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RR Donnelley White Paper

The Role of Product Completion in a Demand-Driven Supply Network

RR DONNELLEY

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Overview

Many supply chain models lack the flexibility and agility to create demand-driven supply networks that build customer satisfaction and profits through greater efficiencies and product customization. This white paper explores the basic concepts behind demand-driven supply networks as well as the vital link provided by product completion services. Product completion is the last point at which a manufacturer can make changes to a product before it gets into the hands of distributors, channel partners and end consumers.

The document will be of particular interest to executive supply chain and logistics managers as well as business leaders interested in understanding how innovative new models are providing companies in the technology, telecomm, networking and medical device sectors with a competitive advantage.

Executives will gain the following important information:

- Why traditional supply chain models are failing
- Why companies are rewarding and prioritizing demand
- What constitutes a demand-driven supply network
- Why companies are shifting from transaction-based processes to customer-oriented strategies
- How companies are creating demand-visibility systems
- How product completion is enhancing demand-driven supply networks
- Five product completion models and how they work

Introduction

To better understand how today's models bring complex supply chain processes together, consider the example of a global leader in broadband, wireless and semiconductor products that wanted to be more customer responsive by trimming time-to-market while lowering inventory costs and obsolescence. The company was manufacturing customer-specific broadband cable modems at its Asian facility and shipping products across Europe through a third-party logistics company.

Meeting demand required a vast inventory of commodities. Often the customer configured products without orders to offset the six- to eight-week production and distribution cycle. The cumbersome system also did not allow clients to specify the inclusion of specific literature inserts.

Here is how incorporating product completion concepts into the supply chain addressed the company's challenges:

- A product completion company introduced its supply chain management and ERP systems to drive efficiencies in procurement of B- and C-class components, inventory management and distribution.
- A postponement strategy transitioned manufacturing toward a build-to-order model that delayed product configuration until receipt of order.
- The product completion provider leveraged its global purchasing power to save commodity costs and negotiate both lower and faster bulk delivery rates.

Cycle time was reduced to five days from receipt of order to delivery and now includes options for customized literature inserts. Costs are lower, and customers are more satisfied.

That, of course, is a simplification of the process, but illustrates why models are changing in today's global manufacturing and marketing environments. The balance of the white paper offers more detail about the rationale behind the shifts, new models that are developing and emerging roles in a demand-driven supply network.

Traditional Models Lead Companies Down a Difficult Path

Building relationships is the foundation for creating successful business transactions, yet operational capability, not customer demands, have, until recently, been the driving force behind supply chain management. Traditional supply chain management models value customer demand and service but tend to be more transaction based rather than focusing on building relationships. As a result, companies that don't prioritize customer demand often face recurring challenges that inhibit increased revenues, improved efficiencies and business development.

Long-time devotees to traditional supply chain management practices are learning that traveling upstream is painful and costly. Focusing supply chain design on managing the constraints that develop through distribution systems and factories – we are learning – isn't the most efficient, practical or manageable approach to reaching a destination point. In fact, the battle upstream can be so difficult that the end goal becomes an afterthought as wrong turns and poor directions inhibit success or significantly delay the completion of the journey.

Organizations in this position have difficulty understanding and managing a variety of important factors including:

- Customer and end-user demand data
- Recognizing customer buying patterns, category behavior, market potential and current profitability
- Gaining valuable insight into market factors, the customer and the channel
- Gaining access and usability of actual demand at point-of-purchase
- Sensing and satisfying demand on a timely basis

Supply chain management is much more than simply a linear method for delivering products to customers in a timely, economic and satisfactory fashion. Unless companies broaden that approach to include one that encompasses a closed loop demand-sensing mechanism, they lose the ability to sense business opportunities and create networks with the tools to implement business strategy.

Historically, a fine-tuned supply chain was one in which all parts of the chain are holistically managed instead of segmented into smaller parts that may or may not fit together. These include:

- Managing supply and demand
- Sourcing raw materials and components
- Manufacturing and assembly
- Warehousing and inventory tracking
- Order entry and management
- And distribution across all channels and delivery to customer

Today, there is a new movement afoot. As customer loyalty and economic stability become vital instruments in keeping businesses afloat and healthy, successful companies are actively shifting from merely managing demand to a model of rewarding and prioritizing demand, letting supply and distribution issues follow in the management process. This new movement is called the "Demand-Driven Supply Network."

Introducing the Demand-Driven Supply Network

Companies that took the plunge and implemented a demand-driven supply network into their business strategy would say they are already realizing the advantages. The journey downstream is smoother, more efficient and faster than the journey upstream.

But what constitutes a demand-driven supply network? AMR Research, the leading market research and advisory firm focused on the supply chain, defines demand-driven supply network as "a system of processes and technologies that enables organizations to sense and respond to real-time demand across a network of suppliers, employees and customers." In other words, a demand-driven supply network requires "aligning all company resources and infrastructure, supply chain processes and flow of information to serve the downstream source of demand." Companies employing a demand-driven supply network start with demand and work backwards when creating the supply chain and implementing business strategies.

A Shift in Focus

As the focus shifts from transaction-based processes to customer-oriented strategies, research is providing insights into key components of the supply chain needing significant attention for companies to achieve higher levels of service at lower costs. According to 2005 AMR Research of Supply Chain Management, the single most important component required to master supply chain management is understanding and managing customer and end-user data. Ironically, this critical piece also represents the largest gap in current performance.

Leaders in supply chain management are adopting strategies to increase demand visibility and place it at the forefront of strategic planning. Adjusting thinking and management of the supply chain encourages companies to restructure processes when implementing a demand-driven supply network. This restructuring of the supply chain and shift in strategic planning is leading companies to adopt the concept that a customer order is not just an order, but a "part of creating an opportunity with a relationship."

The major focus for companies employing a demand-driven supply network is on achieving real-time demand and on developing methods to ensure that product completion addresses actual need and fulfills all customer requirements efficiently and on time. The ability to accurately leverage real-time demand starts with a clear demand-visibility signal and focuses on a four-step model to increase demand-driven supply network capabilities. These steps include:

- Reacting to demand to accurately forecast
- Anticipating demand to match supply with demand
- Collaborating on-demand with channel partners' customers to grow opportunities
- Orchestrating a supply network around a demand signal to align demand with profitable opportunities for business development

Creating Demand-Visibility Systems

Creating an effective and clear demand-visibility system also requires following essential processes that help clarify customer demand, increase demand visibility and produce an efficient, profitable supply network. AMR Research defines the four key processes as:

- **Demand insights.** The use of demographic and market data to determine market potential, category buying patterns, and market shifts
- **Demand sensing.** The time that it takes to sense the purchase of a product or service in the channel
- **Demand shaping.** Focused activities by a company to shape and grow revenue within a category
- **Profitable and reliable demand response.** A demand-driven supply network response that is profitable and reliable

Relying on the theory that traveling downstream is the best approach to reaching a destination point, one must keep in mind that accepting such a theory requires understanding the surroundings and having a feel for the present conditions.

Demand insights provide clarity on market conditions and customer buying patterns, allowing companies to gauge market potential. Once evaluated, companies can store and query the data based on need throughout business development. Companies that typically excel at utilizing demand insights include retailers, online consumer electronic companies, airlines and direct store delivery companies.[1]

Based on company success and industry research, the following five steps can help improve demand-insight capabilities:

1. Determine key attributes that need to be tracked to improve demand response.
2. Understand all sources of market data to sense these key attributes and buying behaviors.
3. Build a demand signal repository to model these key attributes.
4. Match the data granularity in the data signal repository to the requirements in the demand-visibility system.
5. Transition to attribute-based forecasting to better use the information in the data signal repository for demand sensing.[2]

The best way to determine supply needs is by monitoring actual consumption of a product and knowing when and where customers purchase products in what volumes. **Demand sensing** is the amount of time it takes to determine actual purchase of a product or service in the channel. Leaders in demand-driven supply networks are often those who are able to sense demand the fastest and most efficiently through advanced technology that operates on the basis that time is of the utmost essence.

Appropriate technology systems can best reconcile point-of-purchase information with perpetual network inventories and flows to accurately determine demand patterns and to better serve customers. Product development, customer demand and the shortening of product lifestyles increase the necessity for companies to acquire demand data at the point-of-purchase in very frequent intervals (at least daily). A week to two weeks or more is now too long to be responsive and profitable.

The ability to grasp real-time demand gives companies the competitive edge needed to emerge as industry leaders. Companies such as Dell and Seagate in the technology space are good examples.[3] Industry leaders are increasing forecast frequency as a method for improving demand sensing. While the understanding of real-time demand is key to successful business transactions, a recent study of 300 North American companies found that 56 percent of the companies took more than two weeks to sense true channel demand. Only 26 percent can see channel demand in days or hours.[4]

To improve demand-sensing capabilities, AMR Research suggests following these steps:

1. Increase the frequency of demand forecasting.
2. Design corporate forecasting systems to model channel demand.
3. Sense demand based on attribute-based models synchronized with market-data signal repositories to tie corporate forecast to shifts in demand insights by attribute.
4. Model major accounts in the demand-forecasting system to enable demand synchronization with distributor or channel networks through private networks.
5. Compare channel consumption data with other demand inputs: the constrained S&OP plan and customer orders.
6. Bring the channel data into a demand-visibility system at least daily.
7. Trigger alerts and exceptions based on role-based alerts and established goals.

Demand for products and services, while often naturally present based on customer needs, requires **demand shaping** and strategic planning to drive revenue. Companies employ multiple methods for shaping demand such as introducing promotions or trade incentives, reducing prices, releasing new products, strategic marketing and advertising or revamping product or package design. Of these demand-shaping activities, research shows that price management and new product introductions are the most important components of increasing revenue and customer demand.[5]

Evaluating the effectiveness of demand-shaping activities requires demand sensing to determine which approaches are driving revenue. Through industry research and surveys, AMR Research found that companies most invested in implementing demand-sensing capabilities are most successful at demand-shaping activities that provided increased revenue. Regardless of the industry, demand-shaping activities remain one of the most important components for driving customer demand and profitability. Executing a successful demand-shaping program, according to AMR Research, requires companies to:

- Agree on the major demand-shaping programs they will track in the sales and operations planning process. Define and communicate success criteria
- Ensure that the degree of demand shaping equals the supply network capabilities of the sales and operations planning constrained plan
- Build exceptional management capabilities for these major demand-shaping programs into the demand-visibility signal
- Focus on building excellence into the baseline of demand forecasting – the forecast with no demand-shaping activities
- Measure demand-shaping activities and build libraries of demand based on the attributes of the demand-shaping events

- Review the progress of these demand-shaping activities weekly using the demand-visibility signal
- Track demand-shaping effectiveness against predetermined goals

In a demand-driven supply network, profits do matter. Increasing revenue is the main objective as well as the reason for having clear demand visibility. Creating a **demand response** that is efficient and effective will:

- Help businesses grow
- Increase customer satisfaction
- Ultimately build revenue

An effective demand response requires industry leaders to develop demand signals through demand translation and demand consumption logic.

To translate demand, companies look at independent or channel demand to determine the demand for products at each ship-to location. Evaluating demand at individual locations places products at the appropriate locations and avoids over- or understocking of items. Failing to understand ship-to location requirements can result in lost profit and unnecessary shipping expenses. Demand translation must also occur from independent or channel demand. This process involves reviewing demand at the ship-to locations to determine demand at the ship-from locations.

Accurate and effective demand response also requires evaluating dependent demand, or the sensing of demand at ship-from locations. Dependent demand focuses on demand at each location, demand in the factory, demand for specific parts for the suppliers and the demand for logistics within the entire network. To ensure that companies are implementing effective, profitable demand response, AMR Research suggests the following actions:

- Actively involve operations and procurement in the development of the constrained plan. Make the constrained sales and operations plan visible with daily consumption
- Mimic demand-driven supply network leaders and evaluate the network quarterly to determine the best mappings of independent to dependent demand
- Translate the tactical dependent signal to factory material requirements by using factory-scheduling systems
- Publish factory demand requirements and forecasted demand requirements to major suppliers
- Display consumer order consumption against the forecast by major account, showing original orders, back orders and order allocations
- Translate order changes into anticipated changes in service-level agreements
- Change from an expediting mind-set. Reward teams for driving a profitable demand response, not for meeting rush orders

Demand-Driven Supply Network in Summary

A demand-driven supply network simplifies the way in which companies pursue growth in revenue and implement strategies for business development. When the customer becomes the first order of business and demand is the starting point for managing the supply chain, opportunities for increasing revenues, customer loyalty and satisfaction and product development will follow.

Research on industry leaders shows that demand-driven supply network masters seek ways to reward relationships and create a value system for the customer through:

- Postponement strategies to customize products
- Specialized services
- Premium service

The airline industry is a prime example of how rewarding customers for their loyalty and honing in on their travel needs can mean not only staying afloat in a competitive and strained industry but can also turn companies into profit-making, cross-industry leaders. Reevaluating traditional supply chain management methods is not time wasted but part of the process of "renewing economic growth for yourself, your organization, and the wider world."[6]

The Importance of Product Completion in a Demand-Driven Supply Network

Increasingly, companies today are building finished, packaged products in Asia and then shipping them to major geographic distribution points. While per-unit costs can look attractive on the surface, long lead times challenge manufacturers to become more demand driven. The result is often a lack of responsiveness to changing customer demand and high obsolescence rates.

Although it may seem counterintuitive to add a stage in the supply chain and gain greater flexibility and efficiency when taking products to market, that is precisely what an effective **product completion** strategy should accomplish.

Product completion is the last point at which a manufacturer can make changes to a product before it gets into the hands of distributors, channel partners and end consumers. This stage allows for configuration and customization of products once the company knows demand and has generic product located very near the customer, minimizing the impact of forecast inaccuracies, especially in environments where customer options proliferate.

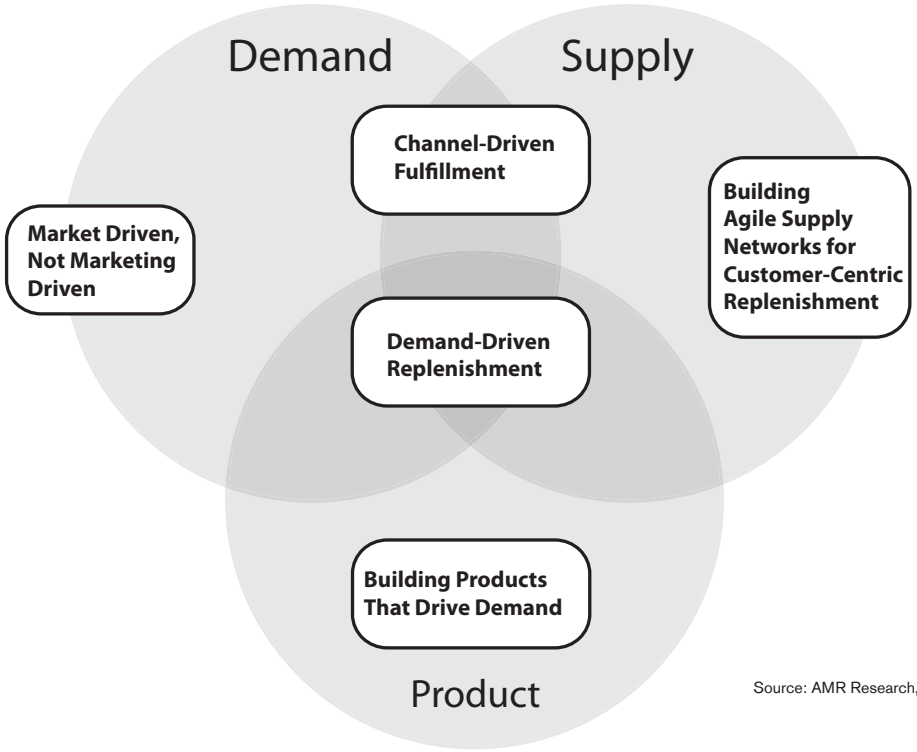
It is the stage at which innovative manufacturers in segments ranging from technology to telecom, industrial products and medical devices are reaping the benefits of a more efficient approach to market: Products that not only better meet market demand but also are produced more cost-effectively versus a fully packaged approach.

Product completion contributes to a demand-driven supply network by providing a strategic approach to the management of B- and C-class components, working as the bridge between supply and demand. At the foundation lies IT that provides visibility to process and product for Post-Manufacturing to real-time customize-to-order operations models, and across the key product completion stages including:

- **Sourcing/procurement.** Global purchasing along with vendor management and evaluation
- **Inventory management.** Optimizes quality and availability
- **Assembly.** Brings a wide range of components together

- **Configuration.** Differentiates goods for channels and markets
- **Customization.** Makes finished goods relevant to customers
- **Testing.** Validates the components market readiness
- **Packaging.** Encloses product and prepares for shipping
- **Fulfillment/distribution.** Takes order/demand signal and ships product

Agility at product completion is more critical than ever as the demands of global markets and channels compound the complexities of going to market.



Source: AMR Research, 2005

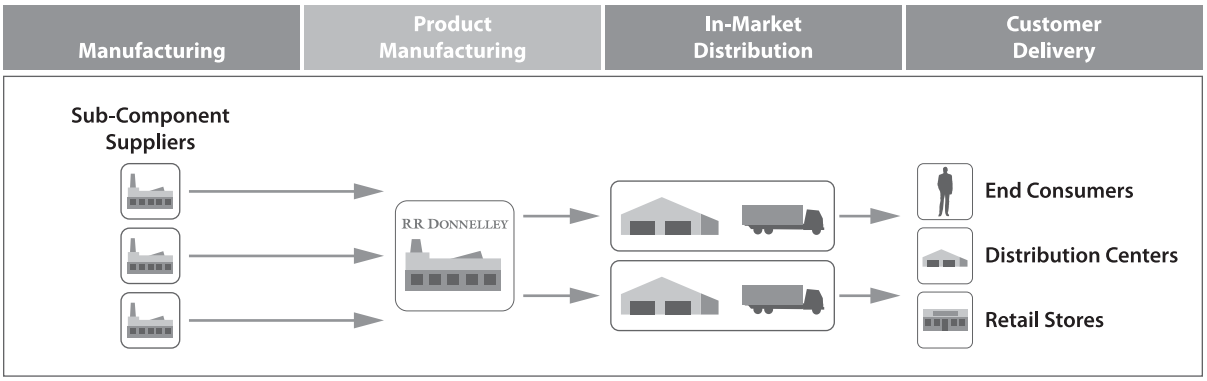
Product Completion Models

There are several demand-driven product completion models designed to address a variety of manufacturing needs. Generally, product completion services are provided by outsource companies that specialize in this critical, but often overlooked function. Following is a summary of the six primary models and their key attributes:

1. Premanufacturing Service Model

Purpose: Provides services that streamline the supply of materials and sub-components or other kits into a manufacturing operation. A computer manufacturer, for example, might use this model to supply accessory kits to the factory floor on a JIT basis. It allows companies to focus on core competencies rather than manage activities related to lower-level components.

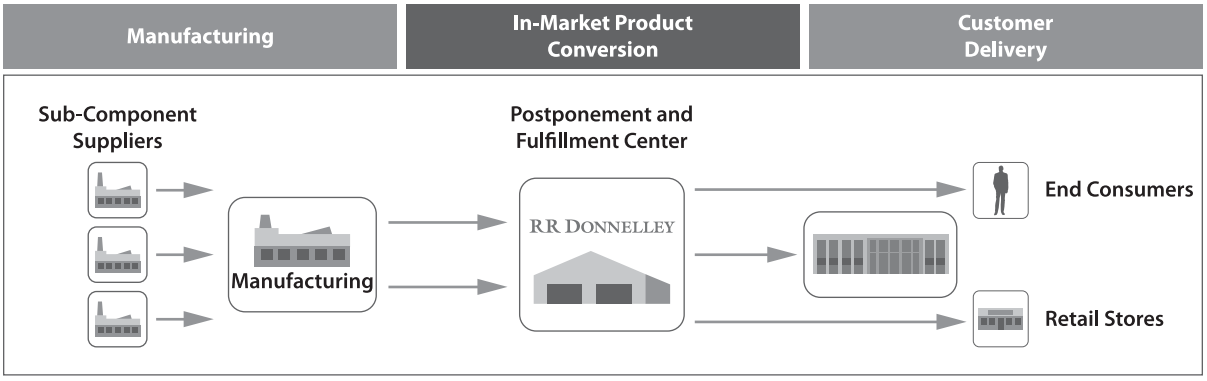
Features	Benefits
Materials sourcing, management & procurement	Streamlines & aggregates component purchases
Product subassembly & configuration	Consolidates fragmented activities and allows client to focus on core competencies
Accessory kit supply	Compresses supply chain
JIT delivery to point-of-use-factory lineside/Kanbans	Reduces inventories (VMI hubs)
Kits merge with system at point of use	Reduces overall costs



2. Post-Manufacturing Postponement Model

Purpose: Provides in-market product conversion services to transform a generic item into a specific SKU. A blood glucose monitor manufacturer, for example, might use this model to convert a base monitor into a country-specific SKU containing appropriate language and measurements. This combines some aspects of both push and pull models, whereby accuracy of demand forecasts for the generic item is still important, but final configuration incorporates demand-based elements.

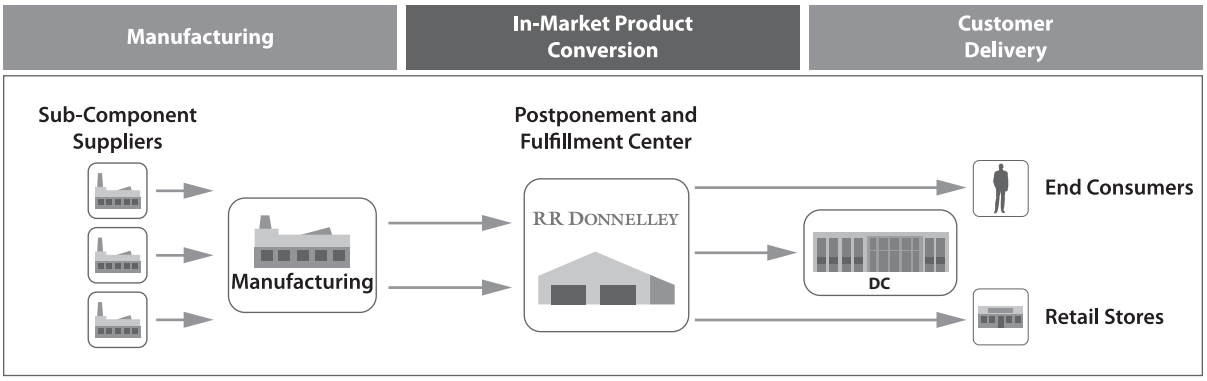
Features	Benefits
Materials sourcing, management & procurement	Streamlines & aggregates component purchases, consolidating fragmented activities
Core devices shipped from CM, ODM or OEM to product completion provider	Provides ultimate flexibility by keeping product generic for as long as possible
Product configuration, testing & pack-out	Eliminates costly rework in market
Final product assembly	One-stop shop for product completion
Bulk shipping to distribution center	Minimizes freight spend through bulk shipping



3. Build-to-Order Postponement Model

Purpose: Provides in-market product conversion services to transform a generic item into a specific SKU on a build-to-order (BTO) basis. This method minimizes the importance of a demand forecast by building products specifically to known market demand.

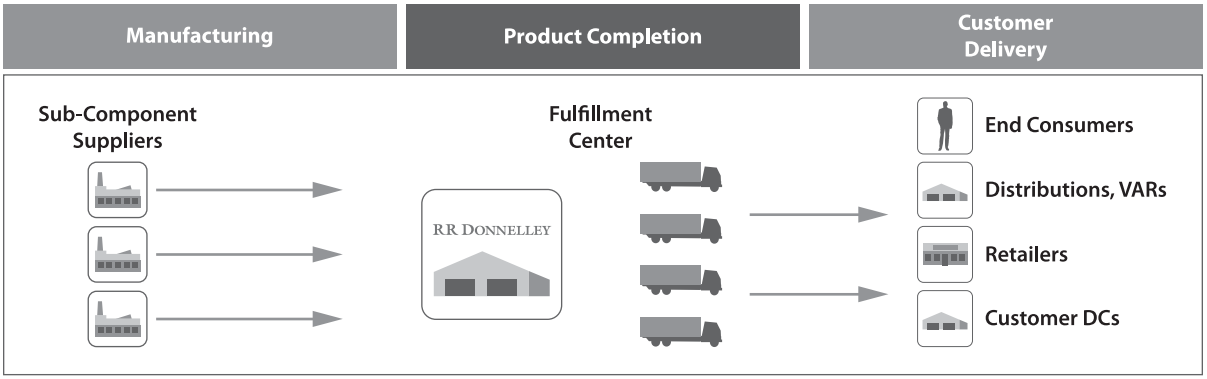
Features	Benefits
Materials sourcing, management & procurement	Streamlines & aggregates component purchases, consolidating fragmented activities
Core devices shipped from CM, ODM or OEM to product completion provider	Provides ultimate flexibility by keeping product generic for as long as possible
Product configuration, testing & pack-out	Eliminates costly rework in market
Final product assembly	One-stop shop for product completion
Direct fulfillment to end user or retail channel	Minimizes freight spend through bulk shipping; no warehousing of finished goods & lower finished goods inventories in the supply chain & channel; increases vendor's response to changing markets & demand; supports short product lifecycles; reduces obsolescence risk



4. Total Turnkey Manufacturing & Distribution Model

Purpose: Provides a completely outsourced solution for materials management, product assembly, product distribution and fulfillment activities. Fulfillment can occur to distribution centers or direct to end users or retail channels. A software manufacturer, for example, might use this model to have a product completion provider perform all support activities including materials and supply-base management of subcomponent suppliers, product assembly, packaging, fulfillment and distribution.

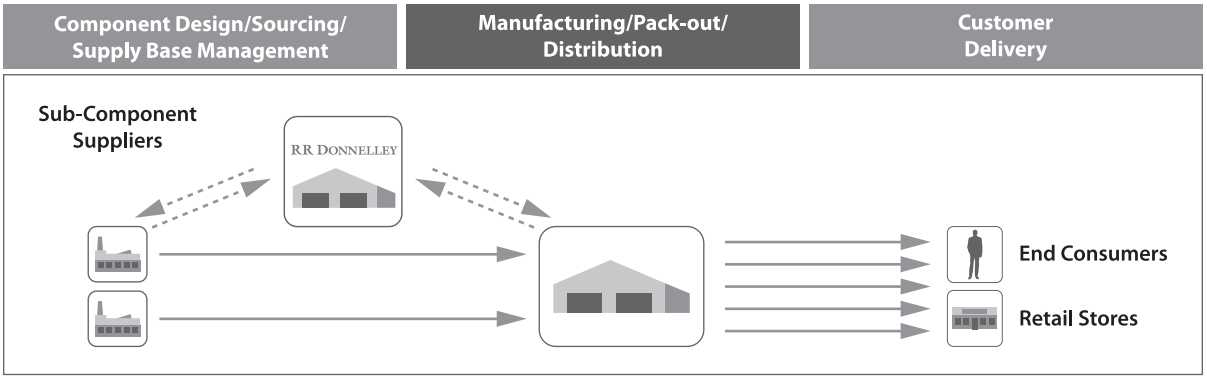
Features	Benefits
Completely outsourced materials management	Reduces working capital requirements
Product assembly	Reduces touch points in supply chain
Product & component distribution	Consistent end-to-end manufacturing & distribution
Fulfill orders by either shipping to distributors or directly to end consumers or retail channel	Companies focus on core competencies – product development, sales & marketing, customer service



5. Procurement Services Model

Purpose: Provides material and supply-base management of B- and C-class components to streamline the supply of materials, subcomponents and other kits into a manufacturing operation. A computer printer manufacturer, for example, might use this model to provide accessory components or kits that accompany the printer. The product completion specialist would develop a material sourcing and management plan according to the manufacturer's specifications, masters and forecasts. It would then take responsibility for ensuring that materials are shipped on time and to specification directly from the supplier to the manufacturer's point-of-use or warehouse. Kitting might be added as an additional service.

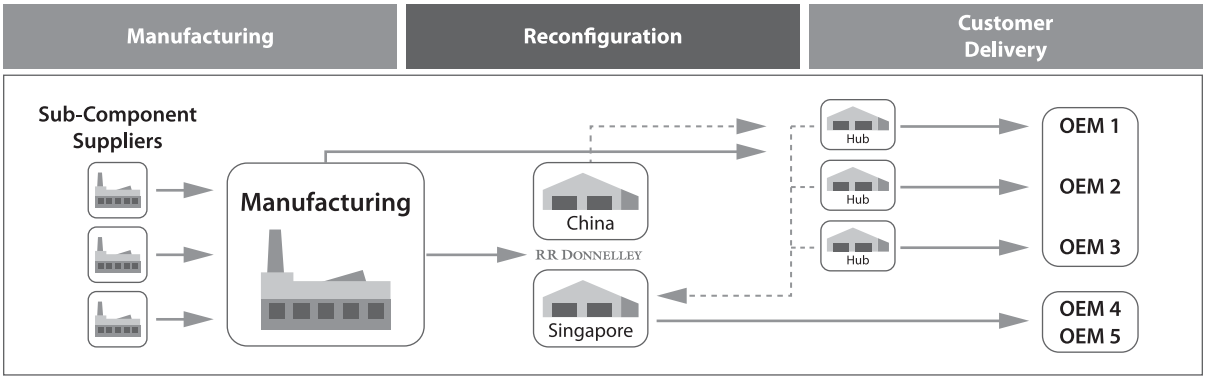
Features	Benefits
Customer supplies specifications, masters & forecasts for B- and C-class components	Relieves manufacturer of purchases that fall outside base product manufacturing, allowing greater focus on core capabilities
Product completion provider sources & manages materials procurement	Widens selection of suppliers; often leverages larger book-of-business for core commodities purchased
Materials suppliers ship directly to manufacturer's point-of-use or warehouse	Consolidates the supply chain; reduces freight and logistical headaches; deliveries managed to meet demand
Product completion provider bills manufacturer for all components purchased	Simplifies payment process for manufacturer



6. Hard Drive Reconfiguration Services Model

Purpose: Geared specifically to the computer market, this service takes customer-specific drives and reconfigures them to different OEMs on short lead times. For example, forecast inaccuracies might result in overstocking of HDDs for a partifular OEM customer. The HDD manufacturer instructs the OEM to ship them to a reconfiguration center for reconfiguring into a different OEM customer's needs, which might include tasks such as re-flashing the firmware and shipping the HDD. Product completion providers offering this service generally make it available in a number of major geographic regions, i.e., North America, Asia and EMEA.

Features	Benefits
Customer BCS equipment & software reconfigure enterprise hard drives	Provides flexibility; generates revenue; reduces obsolescence and returns



Footnotes

[1] Cecere, Lora. "DDSN Versus SCM: Look to the Sky for the Differences, Part 1," AMR Research (4 May 2006)

[2] Cecere, Lora. "DDSN Versus SCM: Look to the Sky for the Differences, Part 1," AMR Research (4 May 2006, p.5)

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[5] Cecere, Lora. "DDSN Versus SCM: Look to the Sky for the Differences, Part 1," AMR Research (4 May 2006, p.10)

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Conclusion

The most successful companies are developing demand driven supply networks that put the customer first and seek ways to postpone final product configuration for greater customization. Global sourcing and manufacturing pose challenges to companies striving to become more customer and demand focused. The practice of manufacturing fully packaged products in China and other low-cost countries tends to add time to the production cycle while limiting customization opportunities and increasing the risk of expensive product obsolescence. Innovative companies are now implementing a variety of product completion strategies to bring more agility, cost-efficiency and responsiveness to the supply chain.

About Global Turnkey Solutions

RR Donnelley Global Turnkey Solutions is a technology and market leader in supply chain management services focused on product completion. We provide a wide range of outsourcing capabilities to some of the world's largest companies. Services range from materials sourcing, product configuration and testing to customized kitting and global fulfillment.

Global Turnkey Solutions' demand-driven approach helps companies create more customer relevant products through customization and by bringing production, fulfillment and distribution as close to end markets as possible. Our local facilities serve major geographic markets and allow companies to customize products and information for individual customers and markets without sacrificing speed or cost-efficiencies.

Who We Serve

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