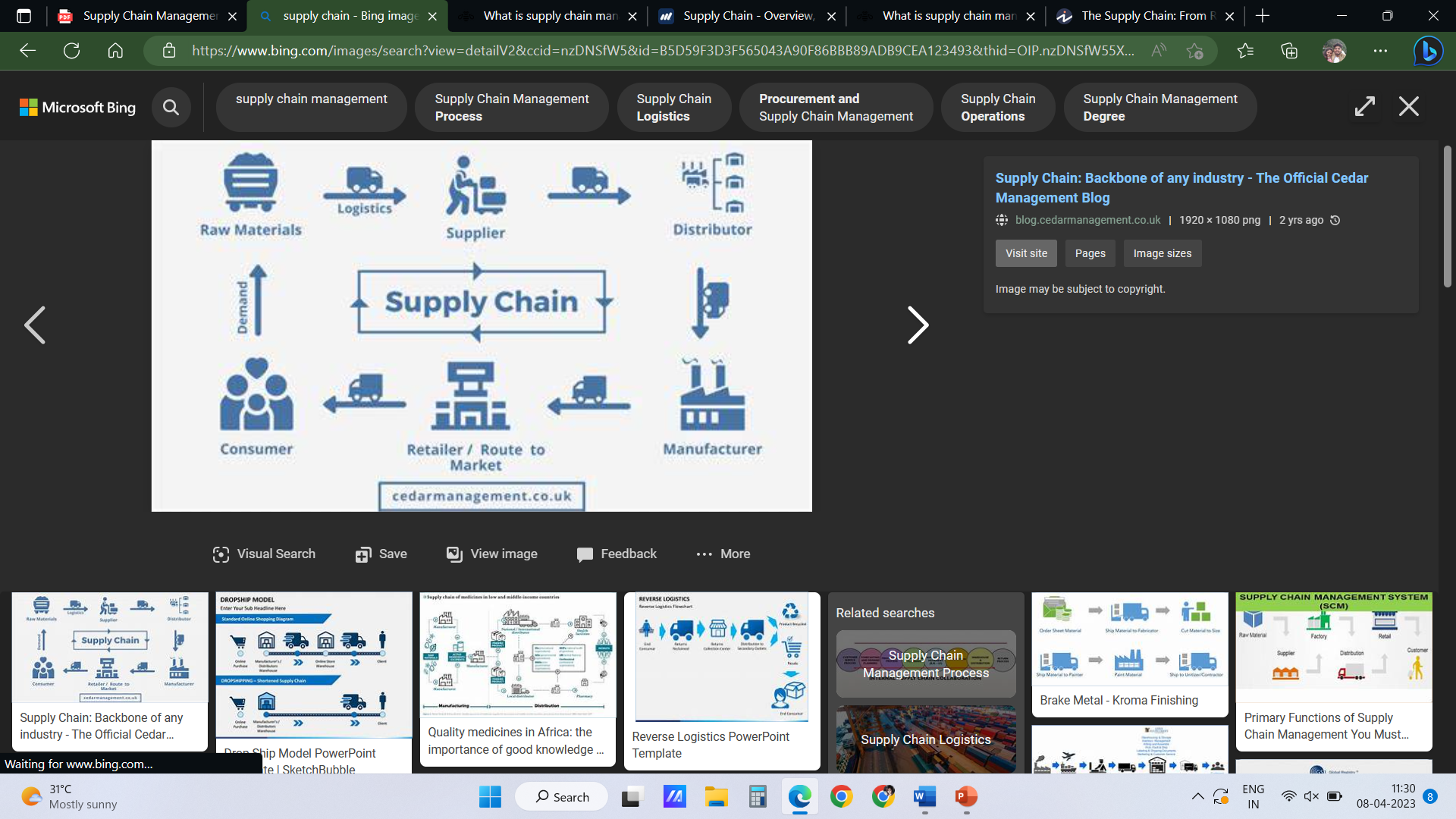
SUPPLY CHAIN MANAGEMENT- UNIT- I

Introduction, Definition of Supply Chain Management, Evolution of the Concept of Supply Chain Management, Key Drivers of Supply Chain Management, Typology of Supply Chains, Cycle View of Supply Chain, Problems in SCM and Suggested Solutions

Introduction

**What is a Supply Chain?**

A supply chain is an entire system of producing and delivering a product or service, from the very beginning stage of **sourcing** the raw materials to the final **delivery** of the product or service to end-users. The supply chain lays out all aspects of the production process, including the activities involved at each stage, information that is being communicated, natural resources that are transformed into useful materials, human resources, and other components that go into the finished product or service.



**Supply Chain Management-**

**Sengupta & Turnbull-**

SCM is the process of effectively managing the flow of material and finished goods from vendors to customers using manufacturing facilities and warehouses as intermediate stops.

Supply chain basically involves integration of business process

Supply chain established linkage between suppliers, customers and within the value chain of a business unit

Supply chain is viewed as a single entity, not fragmented areas of responsibility for functional areas such as purchasing manufacturing distribution etc

Supply chain encompasses all activities involved in the flow and transformation of goods from the raw material stage to the finished product, as well as associated with information flow, cash flow and product flow in the organisation.

* Supply Chain Management is the management of **flow of goods** and **services** that includes all the **processes** that transform raw material into final products.
* SCM is also called the art of mgmt. for providing the right **product** , at the right **time**, right **place** and at the right **cost** to the customer
* A supply chain consists of **series of activities** involving many organization through which the materials move from initial suppliers to final customers.
* **Different Products** have different supply chain. Eg- Maggie Bisleri, flipkart.
* SC manager looks to- **minimise the cost to maximise the profit**. Leading to Lower cost of the product and gaining a **competitive advantage**

**Goal of SCM**

### Fulfilment Efficiency

S[upply chain management’s objective](https://stockarea.io/blogs/key-objectives-of-supply-chain-management-scm/) is to ensure that **inventory** is readily **available** in customer-facing positions to meet demand. Organisations must strive to **match supply** and **demand** on time by making the best use of cross-chain resources. Partners in the supply chain must collaborate to maximise resource productivity, standardise processes, avoid duplication of effort, and reduce inventory levels. These procedures will assist the firm in reducing waste, reducing expenses, and increasing supply chain efficiency.

Cost reduction in the supply chain is an important goal, especially during periods of economic uncertainty when businesses seek to conserve money

### Customer Value Creation

Customers are the organisation’s lifeblood and necessitate the existence of a supply chain. As a result, a core goal of supply chain management must be to constantly meet or exceed customer needs. Customer value creation begins with a market-driven **client service strategy** founded on well-understood **customer expectations**. These criteria should be the base to develop supply chain strategy, design, and capabilities. As a result, service will be of higher quality, variability will be reduced, and fewer violations will be addressed.

### Increase Flexibility

Another critical reason to invest in supply chain management capabilities is the ability to adapt to change. The current business environment is volatile, with numerous factors influencing how organisations run and survive. Supply chain management can assist businesses in adapting to the challenges of globalisation, economic instability, and rising consumer expectations, among other concerns

### Make Supply Chain Resilient

Apart from the ongoing business issues, firms frequently face abrupt and severe supply chain interruptions. Natural disasters, labour strikes, and supplier failures are all examples of uncommon events. These factors impede the flow of goods and expose the company to financial and reputational harm.

### Monitor Financial Success

One of the most obvious goals of supply chain management is to contribute to the organisation’s financial performance. Historically, cost-cutting strategies have focused on streamlining stock levels to reduce inventory carrying costs, automate fulfilment operations to reduce labour costs, and consolidate orders to reduce freight costs. By contrast, leading firms today leverage the supply chain to increase differentiation, sales, and market penetration. Their objective is to maximise shareholder profit and competitive advantage.

**Advantage of SCM**

* **Identifying potential problems.**When a customer orders more product than the manufacturer can deliver, the buyer can complain of poor service. Through data analysis, manufacturers may be able to anticipate the shortage before the buyer is disappointed.
* **Optimizing price dynamically.** Seasonal products have a limited shelf life. At the end of the season, these products are typically scrapped or sold at deep discounts. Airlines, hotels and others with perishable “products” typically adjust prices dynamically to meet demand. By using analytic software, similar forecasting techniques can improve margins, even for hard goods.
* **Improving the allocation of “available to promise” inventory.**Analytical software tools help to dynamically allocate resources and schedule work based on the sales forecast, actual orders and promised delivery of raw materials. Manufacturers can confirm a product delivery date when the order is placed — significantly reducing incorrectly-filled orders.

**Evolution of Supply Chain Management**



The evolution of supply chain management has been characterized by **increasing integration** of separate tasks; a trend underlined in the 1960s as a critical area for future productivity improvements since the system was highly fragmented.

Although logistics tasks have remained relatively similar, they initially consolidated into two distinct functions related to **materials management** and **physical distribution** during the 1970s and 1980s.

This process moved further in the **1990s** as **globalization** incited functional integration and the emergence of logistics in a true sense. All the elements of the supply chain became part of a single management perspective.

he Stages of evolution in Supply Chain Management

There are a total number of 5 stages in the evolution of the supply chain industry. These 5 stages include:

● Stage 1 The early 1980s

● Stage 2 Late 1980s

● Stage 3 The early 1990s

● Stage 4 Late 1990s

● Stage 5 The twenty-first century

Stage 1: Consolidation (the action or process of combining a number of things into a single more effective or coherent whole.: "a consolidation of data within an enterprise".)

Starting from the early 1980s, businesses focused on products. They focused more on quality and the key performance metrics were – inventory turns and production cost. For the purpose of achieving inventory turns, small companies began merging into larger organizations. This also led to organized planning of the production cost which further resulted in becoming a good solution for most businesses.

Stage 2: Integration (the action or process of integrating.: "economic and political integration" "integration of individual countries into trading blocs")

In the late 1980s, businesses shifted their focus from products to the volume of output. Keeping a close eye on the cost, the key performance metrics for Stage 2 of the supply chain evolution turned out to be production capacity and throughput. Companies that started making profits in the earlier stage now analyzed that just production cost will not help them in making more profits. And for this reason, the rate of production and the volume of production became important. By the end of this stage, companies found their solutions.

Stage 3: Market Value (the amount for which something can be sold on a given market.: "insurance may only cover the current market value of your car".)

Then came the third stage of the supply chain evolution which began in the early 1990s. Organizations in this stage started to focus more on market-driven results. The key factor of this stage of evolution was product availability and the performance metrics were clearly – market share and order fill rate. Now the problem was not about making more products but about delivering them to the markets. So, by the end of this stage, businesses had the solution again and were onto their next stages of growth for even better results.

Stage 4: Brand Value (Brand value is the monetary worth of your brand, if you were to sell it.)

During the late 1990s, firms analyze that customers were the game changers for revenue generation. This is when they shifted their business strategies and made ‘lead time’ the key factor in their goals. With this, the key performance metrics changed from market share and order fill rate to customer satisfaction, value-added, and response time. Companies now had the time to analyze that products that were made with a prime focus on customers were what sold out more. That’s how companies started focusing on products that added value to their companies

Stage 5: Automation (the use of largely automatic equipment in a system of manufacturing or other production process.: "unemployment due to the spread of automation" "the automation of office tasks".)

The twenty-first century is more driven by knowledge and that is why having more information is preferred to be ideal for a company’s supply chain management. The key performance metrics for the 5th stage of supply chain management is real-time communication and business intelligence. Over the years, with a growth in each segment of the supply chain, employment has also increased. With more people in the circle, communicating every little detail to each person has become a task. The process of storing information also began to get hectic and for all these reasons, automation started out to be the focus for companies to grow.

Today, all the companies using automation throughout their supply chain are the companies that have a bigger scope to grow. With each stage of the evolution, companies found their solutions, and likely, this stage will also be smooth in transition for those who live up to the changing strategies for their business growth – focus on automation. Keeping automation as a solution for real-time communication and business intelligence, your organization will get the chance to rise above and move on to the next big solution of the next stage of the evolution

**Components of Supply Chain Management**

Planning- Sourcing-Manufacturing- Delivering- Return

Plan

Planning involves a wide range of activities. Companies must first decide on their operations strategy. Whether to manufacture a product or component or buy it from a supplier is a major decision.

Options include:

● Manufacturing a product component domestically

● Manufacturing a component in a foreign market by setting up international production facilities ● Buying a component from a foreign supplier ● Buying a component from a domestic supplier

Planning also involves mapping out the network of manufacturing facilities and warehouses, determining the levels of production and specifying transportation flows between sites. It also involves assessing how to improve the global supply chain and its management processes

When planning, companies should ensure that their supply chain management strategies align to business strategies, that communication plans for the entire supply chain are decided and that methods of measuring performance and gathering data are established before planning begins.

Source

This aspect of supply chain management involves organizing the procurement of raw materials and components. Procurement is the acquisition of goods and services at the best possible price, in the right quantity and at the right time. When sources have been selected and vetted, companies must negotiate contracts and schedule deliveries. Supplier performance must be assessed and payments to the suppliers made when appropriate. In some cases, companies will be working with a network of suppliers. This will involve working with this network, managing inventory and company assets and ensuring that export and import requirements are met.

Make

This stage is concerned with scheduling of production activities, testing of products, packing and release. Companies must also manage rules for performance, data that must be stored, facilities and regulatory compliance.

Transforming raw material into finished goods using- **machines**, **labours** and different techniques.

Sub task included after the manufacturing process-

* Assembly warehouse
* Testing bulbs and electronics
* Inspection edible
* Packaging into lots

SCManager- reduce the cost , lable it, do insurance of the goods

* Things to look while manufacturing-
* Less waste is produced
* Effective Employee training eg- Silk sarees

Deliver

The delivery stage encompasses all the steps from processing customer inquiries to selecting distribution strategies and transportation options. Companies must also manage warehousing and inventory or pay for a service provider to manage these tasks for them. The delivery stage includes any trial period or warranty period, customers or retail sites must be invoiced and payments received, and companies must manage import and export requirements for the finished product

Supply chain Manager looks into

* Effective Delivery channel
* Safe and timely delivery

diversified distribution methods – in the case of rain. Amazon

Aspects to look into

* Receipt of order
* Develop a network of warehouses,
* Deliver products to customer,
* receive payments

Return

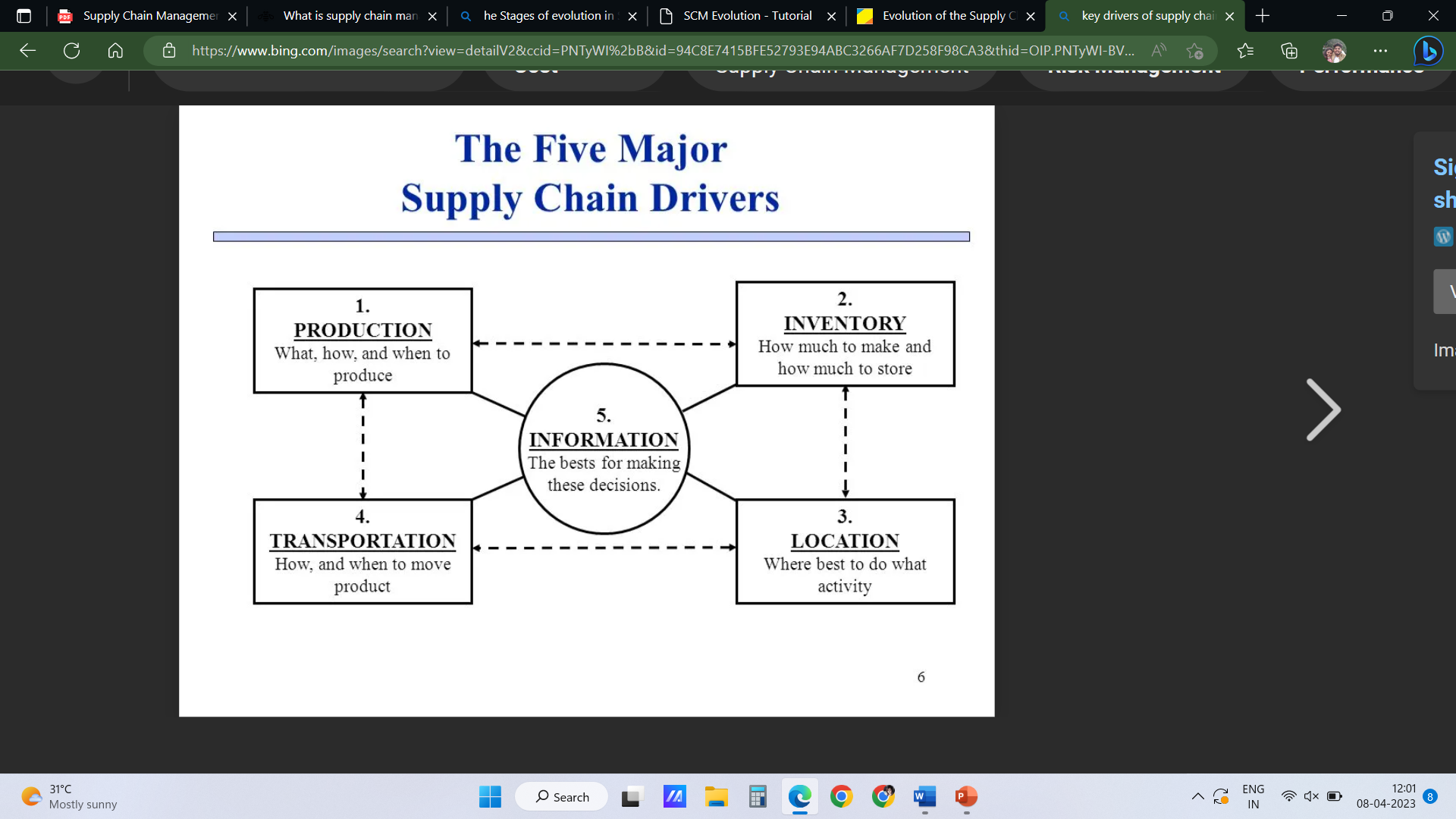
Return is associated with managing all returns of defective products, including identifying the product condition, authorizing returns, scheduling product shipments, replacing defective products and providing refunds. Returns also include “end-of-life” products (those that are at the end of their product lifetime and a vendor will no longer be marketing, selling, or promoting a particular product and may also be limiting or ending support for the product).

**Key Drivers in Supply Chain Management**

Supply chain capabilities are guided by the decisions you make regarding the five supply chain drivers. Each of these drivers can be developed and managed to emphasize responsiveness or efficiency depending on changing business requirements.

The five drivers provide a useful framework for thinking about supply chain capabilities. Decisions made about how each driver operates will determine the blend of responsiveness and efficiency a supply chain is capable of achieving. The five drivers are illustrated in the diagram below:

**Production-Inventory-Location-Transportation- Information**



Production

This driver can be made very responsive by building factories that have a lot of excess capacity and use flexible manufacturing techniques to produce a wide range of items. To be even more responsive, a company could do their production in many smaller plants that are close to major groups of customers so delivery times would be shorter. If efficiency is desirable, then a company can build factories with very little excess capacity and have those factories optimized for producing a limited range of items. Further efficiency can also be gained by centralizing production in large central plants to get better economies of scale, even though delivery times might be longer.

Inventory

Responsiveness can be had by stocking high levels of inventory for a wide range of products. Additional responsiveness can be gained by stocking products at many locations so as to have the inventory close to customers and available to them immediately. Efficiency in inventory management would call for reducing inventory levels of all items and especially of items that do not sell as frequently. Also, economies of scale and cost savings can be gotten by stocking inventory in only a few central locations such as regional distribution centers (DCs).

Location

A location decision that emphasizes responsiveness would be one where a company establishes many locations that are close to its customer base. For example, fast-food chains use location to be very responsive to their customers by opening up lots of stores in high volume markets. Efficiency can be achieved by operating from only a few locations and centralizing activities in common locations. An example of this is the way e-commerce retailers serve large geographical markets from only a few central locations that perform a wide range of activities.

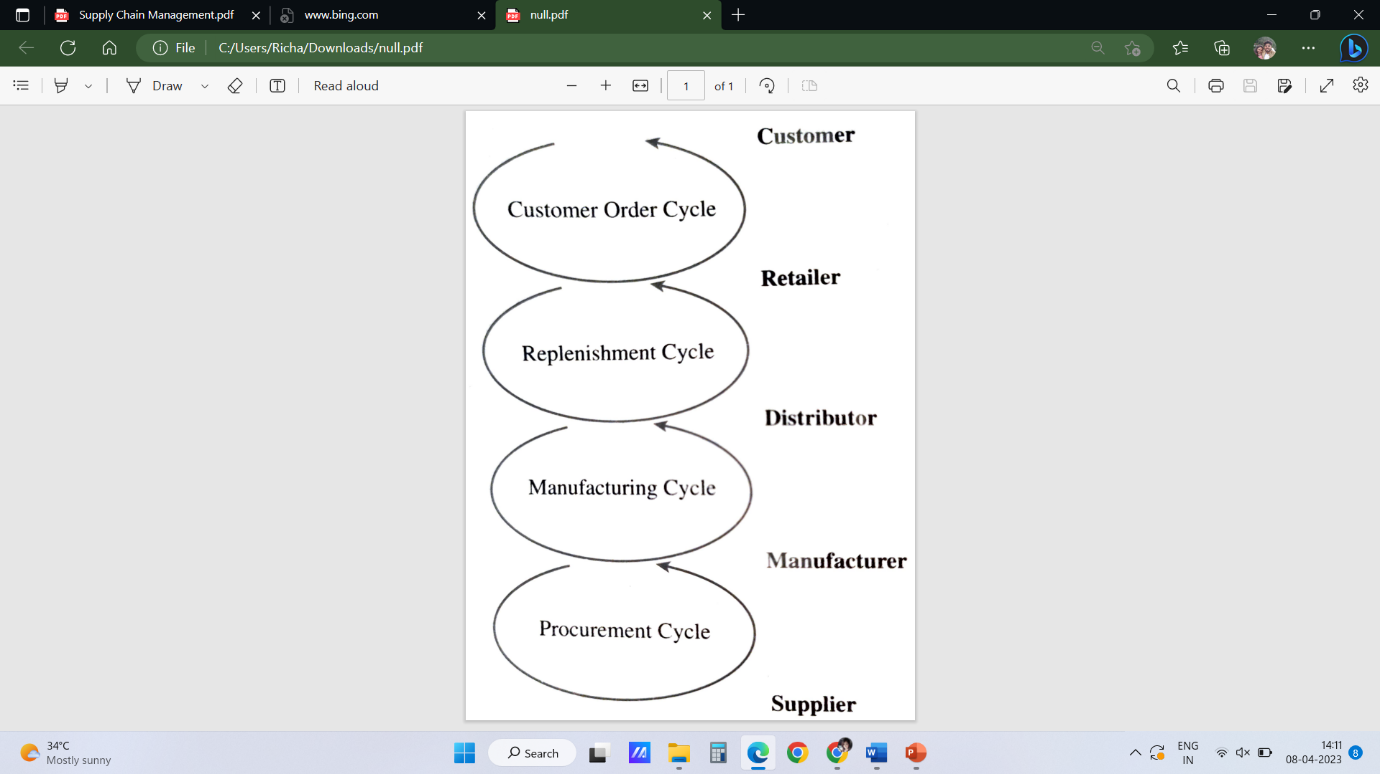
Transportation

Responsiveness can be achieved by a transportation mode that is fast and flexible such as trucks and airplanes. Many companies that sell products through catalogs or on the Internet are able to provide high levels of responsiveness by using transportation to deliver their products often within 48 hours or less. FedEx and UPS are two companies that can provide very responsive transportation services. And now Amazon is expanding and operating its own transportation services in high volume markets to be more responsive to customer desires. Efficiency can be emphasized by transporting products in larger batches and doing it less often. The use of transportation modes such as ship, railroad, and pipelines can be very efficient. Transportation can also be made more efficient if it originates out of a central hub facility or distribution center (DC) instead of from many separate branch locations.

Information

The power of this driver grows stronger every year as the technology for collecting and sharing information becomes more widespread, easier to use, and less expensive. Information, much like money, is a very useful commodity because it can be applied directly to enhance the performance of the other four supply chain drivers. High levels of responsiveness can be achieved when companies collect and share accurate and timely data generated by the operations of the other four drivers. An example of this is the supply chains that serve the electronics market; they are some of the most responsive in the world. Companies in these supply chains, the manufacturers, distributors, and the big retailers all collect and share data about customer demand, production schedules, and inventory levels. This enables companies in these supply chains to respond quickly to situations and new market demands in the high-change and unpredictable world of electronic devices (smartphones, sensors, home entertainment and video game equipment, etc.).

**Cycle view of Supply Chain**

Each cycles occurs between two successive stages of the supply chain. The five stages thus results in the four supply chain process.

A grocery supply chain will have all the supply chain process cycle. Dell sells directly to customers thus bypassing the retailer and distributor.

Each Cycle starts with the supplier marketing the product to customers. A buyer then places an order that is received by the supplier.

The supplier supplies the order which is received by the buyer.

The buyer may return some of the product or other recycled material to the supplier. The cycle of activities thus begins all over

When customers shop online at Amazon they are a part of customer order cycle with the customer as the buyer and Amazon as the supplier.When Amazon order books from a distributor to replenish its inventory it is a part of the replenishment cycle with Amazon as the buyer and distributor as the supplier

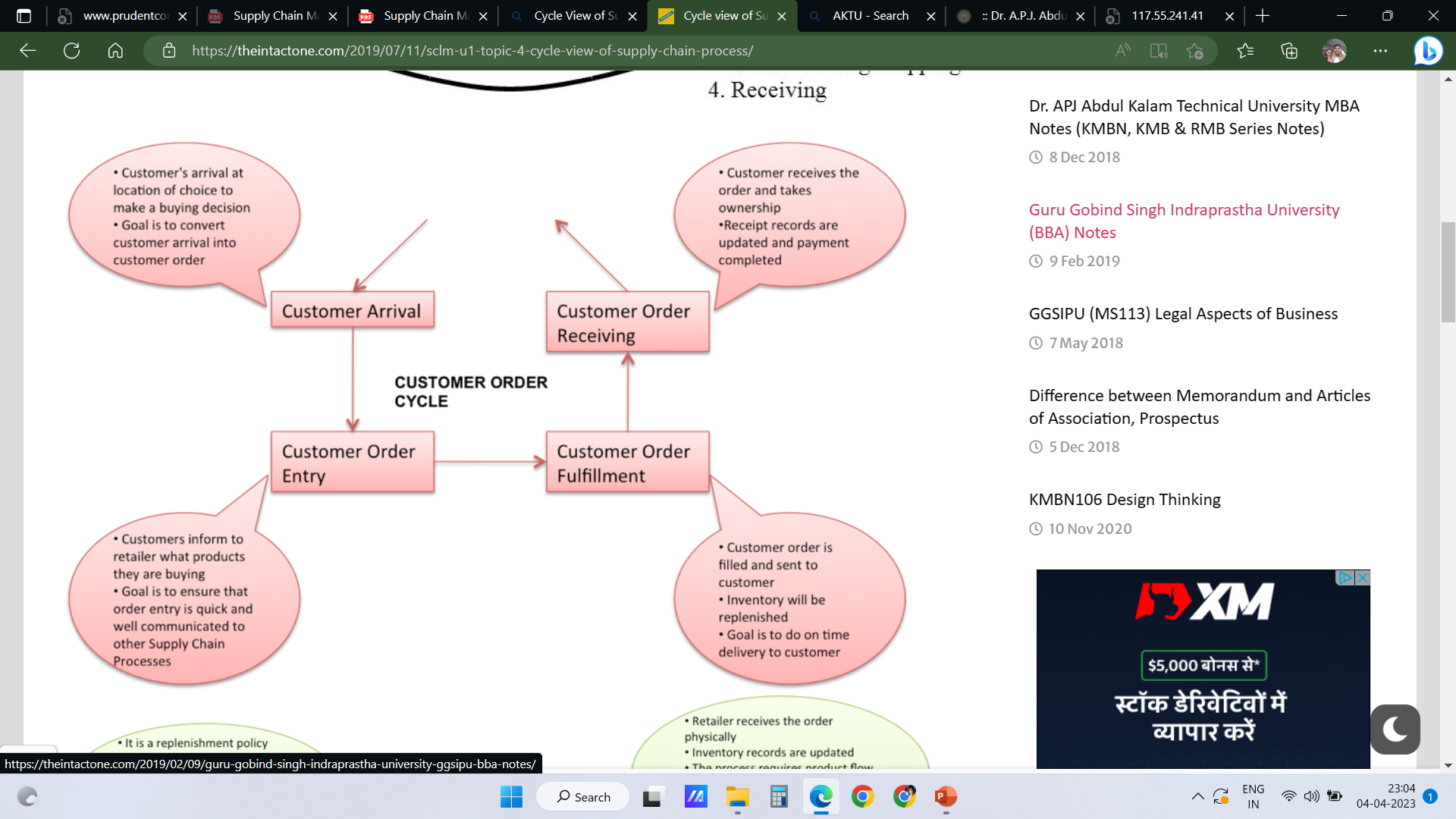
In the **customer order cycle**, **demand** is external to the supply chain and thus **uncertain**.

In **procurement cycle** , a tyre supplier to an automotive manufacturer can predict tyre demand precisely once the production schedule at the manufacturer is known.

When a customer buys a single car, the dealer orders multiple cars at a time from the manufacturer ,and the manufacturer ,in turns, orders an even larger quantity of tyres from the suppliers.

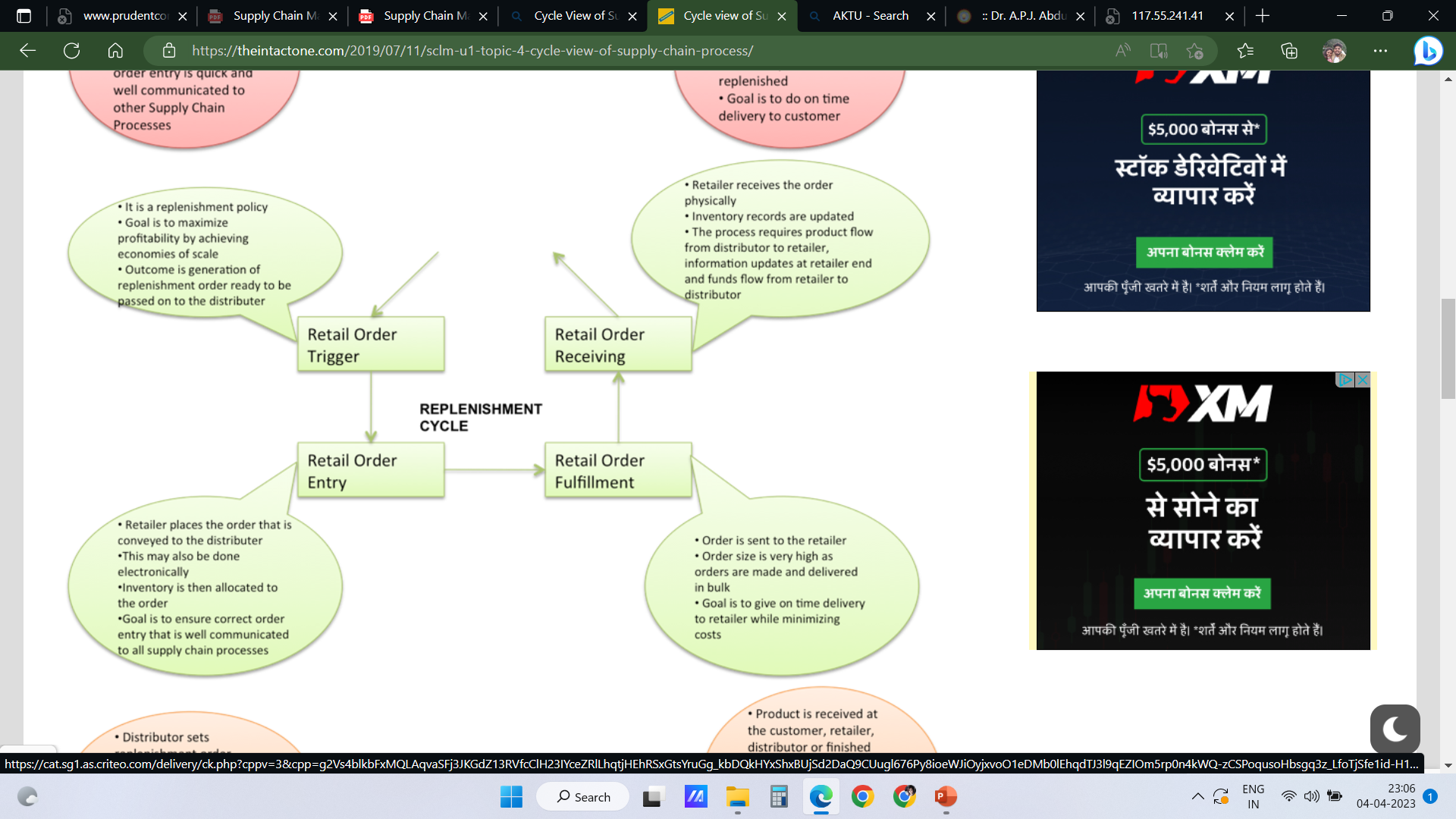
**Customer order cycle**

* Customers arrives and the goal is to convert the customer arrival into customer order
* Customer inform the retailer what product they are buying
* Inventory is replenished and the goal is to do on time delivery to customer
* Customer receive the order and tell the payment is completed



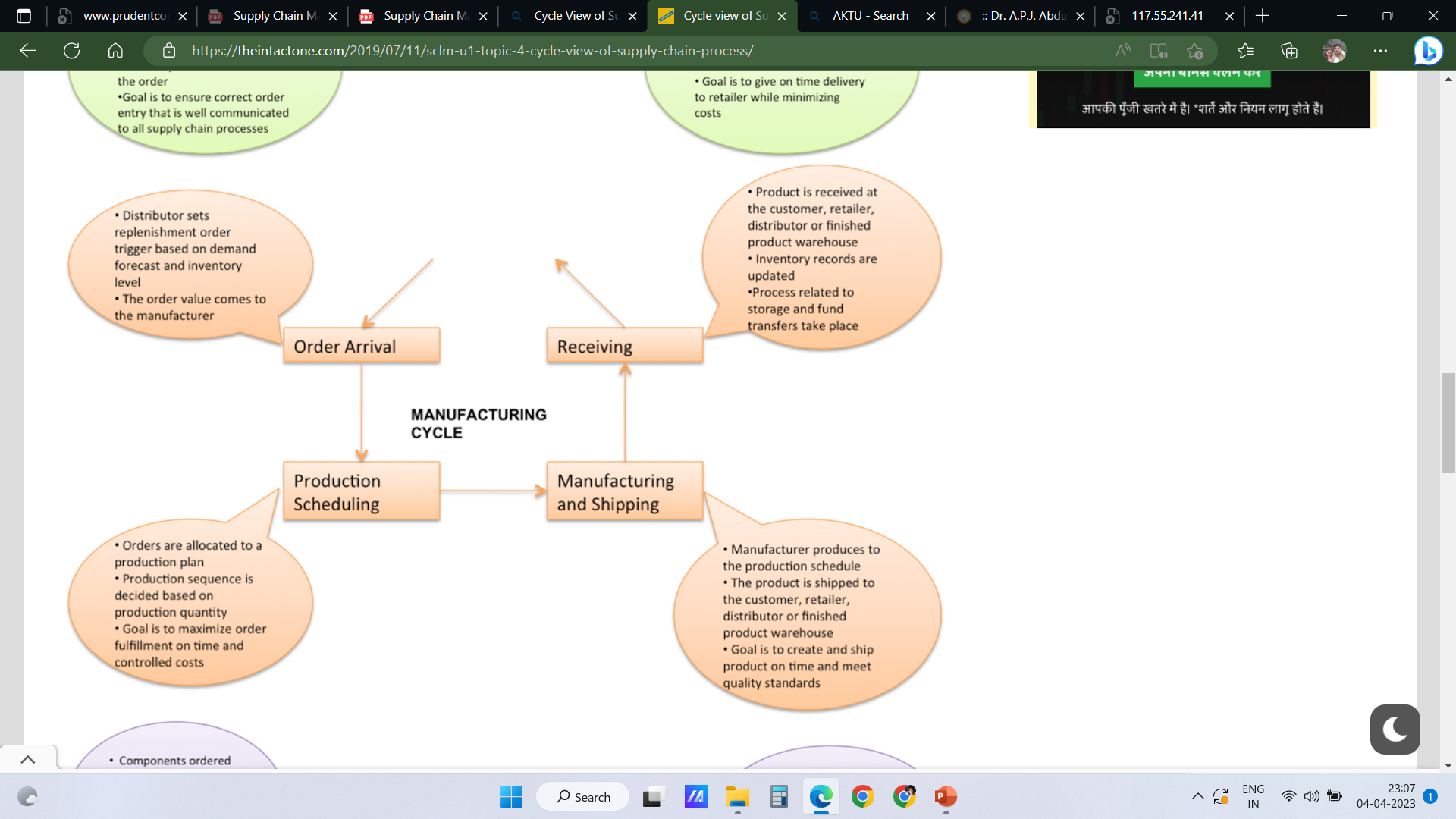
**Replenishment cycle**

* Retailer places to order that is convey to the distributor
* Goal is to maximize profitability by achieving economies of scale
* Order sizes very high and are delivered in bulk
* Goals to give on time delivery to retailer while minimising cost
* Product flow from distributor to retailer
* Funds flow from retailer to distributor
* Information updated at retailers end



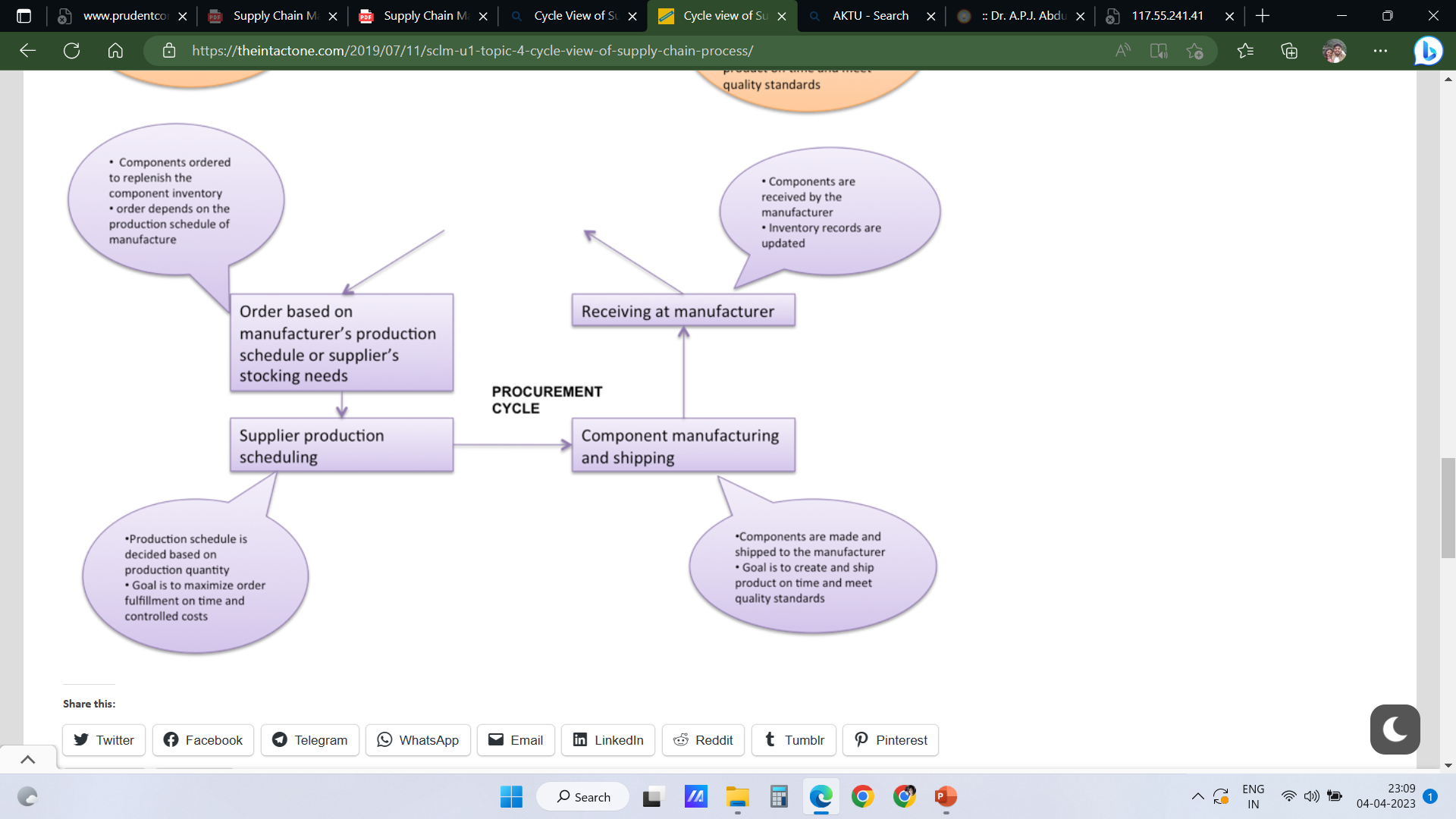
**Manufacturing cycle**

* The order value comes to the manufacturer
* Orders are allocated to a production plan
* Goal is to maximize order fulfilment on time and control cost
* Goal is to create and ship product on time and meet quality standards
* Inventory records are updated
* Product is received at the customer, retailer, distributor or finished product warehouse



**Procurement cycle**

* The components or the raw material is ordered to replenish the inventory
* Order depends on the production schedule of manufacturer
* The goal is to get the raw material or the components at the minimum price
* Received by the manufacture and the inventory records and updated



**Skill of Supply Chain Manager**

**Minimise Shortage**

The first is that customers can obtain the product. When a customer orders a product or goes to a store searching for it, it is in the company's best interest to have it available. Because of how competitive the consumer market is, customers are much more likely to buy a competitor’s item than to wait for a particular product to restock. In addition, if a customer orders an item online and it takes a long time to arrive (or worse — it never arrives), they will be less likely to order from the same company again.

**Maximise efficiency and minimizes the cost**

The second key responsibility of supply chain management is to manage the supply chain that brings the product to the customer. This involves sourcing the materials, finding a manufacturer, finding a delivery service, and offering convenient returns. Having a supply chain that maximizes productivity and efficiency gives the company opportunities to expand and keeps revenue flowing.

**Key Issues in Supply Chain Management**

**Typology of Supply Chain**

While there are **6 models of supply chains** all of them fit into either one of two categories. Either the model is **focused on efficiency** or it is **focused on responsiveness**. The reality is all supply chains have elements of both **efficiency and responsiveness**, but each supply chain model can have a **primary focus** of either.

**SC models that are oriented to efficiency**

* The company predict the customer demand
* And allocate resources based on the requirement,to reduce the cost

**The Efficient Supply chain Model**

The [efficient chain model](https://hbr.org/2004/10/the-triple-a-supply-chain) is best for businesses that are in **highly** competitive environments and must strive for **high efficiency** in their **delivery logistics** to retain a competitive advantage. Under this model, the end goal is to maximize efficiency.

* Eg **Steel and cement Industry.**
* High competitive market with number of producers.
* No difference b/w the product
* Competition is solely on **PRICE**
* Maximum utilization of plant and machinery,so as the cost is reduced

## Fast Supply chain model

It is suitable for businesses that have product lines with **short life cycles**. For instance, a **fashion designer** might have a specific line of designs in a season. The business needs to take the fashion line to the market to maximize returns, as it is usually based on current trends.

* Trendy products-Fashion clothing.
* Life cycle is short
* It depends on how fast the manufacture updates their product portfolio to keep up with fashion trend
* Aspects the company focus-

1. Shortening the time from idea to market
2. Maximising the levels of forecast accuracy

One example is Nike. A leader in active-wear fashion, Nike frequently sets up delivery systems of new supplies and information to create and then sell new shoes and other apparel before that particular trend’s time has passed.

**Continuous Flow model**

The Continuous Flow model is focused on maintaining consistent and smooth supply chain operations. As the name suggests, goods are in continuous flow in this model, and it is based on the stability of supply and demand in the market.

An example of a company using this supply chain model is Amazon. Their supply chain is designed to deliver products constantly, with little to no pauses in supply flow. This allows them to maintain their reputation as a quick and reliable delivery service.

PepsiCo is a well-known example of a continuous supply chain model. The company’s family of drinks and foods maintains a large customer base with little to no variety in demand no matter the season or market conditions. PepsiCo has set up the logistics of its delivery system to continuously receive ingredients to produce its food and beverages, and likewise continuously restock vendors.

* Industries with high demand stability- FMCG
* Goods are always required
* Oil shampoo soap
* Efficiency is based on – that inventory is always stocked up
* Continuous flow of inventory goods
* Demand is at maximum level
* Little variation in customer demand

**SC models that are oriented to responsiveness**

* High demand uncertainty
* Market mediation cost
* Manufacturing and delivery after the Consumer response

AGILE supply chain model

The Agile Supply Network model focuses on creating a supply chain that is responsive and able to adapt quickly to changes in supply or demand. This requires strong communication and collaboration within the supply chain network and flexibility in processes and technology. AGILE supply chain model

* Product is made according to demand and also customized.
* First Demand and requirement, then procure the material, manufacture and delivery
* Eg- Cards, Interior Decorator.

## Custom-configured

The custom-configured model needs custom setups in the assembly and production stages. It is a mix of agile and continuous flow methods where the product that is being manufactured may require some **extra customization**, but it needs to operate on an end-to-end basis. It is usually used for prototype design and manufacturing of small batches. The custom-configured model requires additional investment from the company as compared to more traditional models.

 Dell is an example of a company using this supply chain model, offering individualized computer configurations to meet their customers’ specific needs.

* **Tata-** Some are sent for customization. For **Pattern printing on cars**
* **The Flexible Model**

Flexible Supply Chain Model

The [flexible model](https://www.mckinsey.com/industries/advanced-electronics/our-insights/building-a-flexible-supply-chain-in-low-volume-high-mix-industrials) provides businesses the ability to meet peaks of high demand as well as long periods where demand is low.

Best suited for industries that are characterized by high demand peaks followed by extended periods of low demand. Manager should focus on-

* Ensuring high flexibility
* Having extra capacity of critical resources
* Adequate technical strengths
* Developing a quick process flow

Staples’ paper and writing utensil products are produced and delivered via a flexible supply chain. Staples anticipates high demand during back-to-school season and stocks its stores with excess notebooks, paper, pens, pencils, rulers and other school supplies. The company also must ensure that it has some stock, albeit less, of those products year-round.

Examples

* **Garments**
* **Coolers**
* **Acs blowers**

**Supply chain flows**

The flow of goods are inventory is in forward direction the direction of money flows in the backward direction and the flow of information is in both direction

**Product or material flow**

The product or material flow in a supply chain is concerned with the procurement, movement and storage of materials and finished goods. For a large manufacturer, these operations may consists of thousands of components, raw material and parts and their movements, which ultimately culminate in the delivery of product to an industrial user, retailer wholesaler dealer or other customer. For a large retailer, supply chain operations may commence with the procurement of product from the manufacturer and may terminate with consumer pickup or delivery of a product

**Information flows**

Information flows identifies specific location within a supply chain that requires attention. The primary objective of information sharing is to reconcile any disparity in the system. Accurate information makes the supply chain become more effective. Supply chain information also integrates different operating areas. This integration of different areas involve three major types of information flows- **coordination** flows **cash** flows and **operation** flows

**Fund flows**

There is only one source of fund- **customer**. You pays for the product, the retailer pays the wholesaler, and the wholesaler pays manufacturing company. The higher the speed of transfer of money, the better is the financial position of the firm as the flow of money support the movement of product and may also add to the cost

**Problems in SCM and Suggested Solutions**

1.Quality Customer Service The supply chain management is centralized on the needs of the customers. It is about giving the right quantity and the right quality of the product for the right amount of money. All this, in perfect timing and setting. Solution: It might seem simply, but on the contrary, it isn’t. Customers have different preferences and we have to always adjust to the customer’s needs. Being able to provide customers unique solutions make a difference entirely. Companies that actually excel in this field are the ones that make an effort to learn and invest in new technologies.

2.Costing Globally speaking, the costs of raw materials, energy and labor have increased due to economical constraints. In order for operations to continue production and provide customers with good quality items at affordable rates, adjustments have to be made to keep operations running. Solution: The best solution to this issue would be improving your cost control by executing your plans efficiently through constant monitoring. Through efforts in providing warehouse efficiency you would be able to do so.  
  
3.Risk Management Due to the constant change in the market, coming from a variety of sources such as consumer demands, political agendas and global sourcing, would cause major issues to the operations. Solution: Always be prepared with a risk management plan, on how your company will be able to overcome disruptions during the course of operations. By hiring a logistics software development company you would be able to manage these issues effectively with less effort on your end. After all, logistics management is vital to the entire operation.  
  
4.Supplier Relationship By creating a mutually sound and harmonious relationship with your partners or suppliers, you will be able to provide your customers with products of high standards in a timely manner. This also allows you to create opportunities for improvement in terms of performance. Solution: By building a strong working relationship with your supplier, you would be able to work efficiently and come up with a better output in a short period of time.  
  
5.Qualified Personnel Over the years, it has become a challenge to find talent interested and passionate about this line of work. Personnel hired in this field must have an understanding about the duties and responsibilities needed. Solution: Since locating dedicated personnel to work for this field has become increasing hard to find, their market value will start to rise. Hiring and promoting through in-house staff would be the most affordable solution at this point.

6.Unforeseen Delays Procurement of materials and products may be easy, but the delivery may not always be 100% on time, especially with time differences and a variety of shipping time frames. When items are sourced from different countries, delays like this are very common. Solution: Always have buffer stocks. Through an efficient warehouse management system you are able to know when you need to have certain materials delivered as well as create a time cushion in terms of delivery to make sure everything runs smoothly.

7.Fast-Changing Markets With technological advancements changing our markets everyday, it is quite difficult to stay in pace and adapt to the variety of innovations in the market. But because the goal is to stay efficient in these changing times, companies would have to be more flexible. Solution: Change is inevitable. The way we adapt to change is definitely something we need to manage by using logistics management software. We are able to move with the flow and improve our output as a whole.