

Original Article: Human-Centered Supply Chain Management

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ABSTRACT

In this study, human-centered supply chain management has been examined. Supply chain management simplifies activities related to the supply of goods, increases customer satisfaction and is considered a competitive advantage for a business. In simple terms, supply chain management is a network of people, businesses, resources, technology and specialized knowledge that work together in a coherent manner to produce, distribute and sell products. The supply chain structure usually begins with the producers of raw materials and ends with the supply of the final product to customers by various retailers. Each implementation of the supply chain entails costs for a business. Therefore, it is natural that an optimal supply chain reduces waste of resources and additional costs. The supply chain begins to work when the manufacturer receives the order from the customer. Therefore, its basic functions include product development, marketing, sales, operations, distribution networks, finance and customer service. The entities involved in the supply chain include manufacturers, sellers, warehouses, transportation companies, distribution centers, and retailers. The goal of supply chain management is to improve the efficiency of the supply chain process so that the right product reaches the customer on time and at the lowest cost. The belief that supply chain management can lead to better customer responsiveness and ultimately greater profitability has made many managers aware of the supply chain management debate.

Introduction

As you might guess, the production-to-sale process is not a new process in business and the market [1]. So the history of supply chain management goes back to the day

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when the first products were produced and sold! But with the advancement of technology

and industrialization, the emergence of computers and advanced software, supply chain management has gradually become more complex and specialized [2]. Currently, SCM is no longer a simple past and requires a set of different networks that are available 24.7.

SCM has always been aimed at increasing efficiency and reducing costs; but these days, in

addition to these two important things, it pursues a greater goal. Currently, the customer has the first priority in the supply chain management strategy [3]. Of course, rising customer expectations also require faster progress of this system. One expert in this field says: "A customer is born in the supply chain and dies in the same field." This refers to the importance of supply chain management, which can make or break a customer.

The term supply chain dates back to the Independent newspaper in 1905. However, this chain has existed in practice since the beginning of history. Ancient empires, including the Roman Empire, always considered the development of logistics and the transportation of goods as part of their main strategies. However, until the early 18th century, due to the lack of advanced transportation, the supply chain was more local and regional. Since the late 1920s, the emergence of the concept of mass production laid the initial foundations for the definition of the supply chain [4].

This issue was first successfully implemented by the Ford Company and spread to other businesses. For example, shipbuilding and container manufacturing companies gradually turned to mass production and inevitably paid attention to the supply chain. After that, the emergence of the commodity barcode system in the United States and receiving approval from standard associations brought about another evolution in the definition of the supply chain [5].

Over time, the barcode became an international standard that was used all over the world. Technological advances in the 1980s and onwards, such as the emergence of computers, the Internet and various software, played a major role in the evolution of the supply chain structure. So that with the emergence of ERP software, the concept of supply chain evolved much more than before. Because the ERP

system was responsible for integrating data and information throughout the processes and chain of a business. Finally, the history of the supply chain can be linked to the emergence of social networks, issues related to big data and data analysis. Now supply chain management has been forced to use technology to respond to the needs of stakeholders [6].

What is the importance of supply chain management?

Most successful businesses use supply chain management to reduce overhead costs, deliver products faster, and streamline processes. If a manufacturer's supply chain structure is working properly and optimized, it can fill empty shelves in the retail stores related to its business on time and in the process, eliminate its competitors one by one. The ultimate goal of supply chain management is not limited to delivering the product to the customer; rather, all activities before, during, and after delivery must be considered and addressed in SCM. Weaknesses in supply chain management can lead to broken promises, delays, reduced quality, and further damage to customer trust and loyalty. Of course, these are not the worst things that can happen; Mismanagement of the supply chain can even create legal problems for a business [7].

Supply Chain Structure and Components

The main components of supply chain management include 4 main elements: integration, operations, purchasing, and distribution. Each of these supply chain components has its own importance and must be well-functioning to ensure business success:

- ✓ **Integration:** One of the components of supply chain management is effective communication and constructive cooperation between the parties to a business strategy. This communication minimizes errors and saves business costs.

Integrating different departments combines diverse expertise and creates effective collaborative teams. All of these measures help managers work more efficiently and simplify the supervision of the overall operations of the team. As a result, the weaknesses of the organization will also be better and easier to identify.

- ✓ **Operations:** The operational section refers to monitoring the work of employees and ensuring that goals are achieved as planned. Managers should constantly evaluate processes to ensure that the various stages of the chain are on track, and by constantly evaluating processes, identify efficient parts and use human resources more productively [8].
- ✓ **Purchasing:** Before purchasing raw materials from suppliers, you should check what materials you need? How much? Which suppliers do you want to supply these materials from? At what quality and

cost? Of course, these checks are not limited to raw materials and you also need answers to these questions about machinery, tools, equipment and human resources. If the organization faces a shortage in any of these areas, the production process may be delayed and have irreparable effects on the business reputation. On the other hand, oversupply may exceed the organization's capabilities and budget and cause other problems.

- ✓ **Distribution:** Receiving the goods by the customer and its challenges is the final stage of the supply chain structure. It does not matter whether it is received from the store shelves or by direct shipment! In order to do it in the best way and to satisfy the customer, proper planning is needed. In all these stages, and especially in this last stage, a suitable logistics software will be very helpful (Figure 1).

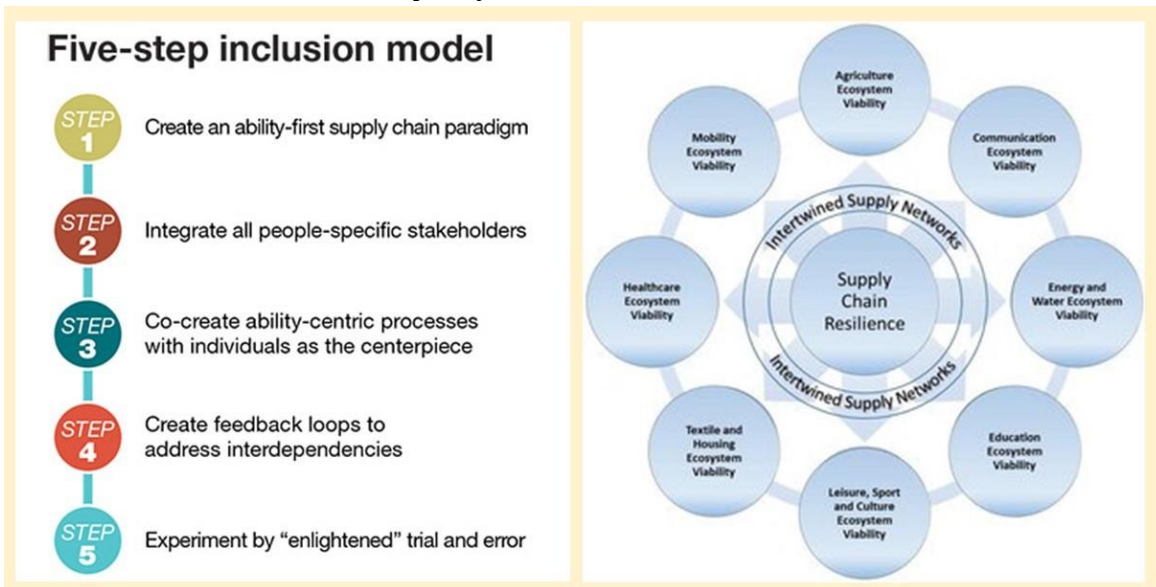


Figure 1. Human-Centered Supply Chain Management

Objectives of Supply Chain Management

The supply chain is the backbone of today's commercial organizations and businesses. Supply chain management strategies place more value on the customer than other

methods and strategies in a business and therefore can have a significant impact on the progress of the organization [9]. In this section, we will discuss the main objectives of supply chain management and examine them:

- ✓ **Improving efficiency:** Increasing efficiency means minimizing waste. Waste and discards are not necessarily physical waste; time, materials, costs, and customers may also be wasted and destroyed during production and supply. Supply chain management minimizes waste and damage by managing and optimizing production, inventory, transportation, logistics, and identifying opportunities for system improvement. The truth is, the whole process is not easy, but the end result is worth it.
- ✓ **Quality Improvement:** Another goal of the supply chain is to maximize the quality of products, while adhering to quality and legal principles. Quality principles are defined based on customer demands. To improve quality, it is necessary to set and use precise standards from the beginning. These standards include adherence to safety principles and compliance with established ethical principles.
- ✓ **Logistics Transportation Optimization:** Contrary to what many people think, SCM is not limited to logistics, and logistics is only one of the areas of focus of supply chain management. This area includes up-to-date material handling systems and software to track the status of the product by the supplier, manufacturer, retailer and wholesaler. SCM ensures that your product supply processes will be well-run [10].
- ✓ **Cost Reduction:** One of the main goals of supply chain management is to reduce costs in most supply stages. The high speed of this cycle in a successful and advanced SCM causes goods to move faster and their storage costs to decrease. In addition, there will be savings in purchasing, production and delivery costs.

Increasing customer satisfaction: As mentioned, customer satisfaction is currently the main priority of supply chain management.

This customer satisfaction is achieved in two ways:

- ✓ **Pricing balance:** Due to the reduction in costs, the business has more freedom to price products. With a relative reduction in prices, the speed of attracting and satisfying customers increases [11].
- ✓ **Improving the delivery process:** In the field of delivery of goods, with the help of supply chain management, customer demands and more are addressed.
- ✓ **Improving distribution:** The supply chain also affects the improvement of the distribution process. Freight channels work in harmony with warehouses, which affects the reduction of costs and the improvement of the speed of distribution.
- ✓ **Increasing coordination in the chain:** Supply chain management works towards greater coordination of stakeholders in a business. This management strategy allows employees, customers and suppliers to communicate effectively with the business. Managers can also better direct employees and employees can communicate with their employers if necessary. All of these things help to increase the overall coordination of the business throughout the supply chain.

What are the principles of supply chain management?

Supply chain management is so important for businesses that if unexpected challenges occur during it, there is a possibility of partial or total failure of a business. This will have irreparable effects on the customer and the manufacturer. Therefore, to manage the crisis and reduce risk, the principles of supply chain management are presented, which we will examine in 7 cases:

- 1. Enable continuous monitoring of inventory:** Create a system for your business that allows you to access the entire supply chain and distribution network, from suppliers to customers, in real time. Provide your

employees with the necessary and sufficient training to update this system and fully justify to them the importance of this task. Every transaction that is made should be recorded in real time and its profit and loss should also be calculated in the system [12].

2. Monitor and manage supply to demand as a process: A product ideally moves in a straight and balanced manner from manufacturer to customer. Each store prepares and stores the required quantities of the product according to its forecasts. Consider this process for all your contracted retailers and plan accordingly. To improve the way, you deliver your product, consider frequent and small deliveries rather than moving large products in small quantities; this creates a kind of balance in your transfers.

3. Consider the speed and accuracy of the system in planning: The process of producing a product until it is purchased by the customer is called the response time of the supply chain. The higher this variable, the greater the problems will be in predicting the need for more production until production stops. On the contrary, if you use up-to-date, healthy and fast logistics and procurement software; process problems will be identified quickly [13].

4. Data analysis is better done in real time: If data analysis is done in real time, it becomes possible to measure fluctuations in demand. In fact, not all products are sold at the same speed! Some products have a constant consumption rate, and some of them experience seasonal peaks and valleys. Supply and demand management needs real-time analysis to identify and classify products based on their sales fluctuations and use this information in supply chain planning.

5. Use and improve predictive models: The more and more up-to-date the input data to the supply chain management system, the higher the possibility of predicting business behavior and its chances of success. Therefore, justify

your forces to timely record the increase and decrease of any variable in this path according to a specific pattern and thereby contribute to the chain management improvement strategy. You can update your current forecast model with new information and thus be prepared to deal with less predictable events [14].

6. Expand your supplier base: You've probably heard the saying, "Don't put all your eggs in one basket!" You can be loyal to one supplier, but at the same time, identify and keep other suppliers on hand just in case. This way, if your main supplier goes down, your business won't be affected by their problems and you won't lose customers. These suppliers can be located at different distances from you and have different payment methods.

7. Consider new distribution channels and networks: Don't stay stagnant. Be open to new events and experiences, and use systems that will ensure your long-term success. You can take advantage of advanced logistics and procurement software to help your business grow.

Types of Supply Chains

In general, there are two types of supply chains: closed-loop and open-loop supply chains, which we will introduce below:

- ✓ **Closed-Loop Supply Chain (CLSC):** In this type of supply chain, materials and resources are returned to the organization's production chain and reused. This is done instead of throwing away waste and the goal is to design a sustainable system that minimizes or approaches zero waste. Most food, fast food, and beverage production and distribution industries fall into this category [15].
- ✓ **Open-Loop Supply Chain (OLSC):** When an organization does not return used products to the original company but rather recycles and uses them in another

company, the supply chain is called open-loop. In such a structure, the products that have been converted into raw materials are used in the production of other materials. For example, worn-out Nike shoes are used

as fibers. The difference between an open-loop and a closed-loop supply chain is that the used and recycled products are returned to the original company or used in another organization (Figure 2).

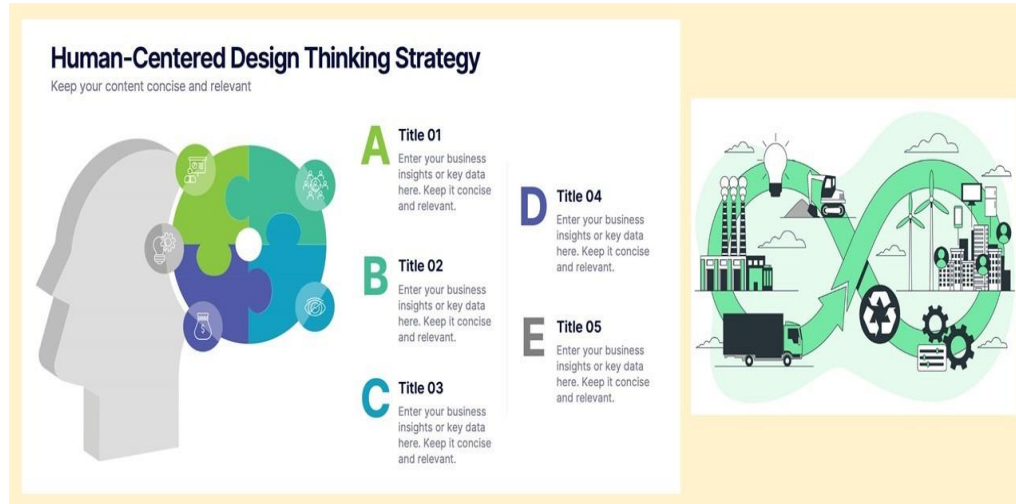


Figure 2. Supply Chain Management Infographics

Types of Supply Chain

As you can probably guess, there are different types of supply chain management, each with its own advantages and disadvantages and are chosen according to the type of business. A wrong choice can cause irreparable damage to the organization.

- ✓ **Continuous Flow Supply Chain Management:** One of the most traditional and oldest types of supply chains is the continuous flow type. This type is considered the best choice for stable industries and businesses; because it requires stability. In this method, there is a stable level of demand and uniform goods are flowing between the manufacturer, distributor and customer [16].
- ✓ **Fast Chain Supply Chain Management:** This management method is used for products whose life cycles are short. For maximum efficiency and proper sales of this type of product, specific activities and skills are required.
- ✓ **Efficient Supply Chain Management:** Efficient supply is used for competitive

industries and aims to maximize efficiency and predictability of production, and for this, adequate and sufficient raw materials and machinery are needed. The smallest inefficiency along this chain will have significant and sometimes irreversible effects on the entire supply network. The challenges of this type of chain are labor shortages, reductions in raw materials, or disruptions in the production process, which opens the way for competitors [17].

- ✓ **Agile Supply Chain Management:** This method is dedicated to specialized items that require more care in the network. Agile supply chain management has been required with the help of technology. Transportation in this category of products has a higher cost and a balance limit in the volume of products must be observed to be economically viable. This method is opposed to the continuous method.
- ✓ **Custom-Configured Supply Chain Management:** Customized supply chain management is a combination of the agile and continuous models, and its settings can

be changed and manipulated. In this case, the product is customized at one or more stages of the chain [18].

- ✓ **Flexible Supply Chain Management:** Another type of supply chain is flexible supply chain management, which allows demand to be managed in volatile conditions. With the help of flexible management, demand can be managed during peak sales seasons and then adapted to the subsequent decline in demand. Procurement and logistics software is needed to implement this method optimally.

Green Supply Chain Management

Green Supply Chain Management (GSCM) is a set of standard and strategic practices for controlling supply chain activities with the aim of reducing environmental impacts and increasing sustainability. The concept of green supply chain seeks to ensure that these supply chain processes are as environmentally friendly as possible by optimizing supply chain processes through the use of advanced technologies and sustainable policies. Green supply chain management is based on the principles of "Reduce, reuse, recycle, recover and degradable" [19].

These principles help organizations to minimize waste generation, use renewable resources and at the same time increase their operational efficiency. By adopting this approach, companies not only comply with legal requirements and environmental regulations, but also benefit from the economic and competitive advantages associated with sustainable processes. Also, paying attention to environmental issues creates a positive image of a business brand in the minds of the audience and has a direct impact on increasing sales.

Main objectives of green supply chain management

The main objectives of green supply chain management may vary depending on the industry and company, but generally include the following:

- 1. Reducing greenhouse gas emissions:** The carbon footprint of supply chains usually contributes significantly to greenhouse gas emissions such as carbon dioxide and hydrofluorocarbons. A green supply chain helps reduce these pollutants by using alternative technologies [20].
- 2. Increasing the use of renewable resources:** Reducing dependence on fossil fuels and using renewable energy such as solar and wind energy is one of the key steps to greening the supply chain.
- 3. Minimizing waste in supply processes:** Harmful industrial wastes create a lot of environmental pollution. Green supply chain management reduces this problem through strategies such as reducing waste generation, using recycled equipment, and employing biodegradable packaging.
- 4. Compliance with environmental protection regulations:** Strict environmental laws are being implemented globally. Green supply chain management prevents legal problems and potential disruptions in businesses by ensuring compliance with these regulations [21].

Main processes of supply chain management

Supply chain management tries to minimize shortages and keep costs down. The job is not just about procurement and purchasing inventory, and supply chain managers must monitor and manage the entire supply chain and logistics operations to maximize efficiency and minimize the organization's supply chain costs. Improving the efficiency and effectiveness of the supply chain ultimately

affects the final product of a business. In SCM, the supply chain manager coordinates all aspects of the supply chain, which consists of five main processes [22].

The main processes of supply chain management are as follows

Planning: To get the best results from SCM, the supply chain management process should begin with planning to match supply with customer demand and production planning. In fact, businesses need to anticipate future customer needs and act accordingly. This planning concerns the raw materials required at each stage of manufacturing, equipment capacity and constraints, and employee needs throughout the supply chain management process. Large organizations often rely on ERP software modules to gather information and shape plans.

Sourcing: The effectiveness of SCM processes relies heavily on strong relationships with suppliers. Sourcing involves working with vendors to secure the raw materials needed during the production process. An organization may be able to plan in advance and work with a specific supplier to obtain the goods it needs. However, different industries will require different resources. In general, SCM sourcing should ensure that:

- ✓ Raw materials meet the manufacturing specifications required to produce the goods [23],
- ✓ Costs paid to manufacture the goods are in line with market expectations,
- ✓ The vendor has the ability to deliver emergency materials in the event of unforeseen events,
 - ✓ The vendor has a good track record of delivering goods on time and with quality.

Supply chain management is especially important when manufacturers work with

perishable goods. When sourcing goods for these companies, attention should be paid to the delivery time of the goods and how well the supplier can meet these needs [24].

Production: Production is at the heart of the core supply chain management processes where raw materials are transformed using machinery, labor, or other external forces to make something new. The product created is the ultimate goal of the production process; Although it is not the final stage of supply chain management! The production process is further divided into sub-tasks such as assembly, testing, inspection, and packaging. During the production process, a business must watch out for waste or other controllable factors that may cause deviations from the original plans. For example, if a company is using rawer materials than planned due to lack of training of employees, it should correct this problem or reexamine the initial steps of SCM.

Delivery: After the products are manufactured and the sale is finalized, an organization must get its products to the customers. The distribution process is often seen as an effective process in the brand image of the business because up until then, the customer has not yet interacted with the product. In strong SCM processes, a company has strong logistics capabilities and delivery channels to ensure timely, safe, and cost-effective delivery of products. This process also includes having backup or alternative distribution methods in case one of the transportation methods is temporarily unavailable. For example, an organization's delivery process should not be affected by unprecedented snowfall in distribution areas [25].

Returns: The supply chain management process ends with product support and the possibility of a customer returning the product.

It's bad enough that a customer needs to return a product, but it's worse when the return is due to a mistake on the part of the business. This process of returning goods is often called reverse logistics. A business must ensure that it has the ability to accept returned products and has properly established a refund process for the cost incurred. Many organizations view customer returns as an interaction between the customer and the company. However, a very important part of this return should be dedicated to identifying defective products, expired products, or non-conforming goods. Without addressing the root cause of customer returns, the supply chain management process will fail and will likely continue to fail in the future [26].

What information does supply chain management provide to businesses?

In the past, using supply chain management was an occasional choice, and in the future, this practice is considered a permanent necessity. In the future, SCM will mainly balance planning and execution, and its proper functioning will require high speed and accuracy. Sooner or later, your business will need this strategy and software; by taking timely action, you can get ahead of your competitors.

SCM provides businesses with three main tools that help develop the business in three areas

- ✓ **Area One:** Identifying Potential Problems: The first area is related to providing the necessary information to identify potential problems before they occur. For example, successful supply chain management identifies products that are constantly returned and takes steps to correct or collect them before the customer loses hope and trust [27].
- ✓ **Area Two:** Balanced and Dynamic Pricing: The second area is related to pricing. Not all

products have the same sales and success throughout the year. Supply chain management helps to identify and examine the conditions affecting the prices of products and update and balance them. Of course, dynamic pricing is not common to all businesses, risks and problems and varies from organization to organization.

- ✓ **Area Three:** Market Analysis: SCM provides the business with sales and demand analysis tools. Information about sales forecasting, order forecasting and how to plan deliveries that helps in proper planning and increasing customer life.

What is the difference between supply chain management and logistics?

The terms supply chain management and logistics are very widely used in the field of production and operations and are sometimes mistakenly used as synonyms. However, these two concepts, although related, have fundamental differences.

- ✓ **Logistics;** Part of a larger whole: Logistics deals with planning, implementing and controlling the flow of goods, services and information from the point of origin to the destination. Logistics includes transportation, inventory management, warehousing, order processing and product distribution. The main goal of logistics is to move goods at the right time and place at the optimal cost [28].
- ✓ **Supply chain management;** A comprehensive and strategic perspective: In contrast, supply chain management is a broader concept that includes not only logistics, but also other key processes such as raw material procurement, production, product development, customer service and cooperation between suppliers and business partners. This area includes strategic decisions about sourcing, process

optimization, and improving the efficiency of the entire system [29].

Examples of the Difference between Supply Chain Management and Logistics

To better understand the difference between these two concepts, consider an automotive manufacturing company:

- ✓ **Logistics role:** Sourcing and transporting ink and plastic from suppliers to the factory, monitoring the inflow and outflow of raw materials, scheduling the shipment of finished products to warehouses, and ultimately distributing them to stores across the country.
- ✓ **Supply chain management role:** Selecting the best suppliers for ink and plastic,

evaluating more cost-effective transportation options, analyzing the optimal amount of space for storage, and investigating whether the production or distribution method could be more efficient.

Or, in another example, consider an e-commerce company:

- ✓ **Logistics role:** Processing orders, managing inventory, packaging, and shipping products to customers [30].
- ✓ **Supply chain management:** Analyzing customer purchasing trends, optimizing inventory levels, working with suppliers to ensure a sustainable supply of goods, and exploring new transportation methods to reduce costs (Figure 3).



Figure 3. Examples of the Difference between Supply Chain Management and Logistics

Supply Chain Management Using Software Solutions

Supply chain management requires a demand-based operating model that brings together

people, processes, and technologies in an integrated manner. In this case, goods and services are delivered with remarkable speed and accuracy. All these tasks can be covered by

an advanced and up-to-date software. Organized and intelligent supply chain management has always been important; but now it is a necessity and a guarantee of the survival of a business [31].

Procurement and logistics software also have other advantages that make them more valuable. The important thing is to choose the right and well-known software that can simplify things. Supply chain management revolves around the issues of responsiveness, delivery, experience and customer satisfaction, and of course, reducing costs also plays a significant role in it. Each management department must be relevant and coordinated with the needs of consumers. On the other hand, finding resources, providing appropriate business rules and policies, and transportation methods are important in this strategy. Technology seems to be moving towards improving and advancing supply chain management, and software is also constantly updating and advancing [32].

Benefits of systemization in supply chain management

- ✓ **Increased efficiency:** By creating standard and specific processes, systemization helps you perform supply chain tasks more effectively and efficiently. This can lead to reduced process time, increased accuracy, and reduced errors.
- ✓ **Reduced costs:** By optimizing supply chain processes, you can significantly reduce costs related to warehousing, transportation, waste, and other items.
- ✓ **Improve customer satisfaction:** Systemization can significantly help increase customer satisfaction by ensuring timely and defect-free delivery of products to customers.
- ✓ **Increase flexibility:** Systemization-based supply chain systems provide you with greater flexibility so that you can respond

more effectively to changes in demand, raw material prices, and other market conditions.

- ✓ **Improve communications:** By creating a common language between different parts of the supply chain, systemization can help improve communication and collaboration between them.

Risk management and decision-making

Supply chain management is inherently risky. MBA programs teach students how to identify risks and develop risk management strategies. This skill is essential for building a resilient and sustainable supply chain [33].

- ✓ **Technology and Innovation:** Many MBA programs focus on emerging technologies in supply chain management, including the applications of big data and artificial intelligence (AI), and prepare graduates to use these technologies to optimize the supply chain. This capability helps them make significant improvements in supply chain performance and customer experience.
- ✓ **Opening connections and networking:** MBA programs give students the opportunity to connect with experts and peers in different industry areas. This networking can help create opportunities for collaboration in the supply chain and provide better awareness of best practices and innovations.
- ✓ **Leadership and Teamwork:** Supply chain management requires leadership and teamwork skills. MBA courses teach students leadership and team management skills that are essential for leading teams and creating effective collaboration between suppliers, manufacturers, and distributors.
- ✓ **Social Responsibility and Sustainability:** Given the importance of sustainable approaches and social responsibility in

today's world, MBA courses often focus on issues related to sustainability and the social impact of the supply chain. This knowledge helps managers make responsible decisions that not only contribute to efficiency and profitability, but also have a positive impact on the environment and society [34].

Challenges

- ✓ **Changing Customs Laws and Regulations:** One of the biggest challenges in managing international supply chains and imports is the constant changes in countries' customs laws and regulations. Each country has its own rules for imports and exports that may affect processes and costs. Any changes in customs laws, such as increased tariffs or changes in required documentation, can delay product deliveries, increase costs, or even lose business opportunities.
- ✓ **Exchange rate fluctuations:** Given that many international supply chain activities require payments and transactions in foreign currencies, exchange rate fluctuations can have a significant impact on the costs and profitability of organizations. Sudden changes in exchange rates can increase the price of imported goods and raw materials. Organizations should find solutions to mitigate the risk of currency fluctuations, such as using financial instruments or fixed contracts.
- ✓ **International transportation issues:** One of the major problems in the international supply chain is delays or disruptions in the transportation of goods. These issues can be caused by weather conditions, global crises such as pandemics, wars, sanctions, or problems related to transportation infrastructure. These disruptions can lead to delays in delivery times, increased transportation costs, and customer

dissatisfaction. In addition, organizations must pay attention to challenges such as choosing the most appropriate transportation route and managing potential risks in this sector [35].

- ✓ **Global logistics and coordination challenges:** Managing international supply chains and imports typically involves a large number of suppliers, distributors, and customers in different countries and regions. This can create challenges such as international coordination, language and cultural differences, different laws in each country, and the need for integrated information systems to manage and track goods.
- ✓ **Political and economic risks:** Political changes or economic crises in different countries can have a major impact on international supply chains. Wars, sanctions, political unrest, and economic crises can limit access to markets, increase costs, or even completely cut off the supply of resources. Organizations must adopt strategies to manage these risks and ensure the sustainability of their supply chains in times of crisis [36].

Opportunities

- ✓ **Cost reduction through cheaper sourcing:** One of the biggest benefits of an international supply chain is access to cheaper resources and lower-cost suppliers. Organizations can reduce their production costs and thus increase their profitability by sourcing raw materials or goods from countries with lower production costs. For example, many companies move their production to Asian countries because of their lower labor costs.
- ✓ **Access to new markets:** An international supply chain allows organizations to reach new and wider markets. This opportunity

can be particularly attractive for companies operating in saturated domestic markets. By expanding into international markets, organizations can increase their sales volume and benefit from higher revenues [37].

- ✓ **Diversification of resources and risk reduction:** By expanding the supply chain internationally, organizations can access more diverse resources. This diversity helps them reduce the risks associated with dependence on one or more suppliers and be more resilient to disruptions in the supply chain. For example, if a supplier is unable to fulfill its obligations due to internal problems or economic crises, the organization can use other suppliers in different regions.
- ✓ **Innovation and access to advanced technologies:** Expanding business activities globally allows organizations to access the latest technologies, new production methods, and innovative solutions. This can help improve product quality, reduce costs, and increase competitiveness. The use of advanced technologies in production and supply chain management can significantly increase the efficiency of organizations.
- ✓ **Use advanced software for better management:** Using advanced software tools such as enterprise resource management (ERP) systems allows businesses to manage their supply chain

processes effectively and seamlessly. These software's help organizations to have accurate and up-to-date information on inventory status, delivery schedules, costs, and supplier communications, and optimize their processes globally [38].

Overall, international supply chain management, despite the many challenges it brings, can provide vast opportunities for businesses. By using new technologies and careful planning, organizations can turn these challenges into opportunities and succeed in global markets.

The relationship between supply chain management and logistics

Supply chain management and logistics are two related but distinct concepts. Logistics is a part of the supply chain that focuses on the transportation, storage, and delivery of products. Supply chain management is a more comprehensive process that includes all aspects related to the production and distribution of products. In other words, logistics is a subset of the supply chain. Optimizing logistics, including the use of new technologies and management tools such as ERP software, can help improve the overall efficiency of the supply chain. This is especially effective in today's world where speed and accuracy in the delivery of goods are of great importance (Figure 4).

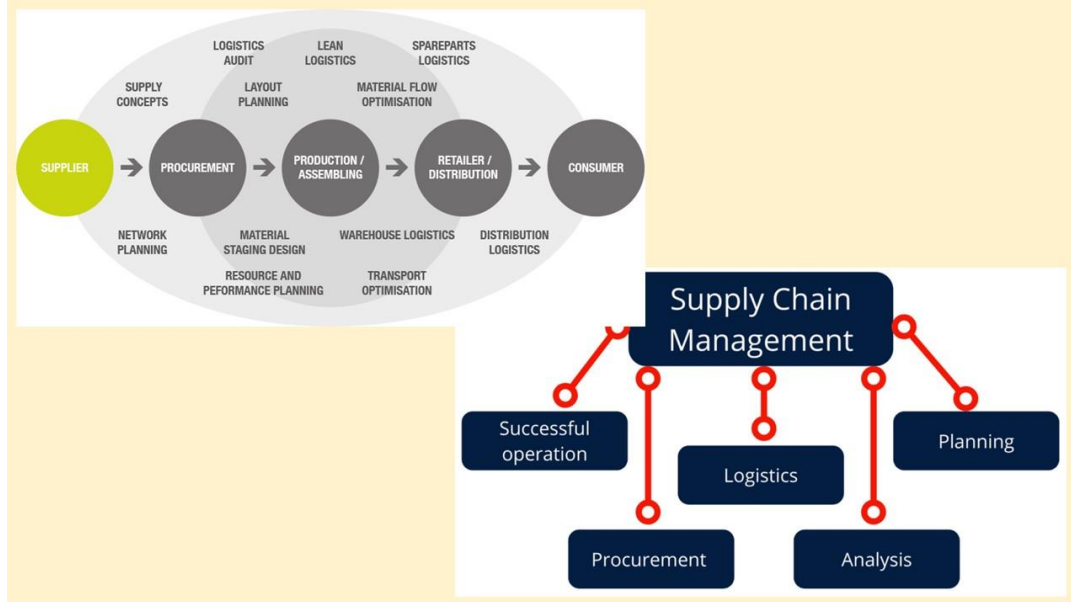


Figure 4. The relationship between supply chain management and logistics

New technologies and innovations in supply chain management

Today, the use of new technologies in supply chain management has become very important. Advanced technologies such as artificial intelligence, machine learning, the Internet of Things (IoT), and block chain help organizations manage their supply chains more accurately and quickly.

- ✓ **Artificial intelligence and machine learning:** Used to better predict demand, optimize transportation routes, and identify bottlenecks in the chain.
- ✓ **Internet of Things (IoT):** Enables real-time tracking and monitoring of inventory and products.
- ✓ **Block chain:** Provides greater transparency and certainty in transactions between suppliers and manufacturers and stores information in an immutable manner [39].

Discussion

Examples of the application of systemization in supply chain management

- ✓ **Establish standard processes for purchasing raw materials:** With systemization, you can completely standardize the processes related to purchasing raw materials. This can include creating purchase lists, determining supplier selection criteria, negotiating prices, and carrying out ordering processes.
- ✓ **Optimize warehousing:** With systemization, you can completely optimize the processes related to warehousing. This can include creating inventory management systems, organizing the warehouse, managing the entry and exit of goods, and tracking the location of goods.
- ✓ **Effective transportation management:** With systemization, you can effectively manage transportation-related processes. This can include selecting appropriate transportation methods, planning routes,

tracking shipments, and managing transportation costs [40].

- ✓ **Establish quality control systems:** With systemization, you can create quality control systems for your products and services. This can include conducting inspections, tests, and other necessary measures to ensure the quality of your products and services.

Examples of supply chain management

Walmart and P&G, which began in the late 1980s, are classic examples of supply chain collaboration. Before they started, they shared quantitative information with retailers and manufacturers to connect their supply chains, and the result was that sharing information reduced costs. This made other retailers more willing to explore this new solution. In the early 1990s, Walmart formalized its Retail Link system and added other retailers to its supply chain [41].

There are several software companies on the market, each with its own strengths and features. Some of the most famous supply chain management software companies are

- ✓ **SAP:** The most famous software solutions provider in the world. It has a wide range of modules to manage processes related to logistics, production planning, inventory management, etc.
- ✓ **Oracle:** Oracle offers a comprehensive suite of SCM software solutions that cover areas such as logistics, order management, and transportation management.
- ✓ **IBM:** Offers a wide range of SCM software solutions, including supply chain management, demand planning, inventory optimization, and order fulfillment.
- ✓ **Microsoft:** Microsoft offers its SCM software solution through the Dynamics 365 suite, including modules for inventory management, warehouse management,

and transportation management in its software.

- ✓ **JDA:** Provides supply chain management software solutions, including demand planning, inventory management, and transportation management [42].
- ✓ **Infor:** Offers a variety of SCM software solutions, including modules for demand planning, supply chain management, and warehouse management.
- ✓ **Manhattan Associates:** Offers a suite of SCM software solutions that include modules for order management, transportation management, and warehouse management.

Examples of Supply Chain Management in Iranian Companies

Iranian companies have also been able to achieve success in domestic and international markets by implementing supply chain management (SCM) systems. Some successful examples include:

- ✓ **Golrang Industrial Group:** With a wide variety of products in various fields such as detergents, food, and cosmetics, this group is one of the successful examples of supply chain management in Iran. By creating an extensive network of raw material suppliers and utilizing advanced warehouses and integrated distribution systems, Golrang has been able to quickly respond to market needs and maintain the quality of its products [43].
- ✓ **Iran Khodro:** As one of the largest automobile manufacturers in Iran, Iran Khodro has a complex supply chain that includes sourcing parts from domestic and foreign companies, manufacturing, and distributing manufactured vehicles. By establishing strategic partnerships with component suppliers and using modern technologies in logistics and warehousing management, the company has succeeded

in optimizing the production and delivery process of automobiles.

- ✓ **National Iranian Petrochemical Company:** In the petrochemical industry, supply chain management is of great importance. National Iranian Petrochemical Company is one of the most successful examples of SCM in Iran, overseeing processes from petrochemical feedstock supply to chemical product production and distribution. The use of advanced export terminals and marine transportation systems is part of the company's strategy for supply chain management [44].
- ✓ **SNAPP:** In the field of technology and services, SNAPP, as the largest smart transportation system in Iran, is a successful example of service supply chain management. The company has created an efficient digital supply chain by connecting drivers, users, and the support system. The use of big data for demand forecasting and smart route management is one of the strengths of this system.
- ✓ **Kaleh Company:** In the field of dairy products, it is one of the leaders in supply chain management in Iran. The company has been able to achieve sustainable growth by utilizing farmers and livestock keepers as suppliers of raw materials, advanced production lines, and an extensive distribution system throughout the country. Therefore, Iranian companies have been able to succeed in supply chain management by relying on modern technologies, establishing strong relationships with suppliers, and using modern methods in warehousing and distribution. This approach has not only helped increase productivity and reduce costs, but also improved their competitiveness in domestic and international markets.

Conclusion

The data-driven approach takes advantage of access to new data sources to help companies manage supply chains. In many cases, data is a collection of various traditional and non-traditional sources. Some modern companies also use advanced tools based on artificial intelligence to analyze more complex data sets. The modern supply chain is becoming increasingly complex and global. For businesses, this means it is critical to identify potential vulnerabilities in the supply chain, address bottlenecks, and respond quickly to supply chain disruptions. For businesses, the supply chain is not just a simple, linear chain of activities. It is a dynamic network of integrated processes, technology, and people. Many CEOs don't consider the supply chain until a major problem occurs, when organizations need to develop coherent strategies and make data-driven decisions to improve data-driven supply chain performance [45].

In fact, achieving excellence in supply chain management can deliver sustainable growth and greater financial results. The starting point for a supply chain review is to acknowledge how current supply chain performance is driving big financial results. Taking a systematic and structured approach that aligns key operational performance metrics with return on investment (ROI) is essential and can show how the day-to-day operations of the business are driving financial results. Then, with reality-based insights, a tailored transformation plan can be adopted that targets the most beneficial actions. There is no doubt that data-driven supply chains can provide growth opportunities for many companies, as most companies do not examine their supply chains until something goes wrong [46].

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