

Introduction to Supply Chain Management

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The courses align to [career pathways in New Jersey's growth industries](#) including health services, technology, energy, and global manufacturing and supply chain management as identified by the New Jersey Council of Community Colleges.

Chapter Summary

You may not realize it, but everything you buy, from food to clothing to gasoline, is available to you as a result of a long, often complex series of activities. Like many things, we tend to notice this most acutely when it goes wrong. Maybe you can't find the particular laptop computer you are looking for, or something more immediate, like gas for your car. It could be something even more critical, like baby formula (see the article at the end of this section).

"Supply Chain Issues" are often cited as the reason behind shortages of products in today's world. But what does that mean? What does a Supply Chain entail? And why can it have such a strong impact on our daily lives?

This is what we are going to discuss in this chapter. This chapter will be a brief introduction to Supply Chains and Supply Chain Management. By the time we're done, you will understand what a Supply Chain is and how it works, the components of Supply Chain Management, and the different inter-related activities it takes to get products to customers consistently and efficiently.

Learning Objective Summary

- Discuss the importance of Supply Chain Management
- Define and explain the different components of Supply Chain Management
- Explain the importance of forecasting in the supply chain
- Provide different approaches to forecasting
- Explain the significance of inventory management in the supply chain
- Explain the importance of sourcing to the supply chain
- Discuss the role of logistics and warehousing
- Provide examples of issues faced in a global supply chain

Section 1 - Introduction

"The beginning of wisdom is to call things by their right names."

- Confucius

Learning Objectives

- Describe what a Supply Chain is
- Describe what Supply Chain Management is and why it's important
- Identify the components that make up Supply Chain Management

What is Supply Chain Management (SCM)?

If you have ever read about Supply Chain Management before, you've probably seen a long, complex definition, like this:

Supply Chain Management is the management of relationships in the network of organizations, from end customers through original suppliers, using key cross-functional business processes to create value for customers and other stakeholders.

Source: Douglas M. Lambert, Editor, *Supply Chain Management: Processes, Partnerships, Performance, Fourth Edition*, Ponte Vedra Beach, FL: Supply Chain Management Institute, 2014, p. 2.

Did you understand all of that? If you didn't, don't panic. By the time we're done, you will.

Before we try to define Supply Chain Management, we should probably define what a Supply Chain is. Let's start with something simple.

You are, in all likelihood, wearing clothes right now. If you're not, just pretend that you are. Now those clothes came from somewhere, most likely a store or online retailer. So, we have this:

Retailer

Now let's think for a minute. Did the retailer make the clothes? Probably not. Where did they get them from? Most likely what's called a distributor.

Distributor

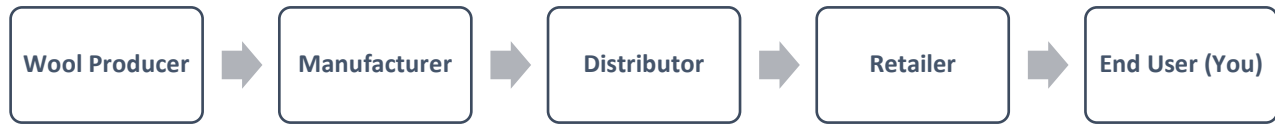
Now, the distributor probably didn't make the clothes either. Where did the distributor get the clothes from? Most likely a manufacturer.

Manufacturer

Now, it gets a little tricky. The manufacturer made the clothes, but what are clothes made out of? There are lots of different materials used for clothing, but let's go with wool. Where does one get wool? Wool comes from sheep. There are a few steps here, but let's consolidate them into one link

Wool Producer

Okay, so now we have:



This is a supply chain. That's it. That's all it is. We will talk about a lot of other things, but everything we talk about in this chapter can be boiled down to the very simple supply chain shown above.

So, what is a supply chain? Simply put, ***a supply chain is a system of related (or linked) activities involved in providing a product or service to an end user.***

Now that you know what a Supply Chain is, we can define what Supply Chain Management is: the management of a supply chain system.

Definitions and terminology

Supply Chain Management people love jargon. Not just the good kind of jargon, but also the bad kind:

Jargon: obscure and often pretentious language marked by circumlocutions and long words

(Source: Merriam-Webster online dictionary)

So, if we want to swim in the waters of Supply Chain Management, we are going to have to spend some time on definitions and terminology.

We've already covered some key terms:

Supply Chain: a system of related (or linked) activities involved in providing a product or service to an end user.

Supply Chain Management: the management of a Supply Chain

Manufacturer: an organization that makes a product, especially from raw materials

Distributor: an organization that distributes products, especially to other commercial organizations

Retailer: an organization that sells products or services to end users

End user: the ultimate user or consumer of a product or service, also called end customer.

Now, let's swim out a little deeper.

Stakeholder

As used in business, a stakeholder is a person, group or organization that has a 'stake' (an interest) in a business or business process. In the narrow sense, this is someone that has a direct, legitimate interest in the business (such as a business shareholder or investor). In the wider sense, it can be any person or organization that *can affect and/or are affected by* the business. The wider sense can include employees, managers, labor unions, and external people or organizations, such as government regulators or the local community.

Sourcing (Purchasing)

Sourcing, as a functional area, involves identifying sources of supply, negotiating purchases, arranging delivery and managing the overall business processes and relationships involved.

Operations

As used in business, the term operations can have a lot of different, closely related meanings. The usual definition is that operations is *the process of turning inputs into outputs*. Another way to think about it is that operations usually refer to *executing the core activity of your business*. So, if you are a shoe maker, actually making the shoes would be considered operations.

Forecasting

Forecasting, also called demand forecasting or demand planning, means deciding how many of a particular thing to make. We will talk more about this later.

Logistics

Logistics refers to the movement and storage of materials or products. Logistics can be inbound or outbound, and usually involves multiple modes of transportation.

Value

Value is what something is worth. As used in business (as in the definition at the beginning of this chapter), when we talk about creating (or adding) value, what we mean is that we take something that is worth x (in the example above, the wool), apply a business process (in the example, manufacturing clothing), and now it is worth more than it was ($x + y$).

Cross-functional

Cross-functional refers to a process that involves multiple functional areas or departments (in a business, functional areas may include Production, Purchasing, Logistics, Sales, Research and Development, etc.). Supply Chain Management, by its very nature, is a cross-functional discipline. We will talk about this in the next section.

Components and functional areas that make up SCM

Supply Chain Management, in that it is concerned with moving things from an origin point to an end point, necessarily involves multiple processes. There are several different ways to categorize the various areas of Supply Chain Management. You might see the activities broken into something like *Plan-*

Source-Make-Distribute. Another variant is *Buy-Make-Sell*. Some models include a category for integration, and include things like returns (so that it is more of a loop than a chain).

Don't let this confuse you, as for the most part, these models are just using different words to talk about the same thing (also, refer to the definition of jargon earlier in this chapter).

The main thing to keep in mind is that the three core functions within Supply Chain Management are usually considered to be *Sourcing, Operations and Logistics*. In fact, Supply Chain Management can be thought of as *a discipline that combines these three functional areas into a single, coherently managed system*.

A little history: way, way back in the long time ago (like the 1970's), most businesses were organized such that these three functional areas operated fairly independently of each other. This set-up is sometimes referred to (usually in a derogatory way) as 'silos' or 'business silos'.

Much of the evolution of SCM as a business practice has involved the concept of looking at these processes with a wider view, and integrating these core areas (among others) in a rational way.

To understand why all of this is important, it is important to keep this basic tenet in mind: businesses *exist to make money, and operate in a competitive environment*. What effective SCM does, and why it's important, is that it creates efficiency that lowers cost, and lower costs provide a competitive advantage and increased revenue for a business.

Real World Example

SCM may seem like a rather esoteric business management discipline, but it has critical, real-world consequences for all of us. Imagine you have a newborn baby that cannot eat or drink anything other than baby formula. You rely, without really even thinking about it, on the product you need being readily available – but what if it's not?

<https://www.washingtonpost.com/business/2022/05/11/baby-formula-shortage-similac-alimentum-elecare-fda/>

Section 2 - Forecasting and Demand Planning

"If we have data, let's look at the data. If all we have are opinions, let's go with mine."

– Jim Barksdale

Learning Objectives

- Describe what forecasting is and why it is important
- Identify the different types of forecasting methods

What is forecasting and why is it important?

Forecasting, or demand planning, means deciding how many of a particular thing to make (or acquire to re-sell). Let's return to the clothing manufacturer example from earlier. In all likelihood, the manufacturer that made your clothes makes hundreds, or perhaps thousands of different kinds of clothing. There are different styles, types, colors, sizes, etc. How do they know how many blue shirts of style x to make, as opposed to red shirts of style y ?

What forecasting tries to do is predict how many of each particular item will be sold in the future. So, basically, what we are trying to do here is predict the future. Can you predict the future? I can't, and neither can demand planners. So, forecasts are never correct, or at least they are never completely accurate. They are educated guesses.

This is important to a business due to its impact on cost. It costs money/resources to make something, and if it doesn't sell, then you have wasted that money. Conversely, if your item sells out, and you could have sold more if you had made more, you have lost sales. Being in a competitive environment, if you consistently get your forecasts wrong (or, at least, more wrong than your competitors), you will soon go out of business.

WARNING: Demand planning involves a lot of math. We are not going to get into the nuts and bolts here, but keep this in mind. If, at some point in your future life, you decide to pursue SCM, or just randomly decide to take an elective called Operations Analysis or something like that, be prepared to do some math.

Overview of forecasting methods

There are many different methods companies use to forecast demand. Note, however, that all models have the basic assumption that *historical patterns will continue into the future*. Generally, methods are either *qualitative* or *quantitative*.

Qualitative

Qualitative forecasting methods are methods based on judgement, intuition or experience, usually with little or no data analysis. As such, these types of methods are subjective. This type of method is often used when prior data is not available (*e.g.*, a new product and/or industry). Methods include being an expert and having an opinion, collecting multiple opinions from experts, or performing market surveys.

Quantitative

Quantitative forecasting methods are methods based on mathematical analysis of relevant historical data. Normally, a large amount of data is necessary (generally the more the better), and the data has to be accurate and relevant. These are objective methods, and are based on empirical data. Types include the *time series method* and *causal method*.

Time series method mean developing a forecast based on past values of sequences of random variables indexed by time. In other words, you assemble a large data set of what you're trying to forecast based on a time index (for example, units sold per day), and perform statistical analysis of this data to predict the future.

Causal method means developing a forecast based on historical data of variables other than the one to be forecasted. For example, you could attempt to forecast umbrella sales per month using a data set of rainy days per month.

Now, once you build a data set, you get into the wonderful world of statistical analysis, which is the part with all the math and is a subject unto itself. But to keep this high level, let's look at a practical example using our clothing manufacturer.

In all likelihood, this manufacturer has a demand planning department that has various time series models built, based on a weighted moving average, and waits for the new sales reports to come in each month or quarter. Once these come in, they update their data sets and produce their forecasts. These are forwarded to senior management, who may tweak them based on judgement, experience, or other known or suspected factors. Once approved, this information is sent to Production, who starts to arrange for the next production run, and Purchasing, who will now know how much wool (as well as cotton, polyester, thread, etc.) to buy for the production run.

Inventory Management

As you might suspect, there is usually a fine balancing act in deciding what items to stock, in what quantities and for how long, and what item to order as needed. On the one hand, you wouldn't want all of your production personnel standing around getting paid but not making anything because you are missing blue thread. On the other hand, you wouldn't want to stock large quantities of anything if you can help it, as this just ties up money that could be used for other things, and generally introduces risks like spoilage and damage. So, you have to manage your inventory.

Inventories are often managed through the use of mathematical models. The goal of these models, and inventory management generally, is to optimize inventory levels. Below are a few examples of common mathematical models used for inventory management:

Newsboy models

These models are also called 'news vendor models.' They are named after print newspapers, which have a very short life cycle (often one day) and random (unpredictable) demand. Generally, they can be applied to any short life-cycle product, such as fashion items or holiday items. The main basis for the calculation is the overage cost vs. the underage costs.

Cycle stock models

Cycle stock models are used for long life-cycle items that have predictable demand, (*e.g.*, groceries). The main basis of the calculation is the (fixed) ordering cost vs. the inventory holding cost.

Safety stock models

Safety stock models are used for long life-cycle that have unpredictable demand. This combination applies to most products. The main basis of the calculation is the inventory cost vs. the desired service level.

Real World Examples

<https://www.freightwaves.com/news/supply-chains-have-a-forecasting-problem>

<https://www.forbes.com/sites/forbestechcouncil/2022/07/14/covid-19-altered-the-supply-chain-does-your-forecasting-strategy-reflect-the-new-reality/?sh=59813f925e24>

Section 3 - Sourcing and Supplier Relationship Management (SRM)

“The real price of everything, what everything really costs to the man who wants to acquire it, is the toil and trouble of acquiring it.”

— Adam Smith

Learning Objectives

- Describe what a Sourcing is
- Identify the key components of Strategic Sourcing
- Describe Supplier Relationship Management

Overview of Sourcing

Sourcing, or purchasing, involves obtaining all of the materials, equipment and resources needed to conduct your operations. In most business, this is an ongoing process that is continually managed.

To put this in a real-world perspective, let's think about our clothing manufacturer. We already know that they have to buy materials, like wool or cotton, as well as other components, like thread. What else do they need? Well, they need equipment to manufacture the clothing. This equipment has to (perhaps periodically) be purchased, and it also has to be maintained, serviced and repaired if it breaks. Also, the equipment probably doesn't sit outside, so you need buildings, and electricity, other services, and maintenance for all this (usually called the *plant*, or *physical plant*). On top of this, you would need computer equipment, office supplies, legal and consulting services, and probably many other things.

While this is of a wide scope, the main portion we are interested in here are the materials and services directly related to production. This is what is usually called “*direct spend*.” Everything else, such as support of the physical plant and computer equipment, is usually referred to as “*indirect spend*”.

While much of sourcing is transactional, what we are interested in here is what goes on at the management level, so we are going to talk about two key components in purchasing: Strategic Sourcing and Supplier Relationship Management (SRM).

Purchasing and Strategic Sourcing

Strategic Sourcing is a fancy way of saying that you make your purchases in a thoughtful, planned method. For example, let’s say that our clothing manufacturer has seven different production facilities all over the country. If each one of those facilities made their own purchases, that probably wouldn’t be very thoughtful or well planned. Additionally, let’s say that instead of spending a lot of time on figuring out exactly what they needed for each production run, they just bought the same materials in the same quantities each quarter, and instead of trying to negotiate agreements, they would just call in an order to the same supplier each time and pay whatever their price was on that day.

This may all seem a little silly, but this method of operating used to be very common. What most companies do today is operate strategically: they execute their purchases in a thoughtful, planned way. What form this strategy takes is different for each company, but below are some of the key activities involved in Strategic Sourcing:

Spend Analysis – you can’t really put a good strategy together if you don’t know, in detail, what you are buying. Spend analysis (also called requirement analysis or data collection) involves collecting data and analyzing what you are buying, usually correlated to the amount of spend. How many different products are you buying? Do you spend more on wool or cotton? What purchases are recurring? Which ones aren’t? Where can you consolidate?

Market Research – may also be called vendor analysis or supplier discovery. This is research that seeks to answer the following questions: Where are you buying your materials from? Who else could supply the materials you need, and at what cost?

Negotiation – This covers how you make your purchases. Now that you know, in detail, what you need, and who can supply it, you can (in all likelihood) negotiate a good, mutually beneficial deal with suppliers. This may involve bids, contracts, and numerous other approaches.

Management – There are lots of terms for this piece, such as *optimization*, *integration* and *vendor management*. The key idea is, now that you have figured out what you need, who can supply it, and set up contracts, you have to manage them to make sure the vendors perform well (that is, they supply what you need when you need it), and to identify potential areas for improvement.

This piece leads us into the next area we want to discuss, which is Supplier Relationship Management, or SRM.

Supplier Relationship Management

Supplier Relationship Management is a systematic approach to managing your relationships with suppliers at a high level with the goal of increasing efficiency, reducing costs and providing a competitive advantage. This is similar to the Vendor Management part of Strategic Sourcing, but it's rather the next step (SRM wouldn't be effective without already having Strategic Sourcing in place). The difference is that Vendor Management is more about tracking performance metrics for specific vendors and transactions, whereas SRM is more concerned with building overall streamlined, efficient and mutually beneficial relationships.

An example may help. Let's say that, as part of your SRM approach, you set up periodic meetings with high level managers from your wool suppliers. Through these meetings, you discover that the wool producers have excess inventory each year, because they don't know how much wool you are going to order until you actually place your orders. If they knew a few months earlier, they could adjust their subcontracts with farmers so they could meet your requirements without having excess. You might choose to share your forecasts with your suppliers in exchange for, say, a price lock, volume guarantee, or some other benefit.

Real World Examples

<https://www2.deloitte.com/content/dam/Deloitte/ch/Documents/process-and-operations/ch-en-operations-supplier-relationship-management.pdf>

[https://www.techtarget.com/searcherp/definition/supplier-relationship-management-SRM#:~:text=Supplier%20relationship%20management%20\(SRM\)%20is,strategies%20to%20improve%20their%20performance.](https://www.techtarget.com/searcherp/definition/supplier-relationship-management-SRM#:~:text=Supplier%20relationship%20management%20(SRM)%20is,strategies%20to%20improve%20their%20performance.)

Sustainability in Sourcing

Sustainability is an area that has received increased focus in sourcing, and in business generally. 'Sustainable' can mean a lot of different things, from sourcing coffee beans from a certain economic class of farmers to building buildings with 'green' rooftops. However, what we should focus on here are the core concepts behind these specific examples.

Sustainability does not simply mean 'environmentally friendly'. As much as individuals may be (or want to be) environmentally friendly, and business cannot simply choose to operate in this way if it increases cost. Since, as you will recall, businesses operate in a competitive environment, operating in an inefficient or otherwise more costly manner than one's competitors will ultimately lead to the demise of a business.

So, the main idea of sustainable sourcing is that we take into consideration other factors besides cost, with the understanding that *they will eventually, or indirectly, affect cost*. These other factors are usually categorized as environmental, social and ethical.

Let's say our clothing manufacturer from the above examples uses potentially dangerous chemicals in their wool dyeing processes. It is not legally required that they handle and transport these chemicals in double sealed drums, and this is costlier, so they choose not to do so. An accident happens and there is a chemical spill (which would have been prevented by the double sealed drums). There is significant cost due to the spill, both direct (lawsuit damages, fines, loss or damage to materials) and indirect (damage to the reputation of the company, which will result in lost sales). So, if the company had taken the environmental risk factor into account when they decided on the drum purchase, ultimately, they would have incurred a lower cost.

Notice here that we did not account for the actual impact on the environment from the chemical spill. While most of us would consider a chemical spill 'bad', under traditional thinking, a business does not have a 'good' or 'bad'; they only have profit/loss. This is because we are still accepting the premise that cost (profit/loss) is the only factor in the decision.

A related concept, which challenges this premise, is the concept of the 'Triple Bottom Line', or 3BL. The idea is that focusing strictly on cost (the 'bottom line') is ultimately short sighted, with the alternative being that one should consider a triple bottom line of *social, environmental, and financial*. The 3BL concept is more of a paradigm shift, in that it states that the ultimate success or failure of a company is not dictated strictly by profit/loss (financial success) but also by environmental and social success.

The reasoning behind this is that a business, according to the 3BL concept, has a responsibility not only to shareholders (profit/loss) but rather to stakeholders (which includes shareholders, but also many other parties; refer to the definition earlier in this chapter).

Currently, there is wide acceptance of the basic concept of sustainable sourcing, that is, taking environmental, social and ethical factors into consideration (to the extent that they affect cost). The triple bottom line concept is more controversial.

Section 4 - Operations Management

Overview of Operations Management

In the overall chain of activities involved in making and distributing a product or service, operations is the cool part. It is the part where you get to actually make something – manufacture an item or put work in place.

As a functional area, operations, as noted previously, concerns turning inputs into outputs. What does this mean? It rather depends on the type of business, but normally it involves producing the core product or service that a company creates. In our clothing manufacturer example, it is making the

clothes. To take a service company example, in a construction management firm, the operations manager would oversee the performance of the work in the field across all projects.

Another way to think about this is that operations are concerned with *internal* processes, as opposed to sourcing or logistics, which tend to be focused on dealing with *external* parties or processes, such as suppliers or transportation companies. Operations managers oversee day-to-day activities, production planning, maintenance, and many related areas.

Note, while we are considering Operations Management as a component of the Supply Chain, from a conceptual point of view, some businesses and industries separate these different areas (from a functional point of view). In a smaller organization, usually the activities are combined into one area or sometimes even one person. In a larger company, you might have a Supply Chain Manager that oversees forecasting, sourcing and logistics, and an Operations Manager that oversees production.

Process Efficiency Methodologies

If we're going to study Operations Management, we're going to have to become familiar with some various process efficiency methodologies. There are several out there, all with various flavors. We'll go over two of the most prominent ones here, but the main thing to keep in mind is that these methodologies seek to *increase efficiency*, primarily in a manufacturing environment. First off, we'll need to add a few more definitions to our list:

Just-In-Time Manufacturing

Just-in-time, sometimes JIT, is a manufacturing management approach that aims to reduce the cost or waste of inventory and overproduction. The basic idea is that you get everything ready (such as having materials, components, and labor 'on-call'), and then make the item once you get an order for it. This is as opposed to predicting how many you will need, stocking materials, making a product, stocking the product, and then shipping it when you get orders.

Just-in-time is a pull system. What's a pull system?

Push and Pull Systems

Push/pull is a way of categorizing production methods into a basic dichotomy. In a pull system, products are made when orders are received (orders are 'pulled' by the customers), as opposed to having the product made and ready to ship to the customer upon receipt of an order (the product is made and 'pushed' to customers).

Lean manufacturing

Lean manufacturing has its roots in the processes developed by the Toyota Motor Corporation in the years following World War II. It involves incorporating a Just-in-Time/pull system and, importantly, incorporates this into a philosophical system marked by the concept of continuous improvement.

The Lean philosophy, and system, is usually characterized by five principles:

Value – In a lean process, normally the first step is to identify value. By value, here we specifically mean value to the consumer, or end user of the product. This is usually thought of as a discovery process, and may involve market surveys and analysis.

The Value Stream – Once we identify value, the next step is to map out a process in what's referred to as a 'value stream'. The intent here is to create a flow diagram in great detail. This may include things like information or data flow in addition to actual activities. There are several different ways to do this, and this can become very complicated. Then, each step is assessed to determine if it creates or adds value (as defined within the Lean system).

Flow – Once the process is mapped and the components assessed for value, the step here is to create a new flow that eliminates waste/non-value add steps and activities.

Pull – this involves implementing the pull system, not just on the system as a whole but also, to the extent possible, on component steps.

Perfection – this involves both fine-tuning and continuous assessment/improvement, and also proselytizing the philosophical concepts, which usually involves some culture change.

Six Sigma

While the lean approach focuses on efficiency and the elimination of waste, the Six Sigma approach focuses on *minimizing variability and defects*. Six Sigma has its roots in the Motorola corporation in the 1980s. It's marked by the use of statistical analysis and can be considered a quality control approach. Since its inception, it has evolved into a wider business consulting discipline, replete with its own philosophy, certification structure and specialized vocabulary.

Etymology - the term 'six sigma' uses the term *sigma* (the Greek letter sigma, lowercase σ) in the sense that it is used in mathematical notation in the field of statistics, where it means one standard deviation. The idea of six sigma refers (generally) to setting tolerance to within six standard deviations from the mean, which would work out to 3.4 defects per million.

Six Sigma uses a number of different tools and approaches, within the basic premise that decisions should be based on the collection of empirical data and statistical analysis. The two most common tools are described below:

DMAIC – This is an acronym Define, Measure, Analyze, Improve and Control. This is a step framework that is intended to provide process improvement and, ostensibly, can be applied to any (business) problem. One would define the problem or issue, measure the applicable factors (as well as define and/or identify the factors), Analyze the data, Improve the process based on the analysis, and Control (or maintain) the new process.

DMADV – This is an acronym for Define, Measure, Analyze, Design and Verify. This is also called Design for Six Sigma (DFSS). Yes, six sigma people like acronyms so much, they made two for the same thing. The DMADV framework is designed for developing a new process (as opposed to improving an existing process). The processes are similar to DMAIC, except in the Define step you are defining goals as opposed to the problem, and the steps of Design (the process) and Verify (test) replace Improve and Control.

These process efficiency methodologies, and others, can become very complicated, and have developed into areas of study in and of themselves. This is due, in part, to the growth of the business consulting industry, especially in the 1990s and 2010s, the portability (and salability) of ready-made process improvement recipes, as well as the philosophical component that some of these systems have, which can create an emotional-based adherence to a doctrine.

This is not to say that they don't have value, but, generally, truly effective process improvements tend to be industry specific. With a little intuition, one can see that a while lean system could make a lot of sense for something that is high value, low volume, like automobiles, it may not work so well for something like laundry detergent. Also, six sigma, or low tolerance quality control generally, may make a lot of sense for something like the mass production of complex items, like consumer electronics, but this original system bears little resemblance to what's usually referred to as six sigma today.

Section 5 - Global Logistics and Customer Relationship Management (CRM)

"What you want is not impossible, it is merely expensive."

– Nicola Tesla

Learning Objectives

- Define Integrated Logistics
- Identify the key elements/areas within logistics
- Describe Customer Relationship Management

Integrated Logistics

The area of logistics is concerned with the physical movement and distribution of goods. This can include both inbound logistics (especially returns, or *reverse logistics*) and outbound logistics.

Logistics, as a business discipline, has been around for a long time. Logistics within a coherently managed SCM system is often referred to as 'integrated logistics'. This just means that the logistics functional area is systematically linked to the larger business process (as opposed to the 'silo' model we discussed earlier).

Managing costs is a critical area for logistics management. Generally, it is easy enough to store something or move something somewhere, it all comes down to how much it will cost. Cost management is such a key component that logistics is usually thought of in terms of a *balance of cost vs. service*.

So, what is integrated logistics? It is an ***integrated system to manage and move inventory while balancing cost vs. service.***

Logistics is normally broken down into six elements or areas:

Order Processing

Also called Order Fulfillment, this is the category of activities related to filling orders placed by customers. Generally, this refers to the administrative functions (often aided by software systems) involved in processing the order, as opposed to the physical activities of *picking* (retrieving items from inventory), *packing* and *loading*.

Inventory Management/Control

Inventory management refers to the process of keeping track of *what you have* and *where it is*. This is usually executed through an Inventory Management System, which is a software system designed to perform these functions. Inventory is usually divided into three different categories: *raw materials*, *works-in-progress* and *finished goods*. Again, depending on the scope and scale of the operation, this may be a small system or a very large, complex system.

Keep in mind companies tend to like to *keep as little inventory as possible*.

Transportation

Transportation refers to the process of moving products from one place to another. Most commonly, the core activity is arranging for shipment of a product to a customer, but may include shipment of a product within or between sites and handling returns.

Products are transported from one place to another using several different methods, usually called *modes*. Common modes include *truck*, *rail*, *ship* and *plane*. Specialty modes include things like pipelines (for liquids or gases) and cable (for electricity). Transportation using multiple modes is called *inter-modal* or *multi-modal*.

In North America, most freight (about 70-75%) is moved by truck, also called motor freight. There are many different types of motor freight used, such as line haul/long haul trucks and specialty trucks (such as a refrigerated truck). The key thing about motor freight is that it can transport *point-to-point*, which is (usually) not possible for rail or plane. However, to transport a product over a long distance, rail freight tends to be more cost effective. Rail and motor freight are usually combined to complete deliveries.

Other modes of transportation may be faster but are usually more expensive. For example, flight freight is the fastest way to move materials and products but is far more expensive than, say, transport by ship (generally, about 80% of international shipments move by ship).

Warehousing

Warehousing refers to the overall strategy of *what to stock and where to locate your warehousing*. Location is key, as generally companies want stock to be as close to the end point of the product as possible (to reduce transportation time and cost). With large companies, especially distributors, warehousing strategies can be very complex, and may include larger distribution centers along with smaller warehouse units, often in what's called a 'Hub and Spoke' model.

Material Handling

Material handling refers to the movement of goods within a warehouse. This is normally a constant process. Inventory is rarely static; goods generally move in and out frequently. Receiving items into a warehouse is usually called, aptly enough, receiving. Moving items out of inventory usually involves a process called 'Pick and Pack' – items are picked (retrieved) from a storage location and packed for shipment. The picking function is often automated, and even modest-sized companies often use some combination of human resources and automation for picking.

Packaging

Packaging refers to packaging an item or items for shipment. This may be a small item that is picked and put in a box upon receipt of an online order, or it may be dozens of pallets (skids) to be shrink-wrapped, stacked and loaded onto a truck. Generally, the cost of packaging for a retail sale is nominal, but for wholesale distribution, packaging is often a major cost area.

Sometimes 'Network Design' or 'Planning' is added as an additional area.

Note, logisticians, in addition to jargon, also love abbreviations and acronyms. So, you may hear 'logistics' referred to as 'log', and warehousing written as 'whse', etc.

Customer Relationship Management (CRM)

Customer Relationship Management, or CRM, refers to the process of managing a company's interactions with their customers. Normally this includes maintaining relationships with customers (often at various levels), maintaining a database of customer information (usually within an information system, called a 'CRM' or CRM system'), tracking and analyzing data, and mass communications with customers.

CRM is usually the core area of responsibility for a company's Sales and Marketing teams. It relates strongly to SCM in that, ultimately, what SCM does (what they buy/make/ship) is driven by customer demand.

An example may help. Let's say we have a manufacturer of laundry detergent. Their customers are most likely going to be retailers and distributors (as opposed to the end-user of their product). Regardless of what type of forecasting approach this company takes, their purchasing and production scheduling will be based on orders from customers (either existing orders or, more likely, forecast orders). The data used to develop these forecasts will be collected and developed with the sales and marketing teams and will come from the CRM system.

Logistics also interacts with CRM, but more directly, usually in the area of shipping coordination and return management.

Global logistics and international trade

The areas of global logistics and international trade have become core components of Supply Chain Management, particularly for larger manufacturing organizations. For many companies, the days of manufacturing and shipping an item from a single location are a thing of the past. As international shipping has become more and more stable and standardized, and communication technologies have advanced, companies have evolved to take advantage of labor and commodity markets all over the world.

In fact, most global trade today – about 70% - is made up of components or unfinished goods, meaning that most international trade is done as a link in a larger, global supply chain.

For some industries, managing a global supply chain has become routine. In particular, complex manufactured items like automobiles and electronic equipment typically have multiple tiers of international suppliers, with dozens or even hundreds of international shipments involved in generating the finished product.

In managing logistics for international shipping, there are a few particularities to keep in mind:

Documentation – international shipping usually requires additional, and specific, documentation. In addition to typical transaction records such as Bills of Lading, Purchase Orders and Invoices, international shipments may involve such things as a Letters of Credit, Sight Drafts and a Certificates of Origin. In addition, all international shipments must go through customs, with specific requirements (and the time it takes to meet them) varying widely.

Mode of Transportation – as we discussed previously, there are various modes of transportation, such as truck, rail, ship and plane. For international transit, certain modes may have different requirements. For example, geographically connected countries may have an expedited customs agreement that applies only to trucks, but not shipments via rail, or vice versa. Also, overseas shipping options will be more limited (given that trains and trucks can't float), and the cost factors may be different. For example, for a domestic shipment, air freight may be three times the cost of rail, but for a particular international destination, it could be much different (such as being ten times the cost).

Time of Transit – time of transit can be of critical importance, not only due the absolute amount of time it takes to get a shipment from point A to point B, but also because of the effect variations can have on the other links in the chain.

The main thing to keep in mind with international logistics is that there are a lot of interconnected parts and pieces. This can mean a lot of opportunities for things to go wrong. Product shortages, like the ones we talked about at the beginning of this chapter, are often blamed on ‘supply chain issues’ but, upon closer analysis, the core problem often comes down to international logistics, and what’s usually referred to as the ‘cascade effect’ or ‘ripple effect’.

For example, let’s say you are expecting a shipment of components to come into the Port of Los Angeles. These components are to be taken to an assembly facility in Mexico. If the shipment is delayed, say by bad weather, or because of restrictions imposed by the port, the (contracted) trucks you had scheduled to take the components to Mexico are not going to wait around. You would have to find alternate transportation. But the factor that caused the delay affected many other shippers, so there may not be any trucks available, or, if there are, they may be too expensive. Further, the factory workers in Mexico aren’t going to wait around for the components, and you might not be able to re-schedule them when the components do arrive. Further still, the components to be assembled there are expected somewhere else at a certain time, so delaying them will cause the same problems down the chain.

And all of this is just for your shipment. The container ship that was delayed has thousands of individual cargoes, each one of them being a link in a larger chain. You can see how one small delay can cascade very quickly into regional, national, or industry-wide product shortages.

Real World Examples

<https://www.supplychaindive.com/news/shippers-to-see-no-relief-in-2022/619697/>

- <https://www.adb.org/sites/default/files/publication/579121/ppe-covid-19-supply-chains-bottlenecks-policy.pdf>

Case study

Introduction

When thinking of a company that has achieved so much efficiency in the supply chain a few come to mind. One company that is often touted as having one of the best strategies is Walmart. Walmart is a superstore that promises “everyday low prices” (Walmart Corporate, n.d.) the question is how? How can they sell their products at a discounted price yet still be valued at more than \$360 million dollars?

Background

The first Walmart store was opened in 1962 by Sam Walton in Rogers, Arkansas. His vision was to create a store with the lowest prices anywhere and at any time. Within a mere 5 years he had 24 stores and sales of \$12.7 million. Before the end of that decade, they officially incorporated Wal-Mart Inc. In 1970 they sold their first stocks for \$16.50 per share. By 1980 they had \$1 billion in annual sales, the fastest of all other companies at that time. Walmart continued to thrive both nationally and internationally. It celebrated its 60th anniversary in 2022.

Forecasting/ inventory management

Businesses are not successful unless they are able to accurately forecast inventory needs. Demand planning and forecasting have also been improved dramatically through simple efforts made by Walmart. Walmart shares its inventory data with its suppliers in order to maintain cycle stock levels. Once an item is sold in one of the stores the data is automatically sent to the suppliers to replenish the shelves. Suppliers in turn can use this data to effectively prepare for Walmart's future needs, reducing the safety stock needed.

Relationships with strategic suppliers to any retail giant are vital, as discussed in the section on supplier relationship management.

Walmart's relationship with each supplier is unique. Because they are one of the world's top companies this allows them much leverage in negotiations with suppliers.

Sourcing/ procurement

Walmart introduced concepts in sourcing that have become industry standards in supply case management. In 1982, Walmart installed the largest private satellite communication network. It is renowned for using Electronic Data Interchange (EDI) with suppliers (Walmart Corporate, 2011). EDI greatly reduced transaction costs by automating most, if not all, paper-based transactions. EDI maximizes efficiency throughout all processes of their whole supply chain from putting orders in to supplier to confirming receipt of the products to paying the invoices. These savings can then be passed down to the customers.

Even more Walmart's move to EDI has allowed them substantial control over the ordering process. They can now greatly coordinate and schedule orders and deliveries. This ensures a steady flow of goods going to the right places and the right time, reducing any interruptions in the stores. This consistency has become another core goal of Walmart.

Logistics/ Warehousing

The logistics of Walmart have added to its growth dramatically. They are known for expanding their store locations near their distribution centers. They build the distribution center in central locations that can support a large group of stores. These distribution centers become the foothold to new territories in

which they can build new stores at negligible additional costs. These cost-saving methods are one way they can keep their prices low, which allows them to be a top competitor.

Global growth

Renown for being one of the most globalized companies in the world, Walmart entered the foreign market in 1991 when they opened a Sam's club in Mexico City. Later in 1994 they expanded into Canada and in 1996 into China. Continuing to grow internationally, by 2010 Walmart commits itself to global sustainable agriculture. By 2015 it became a global force that "employs 2.3 million associates worldwide and serves more than 200 million customers each week at more than 11,000 stores in 27 countries." (Walmart Corporate, n.d.)

Conclusion

As can be seen Walmart is a company that has many methods of controlling costs throughout the whole supply chain. These lower costs can then be passed down to the consumers, creating a loyal customer base. One question that may lend itself here is why do they not increase prices? The answer is even with a low margin for profit for many items, it is compensated for by the sheer volume of sales.

References

- Walmart Corporate. (2011, November). *Getting Started with EDI*. Retrieved from http://c46b2bcc0db5865f5a76-91c2ff8eba65983a1c33d367b8503d02.r78.cf2.rackcdn.com/96/94/da43534249f4acf56eb3a6c3d032/getting-started-with-wal-mart-edi_129954166278575666.pdf
- Walmart Corporate. (n.d.). *History*. Retrieved from <https://corporate.walmart.com/about/history#:~:text=On%20July%202%2C%201962%2C%20Sam,Walmart%20store%20in%20Rogers%2C%20Arkansas.&text=The%20Walton%20family%20owns%2024,up%20%2412.7%20million%20in%20sales.&text=The%20company%20officially%20incorporates%20>

Activity

You are an Amazon seller and your top clients lived in the 8 metro areas listed below. You want to create a network of 3 warehouses that a centrally located to you clients.

1. New York, NY
2. Los Angeles, CA
3. Chicago, IL
4. Dallas, TX
5. Houston, TX
6. Washington DC
7. Miami, FL

8. Philadelphia PA

In which cities will your warehouses be located? Note that the warehouse closest to the metro areas are probably more expensive than the ones in more rural areas.

What metro areas will each warehouse be serving?

Are there already Amazon warehouse in the location you picked, you can find this out with a quick internet search? If there aren't you may need to move to a location where there is a warehouse already.

Which modes of transportation will be the most efficient to use?

What will your travel time (travel time from warehouse to destination) be for every city you serve? Keep in mind shorter lead time allows for faster delivery and happier customers.