Maritime College
State University of New York

Department of Global Business and Transportation

An Introduction to the Supply Chain

Introduction

TMGT 8510 System Design and Control begins with an examination of the principles of system dynamics and then extends and applies these principles to the supply chain.

The supply chain model being used in the second portion of the course is SCOR (Supply Chain Operations Reference model[1]), a very specific and detail model of the supply chain.

It's of benefit to provide an introductory note to the supply chain that will serve as to bridge between the context in which supply chains operate and this model.

Definitions of Supply Chain

Provided here are a number of examples of the definition of supply chain. There seems to be no one dominate definition that everyone interprets the same way. The point of introducing several definitions is for you to recognize the similarities and differences. This recognition will, in turn, help you to understand more quickly and precisely the supply chains encountered outside the class.

Certificate in Supply Chain Management

The best place to start is with the program of study that gave rise to this course, the Certificate in Supply Chain Management, an elective component of the Masters of Science in International Transportation Management at SUNY Maritime College.

In the context of this course the supply chain comprises a number of channels.[2]

1. The Communications Channel enables information exchange and is the force that binds and integrates the intermingled channel processes together in complementary functions.
2. The Finance Channel enables the exchange of commercial and other value.
3. The Human Resources Channel instills the utility of human skill in recruiting, training, and maintaining an optimum workforce.
4. The Logistics Channel instills time and place utility in products and/or services as they are respectively moved or delivered through the full extension of the supply chain.
5. The Manufacturing Channel gives form to products and/or services.
6. The Marketing Channel instills the value of possession through transforming products and/or services.

Two comments here. First of all, it's not been made clear what these channels are intended to do. That is, what is the outcome? This presents no problem to you if you have prior knowledge of the supply chain.

Second, all channels are not the same "length." This is not evident unless you have some background in the field. If a diagram of the Howard model existed, it might look like this.

---

[1] Supply Chain Council, http://www.supply-chain.org/cs/root/home [May 29, 2008]

[2] Lawrence J. Howard, "Proposal from the Department of Global Business and Transportation to Establish a Professional Certification in Supply Chain Management by Creating a Field of Emphasis within the Master of Science Degree Program in International Transportation Management," 2007, unpublished work.

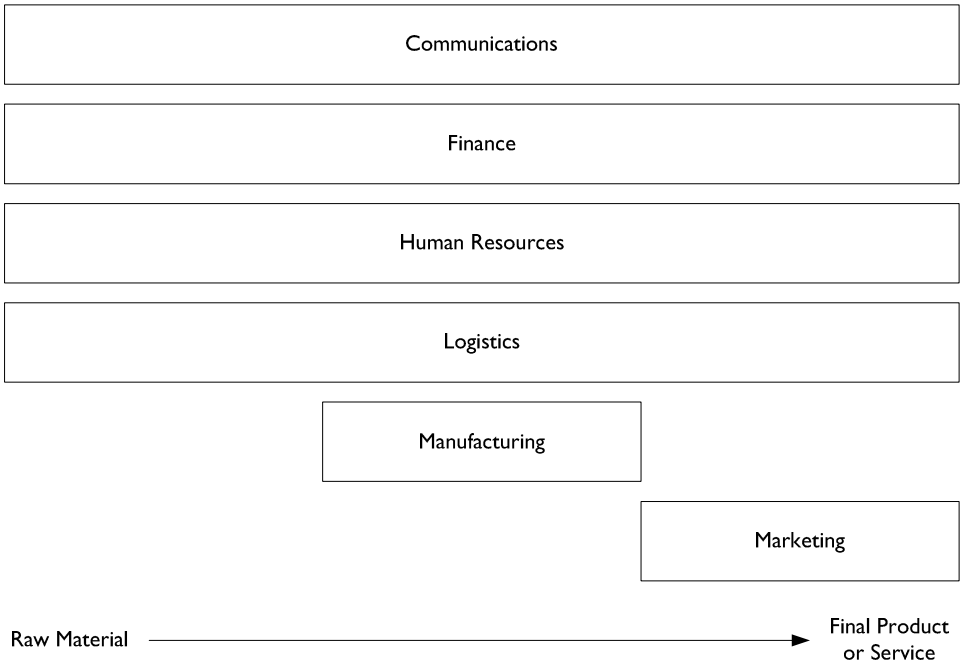

Figure 1 Howard Model

Howard presents a detailed description of the activities within these channels.

CSCMP

The CSCMP (Council of Supply Chain Management Professionals) provides a definition that is a bit more abstract than that of Howard's.

> "Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies."[3]

The idea here is that that value can be provided to a customer through the actions of parties that transform products and services in terms of time, place, form, and function. The delivery of gasoline from a refinery to a gasoline station, the aggregation of news from reporters and its publication and distribution in the form of a newspaper are examples of supply chains that come immediately to mind.

We are surrounding by and participate in supply chains every day, so much so that we take them for granted. We ought to be more aware as citizens and will clearly need to be more aware if supply chains represent valuable career opportunities.

Beginning with the CSCMP definition allows for a better understanding of what the Howard model is about.

[3] Council of Supply Chain Management Professionals, Definitions, http://cscmp.org/AboutCSCMP/Definitions/Definitions.asp [May 29, 2008]. Founded in 1963, the Council of Supply Chain Management Professionals (CSCMP) is the preeminent association for individuals involved in supply chain management. CSCMP provides educational, career development, and networking opportunities to its over 9,000 members and to the entire profession.

The Context of Interest

The Context of Interest[4] is the product of a number of years of experience in the supply chain field.

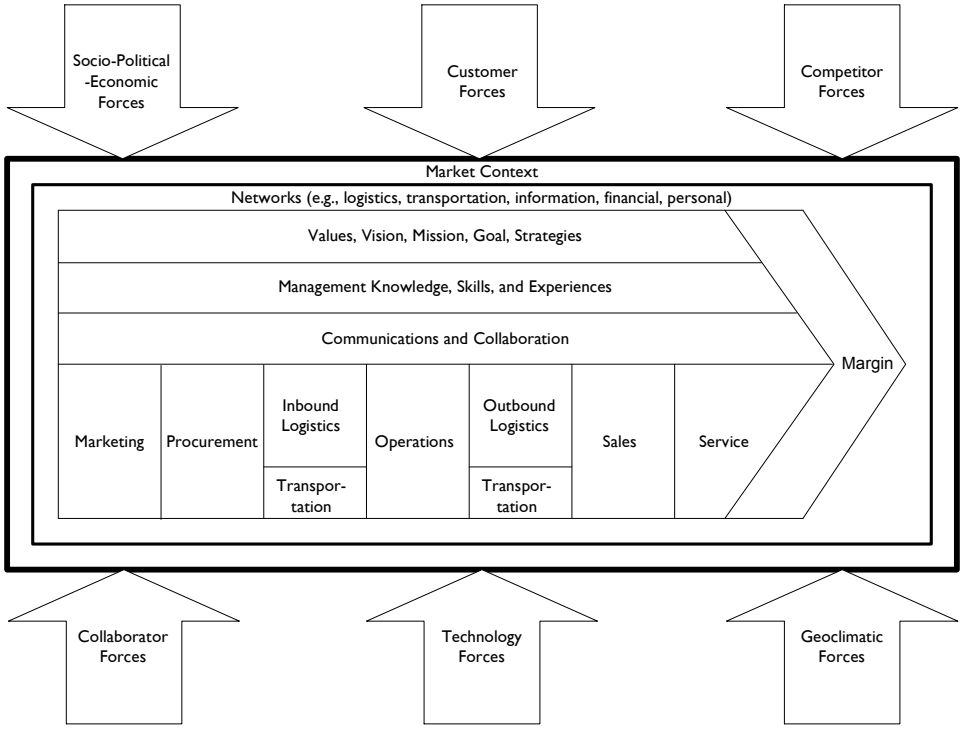

Figure 2 The Context of Interest

This definition is much less abstract than that provided by the CSCMP and is similar to, but a bit more inclusive, than that provided by Howard. Here, the supply chain comprises the meta-processes in the lower half of the arrow – marketing through service.

[4] James Drogan, A Note on Business Drivers, Business Configuration, and Information Technology Strategy, 2005, http://jmsdrgn.squarespace.com/storage/A%20Note%20on%20Business%20Drivers%20Business%20Configuration%20and%20Information%20Technology%20Strategy.pdf, [June 6, 2007]. You will find the Figure 2 The Context of Interest differs from that shown in this reference note. Experience has suggested refinements in the original diagram. The central structure is adapted from Michel E. Porter, Competitive Advantage: Creating and Sustaining Superior Performance (The Free Press, 1985) 0-02-925090-0. Porter calls this central structure the value chain.

Stock and Lambert

Stock and Lambert[5] provide a view of the supply chain that emphasizes its network characteristics.

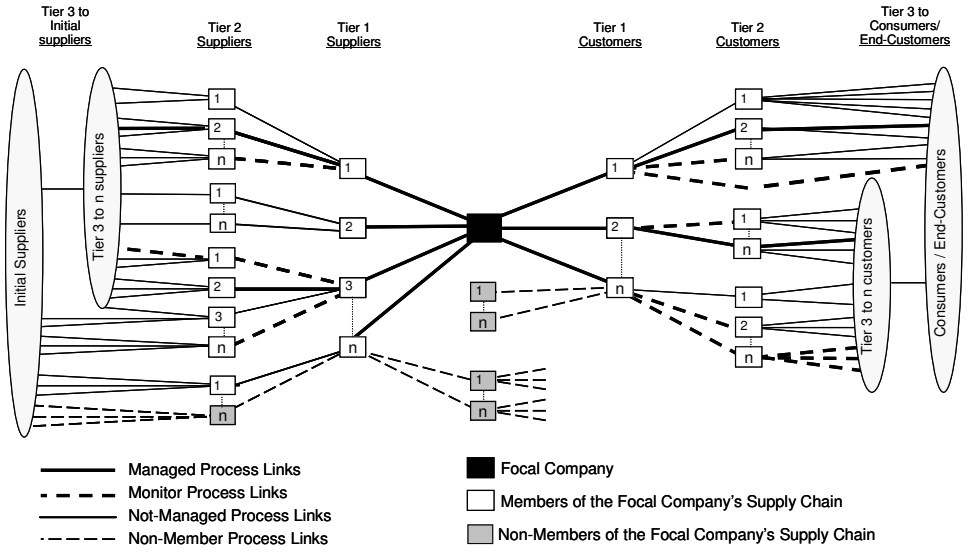

Figure 3 Stock and Lambert

Drogan mentions networks, but not with the degree of specificity shown by Stock and Lambert. It's the configuration of the supply chain network, and its capability and capacity to support the required flows (Howard's channels) that determine its value.

SCOR

The SCOR model[6] provides the basis for the second half of TMGT 8510 System Design and Control.

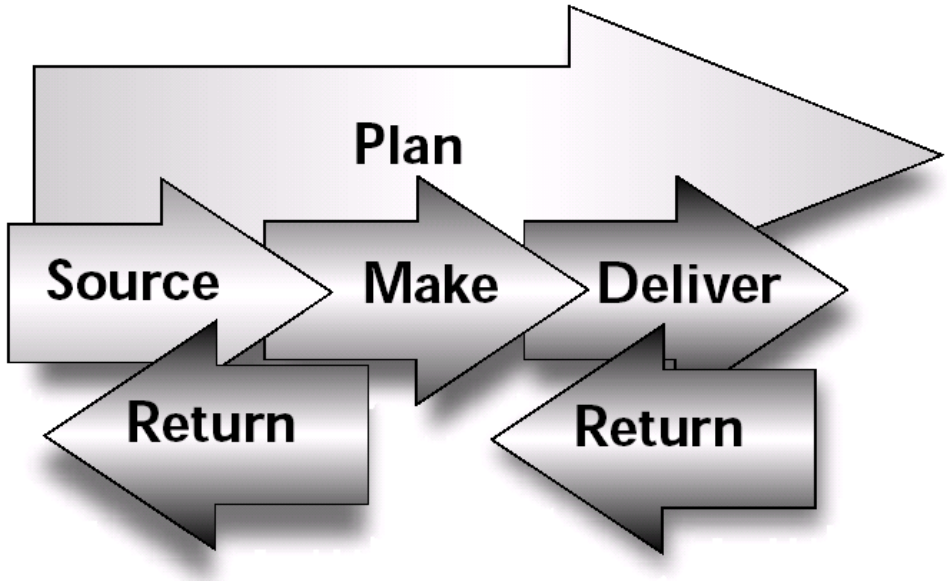

Figure 4 SCOR Model

---

[5] James R. Stock and Douglas M. Lambert, Strategic Logistics Management, Fourth ed. (McGraw-Hill, 2001) 0-256-13687-4

[6] SCOR 5.0 Overview Booklet, Supply-Chain Council, Inc., www.supply-chain.org

The SCOR model is less inclusive that Howard and Drogan, and much more detailed in its definition than any of the others presented herein.

> "The Supply-Chain Operations Reference-model (SCOR) is a process reference model that has been developed and endorsed by the Supply-Chain Council as the cross-industry standard diagnostic tool for supply-chain management. SCOR enables users to address, improve, and communicate supply-chain management practices within and between all interested parties.
>
> SCOR is a management tool. It is a process reference model for supply-chain management, spanning from the supplier's supplier to the customer's customer. The SCOR-model has been developed to describe the business activities associated with all phases of satisfying a customer's demand. By describing supply chains using process building blocks, the Model can be used to describe supply chains that are very simple or very complex using a common set of definitions. As a result, disparate industries can be linked to describe the depth and breadth of virtually any supply chain. The Model has been able to successfully describe and provide a basis for supply chain improvement for global projects as well as site-specific projects."[7]

The detail of this model and the fact that it was produced by a consortium of businesses involved in supply chain gives it great value for our purposes.

The Logistics Channel Stack

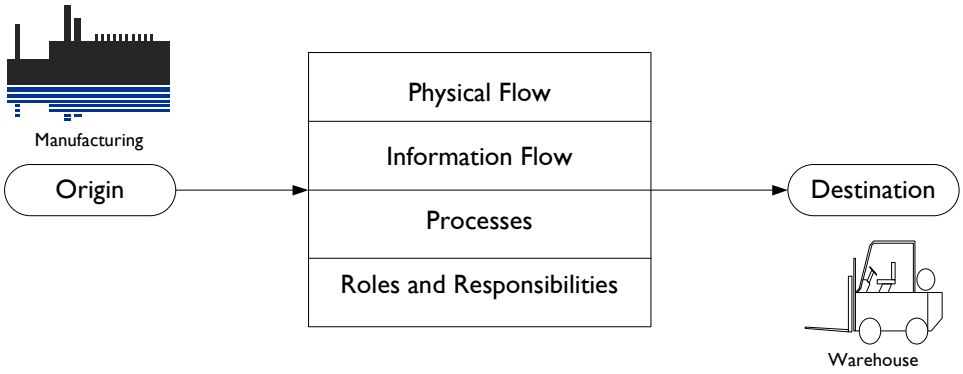

Figure 5 The Logistics Channel Stack

The Logistics Channel Stack emerges out of more than 20 years of working in the field. It has similarity to the Howard Model, although a bit more abstract. It also calls out roles and responsibilities of the parties involved. The contention has been that if you can describe in detail these six major themes then you probably have a good understanding of the logistics channel. This stack easily expands to the supply chain.

Why the Differences?

The definitions of supply chains often differ because of the different objectives and points of view held by the individuals promulgating the definitions. Objectives and points of view are shaped by experience, products and customers, industries, and marketplace characteristics.

My experience is that there is always something of value in a definition of a supply chain. At a minimum you learn what the person on the other side is thinking and how that thought is communicated. And, therefore, what you may need to do to have effective communications with the person. This is of particular importance if the other person is your customer.

One should be, in my view, of an open mind when looking at these definitions. What can you learn from these definitions that enhances the value you bring to understanding supply chains and their performance can be improved?

---

[7] Supply Chain Council, http://www.supply-chain.org/cs/root/scor_tools_resources/scor_model/scor_model [May 30, 2008]

Synthesis

If there is potential value to us in all these definitions, then we need some way to synthesize what we discover into a coherent tool and surround the tool with the skills and experience needed to wield it in a valuable manner.

We don't build tools, skills, and experience from nothing. There is something around which things begin to coalesce. In my case, it was railway freight transportation.

The railways in the US became deregulated in the fall of 1980.[8] Subsequent to that time my colleagues and I were exploring with the railroads what this new freedom meant. In 1985 I began to entertain the question, "If the railways become really good at railroading, what else can they do?" By "do" I meant do to earn money. This led me to the notion of logistics, a phrase that was beginning to become prominent in the world of business. Why? Well, the railroads were becoming pretty good at moving things around networks. Perhaps the skills that allowed them to be good at railroading would allow them to become good at moving other things around, outside of the railroad network.

In 1985 I attended the CLM (Council of Logistics Management; forerunner of CSCMP) in Dallas. The intent was to understand more about the logistics concept and practice, how this related to the railway business, and what opportunities existed for the railways in this field.

My learning of logistics was coalescing around my understanding of the railway business.

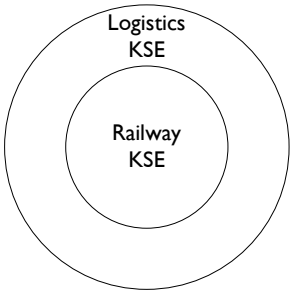

Figure 6 Railway and Logistics Knowledge, Skills, and Experience

I subsequently learned about supply chain, putting another payer of understanding on Figure 6.

Let me build from transportation to supply chain using Figure 2 on page 3 as a base.

First, there is transportation.

Figure 7 Transportation

We then add logistics.

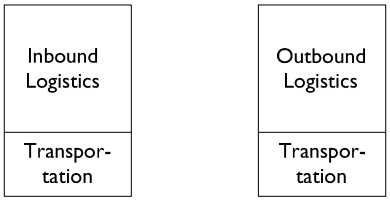

Figure 8 Transportation and Logistics

---

[8] Jean-Paul Rodrigue, Claude Comtois and Brian Slack, The Geography of Transport Systems (Routledge, 2006) 0-415-35441-2. See Chapter 9 for a brief summary of deregulation in the US railroads.

Finally, we add the remainder of the supply chain.

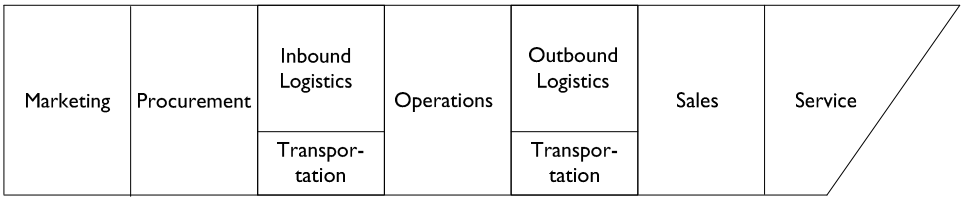

Figure 9 The Supply Chain

Figure 9 is my synthesis of my understanding of the supply chain. From this simple mental model I can ask any number of questions to understand a specific supply chain under considerations.

For example:

1. For each of the nine meta-processes shown in Figure 9, what does the process start with, end with, and include?
2. I could link this with Figure 5 on page 5 and ask question about the roles and responsibilities of the involved parties.

I'm not, by the way, suggesting that your models should be the same as my models, or that your approach to synthesis should be the same as mine. I am suggesting that you need to synthesize your learning about this subject into a coherent whole that may best realized as a set of tools (mental models) coupled with skills and experiences in their application.

Involved Parties

There has been implication throughout this note that a single company is likely not to encompass all the roles, responsibilities, and processes that comprise an end-to-end supply chain. Let me now deal with this matter, and its implications, in a more direct manner.

If we examine our personal lives we find that we have outsourced many of the tasks that our ancestors often did for themselves. Medical and dental care, automobile maintenance, growing and preparation of food, design and construction of housing are examples of this outsourcing.

Why do we do this? Because someone else is more competent and more cost effective is one reason. Another reason, of course, is simply that we don't wish to take the task up.

Organizations do much the same thing for much the same reason.

I would assert that the business system required to coordinate the activities of multiple independent parties such that the customer receives the right product at the right place, right time, right condition, and right price is substantially different than if a single company performs all the activities. This suggests to me that questions of shared agendas, coordination and control, take on a special interest when multiple parties are involved. And, in addition to command, communications, and control, we need to consider the importance of other skills such as negotiation, collaboration, and dispute resolution.[9]

See "From Many to One: Managing the Multi-Sourced Supply Chain" in the appendix for an article that sums well this notion of involved parties.

Summary

What do you need to remember?

---

[9] See James Drogan, Managing the Business, 2007, Paper, SUNY Maritime College, http://jmsdrgn.squarespace.com/storage/Managing%20the%20Business.pdf, [February 19, 2008] for further discussion of the issues associated with future business models.

1. Supply chains are about satisfying customers by delivering to their expectations at a price they are willing to pay and in such a way that the members of the supply chain will enjoy sustainable competitive advantage.
2. Value is provided to a customer through the actions of parties that transform products and services in terms of time, place, form, and function.
3. Supply chains are not understood unless there is a clear definition of what they begin with, include, and end with.
4. There is no single, accepted definition in the manner of, say, the First Law of Thermodynamics. Different definitions serve different purposes. Learn to be comfortable with and take advantage of these differences.
5. A clear definition of the issue to be addressed is critical to selecting the approach to looking at a supply chain.

James Drogan
May 31, 2008

Appendix

From Many to One: Managing the Multi-Sourced Supply Chain[10]

Robert J. Bowman, Global Logistics & Supply Chain Strategies | May 06, 2008

Even if a product is assembled in one place, its parts probably come from multiple locations. Here's how some companies are dealing with the complexities of truly global supply chains.

http://www.supplychainbrain.com/content/headline-news/single-article/

Here is one definition of outsourcing: a company shuts down its local factory, shifts production to China, makes the entire product there and ships it to the U.S. for sale.

If only it were that simple.

In reality, global supply chains consist of goods and components sourced from multiple locations. A product might indeed be made in China. But the parts that go into it are likely to come from half a dozen other countries. And that scenario poses massive challenges, as companies strive to synchronize the flow of parts into a central production site.

Apple's iPod is a prime example. The popular music player undergoes final assembly in China. But its hundreds of parts are said to come from China, Taiwan and the Philippines, among other countries. (Apple prefers to keep the details of its supply chain under wraps.) Portions of the newer iPhone reportedly are sourced from Singapore and even the U.S.

Automakers have been practicing this strategy for years, says Jane Barrett, a research director with AMR Research Inc. And they have gone far beyond the mere sourcing of individual parts from all over the world.

Toyota was among the pioneers of a system where suppliers in various countries make entire sub-assemblies for cars. The practice generates additional complexity, as original equipment manufacturers (OEMs) demand precise delivery of systems that must be merged into the assembly line within narrow windows of time. Because OEMs refuse to keep large inventories of parts on hand, suppliers must coordinate their shipments on a just-in-time basis. While they generally work from forecasts that span eight weeks, they might be required to respond to change orders within half a day, or even a matter of hours, says Barrett.

There's little room for error. At Toyota, "suppliers get told exactly which sequence [of parts] to put on the truck," she says. "It's extremely integrated."

A number of tools and management techniques are available to help coordinate a multi-sourced supply

---

[10] Robert J. Bowman, "From Many to One: Managing the Multi-Sourced Supply Chain," Global Logistics & Supply Chain Strategies (2008), vol. May 2008. Global Logistics & Supply Chain strategies (www.supplychainbrain.com) is an excellent source of information.

chain like Toyota's, including the kanban system of parts replenishment and Lean methods for eliminating waste from the organization. In addition, says Barrett, enlightened OEMs work with suppliers to create standardized platforms and components, so that a given part can go into multiple models from the same automaker.

That level of collaboration, which begins at the design stage, is still in its infancy, Barrett suggests. But it takes on growing importance as companies diversify their sourcing. According to AMR, some 70 percent of a product's cost is locked in during the early design phase. To control that expense, OEMs need to involve suppliers at an earlier point than the purchase of parts or finished items.

Barrett cites one builder of jet engines that selected 20 key suppliers before proceeding with design of a new product. Together they came up with a more fuel-efficient engine, which has found success in the marketplace. More companies should embrace this philosophy of "open innovation," she says.

From Small to Large

The concept of a widely distributed supply chain has gone from micro to macro. The latest convert is Boeing Co., whose 787 Dreamliner passenger jet is being assembled from sub-systems contributed by an army of suppliers from various countries. The task of coordinating all those vendors and their thousands of parts is a huge one. In fact, Boeing ran into supplier problems that pushed back flight testing and delivery of the new aircraft by many months. The company cited "ongoing challenges with out-of-sequence production work, including parts shortages, and remaining software and systems integration activities."

Exostar provided the software platform for collaboration between Boeing and its suppliers. Peter Scott, vice president of marketing and corporate development, dismisses the 787 delays as "growing pains." As companies globalize their supply chains and shift more responsibility to suppliers, he says, they go through an inevitable learning curve. Such "partner-based manufacturing models" involve the application of brand new technology and processes, which can lead to glitches along the way.

Scott says OEMs are beginning to understand the need for visibility that extends well beyond their Tier 1 suppliers, all the way back to the purchase of raw materials. That's especially vital for aerospace manufacturers, whose need for highly sophisticated parts often precludes the ability to draw on multiple suppliers for the same item. So when a major supplier goes down, the entire chain is likely to be disrupted.

Several OEMs use the Exostar platform to issue production forecasts to suppliers, receive commitments from those suppliers, then manage individual demand signals to orchestrate the shipping of parts from multiple locations. Scott says Exostar is working to tie logistics service providers (LSPs) into the platform as well, in order to track the physical flow of goods and optimize pickups within a given area. The technology allows for the constant trading of messages about the availability and status of orders, so the OEM knows exactly what it's getting and when.

Boeing has labored to incorporate design into its collaboration efforts with suppliers, Barrett says. All are required to utilize the same tools for computer-aided design (CAD) and management of a given product across its entire lifecycle. Increasingly, the development of new product involves a team of independent designers and engineers from several countries, constantly exchanging electronic messages and images to make up for the variation in time zones.

Role of Third Parties

LSPs have a big role to play in coordinating the links of a complex supply chain. Germany's Schenker AG works with suppliers from around the world to translate OEM forecasts into actual moves, says Rob Walpole, senior vice president of logistics and supply chain development.

Schenker is responsible for the timing of the shipments. It will take a manufacturer's forecast and examine inventory on hand next to the plant, as well as items in transit from suppliers. Then it translates that information into a "pull" signal at the supplier's location. The supplier who bears responsibility for holding

inventory, although Schenker manages the task of balancing stocking levels based on actual demand. “At the end of day,” Walpole says, “if there’s more inventory than necessary, it raises costs.”

The need for just-in-time delivery, coupled with the sequencing of parts into the assembly line, make the job especially challenging. Not every supplier can maintain a stocking location close to the OEM’s plant, although automakers such as Toyota ask many of them to do exactly that. Others have to factor in the vagaries of long-distance transit in order to assure the timely arrival of their components, some of them complex sub-assemblies, at the plant.

The trend toward outsourcing of large pieces of a plane or automobile has given birth to another partner in the supply chain, and yet another level of complexity. According to Walpole, many suppliers lack the skills to create such units, so another entity might stand between them and the OEMs. Its job is to bring together many parts into a system that is then shipped out to the plant for final assembly. Such partners also handle the job of supplier inspection and approval.

In such cases, says Walpole, Schenker can act as logistics coordinator for multiple legs of the journey, in addition to recommending the best provider of a sub-assembly service in a low-cost production environment such as China. The LSP can also perform relatively simple tasks related to the customization of generic product to meet individual market needs, such as the packaging of peripherals into kits, and the inclusion of product literature in the local language.

The electronics sector, with its heavy dependence on outsourced manufacturing, can benefit greatly from such services, Walpole suggests. The biggest difference between that industry and many others, he says, “is the nimbleness that’s required.”

Oakland, Calif.-based APL Logistics, a long-time presence in Asia, plays a variety of intermediary roles within supply chains that draw on multiple sources of product. On the consumer-electronics side, it might merge speakers and stereo units into a single product, says Tony Zasimovich, vice president of international services. Or it might consolidate shipments from many locations into a single container. The company runs merging centers in Kaohsiung, Taiwan and Singapore, where it accepts parts from major Asia production centers and ships them out to overseas buyers.

Providers like APL Logistics benefit from the increasing reliance of retailers and manufacturers on postponement programs. In what amounts to a vendor-managed inventory service, it will store product arriving from various locations, then wait for orders from distributors. In general, the customer has already taken title to the inventory. APL has also managed other VMI vendors, providing information on order status and shipping into Supplier Logistics Centers in the U.S. In those cases, Zasimovich says, the customer might not take possession of the goods until they are landed.

Information can take the place of physical goods when a supply chain is stretched around the globe. Zasimovich says companies generally want to know when a shipment has passed through various key points in its journey, including transfers between handlers. Using the APL Logistics visibility tool known as SeeChange, they can go online and receive 20-minute status updates which reference specific purchase orders or even SKUs. When something goes wrong, exception messages are conveyed through management dashboards which allow for quick remedial action.

The Holistic View

When it comes to streamlining multi-sourced supply chains, the biggest successes have been in mature industries such as high-tech and consumer electronics, says Alex Thompson, vice president of product management with San Mateo, Calif.-based TradeBeam, a vendor of global trade management software. Companies such as Apple and Dell Computer have achieved a holistic view of their networks, enabling them to deliver the right product to the right customer. In general, though, “most companies have not taken advantage of globalization opportunities that are out there.”

The main obstacles are organizational in nature, Thompson says. Many companies remain divided into

functional silos that operate within narrow areas of responsibility. As a result, they can't reap the benefits to be had from merging physical and financial supply chains on a global scale. Information generated by shipments can't easily be reused for data reconciliation, financial processes and other purposes. Throw in multi-country sourcing, and the disjointed supply chain becomes even more difficult to manage.

One TradeBeam customer that has achieved some success in this area is the French automaker Renault. The company set out to build the Logan, a low-cost car with a target price of 5,000 euros. The goal was to win market share in middle-income economies such as Egypt, but Renault couldn't reach it without streamlining the global import and export process. The company drew on TradeBeam's software to create a single, centralized database of global trade data. The tool allowed it to work more closely with local suppliers and joint ventures, as well as logistics partners.

At the same time, Renault could make better use of free-trade agreements for globalized product design and sourcing. The company ended up shipping parts to Romania, then complete knockdown kits to Morocco, where it performed light assembly. That last step qualified the cars for shipment to Egypt at a lower duty rate, Thompson says.

Industries with a longer track record in outsourcing tend to do better when it comes to diversifying the supply base. The semiconductor industry is well along the path, having moved to an outsourced, "fabless" manufacturing model some years ago, says Ashok Santhanam, president and chief executive officer of Bristlecone Inc. in Milpitas, Calif. Such companies will buy silicon wafers from Asia, then conduct assembly and testing in other parts of the world, often relying on contract manufacturers for a large part of the process.

One reason to deal with multiple suppliers is to play them off one another to obtain a lower price. But the real motivator is a need to create the most efficient and synchronized supply chains possible, Santhanam says. Different sources of parts and product might serve particular markets, based on capacity and access to logistics services. Local-content requirements within free-trade agreements can also drive decisions on sourcing.

Supply chain planning software allows a manufacturer to look at various constraints related to inventory, in order to balance the need for assured supply with the risk of obsolescence. The tool also determines how much a given supplier can contribute.

Meanwhile, on the factory floor, manufacturers must coordinate the inbound flow of parts with the ability of their machines to make certain types of product. One customer of Bristlecone, a printing plant, has to carefully plan production to allow for the time needed to clean equipment when it switches from one color to another, says Anil Gupta, vice president of marketing.

Companies attempting to build more complicated supplier bases are finding help from vendors of spend management software. Pat Furey, senior category manager for Sunnyvale, Calif.-based Ariba Inc., says his company can advise on the best place to site production and suppliers, based on considerations of logistics, cost and the competitive landscape. Category managers can track product price and availability in various locations. Ariba also takes into account the risks from sourcing in distant countries, or places where supply disruptions might be more likely. "We make sure our customers are sourcing in the right region," Furey says.

The tendency of manufacturers to outsource whole assemblies presents new challenges for certain sectors, Furey says. In adopting a process that is common in the computer industry, Boeing was treading on new ground. Some key suppliers weren't accustomed to assembly work and had to adjust their operations. The Boeing experiment, he says, "wasn't a bad idea. It's just going to take a while [to perfect]."

Multiple Supply Chains

A multi-sourced supply chain actually consists of several chains that must be modeled and managed in a coherent manner, says Bob Anson, senior director for total supply management with i2 Technologies in

Dallas. Step one is to perform high-level modeling of the entire network. “As companies have become more global,” he says, “they have not necessarily had a centralized approach to supply chain network definition.” Planning has tended to occur on a region-by-region basis.

Master planning has to take place across all supply chains in order to allow for efficient material flow to and from multiple regions. Only then can companies designate materials for the right region while making trade-offs that result in the best outcome from a global perspective. On the execution end, Web-based supplier portals can help to foster collaboration among an army of suppliers in various locations, not to mention better control by an OEM over its whole supplier base, Anson says.

The increase in supply lines and partners doesn’t mean that companies can relinquish control over their networks. According to Anson, some OEMs are negotiating price or capacity with Tier 2 suppliers, then acting as a broker of those parts for Tier 1 producers. In the high-tech sector, a company might purchase key semiconductor components for use in sub-assemblies. The trend can be seen in electronics as well, where companies such as Hewlett-Packard and Dell are buying up raw materials and allocating them to suppliers as needed. In the process, they get a better price or ensure access to key commodities.

In such cases, it becomes essential for the manufacturer to keep close tabs on purchased raw materials as they move toward final assembly. That’s the only way to ensure that suppliers are meeting their contractual obligations and not using the OEM’s dedicated commodities or parts for another customer. “Visibility mechanisms allow you to make sure that you can connect the dots,” says Exostar’s Scott.

Andrew Kinder, director of supply chain product marketing with Infor in Atlanta, sees no reversal of the trend toward outsourced supply chains. On the contrary, he learned in a recent survey of 100 supply chain directors in the United Kingdom, companies are still planning to outsource their operations and China remains the number-one target.

“Elongated” supply chains require the management of multiple items from multiple sources, Kinder says, even if China is the focus for most finished-goods production. But companies won’t accomplish that goal without a consolidated view of global customer demand. Only then can they plan their supply chains appropriately.

Each decision carries its own set of impacts related to cost, timing, service and product quality. Global network optimization tools can help companies make the proper trade-offs between capacity and inventory, based on good demand planning, Kinder says. Leaders in the field re-optimize their systems at least monthly. In the pharmaceutical industry, companies selling into Europe might adjust their sourcing patterns several times a year, based on the need to match supply with demand.

Kinder tells of one Infor client, a nautical engineering company, that relies on sole sourcing only when absolutely necessary, drawing on multiple suppliers for other types of product. The company is fully aware of the risks involved in each sourcing decision.

As complicated and risky as it might seem, the multi-source model offers advantages of cost and efficiency that will continue to entice companies with global supply chains. Santhanam suggests that many manufacturers are just beginning to understand the strategy’s value. “There’s a long way to go,” he says. “But it’s clear that the synchronization and inventory reduction mantra is on everyone’s lips.”

Resource Links:
AMR Research, www.amrresearch.com
APL Logistics, www.apllogistics.com
Ariba, www.ariba.com
Bristlecone, www.bcone.com
Exostar, www.exostar.com
i2 Technologies, www.i2.com
Infor, www.infor.com

Schenker, www.schenker.com
TradeBeam, www.tradebeam.com

Bibliography

Bowman, Robert J. "From Many to One: Managing the Multi-Sourced Supply Chain." Global Logistics & Supply Chain Strategies, 2008. 38-41. Vol. May 2008.

Drogan, James. Managing the Business. 2007. Paper. SUNY Maritime College. http://jmsdrgn.squarespace.com/storage/Managing%20the%20Business.pdf. [February 19, 2008]

---. A Note on Business Drivers, Business Configuration, and Information Technology Strategy. 2005. http://jmsdrgn.squarespace.com/storage/A%20Note%20on%20Business%20Drivers%20Business%20Configuration%20and%20Information%20Technology%20Strategy.pdf. [June 6, 2007]

Howard, Lawrence J. "Proposal from the Department of Global Business and Transportation to Establish a Professional Certification in Supply Chain Management by Creating a Field of Emphasis within the Master of Science Degree Program in International Transportation Management." Bronx NY: SUNY Maritime College, 2007.

Porter, Michel E. Competitive Advantage: Creating and Sustaining Superior Performance. The Free Press, 1985, 0-02-925090-0

Rodrigue, Jean-Paul, Claude Comtois, and Brian Slack. The Geography of Transport Systems. Routledge, 2006, 0-415-35441-2

Stock, James R., and Douglas M. Lambert. Strategic Logistics Management. Fourth ed: McGraw-Hill, 2001, 0-256-13687-4