

## Module-5

### New approaches in Supply Chain Management

Here are some of the emerging technological trends, tools, and innovations used in supply chain management:

**Big data.** Massive amounts of data are generated every single day. Each minute, 4.5 million searches are entered in Google, 18.1 million text messages are delivered, and 188 million emails are sent. Mobile devices such as wearables, smartphones, and tablets generate a significant amount of the total data usage each day. With so much information at our disposal, it takes complex computing techniques to gather, sort, clean, and analyze such large data sets. Data science and analytics allow companies to use data to gain valuable insights and revolutionize supply chain management. Big data brings value and assistance to the following areas in supply chain management:

- Quality control;
- Cash flow;
- Real-time deployment;
- Warehouse efficiency;
- Weather patterns;
- Predictive strategies; and
- Inventory, supply, and demand.

**Artificial intelligence and machine learning.** AI and machine learning create fully- or semi-automated processes and procedures for supply chain optimization. Optimization improves forecasting, planning, implementation, and maintenance in logistics by using AI and machine learning to emulate human performance and knowledge. AI and machine learning boost the end-to-end supply chain by:

- Tightening data security;
- Applying predictive modeling to third-party logistics;
- Providing full supply chain visibility to improve management of key performance indicators (KPI);
- Automating inventory management, shipping transactions, and delivery routing; and
- Improving customer service.

**Internet of things (IoT).** The IoT — the streamlined connection across various devices — increases visibility and connectivity, while also reducing costs. Wearables and mobile devices like Apple Watches, Fitbits, and smartphones, are especially useful in warehouse settings. Wearables, in particular, provide solutions that lead to having a “touchless” supply chain: the total elimination of the labor-intensive selection of items from inventory to fulfill a customer order, also known as “picking.” Other IoTs allow warehouse and logistics managers to securely track inventory and monitor equipment. Other benefits include:

- Improved asset utilization;
- Better customer service;
- Streamlined inventory and supply availability; and
- Safer and more reliable work environments.

**5Gs.** According to Qualcomm, 5G is foundational to further innovation, which is certainly the case when it comes to supply chain management. Gaining real-time data is difficult when suppliers lack connectivity. Supply chain visibility becomes spotty without 5G. And third-party logistics is made possible through the use of 5G because it elevates mobile networks

through multi-Gbps peak rates, ultra-low latency, and massive data capacity. High-level performance, increased efficiency, and new user experiences become available when 5G interconnects people, machines, objects, and devices. 5G further offers the power to:

- Extract larger amounts of data concerning location, temperature, pressure, and other information that is critical in the end-to-end supply chain;
- Ensure uniformity of information sharing with all stakeholders;
- Resolve issues that would otherwise be aggravated with time delays; and
- Understand exactly where raw materials come from.

**The Cloud.** At any point during the end-to-end supply chain, companies track materials and products, get real-time updates, and inform customers of the status of an order. This is all made possible with cloud computing. Cloud-based solutions enhance a number of areas such as data storage space, integration, security, and information sharing. Activities and processes are streamlined between multiple devices and an enterprise of software users.

**Advanced supply chain management software.** Advanced software has disrupted the entire supply chain industry. In order to stay competitive, logistics companies continue to incorporate technology into their supply chain systems. Businesses feel compelled to track the latest technologies on the market because of consumer demands on cost and delivery speed, and the increasing popularity of customer rating metrics. As technology advances, supply chain software becomes more complex, allowing companies to stay ahead of mistakes, make modifications to orders, communicate across various media channels, and automate shipping. G2— a tech marketplace where businesses discover, review, and manage industry technology — lists the following supply chain management software companies and tools as some of the most popular in the industry:

## Outsourcing supply chain operation

### Why Supply Chain Management Gets Outsourced

But why are companies increasingly trending towards supply chain management outsourcing? We are now living in a time that is more interconnected than ever. Globalization has opened up endless possibilities and ways to do business.

For that reason, it's important to appreciate just how critical it is for companies to effectively manage their supply chains. Think of a company's supply chain as an interconnected web linking its various suppliers. All of these players hold a key role in producing and distributing a unique service or product that is critical to the business's operation.

According to a study conducted by **Deloitte**, companies with superior supply chain management capabilities were significantly outperforming on both growth and revenue compared to companies with average or subpar supply chain management capabilities. In fact, it was reported only 8% of organizations with lower performing supply chain had above average revenue growth. As you can see, high performing supply chain management is vital.

But a number of companies simply don't have the resources to keep up with their supply chains, or it's simply inefficient for them to do so. At that point, they will call in external supply chain logistics and management experts.

These experts will often already have relationships established with a number of suppliers and can leverage these relationships to get clients much better prices. They also tend to offer a number of other benefits and services that help reduce overhead

## Risk Associated with Supply Chain Management Outsourcing

While the possibility of supply chain management outsourcing can absolutely make a company more competitive, reduce the possibility of supply disruptions and resulting headaches, and free up human and actual capital, there is still a major risk: selecting the wrong partner.

- **Cost Control**  
It can be more reliable to outsource to the right logistics company rather than perform the operations in-house to control and manage cost.
- **Alleviate Quality Issues**  
When you pick an appropriate 3PL or 4PL for your supply chain management, you are opened up to their network, industry experience, and web of resources you would not be exposed to otherwise.
- **Increase Redundancy**  
A lot of different infrastructure is utilized during the supply chain management process, a third-party can properly outsource appropriate steps in the process rather than handling it all in-house. The benefits include improved reliability and availability of the system.
- **Manage Complexity**  
If you're getting lost in the details, it may be time to hand over your supply chain management process. The appropriate 3PL or 4PL can navigate through the complex portions of the process, saving you the headache.
- **Reduce Pressure on Staff**  
Rather than bulking up on staff, or straining current employees, it is more effective to utilize outsourcing. With proper staffing, tasks can be delegated and completed efficiently without impeding on other areas of your business.
- **Supplement Your Engineering Skillset**  
Planning, designing, and creating can require expert knowledge your business may not be equipped for, outsourcing can expose you to expert engineering and design knowledge to handle your business needs.
- **Boost Efficiency**  
Increased efficiency leads to meeting customer demands in a timely and effective manner. Outsourcing some parts of the supply chain process can lead to saved time.
- **Increase Your Competitive Edge**  
Outsourcing can give you an edge over the competition because you are exposed to expert knowledge, resources, and business conduct your competition does not have access to while relying only on in-house supply chain management.

## **Co Maker ship in supply chain management**

### **Understanding the Benefits of Effective Shipping Processes**

When we say “transportation” we are referring to the entire process of moving your products through the whole supply chain, from the materials that leave a factory, spend some time at a warehouse, and then continue on to the end user.

Since transportation acts as such a critical element of this equation, making it an integral part of your strategy can lead to significant benefits. When everything is working together effectively, you can expect:

- A higher ROI
- Lower overhead
- Better sustainability
- A competitive advantage
- More effective risk management procedures
- Better demand prediction
- Improved efficiencies
- The ability to meet customer demand

It’s also important to note that you should expect your shipping company to consult with you on the most cost-effective options for every shipment and ensure that you are getting the right type of shipping for your products.

Are your products considered perishable? Your shipping company should help you understand everything about refrigerated transportation.

Are there special considerations for seasonal products? Ask about potential challenges for this year’s crop.

The more you treat your shipping company like a real partner, the more you can expect them to help guide you past any potential issues.

### **Supply Chain Integration**

Your ideal shipping company should be able to enhance almost every aspect of your supply chain activities. This is the most effective way to improve your strategy, because you can work with a single company to provide better warehouse management, inbound freight coordination, order fulfillment, and more.

At Callex ISCS, we provide supply chain management solutions that integrate our storage services so that you can do more than just ship your packages. By combining our shipping with our warehousing facilities, you can take advantage of:

- Flexible pricing
- Experienced fulfilment services
- Material handling experts and equipment
- A variety of storage space options
- High-tech security and monitoring

### **Meeting Customer Demand**

Shipping companies have become even more important in the modern, on-demand marketplace. Customers have high expectations for faster deliveries, and that means that your logistics strategies must find a way to live up to those demands.

This could mean looking at shipping companies with warehouses in physical locations that are closer to your customer base. It could also mean using the most recent and sophisticated

software systems to track inbound and outbound activities, truck locations, and warehouse space.

Customer satisfaction is going to drive your business growth and your ability to remain profitable. You need to find the best ways to deliver your product on time and without excessive shipping costs.

There are a lot of things that may stand in the way, though. Everything from the ongoing driver shortage to the always-increasing costs of fuel can impact your ability to get your products where they need to go. However, planning for these eventualities from the very beginning can help set you up for success in the long run.

### **Tracking Your Shipments**

In order to ensure that your supply chain is running as smoothly and efficiently as possible, your shipping company should provide reliable and effective tracking solutions.

Logistics companies are responsible for the correct picking, loading, and shipping of your products. This can get even more complicated if there are multiple pick-up and drop-off points along the way.

Any losses due to mistakes in the shipping process can be very costly for the manufacturer and the shipping company, which is what makes a reliable tracking system an important part of every shipment.

### **Strengthen Your Supply Chain**

In order to ensure that your supply chain runs as effectively as possible, it's critical to partner with a shipping company that understands your business and can deliver on their promises. This means getting your shipping and warehousing services connected with the most up-to-date tracking and automated systems with managers, drivers, and logistics specialists who are committed to fulfilling the demand for your product from start to finish.

## **The Role of Supply-Chain Management in e-Commerce**

### **The Necessity of Supply Chain Management Strategies**

To heavily summarize, supply-chain management is the organization of all of a business's activities relating to obtaining raw materials and the manufacture and distribution of finished products. When a product is introduced and offered to customers, not only must enough of that product exist to meet consumer demand, but it also must be capable of getting delivered to the customer in as cost-effective and timely a manner as possible.

Remember that e-commerce exists outside of brick-and-mortar locations. Although this field has several advantages, it also comes with the challenge of lacking a primary delivery location. Instead of needing to arrange the supply chain so goods flow towards pre-determined outlets, e-commerce demands flexibility and agility to send items directly to the customer's home.

### **Adjusting Inventory**

Effective supply-chain management in the e-commerce field revolves around how inventory is managed. As mentioned above, the flow of products in e-commerce has to be reactive and able to send purchases out in response to customer orders. Achieving this requires having a

pulse on the flow of consumer demand while maintaining a supply-side mentality. How much of one product should be warehoused and kept on hand versus only being produced when a customer orders? Is existing production scheduling enough to meet anticipated demand or does it need to be adjusted for seasonal spikes and dips? These are just some of the considerations involved in proper supply chain management.

Another key element is easy visibility of the entire supply chain so you can have a proper sense of demand, inventory levels, production levels, costs, and the overall flow of goods. Balancing the management of inventory and production so that neither grossly outpaces consumer demand yet has enough wiggle room in case of unexpected changes is a delicate dance that requires a supply chain's manager to stay informed in as real-time a manner as possible.

## **Green supply chain management**

What is green supply chain management?

Green supply chain management (GSCM) plays a significant role in increasing the competitive advantages of businesses by integrating environmental and economic targets into the supply chain operations.

Green supply chain management (GSCM) can play a major role in increasing the competitive advantages of your business. The goal of sustainable supply chain management is to reduce the carbon footprint and increase the profitability of the supply chain by integrating environmental and economic objectives into the supply chain operations.

Green supply chain management involves functions both within and outside the organisation.

According to the United Nations, "a company's entire supply chain can make a significant impact in promoting human rights, fair labour practices, environmental progress and anti-corruption policies".

Nonetheless, companies find the supply chain the most challenging part in improving their overall sustainability performance. Handling environmental, social and economic effects and encouraging good governance practices throughout a supply chain with dozens of nodes and thousands of partners, suppliers, clients, and shareholders is indeed a titanic task.

So, there is a dire need of different green supply chain management (GSCM) solutions for today's ever-changing supply chain challenges.

## **Distributed Resource planning**

Distribution resource planning, also referred to as distribution requirements planning, is essential for demand and supply planning in supply chain management and beyond. For example, energy resource companies do intensive distribution planning to make sure the grid can meet peak demand. A capacity analysis allows planners to sync energy storage to the overflow needs of the grid so electricity flows uninterrupted.



Distribution planning for supply chain management creates a plan of action to get materials and products from the manufacturer to the distribution center and beyond. This starts with demand planning. Demand planning analyzes data from past customer demand, plus the influence of external factors, both cultural and economic, to predict future demand.

The next step is an assessment of the material requirements to meet projected demand. If you find out there's a shortage of an essential element for your production when you issue a purchase order, that's too late. Think of this step as advanced supply planning.

An important aspect of distribution planning is a capacity analysis of every element of the supply chain. Distribution resource planning means thinking ahead, gaming out all the possible scenarios, and preparing to keep production and distribution flowing under even the most challenging circumstances. Which manufacturing facilities can increase production in the event of a spike in customer demand? Are there transportation resources that can deliver greater volumes? Is a distribution center at capacity or does it have shelf space to take on extra volume? Most importantly, how quickly can these resources ramp up to meet customer demand?

One requirement of robust distribution planning is modeling various scenarios to determine which pressure points in the supply chain affect others. This pre-disaster recovery planning enables you to identify weak links in the chain and shore them up. This is also the point at which supply chain management professionals can tap outside resources to meet the material requirements of production in the event of a disaster.

If 2020 has taught supply chain management professionals anything, it's the importance of pre-disaster recovery planning. While the COVID-19 pandemic drags on, bringing fresh pain to many aspects of distribution and supply, other disasters are waiting on the horizon. Hurricanes, floods, and other types of natural disasters can create sudden and severe breaks in a supply chain. The best supply chain managers have a plan ahead of time and are ready to spring into action when this happens.

To create a pre-disaster recovery plan, you need to plan for every element of your supply chain from raw materials to delivery to the customer. Distribution resources planning [optimizes your supply chain](#) by planning every aspect of the process. End-to-end supply chain management requires visibility into every aspect of production, not starting with manufacturers but with the suppliers that provide raw materials for production.

### **Benefits of distribution resource planning**

Distribution resource planning is foundational to the agile supply chain. Many organizations institute Enterprise Resource Planning (ERP) systems to facilitate demand and supply planning. Companies often turn to ERP software to automate complex resource planning. However, supply chain management professionals must understand the underlying processes.

To calculate inventory requirements, you need to not only keep an eye on predicted future demand but to understand the dynamics of dependent demand. Dependent demand is a demand for one product that affects the demand for another. Independent demand is the customer demand for products that don't impact the sales of other products.

The effect of dependent demand can be positive or negative. In other words, two products may compete for the same customers, leading to reduced demand for one when sales of the

other rise. Or the demand for both products may rise and fall together. A clear understanding of these dynamics is essential for distribution resource planning.

Insightful resource planning creates an environment of collaboration with suppliers that fosters [end-to-end supply chain planning](#). When you involve your suppliers in the supply chain planning process, you gain valuable insights. This type of collaborative planning also prepares every element of your distribution network to better respond to potential disruptions.

### **Skills needed for distribution resource planning jobs during COVID-19**

A typical supply chain manager role requires you to handle supply chain planning and operations. You may also create a demand plan and implement a supply chain strategy that factors in logistics, inventory management, and resource planning. You will be called on to collaborate across departments because the supply chain affects all aspects of business operations.

Distribution resource planning jobs include supply chain manager, supply chain planner, demand planner, production planner, purchasing manager, and logistics director. These roles are generally management positions or part of a career path leading to a role in management. If you're interested in a career in supply chain management, starting with the full skillset is not a requirement. In fact, one of the best ways to prepare for a supply chain job is to pursue an advanced degree, with a course of study that prepares you for the in-demand supply chain field.

In the [MS in Supply Chain Management Online](#) (MS SCM – Online) at UT Haslam, you'll develop proficiency in data analysis, resource management, logistics, and human resource management, among other skills. The MS SCM – Online degree will position you to be on the cutting edge of the rapidly-evolving supply chain field. You'll be ready to jump into distribution resource planning on day one.

### **World class supply chain management**

From a high-level definition, this means having effective interdependent relationships between people, process and technology; and from our suppliers to our customers such that we are enabled to increase market value and drive down end-to-end supply chain costs. Core elements of effort in getting to that end state include:

How do we know we have got a world-class supply chain? There are as many arguments as to what constitutes "world-class" as there are detractors who would question if such a thing even exists. In this modern era, there are significant complexity challenges that require us to consider multiple business dynamics, not least of which are the realities of:

- A global footprint of the supply chain
- Contract manufacturing that is increasing
- 3rd party logistics vendors that are increasing
- Product life-cycles that are becoming more dynamic
- Distribution movements through multi-channels
- Batch size / quantity limitations impacting capacity



- Lead time uncertainty impacting on-time delivery
- Frozen forecast windows with inaccurate information
- Multiple / seasonal supply sources and so on

Within this environment of complexity, there are also many indicators of success that provide insight as to whether or not we are on the right track.

These include:

- Reduced inventory through improved planning and control
- Minimized shortages and interruptions to improve production efficiency
- Reduced materials cost through improved procurement and payment protocols
- Reduced labor cost through better allocation of staff and reduced overtime
- Increased sales revenue, driven by better managed customer relationships
- Increased gross margin percentage
- Reduced administrative costs
- Reduced regulatory compliance costs

Getting to this end state requires not only that we measure ourselves but also that we build strong interdependent relationships across the extended supply chain. The net result is a competitive edge needed to drive successful and sustainable businesses.

## BUILDING COMPETITIVE EDGE THROUGH INTERDEPENDENT RELATIONSHIPS

Competitive edge is something all companies strive for as part of building their so-called "world-class supply chain." From a high-level definition, this means having effective interdependent relationships between people, process and technology; and from our suppliers to our customers such that we are enabled to increase market value and drive down end-to-end supply chain costs. Core elements of effort in getting to that end state include:

- Collaborative long-term relationships built on respect and trust
- Effective demand signals that drive sourcing and manufacturing and enable volume adjustments as needed
- Operations and logistics alignment with capacity managed and leveled production schedules
- Ability to manage mixed loads with on-time / in-full delivery coming into and going out of the organization
- Ongoing collaborative operations and product delivery improvement with cost reductions across the end-to-end chain

But around each corner, many enemies that undermine our abilities to realize this interdependent focus are lurking. Three specific areas that have an unwanted negative impact are:

### Delaying decisions

- Delayed decisions need to be covered by inventory.

- Second-guessing safety stock decisions means it is a false signal.
- Time delays increase the size of the process deviations.

Uncertainty and lack of reliable data

- Broken and unreliable processes result in poor delivery.
- Lack of reliability results in uncertainty -- any uncertainty gets covered by inventory.

Decision points / functional hand-offs

- Each hand-off / pass to another function increases the danger of “dropping the baton.”
- We must minimize manual activity and automate within a controlled environment

The underlying hypothesis from the above is that "bad data / information gets covered by inventory." From a world-class perspective, our interest lies in optimizing opportunities that impact the bottom line. This means understanding the supply chain effort required to support improvements in sales, while also driving down costs.