

# SYS640 -ASSIGNMENT 1

## INTRODUCTION TO SUPPLY CHAINS

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### Problem 1

**Consider the purchase of a bar of chocolate at a convenience store. Describe the various stages in the supply chain and the different flows involved.**

**1.Raw Materials**-Obtaining raw materials, such as cocoa beans, sugar, and milk, is the first step in the supply chain for a chocolate bar. Typically, cocoa beans are farmed in nations like Ghana, the Ivory Coast, and Ecuador. The primary components of a chocolate bar are sugar, sweeteners, flavoring agents and sometimes potassium carbonate. Cocoa trees are evergreen that thrive between 100 and 1,000 feet (30.48 to 304.8 cm) above sea level, within 20 degrees of the equator. The trees, which are originally from South and Central America, are currently produced in industrial farms in countries like Malaysia, Brazil, Ecuador, and West Africa. Almost 75% of the 75,000 tons of cocoa beans grown year around the world are currently produced in West Africa, with Brazil being the biggest producer in the Western Hemisphere. Due to their relative fragility, the trees are susceptible to damage from full sun, fungi, and insect pests. Normally, they are planted alongside other trees, such rubber or bananas, to reduce this harm. The other crops offer shade from the sun and give plantation owners a backup source of revenue in case the cocoa trees don't produce. The cocoa tree's fruit, or pods, measure 3 to 4 inches (7.62 to 10.16 centimeters) in diameter and 6 to 10 inches (15.24 to 25.4 centimeters) in length. Most trees only produce 30 to 40 pods each year, each containing 20 to 40 beans that measure 2 inches (5.08 centimeters) long and are surrounded by a gooey substance. The pods ripen in three to four months, and because the trees grow in a consistent climate, they continue to ripen all year long. Yet, between May and December, the most pods are gathered. No more than half of the 30 to 40 pods on a normal cacao tree will be mature at any given moment. Only fully developed fruits can be gathered because only those will yield ingredients of the highest caliber. On the plantation, mature pods are split apart with a huge knife or machete after being cut from the trees with machetes or knives mounted on poles (the trees are too sensitive to be climbed). Next the beans are manually taken out. The seeds are stacked on the ground and left to warm for many days while being exposed to the sun while still covered with pulp from the pods. A tiny bit of fermentation is brought on by enzymes from the pulp interacting with airborne wild yeasts, which will enhance the flavour of the finished product. The beans' temperature reaches around 125 degrees Fahrenheit throughout the fermentation phase (51 degrees Celsius). Because the embryos are destroyed, the beans cannot sprout while being transported. Moreover, the cell walls of the beans are encouraged to decompose. The leftover pulp from the beans will be removed after they have adequately fermented, and then they will be dried. Following that, they are assessed and bagged in sacks weighing between 130 and 200 pounds (59.02-90.8 kilograms). Once they have undergone inspection, they will be kept in storage before being transported to an auction where they will be sold to manufacturers of chocolate.

**2.Manufacturing Process:** The raw materials are delivered to chocolate producers after they have been sourced. Then, using their own secret recipes and methods, the chocolate producers turn these basic materials into chocolate bars.

**Roasting, hulling, and crushing the beans**

1. At a company's processing facility after the beans have arrived in a shipment, they are first roasted on screens and then in rotating cylinders through which warm air is forced. The moisture content of the beans decreases from roughly 7% to about 1% during the course of 30 to 2 hours. More than 300 distinct compounds in the cocoa beans interact during the browning reaction, which is brought on by the roasting process. The rich flavor that we know with chocolate is now starting to emerge from the beans.
2. The shells split open and separate from the nibs during roasting as well (the meat of the bean). The hulls of the beans can be separated from the beans without smashing them by passing them through a massive winnowing device called a cracker and fanner while being airbrushed. Now that the hulls have been removed from the nibs, they are often sold as mulch or fertilizer. They are occasionally used as a boiler fuel in industry.
3. After that, the roasted nibs go through a process called broyage, which involves crushing them in a grinder composed of rotating granite slabs. The grinder's design might vary, although the majority of them look like vintage flour mills. The result of this grinding is a thick liquid known as chocolate liquor, which is composed of tiny nib particles suspended in oil.
4. The liquor is then further pulverized during the refining process between sets of rotating metal drums. Because the alcohol is becoming smoother and flowing more easily, each subsequent rolling is quicker than the one before it. The final objective is to get the liquor's particle size down to about.001 inch (.00254 centimeters).

**3.Packaging:** Following production, the chocolate bars are packaged and labeled with the company name and nutritional facts. The container also safeguards the chocolate during storage and transportation.

**4.Distribution:** The packaged chocolate bars are then brought to warehouses and distribution centers, where they are kept until they are prepared to be sent to retail establishments. Several middlemen, including wholesalers, distributors, and retailers, may be involved in the distribution process.

**5.Retail:** The chocolate bars are finally put on sale by being put out on racks in convenience stores. The point in the supply chain where the final consumer of the product is sold is the retail establishment.

**The various flows involved in the production of a chocolate bar include the following:**

- 1.Raw materials, finished commodities, and packaging materials are physically moved across the supply chain.
- 2.Orders, invoicing, and delivery schedules are all examples of information flow, which is the dissemination of data and information along the supply chain.

3. Financial Flow: The movement of money down the supply chain, including payments made to distributors, manufacturers, suppliers, and retailers.

4. Reverse Flow: When products are returned or recalled, they are moved back up the supply chain.

*In conclusion, there are various steps and flows in the supply chain for a chocolate bar, from the sourcing of raw ingredients through the sale of the finished good at a retail outlet. Management and optimization of the supply chain for chocolate bars and other consumer items depend on an understanding of these phases and flows.*

## **Problem 2**

**Why should a firm like Dell take into account total supply chain profitability when making decisions.**

While making decisions, a company like Dell should consider the profitability of the entire supply chain because it can have a big impact on the overall performance and sustainability of the business. Here are a few explanations:

**1. Cost Reduction** - Cost cutting opportunities can be found by Dell by taking into account the probability of the entire supply chain. This allows Dell to find ways to cut costs and boost productivity at every stage of the supply chain. Saving money can be achieved, for instance by streamlining supply chains, lowering the cost of carrying inventory and improving supplier agreements. The goal of the cost reduction is to locate the most efficient and cheap means of obtaining and storing goods, transporting them from point A to point B and ensuring customer satisfaction. Choosing the lowest supplier and carrier is one step in the process of lowering supply chain expenses. Every step in the order fulfillment process has a cost and could stand to gain from cost cutting measures.

Some of the Cost Reduction Strategies adopted by Dell

a. Determine high cost workflow inefficiencies

Stop focusing simply on transport costs in order to identify hidden costs in supply chain management. Follow the order fulfillment sequence in its entirety. For more orders to be accurately handled and sent each day, efficiency is the desired outcome. Watch out for process bottlenecks or situations where workers are required to perform an activity that may be automated instead.

Analysis of transaction processing should be the first step. Select the platform for accepting payments such as PayPal, Stripe, Venmo, etc. Verify if the transaction or subscription fees related to this service are acceptable to you by shopping around. Before any of it even reaches the bank account of your company, you can be losing money.

Apply the same amount of inspection to all technological assets. Follow a more effective approach to update the status of an order or assign tasks for order fulfillment. Allot a time for fresh delivery at the warehouse. Encourage your staff to identify any inefficiencies they've seen, and think about engaging a consultant to provide an unbiased assessment of your business practices.

## b.Change up your modes of Transportation

Choosing a trustworthy and reasonable carrier is a continuous process. If you are not consistently cultivating connections with carriers and requesting quotations for various services, you can be losing out on possibilities that are reasonably priced. Failure to diversify your carrier partnerships also increases the likelihood that your firm will be left high and dry if your only carrier unexpectedly goes out of business. Poor carrier diversity puts you in a loss-lose situation since if you can't satisfy your clients by delivering their products, you will undoubtedly lose money.

As an alternative, always have a few carriers available to choose from to give oneself greater control over the supply chain. To further save fuel expenses, use intermodal or multimodal transportation. By putting the item on a train for the interstate or cross-country portion of the voyage and then switching it to a truck for regional or local delivery, you may sacrifice one or two days in shipping timeframes but end up saving money overall. Water travel is an additional practical choice in various regions of the nation.

## c.Consolidate Product Packaging

While in transit, product packaging has two crucial functions: it safeguards the item and provides a visually appealing surface on which to describe the item's features and specifications. The number of items that can fit into a box, is also influenced by packing. There is a maximum number of boxes that can fit in a freight container, especially if you choose FTL shipping.

Lowering product packaging also reduces spending on printing and packaging supplies. One of the best ways to reduce costs in supply chain management and it benefits everyone. Determine the most cost-effective method for shipping your goods without causing damage, as you will lose money for every item that is damaged before it reaches its destination.

**2.Enhanced Customer Service:** By concentrating on the entire supply chain, Dell can enhance customer service by making sure that products are delivered on time and in good shape. A well-managed supply chain can also assist the business in responding promptly to shifting client expectations and delivering a better overall customer experience.

**3.Competitive Advantage:** Dell may have an advantage over rival businesses in the market thanks to a more effective and efficient supply chain. Increased profitability and market share may result from the company being able to react to market changes more quickly, cut expenses, and produce better products.

**4.Risk Management**-Dell is able to recognize and control risks that could affect the company's profitability by having a thorough awareness of the whole supply chain. There are further concerns related to transportation, the environment, and suppliers. Dell can lessen the effect on the company and guarantee supply continuity by addressing these risks.

**5.Sustainability**-Dell's operations may be made to be environment friendly and sustainable by taking into account every link in the supply chain. Among other things, this entails lowering carbon emissions, cutting waste and confirming that suppliers share this commitment. The environment will profit from this, Dell's reputation and brand image will likely also benefit.

*In conclusion, Dell can optimize its operations, cut costs, manage risks, and maintain sustainability by considering the profitability of the entire supply chain. This might aid Dell in maintaining its competitiveness, boosting profitability, and improving its standing in the industry.*

### **Problem 3**

#### **What are some strategic, planning and operational decisions that must be made by an apparel retailer like Banana Republic ?**

As an apparel shop like Banana Republic, there are a number of operational, planning, and strategic decisions that must be made to guarantee the company's success. Here are a few illustrations:

##### **Strategic Decisions:**

1.Product and Brand strategy-Banana Republic must choose the types of products to sell, their prices, and the brand image to uphold as part of its product and brand strategy. This involves figuring out the target market and the kind of clientele they wish to draw.

2.Expansion Strategy-Banana Republic may think about growing its business by establishing additional locations or tapping into new markets. The business must choose the best expansion strategy, taking into account elements including the state of the local economy, the level of competition, and the resources at its disposal.

3.Marketing and Advertising strategy-Banana Republic should choose its marketing and advertising plan to make sure that its items are presented to its target market in an efficient manner. Choosing the most efficient advertising platforms such as social media, television, print media and billboards is a part of this.

##### **Planning Decisions:**

1.Inventory planning-Based on the existing and anticipated demand, Banana Republic must choose the kind and quantity of inventory to stock. Analyzing sales patterns, predicting future demand, and making sure the inventory is in line with the company's product and brand strategy are all necessary for this.

2.Sales and revenue forecasting-Banana Republic must create a strategy to effectively anticipate sales and revenue, taking into account elements like seasonal variations and shifts in consumer behavior.

3.Budgeting Plan- In order to efficiently utilize its resources, Banana Republic must set aside money for its marketing, inventory, and store operations.

##### **Operational Decisions:**

1.Store layout and design-Banana Republic must make sure that its retail locations are inviting to customers visually. This involves selecting the store's layout, style, and visual merchandising tactics.

2.Staffing and Training-Employing and educating workers is important for Banana Republic to ensure that they deliver outstanding customer service, are familiar with the items and comprehend the company's mission and core values.

3. Supply chain management-Banana Republic must manage its supply chain efficiently to guarantee that goods are timely supplied, of high standard, and up to the company's requirement.

*In conclusion, strategic, planning, and operational decisions must be made by a clothing shop like Banana Republic to ensure the company's success. These choices include those relating to inventory planning, sales and revenue forecasting, budgeting, store layout and design, staffing and training, and supply chain management. They also include decisions relating to product and brand strategy, expansion strategy, marketing and advertising strategy, and expansion plans.*

#### **Problem 4**

**Consider the supply chain involved when a customer orders a book from Amazon. Identify the push/pull boundary and two processes each in the push and pull phase**

The phases of the supply chain that are engaged when a client orders a book from Amazon are called the push phase and the pull phase.

**Push phase:** The push phase begins when the publisher produces the book and concludes when it is sent to Amazon's fulfillment facility. The moment the book is received by Amazon's fulfillment facility is known as the push/pull barrier.

The following two procedures are part of the push phase:

1. Printing & Distribution- This procedure entails the publisher printing the book and distributing it to the various bookstores and fulfillment facilities.

2. Inventory Management- Method of managing inventory includes keeping track of the quantity of the book in the publisher's warehouse and making sure there is adequate supply to fulfil demand.

**Pull phase:** The pull phase begins when a consumer orders a book from Amazon and concludes when the book is delivered to the client's address. When Amazon gets a customer's order and begins processing it, that is known as the push/pull boundary.

The following two procedures are a part of the pull phase:

1. Order processing and fulfilment procedure- Following receipt of the customer's order, the book is selected from the inventory, packed and shipped to the address provided by the customer.

2. Delivery procedure- During this procedure, the book will be sent to the customer's address by either a delivery service provided by a third party or by using Amazon's own delivery network.

*In conclusion, there are push and pull phases in the supply chain that are involved when a customer orders a book from Amazon. The pull phase deals with order processing, order fulfillment, and shipping whereas the push phase deals with the publication and dissemination*

*of the book. The moment at which the customer's order is received by Amazon's system and the book is received by the fulfillment center is known as the push/pull boundary. Printing, distribution, and inventory management are two push-phase operations, whereas order processing, fulfillment, and delivery are two pull-phase activities.*

## **Problem 5**

**In what way do supply chain flows affect the success or failure of a firm like Amazon? List two supply chain decisions that have a significant impact on supply chain profitability.**

Success or failure, for a company like Amazon, will depend on how well a company's supply chain performs. Customers must be satisfied for the product movement from the manufacturer to the distributors, and finally to the final consumer, in order for this to happen quickly and credibly. The information flow back through the supply chain allows for the coordination of each participant's actions. As long as money is coming in, all supply chain members may continue to run their businesses. The profitability of the supply chain is impacted by decisions made on sourcing, marketing, and fulfillment.

Supply chain has evolved as a critical differentiator between profitable and unproductive organizations in today's intensely competitive market. In industries where new product introduction is common, this gap is considerably more pronounced. In industries where goods and services have become commodities, top management cannot disregard the impact of supply chain decisions on these firms' bottom lines any longer. As a result, supply chains are the primary field of play for industry competitors. Because of its impact on business profitability, supply chain management presently requires the simultaneous making of a large number of difficult decisions, particularly in relation to the movement of information, goods, and cash flow. In situations like this, decisions that affect both the long and short terms may need to be made.

The value chain will be shaped by the long-term supply chain decisions made since they will affect resource allocation, process design and staging, whether manufacturing is outsourced or done in-house, supplier relationships, and even production capacity. This decision becomes a make-or-break one for any company that chooses to base its competitive position on cost leadership and differentiation. Even in the face of a high implied demand uncertainty, this decision must be strategically thought through with little room for forecasting errors because it will be very difficult to change on short notice. This is due to the fact that the effects of these choices will be felt throughout the company for a number of years. As a result, while choosing a long-term supply chain, every firm must take into account flexibility and affordability. By doing this, the company will be better able to withstand supply and demand shocks, which can have a negative financial impact.

Businesses still need to pay employees, pay suppliers, maintain operations, and fulfill client orders in the near future. The tactical short-term supply chain decisions regarding how to maximize its supplier network, however, determine how these needs are met on a quarterly and annual basis while working within the constraints of the long-term supply chain decision and how operations are continued. These decisions affect the business's bottom line frequently, despite the fact that they are made in the short term. To succeed, a company must consider market risks including currency fluctuations, supplier responsiveness, and competitiveness as you decide how to manage your supply chain. Operational decisions are by no means

insignificant to the success of the organization, even though they frequently have the shortest planning horizons. While choosing an operational supply chain, it is important to consider the reasons of material and time waste, quality, and lead time.

For a company like Amazon, two supply chain decisions that have a big impact on supply chain profitability are:

1. Logistics and transportation management- Choosing the right logistics and transportation management strategies by Amazon is essential to make sure that goods are delivered to customers quickly and efficiently. To guarantee on time delivery, the corporation must select the most effective modes of transportation, such as air, sea or ground and the most effective routes. In order to minimize transportation costs and speed up delivery, the corporation must also strategically place its distribution centres and warehouses.

2. Inventory management- Profitability of the supply chain is significantly impacted by decisions made by Amazon regarding inventory management. The business must keep sufficient inventory levels to satisfy consumer demand while reducing inventory carrying expenses. In order to achieve this, it is necessary to carefully balance inventory turnover and stock levels, as well as to apply inventory optimization techniques like ABC analysis and just-in-time inventory management.

*In conclusion, a company like Amazon might succeed or fail greatly depending on how its supply chain functions. Supply chain profitability is greatly influenced by decisions made about inventory management and logistics and transportation management. Amazon can increase its profitability and competitiveness by making smart judgments about its supply chain.*