

Global Supply Chain Management Issues in the Focus of Development of E-commerce

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Abstract

Supply chain management is vital to a company's success as well as customer's satisfaction. In this paper, supply chain management was studied with Amazon as an example of globally great success. The study observes how Amazon has renovated its supply, and at the same time the study points out components and aspects where Amazon can improve. The paper includes three main parts. First being the principles of supply chain management, in which we discover the types of supply chain, the current trends and the ideas behind these strategies as well as which supply chain strategy should be executed by a business. The second part covers the key factors to successfully manage a supply chain, businesses should focus in certain tasks to improve their supply chain. The last part is about Amazon, how Amazon is innovative, how well Amazon manages its supply chain and ultimately how Amazon is becoming the leader in e-commerce industry.

Keywords: *supply chain management, logistics, management, Amazon*

1. Introduction

Historically, the practice of supply chain management has always been an integrated part of the economic and business development. Fundamentally, the supply chain can be understood as a network of distribution options and facilities that enable the smooth transition between the procurement of raw materials, their conversion into intermediate and finished products and their distribution to the customers. A business that deals with products always require a form of supply chain system. While the supply chain management has, in principle, remain unchanged with its 3-step approach, as the society progresses and the economy grows, businesses need to be able to stay competitive and satisfy the growing demands of their customers. Reducing cost, better quality control and faster delivery are only some of the

conditions that businesses need to keep to strive toward, to stay competitive and to satisfy the customers. In the pursuit of improving the business model, the supply chain system has also evolved in order to satisfy these rigorous requirements. Supply chain management has become a veritable and precise science that has continuously grow in sophistication, in order to keep up with the modern world's complex business models. With the rise of globalization, the possibility of the supply chain grows ever larger with the accessibility to resources from around the world, but the risks and difficulties of its management also expand tremendously as well. The supply chain needs to be adapted to each business, based on different factors such as the business model, the type of industry, the scale of the business, the geographical location, the competition on the market, etc. Implementing the right supply chain is vital to achieve a high business performance and remain competitive. In order to understand the working principles behind a successful supply chain, this paper will explore the different theories and techniques of supply chain management. In addition, a case study of Amazon, one of the most rapid growth companies in the world, in great part due to its innovative supply chain system, will also be included, with detail analysis of its business model and its supply chain network.

2. Principles of Supply Chain Management

Definition of supply chain

The supply chain management is the management of all the links (purchasing, supply, transport, handling, etc.) along the logistics supply chain.¹ The goal of supply chain management is to optimize the steps and methods of supply in order to reduce delivery times, stocks and thus costs to a minimum. Once this optimization is successful, we speak of a workflow organization when there is no stock, no inventory, meaning the products will be delivered to the end consumers in the shortest time, therefore those products won't be sitting in storage, warehouse. To achieve this goal, supply chain management operates different levers in the company. In some cases, it automates orders, based on data received from the company's information system. Thanks to this integrated system, it is possible to track detailed information of all the products and thus go back to the supplier of each material required to assemble the finished product offered for sale to the customer. Product logistics (upstream logistics) encompasses all activities related to production and supply. Support logistics (downstream logistics) includes all distribution activities, product savvy and maintenance. Some characteristics of a competitive supply chain are optimization of inventory – by accurately forecasting the demand of items and products, customization – by

¹ Chopra and Meindl (Chopra, Sunil, and Peter Meindl, SUPPLY CHAIN MANAGEMENT – FIFTH EDITION. PEARSON 2013 Knowledge Boulevard, Sector 62, Noida 201 309, Uttar Pradesh, India., Chapter 1)

manufacturing, delivering and stocking customized parts for customers' needs, flexibility – by changing the supply chain processes according to technological, political, social changes.

Global supply chains have become a common way of organizing investment, production and trade in the international economy. In many countries, particularly in developing countries, they have created jobs in support of economic and social development. Global supply chains are complex, diverse, fragmented, dynamic and everchanging organizational structures.

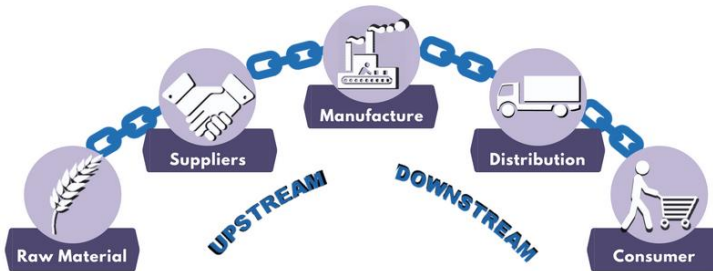


Figure 1: Basic Supply Chain²

Types of supply chain

Efficiency-focused – this is one of the very first supply chain strategies that focuses on efficiency. In many ways, this strategy has existed for over a century. Efficient supply chain strategy with an intense focus on driving down the costs across all supply chain processes and functional areas. Its goal is to supply products with predictable demand at the lowest possible cost.³ Unlike other strategic trends, efficient supply chain is an old but good strategy that still exists today in many organizations. Under the right conditions, this strategy is very viable and clearly supports the generic corporate strategy of cost leadership.⁴

The goal of being more efficient has always existed in operating environments but Henry Ford really brought the concept into the mainstream with his discipline and scientific approach to mass production. Ford had the goal of making cars affordable for the average working family. He accomplished this goal by producing large quantities of vehicles that leveraged economies of scale and drove down unit costs throughout his factories and extended supply chains. To further explore this strategy, we can look at a basic rudimentary

² Basic Supply Chain, <https://mfgtec.org/supply-chain-explained/> [Accessed: 15 February]

³ Hau L. Lee, "Aligning Supply Chain Strategies With Product Uncertainties", *California Management Review* 44(3):p113 April 2002

⁴ Mohsen Attaran, Sharmin Attaran, (2007) "Collaborative supply chain management: The most promising practice for building efficient and sustainable supply chains", *Business Process Management Journal*, Vol. 13 Issue: 3, p.390-404

supply chain model. It starts with raw materials from a supplier (supplier sourcing), that are transported (inbound transportation) to an inbound distribution center (inbound distribution) and that distribution center feeds a manufacturing facility as their production schedule dictates (manufacturing). Once finished goods are produced, they move through an outbound distribution center (outbound distribution) and are transported (outbound transportation) to a wholesaler or retailer for ultimate sale to a consumer. With an efficient supply chain strategy, every one of these functional areas has an intense focus on driving down the cost per unit that typically means that sourcing will select low-cost suppliers and negotiate further large volume discounts for buying in bulk. Likewise, inbound and outbound transportation will focus on selecting carriers that provide the lowest cost per mile rate and then further reduce transportation costs by only sending full shipments. The inbound distribution center will drive down distribution costs by receiving these full rather than partial shipments. In the manufacturing facility, production schedules will be planned and optimized with a nice and long run of a single item that reduces the production costs per unit and minimize changeover costs.

Responsive – with this approach, organizations have an intense focus on quickly reacting to unpredictable demand. The goal of this strategy is to stay in stock on hot new innovative items while still minimizing obsolete inventory levels and associated markdowns.⁵ In other words, a responsive supply chain is able to deal with uncertain sales patterns without holding large amount of safety stock by rapidly responding to demand signals. The responsive supply chain strategy has certain conditions. It is typically used with innovative products and it complements a corporate strategy based on differentiation. The origins of a responsive supply chain can be traced back to the Toyota “just in time” production system.⁶ Just-in-time production invests heavily in reducing the amount of time it takes to perform basic tasks. This reduces overall lead times for a finished product. A responsive supply chain strategy builds on the idea of reducing lead times within a factory and expands the concept of all functional areas within a supply chain. For instance, consider a generic supply chain that I have mentioned earlier which is supplier sourcing, inbound transportation, inbound distribution, manufacturing, outbound distribution and outbound transportation, these processes have an intense focus on cost-cutting. However, for companies to gain a competitive advantage based on rapid response, the approach for each functional area changes from cost to time. With a responsive supply chain strategy, tradeoff decisions are made with an emphasis of time, rather than cost. Therefore, each functional area is constantly looking to improve processes to drive down cycle times and reduce overall finish goods lead

⁵ Hau L. Lee, "Aligning Supply Chain Strategies With Product Uncertainties", California Management Review 44(3):p114 April 2002

⁶ Cheng TCE and Podolsky S, 1993, Just-in-Time Manufacturing - an introduction, Chapman and Hall, London. P12-44 <https://books.google.hu/books?id=WL95yzpj1TIC&printsec=frontcover&hl=fr#v=onepage&q&f=false> [Accessed: 18 February]

times. For example, sourcing managers will purchase smaller quantities of products just as needed and they will seek out suppliers that provide the lowest lead times for products. Inbound transportation managers will typically use a premium transportation service and faster modes of transportation. Inbound distribution centers will receive products just as they are needed often on a just-in-time basis on short time intervals. Factories will change over lines and equipment so they can build the order with shorter production runs. Outbound distribution centers will respond immediately and pick individual orders as they arrive. Outbound transportation will expedite small shipments direct to the customer as soon as they become available rather than hold shipments for cost-saving.

Risk-hedging – in a supply chain context, risk-hedging strategy is about dealing with supply disruptions. More specifically, risk hedging is a supply chain strategy that has a goal to share and pool resources to collectively share and minimize supply disruption risks.⁷ It takes a lot of coordination, collaboration and cooperation to succeed but it is a vital approach to supply chains that frequently experience supply problems. The concept of risk hedging builds on Fisher's original work⁸ that identified two basic supply chain strategies that is efficient supply chain strategy and responsive supply chain strategy. These strategic approaches to supply chain management address varying conditions of demand, certainty or uncertainty, by identifying appropriate actions for functional or innovative product types. These strategies work well under the right conditions, but they assume that supply characteristics are stable. There are also times when supply is erratic, unpredictable or uncertain. When supply is uncertain, efficient and responsive supply chain strategies are inappropriate. Because when supply is uncertain, making assumptions based on supply stability can lead to problems. To illustrate this concept, the basic supply chain works fine if all sources of supply keep flowing throughout the supply chain, but what happens when there's some type of supply disruption, when a supplier cannot deliver to a manufacturer, the supplier has ongoing quality problems or erratic lead times that lead to delayed deliveries. Regardless to the cause of the supply chain disruption, everything stops flowing and retail shelves become empty of products that consumers want or need. In this case, a risk-hedging strategy is appropriate. With this strategy, supply chain managers can seek out multiple sources of supply to spread out the risk and minimize supply disruptions. Although one of the suppliers might have a delivery

⁷ Hau L. Lee, "Aligning Supply Chain Strategies With Product Uncertainties", California Management Review 44(3):p113 April 2002

⁸ Gregory A. Harris, Paul J. Compton, Philip A. Farrington, Engineering Management Journal; EMJ 22(4):p31-43 · April 2015
https://www.researchgate.net/publication/276090534_An_Exploration_of_Fisher's_Framework_for_the_Alignment_of_Supply_Chain_Strategy_With_Product_Characteristics [Accessed: 20 February]

issue for a short period, it's unlikely that all suppliers would all experience a same problem at a same time. The more sources of supply that we have, the less risk we have.

Agile – an agile supply chain strategy focuses on “being responsive and flexible to changing customer needs” while simultaneously hedging against supply disruption risks.⁹ In another way, supply chain agility comes down to quickly responding to changing supply and demand conditions. The concept of supply chain agility also builds on Fisher’s work with efficient and responsive supply chain strategies.¹⁰ Those strategies deal with varying degrees of demand uncertainty. An agile supply chain strategy should be used when both supply and demand uncertainty are high. According to Professor Hau Lee, an agile strategy should be combined with the best of risk-hedging and responsive approaches because risk-hedging addresses supply uncertainty and responsiveness addresses demand uncertainty. But an agile supply chain strategy involves more than just combining risk-hedging with responsiveness, it also involves the intersection of key relationships, sensitivity, processes, information and flexibility. To explain this in more detail, starting with relationships – due to the high level of uncertainty and situations that require agile supply chain strategy, organizations need to form relationships with each other to help manage or reduce supply and demand uncertainty. These valuable relationships require firms to quickly partner with each other in order to communicate, collaborate and coordinate about chain process flows. Agility requires multiple organizations working together to solve problems. It also requires a shared belief that leveraging relationships can create synergies. Managing supply chains under uncertain conditions is difficult and it requires all supply chain members to work together towards a common goal of serving the consumer. Sensitivity – is also key in an agile supply chain strategy. It’s about being alert and being able to quickly identify changing market conditions. When there’s a great deal of supply or demand uncertainty, it is critical to be sensitive and identify changes as soon as possible. Without that, supply chain members cannot react quick enough and the quick reaction is the essence of agility. Supply chain agility can also be enhanced by innovative processes. For example, postponement activities can reduce lead times and increase responsiveness under uncertain demand conditions without increasing costs. Capacity or inventory buffers also enable operations to withstand unpredictable spikes and demand or supply shortages. Leveraging information is important in any supply chain and it’s even more important in agile supply chains. Supply chain partners need a high degree of information sharing, this requires them to have a high degree of connectivity and even being virtually integrated. Leveraging information is key to collaborative efforts for

⁹ Hau L. Lee, "Aligning Supply Chain Strategies With Product Uncertainties", *California Management Review* 44(3):p114 April 2002

¹⁰ M. Fisher, "What is the Right Supply Chain for Your Product" *Harvard Business Review*, 75/2 (March/April 1997): p105-116

relationships and for sharing the market sensing insights in a changing environment. When demand and supply uncertainty are high, one of the best ways to combat this difficult situation is to share information in a timely and accurate format. Finally, flexibility – is the essence of agile supply chain strategy. People and processes both need to quickly change and respond to evolving supply and demand conditions. People need to be open to constant change and have an attitude that embraces an uncertain environment. Likewise, processes need to be designed in a way that enables quick modification to meet new demands.

To recap, we can see in the following table when to apply the appropriate supply chain strategy regarding different levels of supply and demand uncertainty.

		Demand uncertainty	
		Low (functional products)	High (innovative products)
Supply uncertainty	Low (stable process)	Efficient supply chains	Responsive supply chains
	High (evolving process)	Risk-hedging supply chains	Agile supply chains

Figure 2: Hau Lee's Uncertainty Matrix ¹¹

Source: Professor Hau Lee, Stanford University

Trends of supply chain management

Globalization and its impact on supply chain management

Nowadays the term globalization describes the emergence of worldwide interconnectedness: people, institutions, knowledge and culture. This is most apparent in economic institutions that allow the expansion of markets by reducing the barriers both geographically and

¹¹ Hau L. Lee, "Aligning Supply Chain Strategies With Product Uncertainties", California Management Review 44(3):p114 April 2002

institutionally. Companies are then able to expanse their operations across borders, leading to the movement of capital, production and human resources.¹²

The term globalization was coined in the 1980s as a result of Theodore Levitt's article "The Globalization of Markets"¹³, published in Harvard Business review in 1983, which predicts the advent of a global market that replaces national markets. The expression quickly seduces the business world: companies are becoming more anxious to present themselves as "global", with slogans such as "The world is our audience" (Time Warner) or "Your bank all over the world" (HSBC).

To recap, a good management of the supply chain allows an optimized production in order to deliver to the final customers the best possible products in the best condition at a shortest time, while reducing the cost of the whole chain. However, managing this supply chain is sometimes difficult due to globalization.

Here we will discuss the economic globalization and its relationship with the supply chain. Unlike globalization, which has a broader meaning, and which refers to the development of the links of interdependence between men and women, human activities and political systems on a world-wide scale, economic globalization concerns mainly the global economic exchanges: goods and services, production factors – capital, work knowledge, etc. Among the characteristics of the current phase of globalization, economic activities are no longer organized on a national scale. The gradual disappearance of trade and investment barriers and the progress of ICT (information and communication technologies) and the progress of the management systems have allowed the relocation of production processes in different countries to take full advantage of cost reduction, availability of raw materials and more favorable regulations. As a result, there is an increasing proportion of production which is functionally integrated into coordinated system on a global scale. This shift has affected on different level of global economic integration and complex supply chains. Even though this type of structure makes it difficult for a company to manage all the networks of suppliers, which increases the complexity of the purchase, outsourcing is increasingly seen as a value creation that can provide multinational companies with a competitive advantage. Such a development unfortunately has important social and environmental implications and there is growing concern about the tension between market pressures and the sustainability of the global supply chain. In many sectors, such as textile and toy industries, the labor market is more flexible and outsourcing relationships are widespread. Many pressures – price, flexibility, unrealistic deadlines and expectations of quality, lack of education and

¹² Robert O. Keohane and Joseph S. Nye, Jr, Globalization: What's New? What's Not? (And So What?).Source: Foreign Policy, No. 118 (Spring, 2000), pp. 104-119

¹³ Theodore Levitt, The Globalization of Markets, 1983, <https://hbr.org/1983/05/the-globalization-of-markets> [Accessed: 21 February]

knowledge, and the weak bargaining power of suppliers – are often reinforced when moving to lower levels of a global supply chain. To address this evolving environment, several strategies have been developed, which include search for low-cost sources of supply in geographically dispersed areas; reduction of supply cycles; information systems improvement; transition from manufacturing to distribution, collection of best data of demand based on short-term forecasts.

Just-in-time (JIT), Six Sigma, Total Quality Management (TQM), Business Process Management (BPM), Third Party Service Provider (3PL)

Just-in-Time (JIT) – Toyota helped to create one of the smartest production systems that we have nowadays. After World War II, Japan faced some difficult problems which included lack of cash to finance purchases, scarce resources and limited land to expand factories. However, by slowly creating Just-in-Time system, Taiichi Ohno at Toyota managed to turn these problems into advantages. The philosophy behind JIT is to make the entire production system only work with what it needs and to minimize wait times between each stage. In other words, Just-in-Time or lean production aims to ensure that inputs into the production process only arrive when they are needed. The big saving is normally around inventory.¹⁴ Before JIT, a company would keep a warehouse filled with the parts and raw materials it needed. When supplies were getting low, they would have reordered when they had just enough to keep going until the new delivery came. But Toyota realized that it would be more efficient for the company to just keep making that same order as soon as the next one arrives, this way, company never need to keep a stockpile of spare parts. The cost saving would be big since warehousing is very expensive because company has to pay for massive space, power, staff, security and for unused parts.

Six Sigma is a problem-solving methodology which is centered around defect reduction and variation management, executed in the form of a disciplined, data driven and time bound project, always sponsored by the top management in an organization.¹⁵ Six Sigma is originated at Motorola in 1986 and has gained world popularity within a decade. General Electric has reported tangible benefits of 2.5 billion USD per year thanks to Six Sigma initiatives and has made it a central organization wide strategy. Six Sigma has been existing for over three decades now and has remained amongst one of the most used methodologies across industries. With every Six Sigma project, we start with a high variation, on average

¹⁴ Francesco Giordano and Massimiliano M. Schiraldi (March 13th 2013). On Just-In-Time Production Leveling, Operations Management, Massimiliano M. Schiraldi, IntechOpen, Chapter 2

¹⁵ Dag Näslund, (2008) "Lean, six sigma and lean sigma: fads or real process improvement methods?", Business Process Management Journal, Vol. 14 Issue: 3, p.269

we have high number of defects or mistakes or unnecessary steps in the process. Therefore, Six Sigma methodology is used to reduce these numbers and to improve the processes.

Total Quality Management (TQM) - TQM is a management strategy that continues to improve the quality of products and of process of production. It focuses on ways in which these processes can be managed with two key objectives: to reach 100% customer satisfaction and to make zero defects. The principles of TQM are Customer-Focus – the company must place the customer at the center attention in order to understand their needs so that company can meet or exceed customers' expectations, Leadership – by establishing an unity of purpose and organizational direction where all members of an organization can share a common goal, Involvement of People – by creating a working environment without fear that encourages every employees' involvement and achievement of the organization's objectives, Process Approach – to recognize that accomplished things are the result of processes, Strategic and Systematic Approach to Management – a company's strategic plan must incorporate quality as a core component, the strategy here is to do the right things right at the first time and every time, Continual Improvement – to create a culture of continuous improvement for zero defects, zero errors and zero accidents, Factual Approach to Decision Making – it is vital that decisions must only be based on accurate, relevant and reliable data and information, Mutually Beneficial Supplier Relationships – the company and the supplier can both benefit from one another's resources and know-how resulting in value for all. Total Quality Management, however, has limitations. Cost in time and money is part of the limitations since implementing TQM systems can take many years, during these years, substantial costs can accrue due to the lengthy process of training employees which also takes a significant investment by the company in terms of money and the utilization of resources. Fear of change is also part of the limitations.¹⁶ Because of increasing global competition, many organizations are replacing their traditional approach with the TQM approach. However, there are employees that resist change due to uncertainty doubt and fear from the rapid global changes.

Business Process Management (BPM) – at the core, BPM is a process or workflow. It is a series of steps or activities that people or system perform according to a logical path in order to achieve goal. Every business executes a large amount of processes on a daily basis. Not all these processes are efficient. Early workflow software focuses mainly on enabling users to map out such processes in a visual manner and execute them in order to achieve goal of improving efficiency. The usage of BPM software helps companies create value across the business. This is possible by reducing manual entry, improving processing times, therefore, making companies more responsive.¹⁷ That improves customer satisfaction, drives

¹⁶ Douglas, T and Judge, W. (2001). Total Quality Management Implementation and Competitive Advantage: The Role of Structural Control and Exploration. *Academy of Management Journal*. Vol. 44, No. 1. p. 158.

¹⁷ Dag Näslund, (2008) "Lean, six sigma and lean sigma: fads or real process improvement methods?", *Business Process Management Journal*, Vol. 14 Issue: 3, p.275

innovation and business growth and can reduce risk. Another aspect of BPM platform is having them available as either on-premise or cloud offering. The flexibility of being able to move between them as needed maximizes usability with lower costs. Companies that utilize BPM can become more agile and see increased profitability through decreased costs and increased revenue.

Third Party Logistics (3PL) – it may be beneficial for companies to outsource certain segments of their supply chain. A 3PL provider is an external organization that provides logistic services for some or all of their customers supply chain management function. The 3PL organizations can be either asset-based or non-asset based. The non-asset-based provider will perform more of a consulting functions on subjects pertaining to packaging, freight quoting, transportation, settling freight disputes, tracking shipments, customer service issues in cost cutting tactics. The non-asset provider will not own trucks, employees warehouse personnel or warehouse space for inventory storage. This type of provider is mainly made up of people who have gained expertise in logistics field and support their customers by offering help in areas of logistics that are challenging and costly. The asset-based provider will provide warehousing space in personnel. They may own trucks and have drivers on staff. They support their customers by offering tangible services.

3. Key factors to successful supply chain management

Customer relationship management (CRM)

The customer relationship management is an application that enables companies to make the move towards being a customer centered organization by putting the customer at the center of all the information that relates to them and allowing authorized people within the organization to access information. Similar to the 4Ps of marketing, CRM has 7Cs which are Convenience, Customer value and benefit, Cost to the customer, Computing and category management, Customer franchise, Customer care and services and Communication and customer relationships. The components of CRM are Strategy, Process, People and Technology.¹⁸ The objectives of a CRM are to provide products and services that exactly match customer requirements, to offer better customer service, to retain existing customers and to find new customers and to assist the marketing department. When these objectives are met, customers of a customer centered organization should and would feel more valued. The requests are dealt with more rapidly and accurately because all the information required to service the requests is in one place. Customer centered organization may have higher retention rates than competitors organized along traditional lines. CRM is about gaining and

¹⁸ Lakshman Jha, Customer Relationship Management: A Strategic Approach, Global India Publications, 2008, p1-8

retaining customers, by leveraging a CRM system, organization can document and react to customers' experience based on information collected over time. Examples of the types of information that can be tracked in a CRM system include, but are not limited to, the followings: a customer's contact information, business and personal, recent customer activity, customer support issues or cases and the status of their resolution commitments that have been made to the customer.¹⁹ So, in another word, Customer Relationship Management has the business purpose of intelligently finding, marketing, selling to and servicing customers.

Logistics

The word "logistics" was first used in the army and was extensively referred to during the World War II for the movement of supplies, men and equipment.²⁰ In business, Logistics is the movement of goods from the point of origin to the point of consumption. For example, after manufacturing of any product, all the activities that a company do to let that product reach its end consumer is called logistics. These activities, part of the supply chain, include manufacturing, warehousing, transportation, inventory management, order processing. The types of logistics are Inbound Logistics, Outbound Logistics and Reverse Logistics. Inbound Logistics mean whenever we receive the products in our warehouse and whenever we send the products to anywhere from our warehouse, this is called Outbound Logistics. Reverse Logistics, also called Return to Origin, mean whenever customers return the products back to the company. Logistics is concerned with getting the products and services wherever they are needed and whenever they are required. Logistics is the designing and managing system in order to control the flow of materials throughout an organization. In a nutshell, logistics is the key to the success of a supply chain management.

Logistical system is designed to achieve the following objectives for an organization: rapid response, minimum variance, minimum inventory, consolidated movement, quality and life cycle support. Rapid response – it is vital for a firm to have the ability to satisfy customer service requirements in a timely manner. Minimum variance – variance is an unexpected event that disrupts performance of a system. Variance may occur when there is delays in expected time of customer orders, unexpected disruption of manufacturing. It may happen because the goods arriving at the customer's location may be damaged or the delivery may be at the wrong location. The operational areas of logistics are subject to potential variance.²¹ With the use of IT, logistics tries to minimize variance in the operations. Minimum inventory

¹⁹ Tony Wild, *Best Practice in Inventory Management*, Third Edition, Routledge (2008) p.16

²⁰ Martin Christopher: *LOGISTICS & SUPPLY CHAIN MANAGEMENT*. Financial Times Prentice Hall (is an imprint of Pearson. Edinburgh Gate, Harlow CM20 2JE Fourth edition 2011. P 1-2

²¹ Martin Christopher: *LOGISTICS & SUPPLY CHAIN MANAGEMENT*. Financial Times Prentice Hall (is an imprint of Pearson. Edinburgh Gate, Harlow CM20 2JE Fourth edition 2011. P 33

– to achieve minimum inventory, the logistical system design controls the inventory commitment and the turn velocity. Total commitment is the financial value of inventory deployed throughout the system whereas turn velocity is the rate of inventory usage over time. The objective here for logistics is how to minimize the financial value of inventory which is being deployed throughout the system at a particular time while also trying to increase the turnover rate of the inventory. Consolidated movement – the most important cost related to logistics is transportation. It is directly proportional to the type of the product, the size of the shipment and the distance traveled. It is desirable to achieve movement consolidation for a firm in order to decrease the transportation cost. To achieve that, smaller shipments need to be grouped together for consolidated movements. Quality – as it should be an objective to logistics because when quality fails, logistical performance needs to be reversed and then repeated thus commitment to Total Quality Management (TQM) is necessary to improve the logistics management. When there's an incorrect shipment or when there's damaged products during the transit, a company has to rework its customer's order which will be more costly than performing it right the first time. Therefore, logistics is a main part of developing and maintaining continuous Total Quality Management improvements. Life-Cycle Support - nowadays, most of the products are sold with guarantees that they will perform over a period of time. If a particular product does not perform as it should, to ensure the guarantee, a normal value-added inventory flow towards the customer must be a two-way route. The customer should also have the option and facility to return the product back to the factory. Product recall is also as important, that may be resulted from increasingly rigid quality standards, product expiration dating and responsibility for hazardous consequences. Additionally, environmental concerns require the capacity to recycle and reuse ingredients and packaging materials where again the reverse logistics movement would be essential.

Purchasing management

Purchasing is one of the key activities in materials management function of an organization. Inventory management is directly linked to purchasing management. Purchasing function is generally referred as procurement. Any inventory control system is directly influenced by purchasing. The primary goals of purchasing are to ensure uninterrupted flows of raw materials at the lowest total cost, to improve quality of the finished goods produced and to optimize customer satisfaction. By actively looking for better materials and more reliable suppliers and working more closely with strategic suppliers to improve quality materials, purchasing helps companies to reach the stated objectives.²²

²² Tony Wild, *Best Practice in Inventory Management*, Third Edition, Routledge (2008) p.128-138

The 7 critical dimensions of the purchasing function are spend analysis – the process of collecting historical data by item purchased, it is based on historical consumption data and should display all expenses broke down per item per period per business unit. It is important to get the consumption numbers because they are crucial to demand management. Consumption rate, sales and production forecasts are the primary inputs to define sourcing strategies, capacity levels and to assure the supply required for business operations. Specifications / statements of work (SOW) – here the purchasing personnel should gather technical and functional requirements. They have to ensure that all transactions are well documented. By combining requirements from distinct areas, they can reduce the overall cost. Category management – the purchasing team develops insights to align internal needs and external sources. To facilitate the work, internal resources and external sources are grouped by related products and type of application. Supply evaluation is one of the most important activity conducted by the purchasing team. The primary objective is to reduce supply risks and optimize the value added to the company. Contract management and cost management are the two tasks under the direct responsibility of the purchasing team. The purchasing department is usually the primary contact with suppliers and also should control and manage the purchasing costs. Supplier relationship – here the purchasing team works on day-to-day transactions to mitigate supply risks, identify opportunities for cost reduction and managing suppliers' performance. Another key task is to develop the purchasing organizational structure and its governance procedures. Therefore, the supply strategy involves spend analysis, demand management, specifications, category and supplier management, contract management, cost management, purchasing process and supply relationship management.

We can divide the purchasing types into materials – raw materials, components, goods, materials, repair, operation (MRO items), production items, services – outsourcing, transportation, 3PL, supporting service, specialized services, investment – projects, facilities, equipment and situations – new buy, modified rebuy and straight rebuy. When company faces a purchase of a new product or service for the first time, there are several uncertainties about the product itself and the supplier. In the modified buy case, the company buys an existing product from a new supplier or a new product from an existing supplier. It is considered an operation with less risk than a new buy because the company has the knowledge about the product or the supplier performance. The less risky situation is when the company is purchasing a known product from a known supplier. This is called straight rebuy.

In the following chart, we can see an example of a purchasing process.

Figure 3 Purchasing Process²³

The purchasing process begins with the identification of the needs, those can be defined during the planning, during a product development, in new projects or during the production process.²⁴ In the production planning, the sales forecast forms the aggregate and material requirement plan (MRP). It is possible to determine the quantity and dates for raw materials, components and semi-finished goods needed to meet the production plan based on the MRP. The requisitioning involves the specification, describing material characteristics, quantity and date in which the materials are required. When it comes to services, a statement of work should be elaborated to guide the contracting process. The Business units inform the needs and the descriptions through a purchase requisition. Supplier identification and selection involves the task identifying possible suppliers and how to evaluate them. The effort dedicated to this task depends on the size and the value of the purchase. Supplier's type, size, location and risks are important points to be evaluated. Also, the kind of approach will be used such as bidding, negotiation. After the supplier selection, the purchasing team has to negotiate the contract. The contract establishes how purchase orders will be issued, due dates, lead times, prices, times to respond or delivery, acceptance procedures, payment process and implications in case the supplier fails to meet the contract conditions. When receiving

²³ Purchasing Process, <http://mytypings.com/business-buying-process/> [Accessed: 28 February]

²⁴ Tony Wild, *Best Practice in Inventory Management*, Third Edition, Routledge (2008) p.153

materials, the purchasing department should coordinate the receiving, inspection, confirmation the information on the purchase order, invoice and the receiving report. This confirms that the material ordered was delivered and charged correctly. After receiving, the purchasing department should authorize the payment according to the contract terms, also the purchasing department should measure and report the supplier performance periodically.

Forecasting and Demand planning

Forecasting is a very important tool because the rest of the planning of the entire supply chain depends on it. In other words, forecasting is the basis for all strategic and planning decisions in a supply chain. If we look back at Professor Hau Lee's uncertainty matrix, the forecast accuracy varies according to the uncertainties. The forecast tends to be more accurate when the supply and demand uncertainty is low and become more inaccurate when the uncertainties are high. Some of the characteristics of forecasts are forecasts are always imperfect, since they are just projections, long-term forecasts are less accurate than short-term forecasts and aggregate forecasts are more accurate than disaggregate forecasts. The forecasting methods are primarily classified in 2 categories. One is qualitative and the other is quantitative. Qualitative methods are very subjective, for example, qualitative methods are used when there's a lack of data, companies have to rely on experts' opinion.²⁵ Qualitative methods are mostly used for long-term forecasting, usually 1 year or more. In the other hand, whenever there's available data, companies will always use the quantitative forecast methods. The most popular quantitative method is time series. Time series method can be used for immediate requirement as well as intermediate requirement. The other quantitative method which is widely adapted is causal analysis – cause effect analysis meaning the relationship between demand and some other factors (income level, advertising expenses, cost of the product, etc.) to develop a forecast.²⁶

Every organizational function relies on forecasting for numerous reasons. Forecasting allows the marketing department to estimate the demands, future trends. It allows finance department to set budgets, to predict stock prices. It helps companies to manage their operations more efficient, to have better capacity planning, scheduling and to better control their inventories. And without a doubt, forecasting allows companies to select better suppliers and to make better purchasing decisions.

²⁵ Chopra and Meindl (Chopra, Sunil, and Peter Meindl, SUPPLY CHAIN MANAGEMENT – FIFTH EDITION. PEARSON 2013 Knowledge Boulevard, Sector 62, Noida 201 309, Uttar Pradesh, India., Chapter 7)

²⁶ Tony Wild, Best Practice in Inventory Management, Third Edition, Routledge (2008) p.156-166

A lack of forecasting and planning or the independent forecasting among supply chain member will cause a mismatch between supply and demand, hence it will result the rise to the bullwhip effect, which I will discuss next.

Resource Planning

Resource planning encompasses all the processes of determining the production capacity required to meet the demand. The capacity here refers to the maximum workload that an organization is capable of completing in a given time period. Usually, a poor resource planning application will result a situation where the organizational capacity cannot meet the demand, in other words, there will be underutilized capacity and unfulfilled orders. In addition, the excess capacity results in high production costs per unit, the overcapacity can also result in lower quality products and stressed workers. Therefore, the goal of resource planning is to minimize this discrepancy because it is critical to balance production plan with capacity.

It is important to discuss about the demand distortion along the supply chain – we call that the “bullwhip effect”. The bullwhip effect is the unexpected distortion of the supply chain caused by repetitive variation in demand. The unplanned demand from the retailer oscillates back to the distributor and finally to the supplier, magnifying through each level of the supply chain. This is called bullwhip effect because as the oscillating demand magnifies upstream in the supply chain, it is reminiscent of a cracking whip.²⁷

²⁷ Chopra and Meindl (Chopra, Sunil, and Peter Meindl, SUPPLY CHAIN MANAGEMENT – FIFTH EDITION. PEARSON 2013 Knowledge Boulevard, Sector 62, Noida 201 309, Uttar Pradesh, India., Chapter 10)

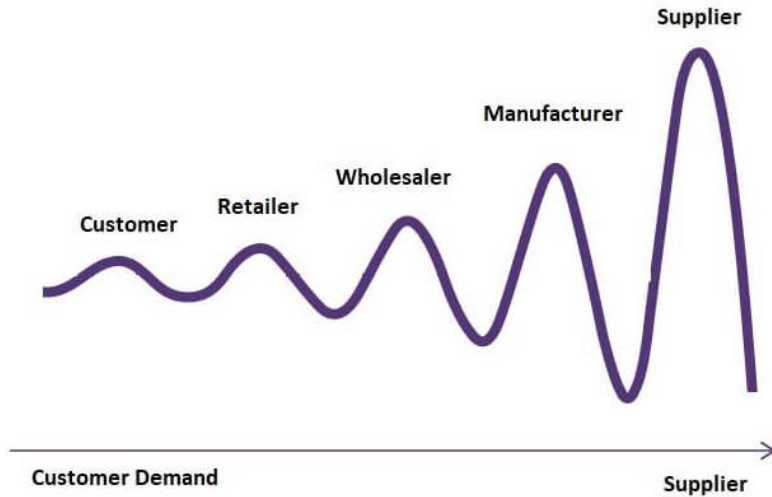


Figure 4: Bullwhip Effect ²⁸

Why is this a problem? This can result a negative effect on business performance such as inventory disruptions (insufficient inventory to fulfill the demand), quality control problems (rush in manufacturing process), diminished customer service (customers get upset because their orders are being delayed) and increased cost of material and manpower (working overtime). To further explain the bullwhip effect, let's look at an example of Procter&Gamble, manufacturer of Pampers disposable diapers.²⁹ It doesn't reduce to the supply and demand chain which is similar to most supply demand chain. There is your typical retail store "A MART", one of many which stocks in sells of Pampers diapers. In the weekend, "A MART" is having a sale of diapers at 50% of the price, the target customers, in this case all the mothers with their newborns, are excited so they are planning to stock up. Procter&Gamble's factory gets the big order and starts manufacturing in overdrive, but first it has to negotiate with the union regarding overtime pay and get a lot of more supplies from its suppliers to get the production on track. The supplier then is not prepared for the sudden large order and do not have enough raw materials required to make the diapers because they do not have enough stock. Therefore the supplier causes additional delay in production. Meanwhile "A MART" places its another order that is bigger than usual as it faces an increase on sales with no stock left. The distributor, in turn, runs out of stock and is not capable of

²⁸ Bullwhip effect illustration, Source: <https://www.bizskinny.com/Supply-Chain-Management/bullwhip-effect.php> [Accessed: 5 march]

²⁹ Hau Lee, The Bullwhip Effect in Supply Chains. Spring 1997, Volume 38, Issue 3, p.93-102

covering the orders. So, the distributor places yet another big order and so forth it continues along the supply chain because no one is getting their orders. They carry on placing bigger orders stall, compounding the problem. Ultimately, the factory is taking strain, suppliers are under pressure, distributors are alarmed, retailers are getting upset because they don't get their orders and end customers are upset. By the time the factory starts delivering, everybody downstream starts cancelling their orders and the factory is left with an oversupply of stock.

What causes the bullwhip effect and how we can prevent it?³⁰ There are numerous factors, often in combination which contribute to the bullwhip effect. Four major causes are price fluctuations and sales promotions – sales promotions and price discounts resulting customers buying in large quantities and stocking up, as a result the buying pattern does not reflect the actual consumption. The following cause is order batching – companies place orders in batches often to avoid the cost of processing orders more frequently or to avoid the high transportation costs. The next cause is shortage gaming – when the product demand exceeds supply, manufacturers limit the distribution of their products or customers exaggerate their orders to counteract the rationing, eventually orders will disappear and cancellations will come in, these are making it impossible for the manufacturer to determine the real demand for its product. Demand forecasting inaccuracies – as each entity along the supply chain places an order, it replenishes stock and includes some safety stock with long lead times which make the fluctuation in demand more significant. There are possible countermeasures to prevent these. Countermeasure to fluctuating prices – fluctuating prices can be replaced with everyday low prices. Countermeasure to order batching – more frequent ordering results in smaller orders and smaller variants. Counter measure to shortage gaming – proportional rationing schemes are countered by allocating units based on past sales, ignorance of supply chain conditions can be addressed by sharing capacity and supply information across the entire supply chain. Countermeasure to demand forecast inaccuracies – the inaccurate forecast of demand can be dealt with by providing access to point-of-sale data, single control of replenishment or vendor management inventory can overcome exaggerated demand forecasts, long lead times should be reduced as much as possible.

Inventory Management

The basic definition of inventory is a stock or store of goods. There are 5 types of inventories such as raw materials and purchased parts, partially completed goods called work in progress, finished goods inventories, replacement parts, tools and supplies which are used in during any manufacturing and good in transit to warehouses or customers. Inventory serves several purposes and there are many reasons why companies need to carry inventories. It is used to

³⁰ Chopra and Meindl (Chopra, Sunil, and Peter Meindl, SUPPLY CHAIN MANAGEMENT – FIFTH EDITION. PEARSON 2013 Knowledge Boulevard, Sector 62, Noida 201 309, Uttar Pradesh, India., Chapter 10)

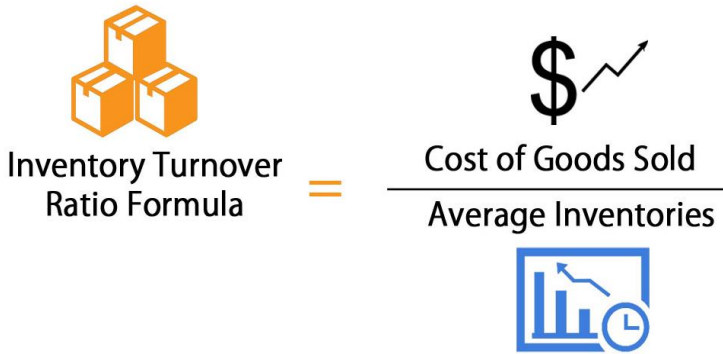
meet anticipated demand because in the case of independent demand, there is a lot of uncertainty involved so there could be fluctuations up and down. Inventory can be used for meeting anticipated demand to smooth production requirements like when there is a mismatch between capacity and demand.³¹ Inventory could be used to decouple operations, for example there are 3 operations required in a manufacturing process: suppose the machines at operation 1 are not functional, operation 2 and operation 3 will suffer if there is no inventory available because they will be sitting idle. With the availability of semi-finished materials in inventory, those parts will be used and fed into the operation 2 and 3 to prevent interruption of manufacturing process. The other function of inventory is to protect against stock-outs. It's called stock-outs when suppliers are unable to provide products to their customers due to their empty inventory.

The main objective of inventory control is to achieve satisfactory levels of customer service while keeping inventory costs within reasonable bounds. Achieving a good customer service and keeping the low cost of inventory are the two important variables for decision making when it comes to inventory control. Companies should balance cost with customer service at all time.³² A company can certainly keep a huge amount of inventory so they could deliver any items from the inventory when they are needed, but then keeping a lot of inventory is going to increase the inventory cost. One of the metrics that is used for measuring the performance of any inventory control process is Inventory Turnover. Inventory Turnover is "the ratio of average cost of goods sold to average inventory investment."³³ The higher inventory turnover rate reflects the more efficient management of inventory. Therefore, it is a good indicator to measure a company's performance during a year.

³¹ Hilton, Ronald W., *Managerial Accounting*, McGraw-Hill, Inc (1994). p.407

³² Tony Wild, *Best Practice in Inventory Management*, Third Edition, Routledge (2008) p.4

³³ C.Madhusudhana Rao, K.Prahlada Rao, Inventory Turnover Ratio as a Supply Chain Performance Measure, *Serbian Journal of Management* 4 (1) (2009) p46



The diagram illustrates the Inventory Turnover Ratio Formula. On the left, there is an icon of three stacked orange boxes. Below it, the text 'Inventory Turnover Ratio Formula' is written. In the center, there is an equals sign. To the right of the equals sign, there is a horizontal line. Above the line, the text 'Cost of Goods Sold' is written. Below the line, the text 'Average Inventories' is written. To the right of the formula, there is an icon of a dollar sign with an upward-pointing arrow, and below it, a blue icon of a bar chart with a line graph and a clock.

$$\text{Inventory Turnover Ratio Formula} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventories}}$$

Figure 5 Inventory Turnover Ratio formula³⁴

There are certain requirements to result an effective inventory management, a company needs to have a system to keep track of inventory, to monitor or track what's available and how things are changing. It is necessary to make a reliable forecast of demand because a company always tries to keep its inventory to fulfill a demand. So, if the forecast is inaccurate, the inventory management will suffer.³⁵ Knowledge of lead times is also important because for example if we place an order to a supplier and if the lead time is known to be two days, but in fact it takes three or more days, this will certainly create some perturbation in the supply chain process. Reasonable estimates of Holding – holding cost is when the inventory is kept which will cost money and occupy spaces along with insurance cost, Ordering – every time an order is placed with a supplier which will cost money and Shortage costs – when the customer is looking for something and it's not available to the customer, there will be a cost involved the customer dissatisfaction, which may result the customer to not return. A good classification system is also needed: Periodic System – physical count of items made at periodic intervals (weeks, months), Perpetual Inventory System – keep track of removals from inventory continuously, therefore monitoring current levels of each item, Two-Bin System – two containers of inventory, as soon as one of the containers becomes empty, that's the indication that a reorder has to be made for that part or component, Universal Bar-Code – for monitoring and controlling inventory, bar code printed on a label that has information about the item to which it is attached, Radio Frequency Identification (RFID) – as the name suggests, this system uses radio waves to monitor different products, the advantage of RFID

³⁴ Inventory Turnover Ration formula, <https://www.wallstreetmojo.com/inventory-turnover-ratio-formula/> [Accessed: 7 march]

³⁵ Brent D. Williams, Travis Tokar, (2008) "A review of inventory management research in major logistics journals: Themes and future directions", The International Journal of Logistics Management, Vol. 19 Issue: 2, p.212-232

is that you do not need a direct line of sight unlike Bar Code scan. ABC Classification System is to categorize inventory according to some measure of importance and allocate control efforts accordingly. It is difficult for big companies to monitor each and everything by giving it equal priority since different items could be different in value and have different significance. Therefore, it is important, for practical reasons, to classify them in different categories. In ABC system, A is considered very important items which require the most managerial attention and review, B is moderately important items and C is the least important items that make up minor impact therefore the control systems should be as simple as possible to reduce wasted management time and attention.³⁶ ABC analysis is based on an Italian mathematician Pareto's rule, the observation is that 20% of the things or items makes the 80% of the contribution.³⁷

There are different inventory models which companies use, and the popular ones are Economic Order Quantity model (EOQ), Economic Production Quantity model (EPQ) and Quantity discount model. The main purpose of using these models is to determine an optimal order quantity and to minimize the sum of annual order cost and inventory holding cost.³⁸ In other words, when you order inventory, you do not want too little (stock-out) or too much (spoilage storage) because you have to bear the purchase cost, ordering cost, carrying cost. Therefore, you must balance to find an optimal order size. In this case, EOQ is used to solve this very issue.

$$\text{EOQ Formula}^{39}: \text{EOQ} = \sqrt{\frac{2SD}{H}} \text{ (units)}$$

EOQ = optimal order; S = order cost; D = annual units demanded; H = carrying cost

A company needs to place orders with outside suppliers and maintain an inventory to satisfy its own or its customers' demand. In some situations, a business may choose to produce goods internally rather than ordering them from an outside supplier. If a company meets demand by making its own products, the economic production quantity (EPQ) model will be more realistic than the basic EOQ model. The EPQ model aims to find the optimal production lot size that minimizes the total cost. The known parameters of EPQ model are (D) the total demand (units per year), (K) the unit setup cost (\$ per production run), (P) the unit producing cost (\$ per unit), (H) the unit holding cost per year (\$ per unit per year) and (R) the production

³⁶ Tony Wild, Best Practice in Inventory Management, Third Edition, Routledge (2008) p.36

³⁷ Tony Wild, Best Practice in Inventory Management, Third Edition, Routledge (2008) p.33

³⁸ Tony Wild, Best Practice in Inventory Management, Third Edition, Routledge (2008) p.143-144

³⁹ EOQ Formula, <https://corporatefinanceinstitute.com/resources/knowledge/finance/what-is-eoq-formula/> [Accessed: 10 March]

rate (units per year). Normally, the production rate (R) should be greater than or equal to the demand (D), otherwise there will be shortages.

4. Other possibilities towards a successful supply chain management

In order to remain competitive in the future, companies will have to manage their supply chain more effectively. The main factors hindering the efficiency of supply chain management are the following:

- Customers demand better product quality, more choices and at lower price
- Products need to be able to be delivered around the world
- Rise of competitors

As pressures continue to increase, firms must step up in order to provide a vital competitive advantage. Many of today's big business cannot keep up the pace and hence, face failure. You will find below the possible activities that supply chain managers should consider in order to ensure that their businesses are ready to face the challenges that lie ahead.⁴⁰

- **Diagnosis:** ask yourself if your company is ready to face the globalization of consumer demands? What can you do to maintain an effective supply chain coordination within company and with your external partners? Are your performance indicators up to date? Such an assessment can provide a company with a specific path to develop its supply chain.
- **Strategy:** companies need to examine their supply chain strategy as an essential part of their overall business concept. How far can the company improve its integrated outsourcing, production and distribution capabilities to achieve superior economic value and customer satisfaction?
- **Business case:** CEO (Chief Executive Officer) and the Board of most companies are not convinced that the integrated supply chain approach will pay them interesting dividends. Supply chain managers and those who wish to play this role must have a priority to defend the integration of the supply chain. They need to support it strategically and practically with examples of service and cost gains from vertical integration.
- **Intelligence and not muscles:** set up a rigorous but small supply chain management team. The objectives will be to provide corporate leadership in the analysis, design and implementation of solutions that will bring service and cost efficiencies to new levels across the enterprise and with external partners.

⁴⁰ Martha C. Cooper, Douglas M. Lambert, Janus D. Pagh, (1997) "Supply Chain Management: More Than a New Name for Logistics", *The International Journal of Logistics Management*, Vol. 8 Issue: 1, p.1-14

- Electronic commerce: plan now for an internet-oriented supply chain. Marketers need to engage with those in the supply chain to see how orders on the internet can aid delivery by pushing cut-off time or even automated regular replenishment.
- Global suppliers: in order to support the new “virtual” organization, it is necessary to have real partners in the global supply chain. These organizations need to develop more high-level skills that are needed to coordinate the entire supply chains. They must offer a full range of services with new patterns of relationships and motivation. Major changes are already being felt in the business environment. Managers need to act now to ensure that they lead a successful supply chain into the 21st century.

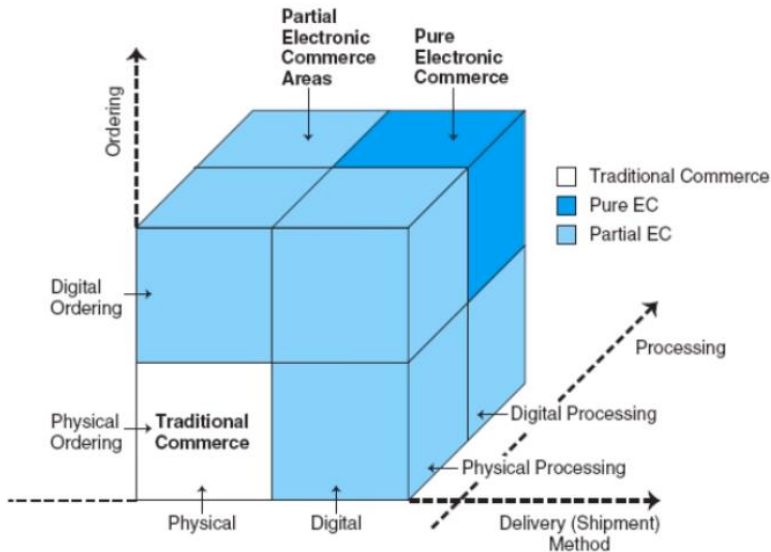
5. Amazon

E-commerce

E-commerce has undoubtedly become a must for any company selling goods and services, whether physical or virtual. But also, for web entrepreneurs who have an interest in conducting their businesses globally. E-commerce is the best platform that offers incredible business opportunities, very flexible, and therefore the potential for development is enormous.

In general, electronic commerce is a subset of e-business, when e-commerce involves the process of buying, selling or exchanging products, services or information via the internet, whereas electronic business is a larger perspective of e-commerce. It doesn't only include the process of buying and selling goods and services, but it also encompasses servicing customers, collaborating with business partners and conducting electronic transactions within an organization.⁴¹

⁴¹ P.Candance, Deans University of Richmond, USA: E-commerce and M-Commerce Technologies – IRM Press 2005 (Publisher of innovative scholarly and professional information technology titles in the cyber age). United States of America 701 E. Cholocate Avenue, Suite 200. P 5-6

Figure 6 Dimensions of E-commerce⁴²

The major e-commerce (EC) concepts are Pure and Partial EC – where Pure EC involves everything happening on the internet, for example buying music or movies on iTunes, in the other hand, Partial EC involves the selling of a good on the internet but the order fulfilment of that good will happen in the real world, for example ordering a book online and it will be sent to you physically. In general, we have brick-and-mortar organizations, where old-economy organizations (corporations) conduct their primary business offline, they have physical stores; consumers are used to the needs for stores to buy the goods or services, where we can see the products in person, touch them. Virtual organizations – that only exist online, where everything is produced online, for example you buy a video game, the order process is done online, and you will get to download a licensed version of the game and you can play it on your personal computer, laptop or smartphone. Steam, Origin are good examples of virtual organizations. Click-and-mortar (click-and-brick) organizations that run some e-commerce activities, usually as an additional marketing channel. Walmart is a good example of click-and-brick organization since not only they have physical stores, they also sell their products online. E-Market is an online marketplace where buyers and sellers meet to exchange goods, services, information. A good example to illustrate this concept is eBay that involves not only Business-to-Consumer (B2C) e-commerce model in which businesses sell

⁴² Dimensions of E-commerce, <http://mar1720introe-commerce.blogspot.com/2015/01/chapter-1-study-guide.html> [Accessed: 16 March]

to individual shoppers and Business-to-Business (B2B) in which all of the participants are businesses or organizations, but also Customer-to-Customer (C2C) e-commerce model in which consumers sell directly to other consumers.

Amazon: an overview

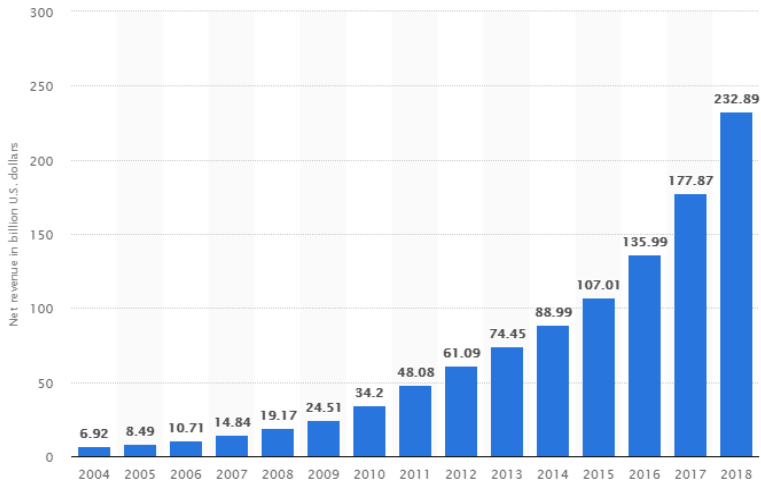


Figure 7 Net sales revenue of Amazon from 2004 to 2018⁴³

Amazon is undoubtedly the leader in their market field – e-commerce. From 2004 to 2018, Amazon's net sales revenue has increased by approximately 34 times, from 6.92 billion US dollars to 232.89 billion US dollars. The success of Amazon.com and its exponential growth are the result of different factors which I will discuss in detail later in this chapter.

But first, let us get to know about the company. Created in 1994 by Jeff Bezos, headquartered in Seattle, Washington. Amazon is part of the first generation of e-commerce sites to have emerged. Specialized in its early days in the sale of books online, the startup has quickly established itself as a reference library for Internet users, before massively diversifying its product catalog. Jeff Bezos, founder and CEO of Amazon, has had his goal to create the earth's most customer centric company. The core value of Amazon is customer obsession. Therefore, the company is built around the customer. From an operation and product

⁴³ Net sales revenue of Amazon from 2004 to 2018, <https://www.statista.com/statistics/266282/annual-net-revenue-of-amazoncom/> [Accessed: 16 March]

development standpoint, the company is always starting with the customer and working backwards. Amazon's mission is to become a place where people can find and discover anything they want to buy online and over time, to be able to serve every individual on the planet. Ultimately, it comes down to price – to sell the product at a lowest price, convenience – to deliver the product as fast as possible and selection – to have as much as possible so customers can have more choices. These 3 factors constitute, how Amazon calls it, a “virtuous cycle of price”⁴⁴, selection and convenience. In other words, customers want more selection, Amazon brings more sellers onto the platform, as more sellers come onto the platform that bring more traffic to the platform, so on and so forth, this drives a better customer experience and enables Amazon to lower their cost structure, which allows them to lower prices and which, again, drives a better customer experience. Amazon often introduces themselves as a retail company and a technology company.

As of today, Amazon categorizes their customers in four segments. The first customer segment is their consumer customer segment, this would be Amazon.com, the Kindle, Amazon fresh, Whole Foods, etc., this is Amazon's primary consumer business. The next segment is the sellers, more than half of the products that is available on Amazon is actually not owned or stored by Amazon. It's owned by small and medium businesses all over the world who partner up with Amazon to sell their products. Amazon also has fulfilment centers, which is called Fulfilled by Amazon (FBA)⁴⁵, where they hold on and store the products from their partners, then Amazon will ship the products to the customers. The third group of customers are called the content creators and entrepreneurs. This involves, for example, Amazon Studios, Amazon Flex⁴⁶, etc. The last group of customers is enterprise customers. This includes Amazon Web Service, their cloud computing business.

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Brand, E-commerce leader Customer base and loyalty Global presence Large product range Cost leadership, agility	Weak operating margin Product flops Technology breakdown	Acquiring new businesses Releasing new products Promoting Global expansion	Heavy competition Regulatory threats

Figure 8: Amazon SWOT analysis

⁴⁴ Amazon Virtuous Cycle, <https://fourweekmba.com/amazon-flywheel/> [Accessed: 16 March]

⁴⁵ Fulfillment by Amazon, <https://services.amazon.com/fulfillment-by-amazon/benefits.html> [Accessed: 16 March]

⁴⁶ Amazon Flex, <https://www.businessinsider.com/amazon-delivery-compete-with-ups-fedex-2017-10> [Accessed: 16 March]

STRENGTHS

The first thing that comes to mind is that Amazon is the world e-commerce leader, rising cloud business and the success of Amazon Prime are driving the brand fast growth. Prime membership globally has exceeded more than 100 million. The other Amazon strength is its large number of loyal customers. Amazon, with its core of customer obsession, creates a superior customer experience, superior customer service, better quality on merchandise and Amazon thrives on innovation. These can only result the ever-growing and loyal customer base. Amazon's next strength is its global presence, it has sellers and buyers around the world, businesses in more than 130 countries have their products enlisted on Amazon platform to sell their products to the global audience. Large product range plays as Amazon's strength, hundred of millions of unique products are available on amazon.com. Amazon is the go-to e-commerce for online shoppers around the globe. Amazon also focuses on delivering products to its customers at a competitive price and in a short time.

WEAKNESSES

One of Amazon's weaknesses is that the multi-billion-dollar company traditionally operates at a very low margin, below 3% comparing to Alibaba's 30%. Another weakness of Amazon is product flops – products made by Amazon is not always a success, some of its products have failed in the past such as Fire Phone, Kozmo or Kinder App. Technology breakdown is also one of the issues, considering a lot of businesses rely on Amazon Web Service, in 2016, the technology behind AWS was down for a short period of time, causing, for example Netflix or Airbnb, a great deal of problems. Such breakdown in the system might lead to a loss of confidence from the customers.

OPPORTUNITIES

Amazon's giant size and cashflow allows them to acquire other businesses. For instance, Amazon has acquired Whole Foods for 13.7 billion USD back in 2017. With an already large base of customers and having a biggest e-commerce brand, Amazon has the competitive edge when releasing and promoting its new products which can improve its revenue. Global expansion opens many doors for Amazon. Being successful in North America and in Europe, Amazon has the Asian market yet to conquer, for instance the South East Asia region, where Amazon can gain a big market share there.

THREATS

Amazon is facing heavier competition in both retail and cloud business. The competition is growing intensely, where Alibaba, eBay as online retailers or Oracle and Microsoft as cloud enterprises are competing with Amazon. Furthermore, legal and regulatory pressures are also

causing trouble for Amazon. For example, in 2017, Amazon has been fined 250 million euros in Europe over unpaid back taxes.

Supply chain, operations, innovations: The Amazon Way

Operating as an online retailer and a Business-to-Business service provider, Amazon owns very few physical stores. Amazon supply chain generally concentrates on the management of delivery and network of distribution centers. Constant innovation in the supply chain usually considered as the significant reason for Amazon to compete successfully with other similar businesses. For years, Amazon has been increasing investment in lowering delivery time of products, generating the option of same-day delivery and drone delivery. To make trip to Amazon warehouse is more efficient and faster, Amazon plans to release relay. The first trucking application which enables drivers to pre check-in and pass through security gates quickly. Amazon has also introduced the Dash button, by pressing this button, customers are able to order household supplies that they have pre-selected at Amazon. These innovations help collecting specific information about rising and falling demands, so they can adjust stocks to match the demand.



Figure 9 Fulfillment by Amazon⁴⁷

Amazon boasts over 70 fulfillment centers in the US and over 90000 full time employees. In order to achieve fast responsiveness, the company positions many warehouses in proximity to local urban markets. The location, size and the number of warehouses are important factors in Amazon supply chain success. In other words, Amazon strategically places its warehouses, positioning closer and closer to main metropolitan areas and city centers and as a result, it uses a pure push strategy for the products stored in its warehouses, on the other hand, Amazon uses a pure pull strategy when it sells the products from the third-party sellers. 100% of Amazon warehouses feature an extensive use of barcode scanners, a near constant cycle of order processing item picking and shipping. Ultimately, digitizing these processes allows Amazon to gain greater visibility into asset dispositions and shipping needs at any given time. Amazon is transforming the supply chain by using digital technologies to adapt its operations

⁴⁷ Fulfillment by Amazon, <https://medium.com/s/story/how-amazon-will-dominate-the-supply-chain-6727936d3ffc>
[Accessed: 17 March]

to the specific needs of employees and partners in every setting. Amazon warehouses, started with barcode scanners to track items at all times, have evolved to a fully digital warehouse, distribution and fulfillment network that moves goods between locations with high efficiency. For Amazon, going digital sets a foundation for flexible, fast moving operations and this has allowed the multi-billion-dollar E-commerce company to make more dramatic strategic changes that are transforming how the supply chain works. In 2012, Amazon has acquired a provider of automated and robotic warehouse solutions called Kiva systems and that company was rebranded as Amazon robotics in 2015. The robots can pick and pack without needing any human assistance enabling Amazon to complete warehouse activities very fast. Over the years, Amazon has significantly increased its number of warehouse robotics, its warehouse robots have grown at the rate of 15000 per year from the year 2015. To date, Amazon's robotics have aimed at bringing goods to people for the picking of orders. The next generation of robots will be able to pick the orders on their own to reduce the need for human order pickers. In 2014, Amazon has launched its new generation fulfillment center that contains the most innovative technology and robotics.

The e-commerce giant focuses on its logistics. Customers can order many products that Amazon has. If consumers order more items one time and want to put them in one box, Amazon has the ability to ensure that items can be delivered in the least amount of time. When a customer submits the order, the item will be delivered to an outbound area where Amazon employees will put the items into a fitted box then the automated package process will deal with everything. After all the processes, the packages will be distributed through Amazon's spiral with full of belts, then the package will be loaded to the trailers and delivered to the customers. Every step is smooth to ensure that Amazon could lessen the time to ship the package.

Amazon distribution model⁴⁸: distributor storage with carrier delivery – this model illustrates that manufacturers will deliver their products to the warehouses, when customers place orders, the products that are stocked in the warehouses will be distributed through different shipping methods to the customers. For Amazon, its inventory is held by its own warehouses, not by its manufacturers. It also combines this network model with the drop shipping service from its manufacturers. The items that Amazon chooses to stock would be only slow-moving or high demand products to reduce the risk of out of stock. Recently, Amazon has tested new ways to deliver customers items. Amazon Prime Air – an innovative delivery system that Amazon designed to get packages to customers in 30 minutes or less using unmanned aerial machines (drones). It is still in an experimental stage and not yet prevailing. However, this is not science fiction, it is all real. Amazon has set up experiments privately to test this drone

⁴⁸ Amazon Distribution Model, <https://www.thebalancesmb.com/how-amazon-is-changing-supply-chain-management-4155324> [Accessed: 17 March]

distributing system and has faith that one day, Prime Air would be the trend in the future. Besides Amazon Prime Air, Amazon provides the Shipping with Amazon (SWA) service, the concept of this new service is that Amazon will pick up packages from businesses and deliver by its own freight and fleet to the customers, not through the third-party shipping companies. This would mean that Amazon plans to take control of its whole supply chain.

Every second on amazon.com, hundreds of vendors are uploading and editing product information, thousands of customers are searching products and numerous packages are moving towards customers. To compete with traditional on-site shopping, Amazon built its logistics system to shorten delivery time. Customers who pay \$99 per year for Amazon Prime are able to receive products in 2 days. In 2017, One-hour delivery is available in 49 cities of 7 countries. To improve responsiveness, Amazon released the Dash button, it allows customers to place orders by one press without computers or smartphones. Customers can also make orders by voice order through Alexa. Amazon-Go allows customers to pick and go without waiting in line to check out. That is Amazon Information Technology which connects data, process, facilities, computing systems and people together to make that happen. At the very beginning of 1995, Amazon used different systems for website and order fulfillment to improve security. In 2000, Amazon spent 200 million dollars to renovate the entire system, including analysis software, a logistics system from managed logistics and database management system from Oracle for communication with supplies.



Figure 10 Amazon Web Service⁴⁹

Amazon develops Amazon Web Service (AWS)⁵⁰ and simple storage service by themselves, launched in 2006, by which Amazon can handle a vast number of products and customer information. All these systems generate efficient supplier relationship management, customer relationship management and internal supply chain management. AWS is a subsidiary of Amazon, that provides cloud computing platforms to customers and to Amazon itself. AWS capability includes computing storage, networking, database, analytics and application

⁴⁹ Amazon Web Service, <https://medium.com/s/story/how-amazon-will-dominate-the-supply-chain-6727936d3ffc> [Accessed: 19 March]

⁵⁰ Amazon Web Service, <https://www.theguardian.com/technology/2017/feb/02/amazon-web-services-the-secret-to-the-online-retailers-future-success> [Accessed: 19 March]

services. AWS provides in time large-scale computing capacity. All Amazon innovations such as the Dash button, Alexa, drone delivery and Amazon Go rely on AWS. Take Alexa as an example, launched in 2014, when a voice order is given to Alexa, the order is passed through the internet to AWS. AWS analyzes the order by cloud computing and sends feedback to Alexa, Alexa then replies to each customer accordingly. All these processes are finished in one second.

	Dec 31, 2018	Dec 31, 2017	Dec 31, 2016	Dec 31, 2015	Dec 31, 2014
<i>Selected Financial Data (USD \$ in millions)</i>					
Cost of sales	139,156	111,934	88,265	71,651	62,752
Inventories	17,174	16,047	11,461	10,243	8,299
<i>Ratio</i>					
Inventory turnover ⁵¹	8.10	6.98	7.70	7.00	7.56
<i>Benchmarks</i>					
<i>Inventory Turnover, Competitors</i>					
Costco Wholesale Corp.	11.16	11.38	11.47	11.35	11.64
Home Depot Inc.	5.22	4.96	4.93	4.89	4.65
Lowe's Cos. Inc.	3.97	4.07	4.07	4.11	3.83
Target Corp.	5.91	5.88	6.05	5.83	5.84
TJX Cos. Inc.	6.09	6.47	5.96	6.46	6.61
Walmart Inc.	8.53	8.39	8.12	8.09	7.98
<i>Inventory Turnover, Sector</i>					
General Retailers	7.67	7.43	7.42	7.34	7.33
<i>Inventory Turnover, Industry</i>					
Consumer Services	8.87	8.67	8.59	8.28	8.35

Figure 11 Amazon Inventory turnover from 2014-2018⁵¹

Figure 11: Amazon Inventory turnover from 2014-2018

From the launch of Amazon Alexa to December 2018, the cost of sales and the inventories have doubled up. Increasing from 62752 million to 139156 million USD and from 8299 million to 17174 million USD respectively.

Inventory Turnover (2014): $63752/8299 = 7.56$

Inventory Turnover (2018): $139156/17174 = 8.10$

Not only Amazon has doubled its volume in sale, Amazon has also been able to maintain a fast pace to convert their current assets into cash, which ultimately translates into their rapid growth and reflects how competitive and efficient Amazon is managing its supply chain.

⁵¹ Amazon Inventory turnover from 2014-2018, <https://www.stock-analysis-on.net/NASDAQ/Company/Amazoncom-Inc/Ratios/Short-term-Operating-Activity#Inventory-Turnover> [Accessed: 21 March]

Conclusion

It is, without a doubt, that Amazon is doing a good job in supply chain management thanks to its innovations built strictly around its customers and to its supply chain optimization technologies. With the launch of Amazon Web Service in 2006 and simple storage service, Amazon formed a completed system which allowed it to master its supplier relationship management, customer relationship management, and internal supply chain management. Following that, Amazon optimized its Logistic and Warehouses Network by placing its storages closer and closer to main metropolitan areas and city centers. Furthermore, the adaptation of digital technologies has created a great hedge on facilitating Amazon's warehouse operation. And most recently, Amazon aims to advance their Distribution system with "Amazon Prime Air" which expects to get packages to customers in 30 minutes or less using unmanned aerial machines. However, there are components and aspects of the supply chain management of Amazon where improvements can be made. First, Amazon can set up its own transportation and actualize superior last mile delivery by creating its own fleet of delivery vehicles and personnel. To a great extent, Amazon relies on courier companies such as FedEx and UPS. In recent years, Amazon brand image has taken a hit because of the unreliability of the last mile connectivity or the last part of the supply chain management that is visible to the end consumer. Second, Amazon can integrate its supply chain management better and move from a cooperation model with the suppliers to a coordination mode, this close coordination mode entails a sharing of information between all its partners and suppliers using the latest technology to expend its supply chain surplus. Amazon continues to innovate its distribution methods to fulfill its consumers with more convenient and fast delivery. We, as Amazon's customers, partners, can expect Amazon to keep introducing the unexpected way to serve its extensive markets.

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