaller suppliers are given additional costs and responsibilities (Subramani, 2004). While the OEM can decrease its inventory, the suppliers must offer additional and smaller shipments. The supplier is burdened with additional functions and the cost that goes along with those responsibilities. Smaller suppliers must hope that their willingness to partner with the larger firms will result in locking in that customer for future relations (Subramani, 2004).

Another drawback to electronic supply chain management can be the over reliance on speed instead of agility (Lee, 2004). Many have found that their supply chain strategies do not work when forced to respond to unexpected events. As inventory levels are minimized, there is less safety stock to handle emergencies. This emergency can come in many forms; a delayed shipment, a broken down truck, a jump in demand, a natural disaster. Unable to adapt to change, these supply chain systems are inaccurate and put their firm at a disadvantage. While speed of information exchange is a great help when making supply chain decisions, the ability to respond to the unexpected provides a larger advantage, especially in industries where supply and demand change rapidly.

It must be added that another factor in the slow adoption of long-term supply chain relationships is that by partnering with other companies, firms must share their own internal information. They must share that information not only with their trading partners but also within their own organization. This requires the traditional silos and focus on functional areas to be revamped. The organizational structure must change to one that makes it easier to share information internally among functions, departments, and processes (Grossman, 2004). Supply chain strategy is no longer a single focus discipline, meant for one department, but a cross-functional decision-making process. It is a means to compete in the marketplace and thus a factor in corporate strategy (Swaminathan and Sridhar, 2003).

Finally, by partnering in long-term relationships, firms may very well see their products and services become common across their industry. If a firm no longer has sole control over its operations, and instead partners with others, its processes become easily copied. Competitors can also partner with like companies, creating products and services that are much harder to differentiate on features. The end result is an industry that focuses on price differences between its products (Porter, 2001).

Web site evaluation

Research objectives

The following section details the evaluation of the public web sites for a variety of companies and industries. The evaluation is intended to show the usage of public web sites for supply chain management with respect to large and midsize companies. Analyzing these current web site initiatives will provide a look at where supply chain companies are currently focusing their attention. The companies selected were chosen to provide a sampling of specific industries rather than a comprehensive guide to every company within an industry. All of the companies selected play both of the traditional supply chain roles, supplier and customer.

Research model

The web sites were critiqued in the following areas (Table II):

- (1) *Company type*. Overall size, in revenue, of the firm.
 - L – Sales greater than \$10 million.
 - M – Sales between \$5 and \$10 million.
 - S – Sales less than \$5 million.
- (2) *Orientation*. An X indicates that the firm's web site meets the following orientations.
 - I – Information on products or services is readily available.
 - S – Service-oriented, with the ability for E-transactions.
 - PR – Public relations information.
 - A – Advertisements.
- (3) *Function*. Web sites are evaluated for functionality, looking at the following categories:
 - marketing and company information;
 - catalog or product information;
 - inventory information for supply chain partners;
 - logistics information for supply chain partners;
 - customer personalization; and
 - order tracking.

Each is evaluated on whether the information is publicly available or only available through a login/password.

 - X = publicly available.
 - PW = password login.
- (4) *Pages*. The number of pages found at the public web site:
 - L – 50 pages or more.
 - S – Less than 50 pages.
- (5) *Focus*. The overall focus of the web site:
 - C – Customer;
 - S – Supplier; and
 - B – Both.

The research model was chosen for a number of reasons. First, as already shown, the evolution of E-SCM is towards information systems that encompass the entire supply chain and not just individual components. Yet, the model attempts to judge how businesses and industries currently communicate within their supply chain in light of the popularity and accessibility of the internet. The anticipation was that most industries would still be using their web sites mainly for informational purposes, with transactional capabilities largely focused on the customer. It was believed that these web sites would be focused on the customer, while supplier relations would rely more

Table II.
Legend for web site
evaluations

Category	Abbreviation	Meaning
Company type	L	Sales > \$10 million
	M	Sales = \$5 – \$10 million
	S	Sales < \$5 million
Orientation	X	Web site has selected orientation
Function	X	Web site has selected function
	PW	Selected function only available through login
Pages	L	> = 50 pages
	S	< 50 pages
Focus	C	Customers
	S	Suppliers
	B	Both customers and suppliers

on point-to-point EDI connections or other traditional methods of connecting to trade partners. By looking at both large and midsize companies, it was hoped to find if there is any relationship between technological capabilities and the amount of incoming revenue.

Research assumptions

The research is conducted with a number of assumptions about current business practices. The first assumption is that in all of the industries selected, it is critical for firms to effectively communicate with both their customers and suppliers. Secondly, the research only looks into a limited amount of companies for each industry; therefore, any conclusions drawn from the research are valid for these companies only, and not entire industries. The research is designed to give an introduction into current web initiatives and not a comprehensive guide.

It must be noted that there are some flaws with the research model. First and foremost, the company web sites were only evaluated to the extent to which they were made publicly available. A number of the sites offered extended services that required passwords to view and to use. The authors concede that access to these areas would be necessary to fully evaluate the companies' E-SCM efforts. The other flaw in the research model is the small number of companies evaluated. The authors arbitrarily chose the companies in the research model. Increasing the number of companies selected and finding a truer sample base would help to greatly enhance the research model. The authors do intend to extend the research model at a later date.

Research summary

The following sections summarize the results of the research found in Tables IV-VII. Of particular interest was the finding that company size played a minimal role in the effectiveness of E-SCM web initiatives. There was little correlation found between the size of a firm's revenues and their implementation of an online supply chain management system. Also important was the critical nature of a firm's supply chain. While large firms would seem to have an advantage over smaller companies, the most critical factor was the importance placed on the initiatives. The results clearly show that smaller firms could effectively implement E-supply chain initiatives.

Automotive manufacturers (Table III)

The web sites for the companies representing automotive manufacturing were very consistent with each other. All provided a wealth of information on the company, their brands, and their products. As far as supply chain management, the web sites focused on two parties; end-users (customers) and distribution channels (dealerships). Customers were provided with the ability to view pricing options on specific models of cars. The web sites provide local dealership information and allow the customer to contact the dealership for price quotes. The automotive manufacturers also provided detailed information on specific dealerships' inventories. The web sites did not allow for e-commerce, the actual purchasing of vehicles online.

Automotive suppliers (Table III)

Automotive supplier web sites concentrated much more on the supply chain. In most cases, access to password protected supplier networks was available for registered parties. Many of these supplier networks allowed for the exchange of past problems and resolutions as well as scorecards on supplier performance. Some of the unique features found on a few of the web sites include the ability to bid on contracts and current production information. American Axle & Manufacturing's web site also included AAMat Home, which gave the ability to employees to access the company's intranet from remote locations. It should also be mentioned that a number of the supplier web sites provided links to, and encouraged use of, third-party sites such as Covisint and Freemarkets in order to better serve their suppliers and customers.

Technology-computers (technology 4)

Nearly, all of the web sites evaluated for computer companies were set-up for E-commerce. As such, these sites had plenty of content designed for the consumer, including product and pricing information. Most sites offered some degree of customization and personalization. For example, by logging in as a government employee the pricing and promotions would differ from a home office user. Many of the web sites also offered a wealth of information pertaining to the technology sector, including case studies, white papers, and company initiatives. Only a few of the companies surveyed offered supplier networks. Hewlett-Packard offers a program, Hard Deck, which allows the exchange of information for marketing, sales, and inventory levels. This program is primarily targeted for authorized dealers and sellers, providing detailed product histories of customers in local areas. Gateway offered an e-Marketplace, which provided a virtual exchange for buyers and sellers in the computer services industry. Members can login with a password and have access to a network of other members providing technology solutions.

Technology-dot-coms (Table IV)

The dot-coms are focused on E-commerce and providing personalized online shopping experiences for their customers. Their web sites reflect their customer focus. They offer a large amount of information and do an excellent job of collecting data on their customers and using that to provide custom storefronts when they return. These companies also offered excellent response time, if there is truth to their posted claims, and in many cases, this responsiveness is a reflection of their efficient supply chain. All of the web sites offered some form of personalization, accessed by setting up

Table III.
Automotive web site
evaluation

Segment	Company	CT	Orientation			M	C	Function			OT	Pages	Focus
			S	PR	AD			INF	S	PR			
<i>Automotive industry</i> Manufacturers	Daimler-Chrysler	L	X	X		X	X	X	X			L	C
	Ford Motors	L	X	X		X	X	X	X			L	C
	General Motors	L	X	X		X	X	X	X			L	C
	Honda	L	X	X		X	X	X	X			L	C
	Toyota	L	X	X		X	X	X	X			L	C
Suppliers	American Axle & Mfg	S	X	X		X		PW	PW			S	B
	Arvin Meritor	M	X	X		X		PW	PW			S	B
	Dana	L	X	X		X		PW	PW			L	B
	Delphi	L	X	X		X		PW	PW			L	B
	Goodyear	L	X	X		X	X	PW	PW			L	B
	Lear	L	X	X		X		PW	PW			L	B
	Tenneco	S	X	X		X		PW	PW			S	C
	Visteon	L	X	X		X		PW	PW			L	B

Notes: Company type (CT), Information (INF), Service (S), Advertisement (AD), Marketing (M), Catalog (C), Inventory (INV), Logistics (L), Customer personalization (CP), Order tracking (OT)

Segment	Company	Orientation					Function			OT	Pages	Focus		
		CT	INF	S	PR	AD	M	C	INV				L	CP
Technology industry Computers	Compaq	L	X	X	X	X	X	X				PW	L	C
	Dell	L	X	X	X	X	X	X				PW	L	C
	Gateway	M	X	X	X	X	X	X				X	L	C
	IBM	L	X	X	X	X	X	X				PW	L	C
	Hewlett-Packard	L	X	X	X	X	X	X				PW	L	B
	Microsoft	L	X	X	X	X	X	X					L	C
	Sun Microsystems	L	X	X	X	X	X	X				PW	L	C
	Amazon.com	S	X	X	X	X	X	X				PW	L	B
	eBay	S	X	X	X	X	X	X				PW	L	B
	Priceline.com	S	X	X	X	X	X	X				PW	L	C
Travelocity	S	X	X	X	X	X	X				PW	L	C	

Notes: Company type (CT), Information (INF), Service (S), Advertisement (AD), Marketing (M), Catalog (C), Inventory (INV), Logistics (L), Customer personalization (CP), Order tracking (OT)

Table IV.
Technology web site evaluation

an account and accessing it through the use of a login and password. Notable features were found at Amazon.com, which allowed their suppliers to set-up their virtual shelves, including checking and adding inventory.

Financial services-banking (Table V)

The banking companies evaluated offered services for individuals, small businesses, and large corporations. There were quite a variety of services offered. While all of the web sites offered some form of account, accessed by password, to access financial information, some sites offered quite a few more features than others. Wells Fargo differentiated itself by offering a spectrum of financial services, including an e-brokerage, to their customers. The bank also offered a business portal, from which their customers could keep track of their accounts receivables and access financial software to help with their decision making. Goldman, Sachs & Co. offered high volume E-trading through brokerages via the FIX, Financial Information Exchange, protocol. However, before this service could be used, an account had to be set-up over the phone or in person, with online connectivity instructions given at that time. The company also offered access to an extranet for its employees using a login and password. Bank One and National City offered the usual personal banking services and were highly diversified in the amount of options that they provided their customers.

Financial services-investment (Table V)

The financial services companies whose web sites were evaluated offered a spectrum of services. Some concentrated on discount trading while others offered a variety of financial services to private investors and employers. Every site touted its secure data transfer, and all offered customer accounts. The discount brokerages, Ameritrade and Etrade, concentrated on only providing a service to individual investors. Their web sites touted the speed of their transactions – Ameritrade makes a 10 second guarantee – and stock information. Principal's web site offered the greatest potential for supply chain management by offering a password-protected network for its suppliers. Among the features provided included e-procurement and supplier registration.

Retail-general merchandise (Table VI)

Many of the general merchandise web sites offered tremendous E-commerce ability but very little in the realm of services for their suppliers. Every site offered customers with the ability to buy online, although there were some differences. Wal-Mart offers online customers the normal range of retail items and also an online pharmacy, order tracking, vacation packages, and even an internet service provider. Meijer on the other hand, offered a minimal range of products for E-commerce. The store did provide an online pharmacy and gift registry.

Retail-clothing (Table VI)

The clothing web sites were primarily customer driven. Most had some E-commerce capability. The more feature-rich offered order tracking to their customers. Much like the general retail category, there was very little provided for their suppliers. Aside from the types of clothing, there was very little differentiation among these clothing web sites.

Segment	Company	CT	Orientation				Function				Pages	Focus			
			INF	S	PR	AD	M	C	INV	L			CP	OT	
<i>Financial services industry</i>															
Banking	Bank One	L	X	X	X	X		X	X			PW		L	C
	Goldman Sachs	L	X	X	X	X		X	X			PW		S	C
Investment	National City	M	X	X	X	X		X	X			PW		L	C
	Wells Fargo	L	X	X	X	X		X	X			PW		L	C
	Ameritrade	S	X	X	X	X		X	X			PW		S	C
	Etrade	S	X	X	X	X		X	X			PW		S	C
	Fidelity Investments	M	X	X	X	X		X	X			PW		L	C
	Janus Group	M	X	X	X	X		X	X			PW		S	C
	Principle Financial	L	X	X	X	X		X	X			PW		L	B
Vanguard Group	M	X	X	X	X		X	X			PW		L	C	

Notes: Company type (CT), Information (INF), Service (S), Advertisement (AD), Marketing (M), Inventory (INV), Logistics (L), Customer personalization (CP), Order tracking (OT)

Table V.
Financial web site evaluation

Table VI.
Retail web site evaluation

Segment	Company	Orientation					Function				Pages	Focus		
		CT	INF	S	PR	AD	M	C	INV	L			CP	OT
Retail industry General Merchandise	Kmart	L	X	X	X	X	X	X				PW	L	C
	Meijer	L	X	X	X	X	X	X				PW	L	C
	Target	L	X	X	X	X	X	X				PW	L	C
	Walmart	L	X	X	X	X	X	X				PW	L	C
	Brooks Brothers	S	X	X	X	X	X	X				PW	S	C
Clothing	Gap	L	X	X	X	X	X	X				PW	L	C
	Jos A Banks	S	X	X	X	X	X	X				PW	S	C
	LL Bean	S	X	X	X	X	X	X				PW	S	C
	The Limited	M	X	X	X	X	X	X				PW	L	C
	Best Buy	L	X	X	X	X	X	X				PW	L	C
Electronics	Circuit City	L	X	X	X	X	X	X			X	PW	L	C
	Radio Shack	S	X	X	X	X	X	X				PW	L	C

Notes: Company type (CT), Information (INF), Service (S), Advertisement (AD), Marketing (M), Catalog (C), Inventory (INV), Logistics (L), Customer personalization (CP), Order tracking (OT)

Retail-electronics (Table VI)

The electronic company web site evaluated offered tremendous E-commerce ability. Product information, promotions, and order tracking were readily available. These sites were highly promotional offering their usual weekly coupon flyers as well as special online deals. Circuit City provided a unique feature with an express pickup option. The consumer can make the purchase from the web but pick up the item at a store. In order to do so reliably, Circuit City must exchange inventory and purchasing information with their stores. Radio Shack offered connections to its affiliates and partners including Compaq and Microsoft.

Transportation-air (Table VII)

The major airlines offered web sites highly focused on their customers. None of the sites surveyed held supplier information. The airlines did offer flight availability, flight and baggage tracking, and logistics information for travel agents. Airline web sites were consistent with each other, offering similar features and services.

Transportation-rail (Table VII)

The railroad companies examined offered extensive logistics and tracking services for their customers. The only railroad that offered web services for its suppliers was Union Pacific. The company offered web invoicing, routing information, and information on how to become a supplier.

Transportation-package delivery (Table VII)

The companies examined offered a number of options for their customers, e-commerce, order tracking, and logistics services. UPS offered a number of supply chain solutions for their business customers, including wireless solutions and web services. Western Union was primarily customer focused. However, the site did offer online payment options and information for its nationwide agents.

One interesting commonality between the case studies and the evaluation of company web sites is that there are industries that are currently more reliant upon and have a better fit with online supply chain management. Citibank's E-SCM efforts were not so much a total redesign of existing company procedures as much as they were simply fitting in new technology. The company has always believed in providing financial services to its customers; the internet simply provides the "hands-free" method by which to do so. Similarities can be found with the transportation companies surveyed. Their focus has always been on the logistics of moving packages or product from point A to point B. These companies are simply incorporating the new technology into current business beliefs.

Conclusion

Supply chain management has been growing in importance, from the early practice of concentrating on internal processes to the web-linking of supply chain partners. Firms have been pressed to increase their operational efficiencies to stay competitive. Companies have begun to see the value in effective supply chain relations. Benefits found resulting from E-SCM include lower inventory levels, quicker response to problems, higher quality levels, higher customer satisfaction, and more diverse product offerings. As internal processes have been improved, external relationships have been examined as the next area of business improvement.

Table VII.
Transportation web site
evaluation

Segment	Company	Orientation				Function			OT	Pages	Focus		
		CT	INF	S	PR	AD	M	C				INV	L
<i>Transportation industry</i>													
Air	American Airlines	L	I	S	PR	A	X	X	X	PW	PW	L	C
	Delta	L	I	S	PR	A	X	X	X	PW	PW	L	C
	Northwest	L	I	S	PR	A	X	X	X	PW	PW	L	C
Rail	Amtrak	S	I	S	PR	A	X	X	X	PW	PW	L	C
	CSX	M	I	S	PR	A	X	X	X	PW	PW	L	C
	Union Pacific	L	I	S	PR	A	X	X	X	PW	PW	L	B
Package Delivery	Federal Express	L	I	S	PR	A	X	X	X	PW	PW	L	C
	United Parcel Service	L	I	S	PR	A	X	X	X	PW	PW	L	C
	Western Union	S	I	S	PR	A	X	X	X	PW	PW	L	C

Notes: Company type (CT), Information (INF), Service (S), Advertisement (AD), Marketing (M), Catalog (C), Inventory (INV), Logistics (L), Customer personalization (CP), Order tracking (OT)

Company web sites are increasingly involving more supply chain issues. Yet, there are still obstacles for a successful implementation of the technology. While E-SCM has allowed for a greater exchange of information throughout the supply chain, it remains to be seen if all parties are willing to exchange that information. Also, as with any organization change or implementation, the success of any supply chain management initiative rests in how well the company sells the system to its employees and its suppliers.

Currently, there are wide arrays of E-SCM in practice. Many company web sites focus entirely on the customer providing product information, E-commerce options, and personalization. Other companies have adopted online networks focused on their suppliers, sharing inventories, supplier scorecards, and marketing strategies. As the economy becomes increasingly global, E-SCM will continue to take on a larger role. As companies focus on cost-effective operations and the freedom of information flow becomes commonplace, E-SCM will become a logical solution. Yet, the supply chain must also become more open with its information sharing, and supply chain partners will need to develop a greater degree of trust. Clearly, the benefits of a pull-based operation are there if companies are willing to collaborate. E-SCM allows for the entire supply chain to become a community, dedicated to efficient operations and customer service.

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