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**BLOCK 3**  
**LOGISTICS MANAGEMENT:**  
**EMERGING TRENDS**

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## **UNIT 10 CUSTOMER SATISFACTION\***

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### **Structure**

- 10.0 Objectives
- 10.1 Introduction
- 10.2 Customer Focus
- 10.3 Customer Service
- 10.4 Customer Satisfaction
- 10.5 Customer Success
- 10.6 Conclusion
- 10.7 Glossary
- 10.8 References
- 10.9 Answers to Check Your Progress Exercises

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### **10.0 OBJECTIVES**

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After reading this Unit, you should be able to:

- Explain the concept of customer focus;
- Discuss the components of customer service;
- Analyse the significance of customer satisfaction; and
- Assess customer success.

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### **10.1 INTRODUCTION**

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The focus of an organisation especially catering to the specific needs of customers is to meet them at least cost and maximise the returns with highest level of customer satisfaction. The consumers are very selective and conscious about their purchase, particularly from point of view of value for money and convenience. The management in general aims to have harmonious customer relationship. The logistics strategy is based on accommodating customer interests, primarily focusing on their needs. The effort is on meeting the requirements of end users, whether they are consumers or organisational end users.

Organisations have customer focus and put a lot of emphasis on customer satisfaction. The justification for this strategy comes from the importance assigned to the customer. This unit attempts to examine the various aspects of customer satisfaction.

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### **10.2 CUSTOMER FOCUS**

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A customer is a person, company, or any other entity who/which buys goods and services produced by another person, company, or other entity.

We shall now discuss the categories of customers. A customer can be either of the following:

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\* Contributed by Col. (Dr.) Rajive Kohli, Management Consultant, New Delhi

- a) **End Users:** The end users are a consumer, an individual or a household who/which purchases products and services for their personal needs. It can also be an organisation to allow an end user performing job in an organisation. The effort is on meeting the requirements of end users, whether they are consumers or organisational end users.
- b) **Intermediate Customer:** These often exist between the firm and end users. For example, a product like a detergent is provided to the supermarkets, which are intermediate customers, for reselling to the consumers.
- a) **Internal Customer:** A customer can be in any delivery location, which could be consumer's home, retail and wholesale businesses, or the receiving areas of manufacturing plants and distribution centres.

The essential concept of customer-focus incorporates logistics into the overall strategy by identifying specific customer needs and focusing on resources and activities. In accommodating the requirements, it needs to take cognisance of the following aspects:

- Customer needs and requirements which are more basic than products or services.
- Different customers have different needs and requirements.
- Products become useful only when they are available as per customer's requirements.

The business strategies traditionally focused on successful exchanges/ transactions with customers for growth in revenue and profit. These generally involved short-term interaction with customers by accommodating their needs and requirements. The result is focusing on creating successful individual transactions between a supplier and its customers. It is more important to focus on the development of relationships with customers by targeting the requirements of individual customers. The trend is to develop long-term relations with key customers to retain long-term preference and loyalty. The steps in developing relationship in one-to-one marketing programme are:

- a) Identifying the individual customers for the products.
- b) Segregating the customers, both in terms of value to the organisation and in terms of their unique requirements.
- c) Establishing communication with customers with the goal of improving both cost-efficiency and effectiveness.
- d) Customising the organisation's operations by adapting to the customer's individual needs.

The requirements of each customer may vary, and specific logistics structures may be required to accommodate these variations. These are:

- a) **Spatial Convenience:** It refers to the degree of shopping space and time needed by the customer. The presence of adequate spatial convenience reduces shopping effort by customer, by providing access to products in a larger number of places such as departmental stores, mass merchandisers, and numerous chain and independent speciality stores.

- b) **Lot Size:** It refers to the number of units to be purchased in each transaction. When customers are required to purchase in large quantities, they are bound to incur costs relating to product storage and maintenance.
- c) **Waiting Time:** This refers to the amount of time between ordering and receiving products. There is need for alternative supply chains that offer end users choices relating to the waiting time by the customers. For example, one faces such situation in online purchases and there is always access to other supply chains.
- d) **Product Variety and assortment:** Different supply chains offer different products and services to consumers and end users. For example, supermarkets may provide a variety of products and an assortment of brands, sizes, etc., of each type, whereas warehouse and convenience stores offer much less.

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### 10.3 CUSTOMER SERVICE

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Customer service is the direct one-to-one interaction between a consumer making a purchase and a representative of the company/firm, a process for providing significant value-added benefits in logistics in a cost-effective way. This generally encompasses “to do business with ease” and being “responsive to customers”. The focus is on the operational aspects of logistics and ensuring that the organisation can assure the Seven rights to the customers. We have already discussed these Seven rights in detail in Unit 4 of this Course.

The customer service to be effective and efficient needs to comply with the following basic customer service attributes:

**Availability:** It is the capacity to have the required inventory as desired by a customer. A considerable amount of time, money, and efforts are spent to generate customer demand but sometimes there are problems in product availability. An inventory stocking plan generally is based on forecasted demand for products with differential stocking policies for specific items depending on sales, profitability, and importance. The inventory can be classified as i) base stock determined by forecasted and planned requirements, and ii) safety stock to cover unexpected variations in demand. The firm generally makes efforts to minimise overall investment in inventory and ensuring availability of products and services for core customers and facilities.

**Flexibility:** It involves a firm’s ability to accommodate special situations and unusual or unexpected customer requests. Certain typical situations arise that require flexible operations which include:

- Introduction of new product
- product recall
- disruption in supply
- one-time customisation of basic service for specific customers; and
- product modification or customisation

**Service reliability:** It is the combined attributes of logistics to perform all order-related activities and provide customers with important information. It involves

ensuring that shipments arrive damage-free; invoices are correct and error-free; they are delivered to the correct locations; and the exact amount of product ordered is included in the shipment. Service reliability also involves the capability and willingness to provide accurate information to customers regarding operations and order status. Customers can adjust and prepare for incomplete or late delivery if they have advance notification.

**Perfect Order:** The concept of the perfect order implies that an order should be complete, delivered on time, at the right location, in perfect condition, with complete and accurate documentation. The total order cycle performance must be executed with zero defects, operational activities must be perfectly executed, and all support activities must be completed exactly as promised to the customer. Such high-level performance may be on a selective basis where the resources required would be substantial. The objective is on zero-defect with total quality management (TQM) in the logistics processes.

All the above logistical outcomes are to ensure performance and customer satisfaction.

**Check Your Progress Exercise 1**

- Note:** 1) Use the space given below for your answers.  
2) Check your answers with those given at the end of the Unit.

1) Explain the concept of customer focus.

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2) What are the fundamental attributes of basic customer service?

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**10.4 CUSTOMER SATISFACTION**

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Customer satisfaction is the degree to which customer expectations of a product or service are met or exceeded. It is a measurement that quantifies the degree to which a customer is satisfied with a product, service, or experience. Logistics management aims to satisfy customer requirements by facilitating important manufacturing and marketing operations. For building a customer service platform in logistics it is necessary to explore more fully the nature of customer expectations.

Customer satisfaction information helps an organisation to improve its products and services. It is not only an indicator to measure customer loyalty, identify dissatisfied customers, help in increasing the revenue, but also facilitates in attracting new customers in competitive business environment.

Customer satisfaction can be understood by analysing the following aspects.

**Customer Expectations:** Customers have numerous expectations of the supplier's basic logistical service platform and they monitor suppliers' performance with respect to each aspect of logistical performance. Customer expectations related to logistical performance are:

- a) **Reliability** is basic aspect of the firm's logistics service platform. It includes the performance of all activities as promised by the supplier.
- b) **Responsiveness** refers to customers' expectations of the willingness and ability of supplier to provide prompt and timely service. This extends beyond product or service delivery to include quick handling of enquiries and resolution of problems.
- c) **Access** involves customer expectations of the ease of contact and approach ability of the supplier.
- d) **Communication** means proactively keeping the customers informed.
- e) **Credibility** refers to customer expectations that information received from the supplier are in fact believable, complete, and honest.
- f) **Security** deals with customers' feelings of risk or of doubt in doing business with a supplier as they make plans based on their anticipation of supplier performance. Also, to ensure that their dealings are confidential.
- g) **Courtesy** involves politeness, friendliness, and respect of contact personnel.
- h) **Competency** is judged by customers in every interaction with a supplier and can be problematic because it is perceived in every interaction.
- i) **Tangibles** such as the existence of good facilities, equipment, and efficient personnel are additional cues used by customers as indicators of a firm's overall performance.
- j) **Knowing the Customer** as customers perceive themselves unique and have expectations regarding suppliers' understanding and their uniqueness and willingness to adapt to their specific requirements.

**Perceived Service Quality and Customer Satisfaction:** The concepts of customer satisfaction and perceived service quality are closely related. The service quality approach is an attempt to understand customer satisfaction from the perspective of the differences between customer perceptions and actual service on various attributes. The distinction between customer satisfaction and service quality is that satisfaction refers to a customer's evaluation of a single transaction, whereas service quality is an evaluation over multiple services transactions.

Customer satisfaction attainment is a complex activity and there are several aspects that need to be taken cognisance of. The gaps in this process need to be identified.

**Gaps in Customer Satisfaction:** The gaps, that influence customer expectations of supplier performance are:

- a) **Knowledge:** The most vital gap is between customers' real expectations and management's perception of those expectations reflecting lack of knowledge or understanding of customers. Its reasons may be many, but it is necessary to have a thorough understanding of customer expectations and its prioritisation.
- b) **Standards:** The gap in standards of performance exists when internal performance standards do not reflect customer expectations. This happens when the basic service platform is based on internal operating capabilities or on a superficial examination of competitive service performance of the company.
- c) **Performance:** The performance gap is the difference between standard and actual performance. The organisations may try to improve satisfaction by eliminating the performance gap, however, the dissatisfaction may exist due to a poor understanding of customer expectations.
- d) **Communication:** It has an important role in ensuring customer satisfaction. There should be no gap between what an organisation is capable of doing and what customers are told about those capabilities, as over commitment at times can be a major cause of customer dissatisfaction.
- e) **Perception:** Customers sometimes perceive performance to be different than actual. Although performance over a long time has been exceptionally good, a below normal level delivery may result in a customer's expression of extreme dissatisfaction.

Any of the above gaps lead to customer perception that performance is not as good as expected. A firm must ensure that these gaps are minimised.

#### **Ensuring Customer Satisfaction: Challenges**

The commitment to customer satisfaction represents a step beyond providing services in an organisation's efforts to accommodate its customers. Some of the challenges in meeting the customer satisfaction are:

- a) Many organisations mistakenly interpret satisfaction by assuming that customers who are satisfied are also happy with the suppliers' performance. This may or may not be the actual situation. If the customer has an expectation of a low level of performance and the firm performs at this low level, the performance, and expectations match and the customer is seemingly satisfied. Performance perceived to be poorer than the expectation level results in dissatisfaction. A satisfied customer need not be happy about the supplier's late deliveries. While expectations may be met, as well as or better than competition, there is still no assurance that the customer shall be happy. The focus on customer expectations ignores the fact that expectations are not the same as needs or requirements.
- b) Satisfied customers are not necessarily loyal customers even though their expectations are being met, they may choose to do business with competitors in expectation of a better service.



- c) Organisations must remember that satisfaction lies in the expectations and perceptions of individual customers and it is better to avoid aggregating the expectations across customers. What satisfies one customer may not satisfy other customers.

The limitations and challenges in customer satisfaction recognise that the only way to ensure accommodation of interests of customers is to focus on customers themselves, not on industry and competing standards of basic service performance.

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## 10.5 CUSTOMER SUCCESS

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It is realised that a firm's ability to grow and expand its market share depends on its ability to attract and sustain the industry's most successful customers. This commitment can be made to gain true competitive advantage through logistical performance. The key aspect lies in the organisation using its performance capabilities to enhance the success of those customers. Customer success shifts the focus from expectations to the customers' real requirements.

**Achieving Customer Success:** A customer success programme involves a thorough understanding of individual customer requirements and a commitment to focus on long-term business relationships having high potential for growth and profitability. It requires that firms work intensively with selective customers to understand requirements, internal processes, competitive environment, and whatever else it takes for the customer to be successful in its own competitive arena. Also, the organisation develops an understanding of how it can utilise its own capabilities to enhance customer performance. It requires a comprehensive supply chain perspective on the part of logistics personnel with focus on the basic service and the firm attempts to meet standards and expectations of prospective customers. A supply chain perspective and a customer success programme clearly recognise that logistics managers must demonstrate an innovative way of functioning. They must understand the entire supply chain, the different categories of customers within that supply chain, and develop programmes to ensure that they are able to successfully meet the requirements of customers down the supply chain. To ensure that a customer is satisfied may require a firm to reinvent the way a product is produced, marketed, distributed, and offered for sale. Collaboration between suppliers and customers to find potential avenues for success may result in the greatest breakthroughs in terms of redefining supply chain processes. Such arrangements are not possible without regular information exchange between the involved businesses to facilitate an in-depth understanding of requirements and capabilities.

**Value-added Services:** This is the unique or specific activities that firms can jointly develop to enhance customer efficiency and effectiveness. Customer success is through the development of value-added services that are customer specific. For value-added solutions of major customers, commitment is to customise or tailor logistics by doing unique things to enable specific customers to achieve their objectives. Logistically it is to provide unique product packages, create customised items or things to be loaded, cap prices on products, offer information services, make special shipping arrangements, and so forth, to enhance customer success. Integrated service providers such as transportation carriers, warehouse firms, and other specialists may become intimately involved in the supply chain for providing such value-added services. These services could

also be in the form of proper sorting and sequencing of products to meet specific customer requirements. The use of third-party specialists is necessary when subcomponents from multiple suppliers are to be integrated and then properly sequenced.

**Developing Customer Success:** This is typically focused on the individual customer. It is essential to identify those most likely to respond to such efforts and who are willing to sustain their loyalty to the supplier. Sometimes focus is on an entire segment of customers to ensure their long-term survival.

The progressive stages in development of customer's success are:

**Cost-Effectiveness:** To gain cost-effectiveness, it is essential that the process and necessary related controls are in place to ensure that basic services could be provided at a consistently high level of performance and in a cost-effective manner. A firm must be able to efficiently perform the basic logistic services required by customers with little scope for basic operational errors.

**Market Access:** The market access stage consists of higher-level commitments to customers who express a willingness to cooperate in efforts to achieve joint objectives. Market access consists of buyers and sellers working together and sharing basic information to facilitate smooth joint operations. This commitment may mean daily replenishment of exact inventory requirements within a consistent delivery schedule.

**Market Extension:** Market extension intensifies a business arrangement, based on moving toward zero defects and introducing value-added services to solidify and expand the business relationship. Such value-added alliances consist of a variety of programmes to improve the competitiveness of selected customers who are willing to commit to the supplier.

**Market Creation:** This final stage represents initiatives to enhance customer success. One form of market creation consists of research and developing new and innovative ways to make relatively small customers increasingly competitive with larger vertically integrated chains.

### Check Your Progress Exercise 2

- Note:** 1) Use the space given below for your answers.  
2) Check your answers with those given at the end of the Unit.

- 1) What are the gaps in customer satisfaction?

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2) How can customer success be achieved?

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## 10.6 CONCLUSION

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Customer satisfaction is particularly important for companies seeking competitive advantage, as they must satisfy the expectations of customers otherwise their place will be taken by other companies whose activities will be more concentrated on customer expectations. The logistics activities within a business organisation attempt to satisfy customers by achieving the time and location related market challenges and through the cost of the service provided as well as the quality, taking into consideration customers' needs and purchase power. The client is generally the main source of income for enterprise, whose choice is based on financial criteria and responsiveness of the enterprise. Customer satisfaction is the degree to which customer expectations are met or exceeded. Quality in service must be perceived by the customer. Customer success shifts the focus from expectations to the customers' real requirements.

In an increasingly competitive world, businesses desiring to increase their profits must increase client loyalty. Customer satisfaction is important because it provides organisations a benchmark that they can use to manage and improve their businesses. Customer satisfaction is also a way to determine the continuity of the business or a product life by measuring the loyalty of the customers. If the customers are satisfied, it will ensure continuity of sales which entails the continuity of the business.

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## 10.7 GLOSSARY

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**Base Stock:** It is the amount of inventory that a firm or company needs to keep on hand to fulfil customer orders with minimum or least amount of delays.

**Product Recall:** It is a request from a manufacturer to return a product after the discovery of safety issues or product defects that might endanger the consumer or put the maker/seller at risk of legal action.

**Safety Stock:** It refers to the level of extra stock that is maintained by firms to reduce the risks of stockouts caused by any uncertainties in supply and demand. Presence of adequate safety stock levels permit smooth operations of the firm.

**Service Reliability:** It involves the combined attributes of logistics and concerns a firm's ability to perform all order-related activities, as well as provide customers with critical information regarding logistical operations and status.

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## 10.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

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### Check Your Progress Exercise 1

- 1) Your answer should include the following points:
  - Identifying individual customers for the products.
  - Recognising specific customer needs and the resources and activities for accommodating their requirements.
  - Communicating with customers with the goal of improving effectiveness.
  - Customising the organisation's activities by adapting to the customers' needs.
- 2) Your answer should include the following points:
  - Availability.
  - Operational Performance.
  - Service Reliability.
  - Perfect Order.

## Check Your Progress Exercise 2

1) Your answer should include the following points:

- Knowledge.
- Standards.
- Performance.
- Communication.
- Perception.

2) Your answer should include the following points:

Customer success can be achieved by focusing on:

- Achieving Customer Success.
- Value-added Services.
- Developing Customer Success.
- Cost-Effectiveness.
- Market Access.
- Market Extension.
- Market Creation.



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## **UNIT 11 GREEN LOGISTICS\***

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### **Structure**

- 11.0 Objectives
- 11.1 Introduction
- 11.2 Green Logistics: Concept
- 11.3 Environmental Impact of Logistics
- 11.4 Protocols for Green Logistics
- 11.5 Green Logistics Strategies
- 11.6 Towards Green logistics: Challenges
- 11.7 Conclusion
- 11.8 Glossary
- 11.9 References
- 11.10 Answers to Check Your Progress Exercises

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### **11.0 OBJECTIVES**

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After reading this Unit, you should be able to:

- Explain the concept of green logistics;
- Examine the environmental impact of logistics;
- Discuss the protocols for green logistics;
- Gain awareness about green logistics strategies; and
- Bring out the challenges of green logistics

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### **11.1 INTRODUCTION**

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Logistics management activities impact environment and in this context the concept of green logistics assumes importance. Green logistics is concerned with the systematic measurement, analysis, and minimising of the ecological impact of logistics. This includes all activities of the forward and reverse flow of products, information, and services between the point of origin and the point of consumption. It is associated with green inventory management, green facility location, operational implications of environmental regulations, responsible purchasing, green technology choice, and principles of eco-design. It aims to create a sustainable company value using a balance of economic and environmental efficiency. The implementation of green logistics is necessary for a sustainable global future.

In this unit, we shall introduce you to the concept of green logistics, its importance and enable you appreciate the significance of climate change and impact of logistics on environment. An attempt shall be made to explain the protocols for green logistics, the strategies and analyse the challenges.

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\* Contributed by Col. (Dr.). Rajive Kohli, Management, Consultant, New Delhi

## 11.2 GREEN LOGISTICS: CONCEPT

The rising average temperature of earth's climate system mainly arising from human activity known as global warming is resulting in disastrous effects on our environment. Global warming is responsible for changes in rainfall patterns, extreme weather conditions and so on. Global warming and its effects collectively are known as climate change. Much worse is predicted unless urgent measures to limit greenhouse gases (GHGs) emissions and deforestation, among other actions, are taken.

Climate change is the global phenomenon of climate transformation characterised by the changes in the usual climate of the planet. Climate change in simple terms implies the global phenomenon of transformation in the average climatic conditions such as temperature and rainfall in a region over a long period of time. The significant changes in global regional temperature patterns, excessive heat conditions, receding water supplies, drought, floods, erosion in coastal areas are also the result of climate change. Climate change impacts are associated with rising average global temperatures, and GHGs produced from:

- Combustion of fossil fuels in power generators.
- Natural gas, petroleum, and chemical industries.
- Transport emissions.
- Buildings design, construction, and power consumption.
- Industrial processes.
- Agriculture including the loss of forests.

Climate change has impact on management of logistics. It can upset supply chains, as for example, sudden floods or flash fires can have secondary effects like migrating workforce or infrastructure in need of a retrofit, in turn directly affecting the functioning of the company. Logistics industry is affected by the deterioration taking place, as changes in weather systems, freak storms, and environmental transformation will greatly impact its activities, forcing established business and trading operations to be altered or wound up altogether.

The interests of business, government, and the public in developing green logistics is increasing because traditional logistics cannot meet the requirements of modern society and has huge impact on the environment. This gained prominence in mid 1980s. Green logistics or eco-logistics has a set of sustainable policies and measures aimed at reducing the environmental impact caused by the activities of the business. This logistics concept affects the configuration of processes, structures and systems or equipment in the transport, distribution, and storage of goods.

Green logistics incorporates all the steps taken to measure and minimise the ecological impact of logistics activities. Green logistics, from the development perspective, is the production and distribution of goods in a sustainable way, taking into account ecological and social factors, there by focusing on environmental cost of logistics. The major sustainability challenges faced by companies are:

- a) **Energy efficiency:** Using the most environmentally and economically sustainable propulsive energy by production sectors.

- b) **Sustainable Transportation Modes:** Development of more sustainable modes and modal combinations; like many large companies are promoting the expansion of the railways.
- c) **Improved operations:** Through innovations to minimise environmental impact.

Globally, efforts are on to reduce the effects of climate change with consensus to reduce emissions. This encompasses measures such as legislation on environmental compliance like mandatory carbon reporting for large corporations, carbon tax for polluting industries aimed at the most heavily polluting sectors such as the coal industry, extending this tax to the transport sector and so on. Companies not seriously taking green logistics would be financially penalised by having to pay for carbon credits to offset their higher levels of emissions.

The objectives of green logistics are to:

- Measure the carbon footprint of logistics operations to develop suitable sustainability measures.
- Reduce air, soil, water, and noise pollution by analysing the impact of each logistics area, especially those related to transport.
- Use supplies judiciously by reusing containers and recycling packaging.
- Design of products and their packaging to minimise their environmental impact.

Green logistics involves more efficient packing, optimisation of routes by companies operating various modes of transport, optimising physical logistics processes and so on.

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### **11.3 ENVIRONMENTAL IMPACT OF LOGISTICS**

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The transportation of freight in the logistics network, powered by fossil fuels such as diesel and petrol, produce gases that impact the atmospheric composition, ranging from local air, water, or soil pollution to global climate change. The road and waterways transport generate noise and vibration impacting human and wildlife. Added to these, the packaging and materials used to preserve the products before they reach customers have environmental impact due to problems in their disposal. The components of the logistics process, mainly greenhouse gases, pollution, and packaging waste impact the environment.

#### **Green House Gases (GHGs)**

GHGs affect global climate by trapping heat and making the planet warmer. Transportation activities produce three types of direct GHGs: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). The impact of each of these greenhouse gases is expressed in terms of carbon dioxide equivalents (CO<sub>2</sub>e), a process commonly referred to as carbon footprint. More than 90 per cent of the GHG emissions in logistics are due to freight transportation.

#### **Pollution**

Pollution is any substance (solid, liquid or gas) introduced into a system having adverse consequences on humans or ecology. In the case of logistics and transportation, the most important environmental impacts are due to air and water



pollution generated during the operation of trucks, airplanes, locomotives, and ships. The impact of pollution is generally localised to cities, ports, trade lanes, freight corridors, although these can also have global effects.

**a) Air Pollution.** The major source of air pollution affecting quality of air is from internal combustion engines of trucks, airplanes, ships, and locomotive engines that move cargo. There are six common air pollutants, also known as *criteria pollutants* in combustion:

- i) Particulate Matter (PM)** or particle pollution is a mixture of extremely small particles and liquid droplets, made up of acids, organic chemicals, metals, and dust particles. The size of particles is linked to their potential for impacting the environment and causing health problems.
- ii) Carbon Monoxide (CO)** is a colourless, odourless gas emitted from combustion processes. Most CO emissions to atmosphere come from transportation.
- iii) Nitrogen Oxides (NO<sub>x</sub>)** It is a generic term for the nitrogen oxides namely nitric oxide and nitrogen dioxide that contribute to air pollution. About half of all this come from combustion process of transport engines.
- iv) Lead** is a naturally occurring element that can be harmful to humans when ingested or inhaled. The major sources of lead emissions have been from fuels in motor vehicles and industrial sources.

**b) Water Pollution.** Water-borne transportation contributes to:

- Release of oils and chemicals through accidental spills and operational discharges
- Release of biocides from toxic chemicals used in paints (particular type of coating to prevent corrosion of metals).
- Dumping of waste garbage and sewage.

The seabed pollution due to shipping is 40 per cent, while coastal facilities and ports add another 9 per cent of pollution. Given the importance of water transportation, efforts to reduce this pollution through better technology and environmentally aware operations, have a direct impact.

### Packaging Waste

Packaging is done to protect, preserve, and transport products. After product use, all packaging joins the waste thereby increasing pressure on landfills. The three main types of packaging are:

- **Manufacturer-provided packaging:** The primary packaging that protects and preserves the product and facilitates the sale of the product.
- **Transport or secondary packaging:** This type of packaging is used for the sole purpose of transporting the product to protect the contents from rough handling. This is commonly used for bulk handling of product, to facilitate the easy transfer from warehouse to truck or container for shipment.

- **Parcel packaging or tertiary packaging:** This is used mainly to group together the primary packages. It is frequently used in the retail delivery industry to aggregate customer orders into one box, to facilitate easy delivery.

For instance, a sustainable transport packing helps in reduced

- raw material and waste disposal costs
- handling and storage costs
- costs of complying with packaging waste regulations

Logistics and transportation activities have direct influence on the design, use, and disposal of secondary and tertiary packaging. Any inadequately disposed packaging is an additional source of waste.

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## 11.4 PROTOCOLS FOR GREEN LOGISTICS

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There are certain protocols to be adhered to in implementation of green logistics strategies and measures. Now let us discuss some of them.

### **Environment Protection Act (EPA) 1986**

This Act relates to the protection and improvement of the human environment and the prevention of hazards to human beings, other living creatures, plants, and property. It is an umbrella legislation designed to provide a framework for coordination of the activities of various central and state authorities.

### **National Green Tribunal (NGT)**

It is established under the NGT Act, 2010, for the effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. It has jurisdiction in environmental matters for speedy environmental justice and helps reduce the burden of litigation in the higher courts, guided by principles of natural justice.

### **Environmental Management System (EMS)**

EMS is a set of policy measures, management actions, operating procedures, documentation, and records having defined responsibilities and accountability of personnel within an organisation towards environmental concerns. It integrates environmental management issues with the overall management functions of an organisation. It is a problem identification and solving tool, which can be implemented in an organisation in different ways, depending on the needs and objectives of an organisation. The keywords for EMS are: Plan, Act, Check and Improve. The International Organisation for Standardisation (ISO) is an independent organisation that develops standards to define expertly-agreed-upon method(s) of performing a given task to ensure quality and consistency. A set of accounting tools are developed by the GHG Protocol to encourage users to understand, quantify, and manage greenhouse gas emissions.

**ISO 14000** is a family of internationally agreed standards related to environmental management that help organisations to:

- a) Minimise their operations, processes, etc., which negatively affect the environment by causing adverse changes to air, water, or land.
- b) Comply with applicable laws, regulations, and other environmentally oriented requirements.

**ISO 14001** is a standard that sets out the requirements for an effective EMS by providing a framework that an organisation can follow. It pertains to the process of how a product is produced, and certification is performed by third-party organisations. It helps organisations improve their environmental performance through more efficient use of resources and reduction of waste, gaining a competitive business advantage. In the logistics industry, this certification assures the customers that every operational aspect will adhere to stringent quality standards within the warehouse, on the way to a customer, or anywhere in between and to ensure that systems and a consistent high level of practices that meet international standards are in place. Within the standard there are numerous elements of ISO 14001 that are required to be met by organisations seeking formal recognition for their EMS.

**GHG Protocol Product Life Cycle Accounting and Reporting Standard:** This is the Product Standard that provides requirements and guidance for organisations to quantify and publicly report an inventory of GHG emissions and removals associated with the specific product. Using the standard, companies can measure the GHGs associated with products including raw materials, manufacturing, transportation, storage, use and disposal. This is the first step towards having more sustainable products.

**Check Your Progress Exercise 1**

- Note:** 1) Use the space given below for your answers.  
2) Check your answers with those given at the end of the Unit.

1) What do you understand by climate change?

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2) Explain the concept of green logistics and state its objectives.

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3) What are the types of packaging?

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4) What is environmental management system?

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## 11.5 GREEN LOGISTICS STRATEGIES

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The effect of green logistics on the environment is determined by the choice of the right kind of transport, suppliers with shorter shipping routes, using lower emissions, returnable containers, and recyclable or biodegradable packaging leading to sustainable impact. The green logistics variables having environmental impact are:

- a) **Distance reduction:** How far are products being moved? Where are they loaded/ unloaded?
- b) **Modal shift:** Which mode of transportation is being used?
- c) **Cleaner equipment:** What kind of equipment is being used for the logistics operation? What kind of fuel and how much fuel does it consume?
- d) **Better load planning:** How much product is being loaded into the conveyance? How efficiently is it loaded?
- e) **Operational excellence:** How skilful is the driver in operating the vehicle? How optimal is the logistics plan?

Green logistics activities include reducing use of non-renewable energy sources, particulate matter emissions, GHG emissions and waste. Their approaches could be technological (replacing diesel to hybrid vehicle or replacing cardboard boxes with returnable packages); better planning and implementing the movement of goods (increasing utilisation of trucks while controlling inventory levels); transportation having lower GHGs emissions; or larger business environmental goals (increasing reverse logistics activities).

The possible business strategies are:

Evaluating eco-friendly norms in purchasing and procurement through:

- Using eco-friendly packaging and limiting the use of plastic in packaging.
- Adhering to manufacturing processes ISO 14001 that ensure implementing an environmental management system in the company's operations.
- Optimising transport fleet management with higher efficiency and cut back of the overall emissions produced by the transport. Also using vehicles that limit emissions, systems that assist in designing effective delivery route planning and prioritise load pooling.
- Ensuring that warehouses adhere to sustainable construction and management standards with eco-logistics warehouse design, and in-warehouse monitoring and promotion of energy savings.
- Reducing and recycling the waste produced in the warehouse by a waste sorting process according to materials to be recycled, roll back in-warehouse paper usage by implementing IT solutions, and waste management to comply with appropriate recycling procedures.
- Improving stock management and reverse logistics processes with a more efficient storage facility to reduce waste through overall process improvement.

The following are some of the green logistics strategies:

**Green Purchasing:** This ensures that the materials and products that are purchased meet the prescribed environmental yardsticks. It monitors the issue of sustainability in the purchasing process and the purchasing criteria such as cost, quality, and delivery. Green purchasing process includes:

- a) Selection of suppliers based on environmental criteria preferring ISO14000 certification.
- b) Environmental collaboration with suppliers.
- c) The 3Rs of reduce, reuse, recycle in purchasing process.

**Green Manufacturing:** A combined set of sound production processes which reduce resource consumption and generate a little or no waste and to provide pollution free scenario. It aims to reduce the environmental burden and can lead to lower raw material costs and production, reduced environmental expenses, and improved public image by using appropriate materials and innovative environmental technologies.

**Green Distribution:** This process is the integration of environmental issues into packaging, transportation, and logistics activities. These include:

- **Green packaging.** Use of environmentally friendly materials and recycled packaging with improved packaging designs and techniques that help companies to reduce waste and costs.
- **Green transportation.** Consolidation of orders and route optimisation are energy saving ways and methods to reduce CO<sub>2</sub> emissions.

**Eco-Design:** It relates to issues related to environmental safety and health over the product life cycle with a potential to be reused or recycled. It includes the following green practices:

- Reduce material/energy consumption during production and product use.
- Reuse, recycle, and recovery (3Rs) of material and component parts.
- Avoid the use of hazardous materials.

**Reverse logistics.** The process of retrieving the products for possible reusing, recycling, and remanufacturing into reusable products. Reverse logistics practices include collection, combined inspection, selection, cleaning, sorting, recycling, recovery, redistribution, and disposal. Used products and/or packaging are selected, collected, and transported to facilities for treatment of the product such as the repair, reuse, reconditioning, reassembly, repacking, and recycling.

For example, TESCO opened the World's First Zero Carbon Supermarket in Cambridgeshire in UK. Built with sustainable wood, LED lighting and a combined heat and power plant powered with renewable fuel, and the store has no net carbon footprint.

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## 11.5 TOWARDS GREEN LOGISTICS: CHALLENGES

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Logistics has a whole range of measures to protect the environment and resources. Logistics decisions are metrics driven i.e. green logistics models must have the right measurements of the various environmental impacts. Emissions measurements should include both direct and indirect emissions. Direct emissions are created by the organisation itself, whilst indirect emissions are created by third party vendors carrying out work on behalf of the company/firm. Accuracies in the actual amount of emissions being released by companies require certifications and best practice measurement processes that would be the means to benchmark improvements over time. Pollution, noise, vibration, and waste measurements are technical in nature and can be estimated through specialised equipment. Weather, terrain, congestion, and operational conditions can alter the actual environmental impact of freight operations with large variance in fuel consumption, NO<sub>x</sub>, and Sox emissions of vehicles.

For any company, going in for green logistics is not an easy task. There are several aspects to be taken care of. Some of the challenges in implementing green logistics policies are:

- Reliance on fossil fuels for goods transport with less fuel alternatives.
- Rising urban traffic due to increased e-commerce deliveries.
- Lack of infrastructure support with stricter regulations for emission limits.
- Increased spending for logistics infrastructure including automation for efficient handling of products and equipment.
- Rising costs for implementing new logistics technologies and policies
- Reduction of speed and flexibility in comparison to a conventional supply chain management system.

- Lack of knowledge about environmental impacts, public awareness, appropriate regulatory framework, and poor commitment by top management of the company.

In general, there are gaps between awareness about green logistics and adopting suitable policies and practices to promote sustainable ecology. There is need for generating awareness, concern for environment protection, and establishing networks between stakeholders. To meet the challenges the key stakeholders, need to come together which wherein the:

- Government provides appropriate regulatory and monitoring framework.
- Company/firm is responsive to environmental concerns of the society.
- Customers are aware and demand for environment friendly products and services.
- Employees would like to work with socially and ecologically responsive company.

**Check Your Progress Exercise 2**

**Note:** 1) Use the space given below for your answers.

2) Check your answers with those given at the end of the Unit.

- 1) Bring out the challenges in implementing environmental policies for green logistics.

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- 2) Elaborate on the business strategies for green logistics.

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**11.7 CONCLUSION**

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Green logistics aims to move and deliver raw materials and products at the lowest possible cost while maintaining the highest standards and minimising environmental impact in the process. It indicates innovation in all steps of the supply chain, the conception of product and in some cases the final use of products. Green logistics policies not only enable the company to comply with environmental regulations but represent a strategic advantage over the competition by revaluing own brand and preparing the company for the future, which

inevitably must be sustainable. Energy saving measures are an effective strategy for coping with rising supply costs. The scientific understanding of many aspects of sustainability is advancing faster than ever before. Politically the global trend is towards more comprehensive environmental and social regulation. The scope of business operations is evolving with a comprehensive approach towards managing their full spectrum of environmental, social as well as economic impacts. Operations form the core of every organisation and increasing globalisation and competition leads to a trend towards adapting green logistics.

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## 11.8 GLOSSARY

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**Carbon Tax:** It is a tax levied on the carbon content of the fuels generally in the transport and energy sector.

**Carbon Footprint:** The amount of carbon dioxide released into the atmosphere because of the activities of an individual, organisation or community.

**E-commerce (Electronic Commerce):** It is the activity of electronically buying or selling of products on online services or over the internet.

**Fossil Fuels:** These are coal, crude oil, natural gas as they are formed from the fossilised, buried remains of the plants and animals.

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## 11.10 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

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### Check Your Progress Exercise 1

- 1) Your answer should include the following points:
- Climate change is the global phenomenon of climate transformation characterised by changes in the normal climate of the planet.
  - It signifies changes in temperature, rain falling a region over a long period of time.

- 2) Your answer should include the following points:
- Green logistics encompasses the measures taken to minimise the ecological impact of logistics activities.
  - It involves production and distribution of goods in a sustainable way, keeping in view the environmental and social factors.

The objectives of green logistics are to:

- Measure the carbon footprint of logistics operations to develop suitable sustainability steps.
- Reduce air, water, and noise pollution by analysing the impact of each logistics area, especially relating to transport.
- Use supplies judiciously by reusing containers and recycling packaging.
- Design products and their package to minimise environmental impact.

- 3) Your answer should include the following points:

The three main types of packaging are:

- **Manufacturer-provided packaging:** This is the primary packaging that protects and preserves the product.
- **Transport packaging or secondary packaging:** This is used for transporting the product and to protect its contents from damage.
- **Parcel packaging or tertiary packaging:** This is used to group primary packages.

- 4) Your answer should include the following points:
- **Environmental Management System (EMS)** is a set of policy measures, management actions, operating procedures, documentation, and records having defined responsibilities and accountability of personnel within an organisation.
  - It integrates environmental management issues with the overall management functions of organisation.
  - The key aspects of EMS are Plan, Act, Check and Improve.

## **Check Your Progress 2**

- 1) Your answer should include the following points:
  - Lack of infrastructure support with stricter regulations for emission limits
  - Increased costs of implementing new green logistics technologies and policies.
  - Reliance on fossil fuels for goods transport with less fuel alternatives
  - Reduced speed and flexibility in logistics movement in comparison to conventional supply chain management.
- 2) Your answer should include the following points:
  - Green Purchasing
  - Green Manufacturing
  - Green Distribution
  - Eco-logistics
  - Reverse logistics



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## **UNIT 12 OUTSOURCING LOGISTICS MANAGEMENT: ISSUES\***

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### **Structure**

- 12.0 Objectives
- 12.1 Introduction
- 12.2 Outsourcing Logistics Management
- 12.3 Contract Lifecycle Management
- 12.4 Types of Logistics Outsourcing
- 12.5 Effective Logistics Outsourcing: Issues
- 12.6 Conclusion
- 12.7 Glossary
- 12.8 References
- 12.9 Answers to Check Your Progress Exercises

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### **12.0 OBJECTIVES**

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After reading this Unit, you should be able to:

- Bring out the various aspects of outsourcing in logistics management;
- Explain the stages of contract life cycle management;
- Describe the types of logistics outsourcing;
- Discuss the factors for success of logistics outsourcing; and
- Analyse the trends of outsourcing

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### **12.1 INTRODUCTION**

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Logistics outsourcing has assumed importance as companies are deriving benefits through high-quality logistics services provided by a third-party or fourth party logistics company (3/4PL). Service quality becomes one of the most important criteria to outsource logistics services to a service provider. Organisations adopt several business improvement methodologies to enhance the business performance and logistics management has been regarded to be crucial to obtain competitive edge. It is supply chain made up of competing multiple organisations, and not a single company, which is a central tenet in the field of logistics management.

Outsourcing is an arrangement whereby a logistics service provider (LSP) performs services for a company / firm that could be provided in-house facilities. Logistics outsourcing is about subcontracting logistics activities to companies / firms that are equipped to provide the services. Lack of understanding on the part of both user and provider is the major cause of difficulty and failure in the logistics outsourcing relationships. Understanding this aspect shall be useful for facilitating improved logistics outsourcing relationship. Successful companies generally focus on core activities and outsource other required activities.

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\* Contributed by Col. (Dr.) Rajive Kohli, Management Consultant, New Delhi

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## 12.2 OUTSOURCING LOGISTICS MANAGEMENT

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Outsourcing is a make or buy decision which is crucial in determining how a business obtains goods and services. Outsourcing decisions can have corporate strategy implications since employment levels, asset levels and core competencies are involved in this activity. Logistics outsourcing is a business practice in which services or job functions are given to a third party, which traditionally were performed in-house by the company's own employees and staff. Logistics outsourcing is the strategic use of outside parties to perform activities relating to certain aspects. The main issues with outsourcing are:

- a) Preoccupation with core businesses and reduction of cost of capital.
- b) Access to external expertise and quality improvements.
- c) Balancing operational cost savings with the cost of monitoring suppliers.
- d) Increased flexibility in business operations.

The benefits of outsourcing are:

- a) Lower costs due to economies of scale, downsizing or lower labour rates.
- b) Increased efficiency.
- c) Focus on strategy/core competencies.
- d) Gaining capabilities that are not internally available.
- e) Access to skills or resources.
- f) Flexibility to meet changing business and commercial conditions.
- g) Less investment in internal infrastructure.
- h) Access to innovation, intellectual property, and leadership.
- i) Possible cash influx resulting from transfer of assets to the new provider.

Risks of outsourcing are:

- a) Slower turnaround time.
- b) Lack of business or domain knowledge.
- c) Lack of control and accountability.

A logistics contract may be used as a basis for outsourcing, and there are a multitude of activities carried out in outsourcing and the problems arising from logistics contracts are like those arising from outsourcing any other contracts.

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## 12.3 CONTRACT LIFECYCLE MANAGEMENT

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Contract lifecycle management for a buyer is the process of defining and designing the actual activities needed in each stage for any specific contract, allocating ownership of the activities to individuals or groups, and monitoring the performance of those activities as the contract progresses through its lifecycle. The contract, due to business needs, ensures that the contracted goods or services are delivered by the supplier in accordance with the contract, and realise the expected business benefits and value for money. The stages of contract lifecycle are outlined below.

- 1) **Contract Initiation.** A procurement starts by clearly describing and documenting the business need before looking for a supplier of the goods or services. It provides the framework to evaluate suppliers. The process by which the buyer finds a supplier for the required goods or service entails use of RFI, RFP, RFQ or RFB (Request for Information, Proposal, Quote or Bid); resulting in several different suppliers submitting their responses for the contract.
- 2) **Contract Negotiation.** The negotiation of contracts is a specialised activity. A detailed review of the contract with the identified supplier is needed. The buyer sends the responses to the relevant suppliers and negotiations are conducted covering several aspects to reach a consensus. Contract negotiation ensures that the contract is fair and balanced with responsibilities for laid down outcomes. After agreement on the terms and conditions, the successful supplier is awarded the contract.
- 3) **Contract Execution.** A new contract is approved and signed by different people to reduce the chance of anything unfavourable or risk of any fraud.
- 4) **Contract Start-up.** This involves a detailed understanding of key information of the contract. It includes the obligations and rights of the buyer and the supplier, method of tracking its compliance, resolution of outstanding matters to be resolved during and immediately after execution, etc.
- 5) **Contract Operation.** To get the best out of the contract, there is need to continuously monitor the activities. This stage lasts through out the contract term involving several activities as:
  - a) **Control Contract Changes.** Changes in requirements, business conditions, regulatory environment, economic trends, and technology can all necessitate a change in a contract. Such changes should be achieved on a timely basis by mutual consent, and through a formal change control process documented in the contract.
  - b) **Track Obligations Compliance.** A contract specifies each party's separate and joint obligations. Adhering to such commitments are critical to the contract. A range of activities which should be tracked in a formal way with deadlines being met on time are:
    - i) Contractual terms and conditions
    - ii) Events and dates
    - iii) Laws and regulations
    - iv) Internal directives and policies
    - v) Jointly agreed processes
  - c) **Checking Supplier Performance.** A regular monitoring of supplier performance is necessary to ensure that delivery of goods and services is as per agreement. This checking and reporting by staff can be combined with customer satisfaction survey results for any remedial action like changes in processes, contract terms, service levels, fees etc.

**d) Performing Periodic Reviews.** A contract needs periodical checking for any changes in circumstances affecting the delivery of expected benefits which may necessitate updates to the contract, or the processes laid down in the contract.

**6) Contract Renewal.** This gives an opportunity to improve the terms of a contract and gain better value from supplier. The contracts should be renewed in time if not going in for auto-renew or auto-cancel. A contract should be renewed if:

- a) There is an ongoing requirement of the activities.
- b) Supplier's service delivery performance has been acceptable.
- c) There have been no insurmountable difficulties in achieving high levels of compliance with all obligations.

**7) Contract Close-Out.** The end of a contract on its expiry or its active termination calls for proper planning and a smooth transition-out from the contract. In contract closing out, following activities should be carried out:

- a) Issuance of a termination notice before the contract expiry date.
- b) Monitor and participate in any disengagement activities needed to move-out from the contract.
- c) Return or destroy any confidential information as required by the owner of such information.
- d) Transfer any assets, and return any loaned items, as required.
- e) Finalise the details of any payments to be made to or by the supplier.
- f) Prepare and finalise contract finalisation paperwork and submit and clear any final payments.
- g) Perform any other specific post termination obligations.
- h) Update the lessons learned for the benefit of all future contracts.

**Check Your Progress Exercise 1**

**Note:** 1) Use the space given below for your answers.  
2) Check your answers with those given at the end of the Unit.

1) What are the benefits and risks of logistics outsourcing?

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2) Describe the stages of contract lifecycle.

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## 12.4 TYPES OF LOGISTICS OUTSOURCING

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### Contract Logistics

Many companies find it more efficient to hire specialised contract logistics companies to manage their logistics for them. In addition to cost, the other advantages are flexibility, improvement of business practices and better efficiency. Contract logistics companies have a deep understanding of how different industries work to best manage the logistics of different companies. They can handle activities such as designing and planning supply chains, facilities, warehousing, transporting, and distributing goods, processing orders, and collecting payments, managing inventory, and even providing many aspects of customer service. They are familiar with the process having expert staff offering comprehensive solutions through various divisions and specialised services, thus creating a value chain that spans from the production line to distribution and to the final point of sale.

Contract logistic companies are invariably started by former logistics managers, who already have a good understanding not only of the industry they work in but also where they may best place their contracts. They are in oil and gas industry, power and energy, petrochemical, renewable energy, infrastructure projects, mining, military, and defence and so on. They can undertake transportation and installation of large loads that require feasibility studies and completing the necessary compliances like customs clearances. Many new services have come to market that transformed the delivery concept allowing pickups and custom delivery beyond the normal scope of delivery hours. Other companies that are working for business to business, focus on large-scale logistical automation that tracks items like shipping containers and freight deliveries for companies using modern software learning tools thus saving money.

### Open-book Contract

A current trend in the contracting of outsourced logistics services is towards more transparency in supplier pricing. The buyers want to know that they are getting value for money, that the logistics supply provider (LSP) is not making excess profits at their expense. This is achieved through scrutiny of costs such as labour, materials, overheads and profits. In an open-book contract, the buyer and seller of work/services agree on which costs are remunerable and the margin that the supplier can add to these costs. The customer is then billed on the actual costs incurred plus the agreed margin. Once a company reaches a size where its operational management becomes complex, it looks towards a strategy to outsource their operations, management, transfer their staff and assets. They have a deal with a service contract for several years, based on an open book accounting base plus a margin. This deal allows them to focus on their manufacturing and marketing services of trading and distribution, with the support of an inter-link manager and a few supervisors to manage the logistics operator performance and track costs. The added value provided by the LSP are the efficiencies and productivity gains from their professional management, operational performance, and financial strength to invest in needed assets, systems, and human resources.

The logistics operator business is to manage their client operations, deciding and arranging delivery trucks and other warehousing storage equipment and materials handling vehicles, as well as in IT hardware and software systems. All are charged

at cost plus a profit margin under the open book concept. An incentive may be included for the supplier to give a realistic price and to minimise the costs whereby the supplier gets incentives (and penalties) calculated as a percentage of the difference between the real cost of the project and the estimate that was provided.

### **Business Process Outsourcing (BPO)**

Businesses look for suitable logistics process outsourcing partners that will help them increase their work accuracy and reduce operational overheads. Some key reasons why logistic companies look to outsourcing are:

- a) **Cost Reduction:** Outsourcing logistics processes to a reliable BPO Partner, can help reduce operational costs by more than half.
- b) **Round-the-clock support:** The 24x7 team support help retain valuable customers.
- c) **Reduce Track and Trace (TAT):** Using Workforce Management tool increases efficiency by reducing of TAT of shipments and documentation management.
- d) **Re-engineered Business Processes:** Perfect mix of the latest business technologies with re-engineered logistics processes provide competitive edge.
- e) **Easy Monitoring and Reporting:** Insights into operations with real-time reports and analysis using easy-to-use dashboards.

### **Original Equipment Manufacturer (OEM)**

Original Equipment Manufacturer (OEM) is a company whose goods are used as components in the products of another company, which then sells the finished items to users. Such products are usually not only of good quality but are also durable. The second firm is referred to as a value-added reseller (VAR) because by augmenting or incorporating features or services, it adds value to the original item. The VAR works closely with the OEM, which often customises designs based on the VAR company's needs and specifications. OEM focuses on business-to-business sales, while VAR sells to the public or other end users.

VARs and OEMs work together. OEMs make sub-assembly parts to sell to VARs. Although some OEMs do make total items for a VAR to market, they usually do not have much of a direct role in determining the finished product. OEMs focus on business-to-business sales, while VARs market to the public or other end users. An increasing number of OEMs are selling their parts or services directly to consumers, in a way making them a VAR.

For example, OEM describes a manufacturer who puts together computers made of other company's parts and then sells the product under its brand name. Examples of OEM are Dell, Hewlett Packard, etc. Apple's iPhone has the Apple logo that is clearly visible to users. It describes its products, but Apple outsources the majority of iPhone manufacturing products to other electronics solutions providers on contract.



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## 12.5 EFFECTIVE LOGISTICS OUTSOURCING: ISSUES

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Outsourcing succeeds when it is well thought out and done properly. We shall now discuss some key issues to be kept in view for all parties involved in outsourcing.

### 1) Know and Define Reasons for Outsourcing

What do you want to accomplish and why? What is it that you want to do better? What would it take to do it and do it well inside the company? Why is that option not viable? For example, in case of freight transportation, the purpose of any company is to reduce freight costs. The problem being encountered could be either high rates, carriers used, or the methods selected; or it can be a symptom of a problem from use of high cost shipping methods, or supplier problems. If the real cause of freight is not identified, then the outsourcing will not be successful, because the reasons for the outsourcing have not been properly identified. Freight also has a service factor, whether it be moving inventory from suppliers, between company operations or to customers, which are to be understood to evaluate the freight cost problem and needs.

### 2) Evaluate Outsourcing Business Process versus Function

This is the key issue because without this the outsourcing selection may be defective. It defines the needs by identifying partners and designing the ways of outsourcing. Knowing what is being outsourced and why, helps in identifying the type of logistics supply providers (LSPs). The reason for outsourcing may also indicate whether to outsource a function or a process. Outsourcing management of inbound transportation is a function for transfer to an outside party; but the inbound supply chain, including supplier purchase orders, supplier performance and transportation is a process for transfers to an outside provider.

A third-party logistics provider/ company (3PL) is mainly concerned with handling just the logistical process, while a fourth party logistics provider/ company (4 PL) manages almost all aspects of the client's supply chain. At times these may own assets like trucks and warehouses while third party logistic provider may not own the facilities/ assets.

Outsourcing a function versus a process can change the type of service provider that should be evaluated. A third-party logistics company is often used with functions, such as inbound transportation and related activities. Managing a function requires depth of skills sets from the service provider. A fourth party logistics company (4PL) may be the better choice with managing a process, which requires breadth of logistics skill sets.

### 3) Recognise Seller and Buyer Roles

The involved parties in outsourcing have different expectations. The selling company outsources its services for building own leveraging position with the transport carriers or other providers and reduce costs of warehouses or other operations. The seller may be focused on his/her needs and not focused on the buyer's needs, thus mainly interested in only getting the business.

Outsource providers who see the potential buyer as a client will recognise the unique needs and accordingly develop and manage the relationship. Those providers who view a prospective buyer as a “customer” may not pay the attention to the business after they have gained it. A customer is one of many customers; he is not unique. Such a provider is proactive, not reactive. Client management differentiates successful outsource service providers, for both gaining and retaining business.

#### **4) Detail Your Operations**

Stipulate in writing what is done, by whom, how it is done, when and why, highlight its strengths and weaknesses. Clearly understand interfaces between departments and how functions and responsibilities are divided between them. Understand “hidden”, and “assumed” work that is done which is beyond the job descriptions, purpose, and responsibilities that outsiders may not notice. The detailed costs of operation such as labour, space, freight etc., are to be worked out.

Define critical points in the function or process which should be mapped as organisational boundaries overlap, defining cross-functional roles and interfaces. It will also show gaps or redundancies which may highlight key areas for the 3 Party Logistics providers or 4 party logistics providers that are critical for success.

#### **5) Set Metrics/Key Performance Indicators and Accountability**

The expectations from outsourcing is with specific reason and anticipated results. The planned results should be defined clearly and be tangible. Goals which are vague goals such as “reducing costs”, “improving supplier performance” etc., does not ensure accountability and can lead to disputes during the contract. The results should be measurable and be clearly set in early discussions as part of the expectations to know the realities of accomplishing them.

The focus should be on the key metrics and performance indicators that relate to outsourcing success. Accountability and responsibility from and for both parties should be understood. Logistics management is complex having multiple areas of responsibility and accountability with multifunction process over large geographies. It runs from suppliers right through to customers. Hence it is better to identify and define responsibilities and metrics early in the process well before signing of contract.

#### **6) Be Aware of Risks**

Outsourcing involves change management, even business process reengineering, is not a guarantee of success with anticipated benefits but has potential downsides. So, one needs to anticipate the various scenarios, internal and external factors that can impact the activities and results.

Hence it is better to do risk assessment, identify real and perceived risks, that shall help to mitigate risks. Think through the probable scenarios – goals not attained, service problems that seriously impact the company as to customer deliveries or with purchase orders from suppliers, inventory difficulties of stock outs or surges in levels, unanticipated cost increases and relate them to available options .

Outsourcing results in transfer of company's knowledge, practices, and resources. In case outsourcing does not work, the company should be prepared to remedy it in an appropriate manner. If it cannot be remedied, agreement can be terminated, and another service provider needs to be identified. The company must carry out proper transfer from one provider to another, regroup and bring the outsourced service under control.

### 7) Plan the Change

Outsourcing does not work on its own, but parties should plan for the change. There are major and minor tasks to be outsourced and outsourcing results in people and departments giving up ownership of the function or process. All affected parties build teams to detail things to be done, develop the plans and timelines, understand any customisation and reengineering required, coordination of activities and distribution of work or information, and provide training to the people.

### 8) Manage the Outsource Operations

Successful outsourcing takes effort to manage the LSPs and operations. Use the key performance indicators continuously. Meet regularly, especially during the implementation, to review progress, problems, and successes. Also assess what must be done and who must do it.

#### Check Your Progress Exercise 2

**Note:** 1) Use the space given below for your answers.

2) Check your answers with those given at the end of the Unit.

1) Describe some of the types of logistics outsourcing.

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2) Discuss issues involved in success in outsourcing.

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## 12.6 CONCLUSION

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Outsourcing can bring big benefits to businesses, but there are significant risks and challenges when negotiating and managing outsourcing relationships. Fast changing customer demands have an increasing effect on company policies. Advances in technology makes production more more focused. Successful companies will have to concentrate on core activities. Those other than core activities, will have to be outsourced.

Globally and locally, outsourcing has already become the practice in all sectors of business and value chains. Outsourcing has been one of the most used management practices during recent times, and the outsourcing business continues to grow and expand significantly across all value chains.

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## 12.7 GLOSSARY

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**Business Process Reengineering:** It is a business management strategy pioneered in 1990s focusing on the analysis and design of workflows and business processes within an organisation. It is aimed to help organisations fundamentally to rethink about their functioning to improve customer service, cut operational costs and become a successful company to compete in global market.

**Contract logistics.** Outsourcing of resource management tasks to a third-party logistics company/ provider (3PL).

**Logistics contract:** A commercial contract under which one party, known as 3PL, provides services of a logistical nature to a customer in exchange for payment of an economic amount.

**Request for Bid (RFB):** It is a document where a company solicits commodities and services from outsiders. It has all specifications and conditions and terms of contracting. This is used in situations where potential service providers or vendors differ principally on price.

**Request for Information (RFI):** It is a business process whose purpose is to collect written information on the capabilities of various suppliers in outsourcing. It is generally used to compare and arrive at a decision.

**Request for Proposal:** It is a document that a company or agency interested in procuring a commodity or service offers to the potential suppliers to submit business proposals.

**Request for Quotation:** A request for quotation is a business process in which a company or public entity requests a quote from a supplier for the purchase of specific products or services. It involves along with the price, payment terms, quality level etc.

**Value Chain:** It is a set of activities that an organisation carries out to create value for its customers.

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## **12.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES**

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### **Check Your Progress Exercise 1**

1) Your answer should include the following points:

The benefits of logistics outsourcing include:

- Lower costs
- Increased efficiency
- Focus on strategic/core capabilities
- Access to skills and resources
- Flexibility
- Access to innovation
- Possible cash influx

Risks of outsourcing are:

- Slower turnaround time
- Lack of business or domain knowledge
- Lack of control and accountability

2) Your answer should include the following points:

Elaborate on the following stages of contract lifecycle:

- 1) Contract Initiation.
- 2) Contract Negotiation.
- 3) Contract Execution.
- 4) Contract Start-up.
- 5) Contract Operation.
- 6) Contract Renewal.
- 7) Contract Close-Out.

### **Check Your Progress Exercise 2**

1) Your answer should include the following points:

Description of

**Logistics Management:  
Emerging Trends**

- Contract Logistics
  - Open-Book Contract
  - Business Process Outsourcing; and
  - Original Equipment Manufacturer.
- 2) Your answer should include the following points:
- Issues in achieving success in outsourcing include:
  - Know and Define Reason for Outsourcing.
  - Evaluate Outsourcing Business Process versus Function.
  - Recognise Seller and Buyer Roles.
  - Detail Your Operations.
  - Set Metrics/Key Performance Indicators and Accountability.
  - Be Aware of Risks.
  - Plan the Change.
  - Manage the Outsource Operations.



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## **UNIT 13 EFFECTIVE LOGISTICS MANAGEMENT: CHALLENGES\***

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### **Structure**

- 13.0 Objectives
- 13.1 Introduction
- 13.2 Challenges to Effective Logistics Management
- 13.3 Efficient Transportation
- 13.4 Customer Management
- 13.5 Business Process Planning
- 13.6 Improving Supply Chain Visibility
- 13.7 Workforce Management
- 13.8 Technological Developments
- 13.9 Regulatory Compliances
- 13.10 Environmental Issues
- 13.11 Conclusion
- 13.12 Glossary
- 13.13 References
- 13.14 Answers to Check Your Progress Exercises

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### **13.0 OBJECTIVES**

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After reading this Unit, you should be able to:

- Identify the challenges to effective logistics management;
- Describe aspects of business process planning and workforce management in logistics;
- Gain awareness about technologies and software for logistics enhancement; and
- Examine the regulatory and environmental issues related to logistics.

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### **13.1 INTRODUCTION**

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The logistics industry is the backbone of any economy, and the driving force behind all sectors. The management of logistics has always been a complex task, but with time it has become even more specialised activity. Almost every business is in the activity of sale and purchase of materials and goods which are to be transported to specific places. The need for logistics is increasing due to e-commerce which is emerging to be a type of mass shopping as people prefer to shop online due to ease and convenience.

The global outlook for logistics industry is optimistic but the road ahead is challenging. Globally, the economy has a huge potential for good logistics. Logistics professionals face many challenges throughout the supply chain to

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\* Contributed by Col. (Dr.) Rajive Kohli, Management Consultant, New Delhi

handle the growing demand from customers and the need to meet their expectations.

The logistics industry is subjected to tremendous pressures in present times being driven by technological innovations, changing consumer expectations and stringent regulations. This is the last unit of this Course and it presents an overview of the challenges confronting the domain of management of logistics.

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## 13.2 CHALLENGES TO EFFECTIVE LOGISTICS MANAGEMENT

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There are many strategic challenges in global logistics strategy but cutting transportation costs has continued to be one of the difficult amongst others. Longer supply chains have greater exposure to risk. Greater variability due to several deviations from the plan and large buffer inventories can add significantly to the costs.

The key challenges and opportunities in logistics management are:

- Internal alignment: improving internal alignment before further integrating externally.
- External improvement priorities: picking upstream and downstream collaborative opportunities.
- Managing costs for healthy, profitable growth of the company.
- Workforce availability especially the supply chain managers, logistics managers and the team of logistics specialists.

Many of the challenges can be overcome by working with a logistics service provider (LSP). Some of the key threats to effective logistics management are:

- Efficient transportation
- Customer management
- Business process planning
- Improving supply chain visibility
- Workforce management
- Technological developments
- Regulatory compliances
- Environment issues

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## 13.3 EFFICIENT TRANSPORTATION

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A company's transportation department can decrease the expenses of the logistics firm and the processes can be overhauled for faster delivery of the products. It can be achieved by finding the best delivery route which would be shortest, yet safest route, also saving money and time. Cost-effective packaging would ensure low investment and safety of goods by optimising the packaging as it occupies less volume, and it does not increase the weight of the package.



**Cutting transportation costs:** It is the single biggest challenge for the logistics industry, since transportation is a major part, covering about 30 percent of total expenses, but with rising fuel prices, the costs can escalate. Transportation costs are a major item in logistics and all freight forwarders try to negotiate the best rates for the movement of cargo.

**Reducing carriers:** Companies can redistribute their business among fewer carriers and negotiate for lower rates. However, this increases the risk of over dependency on few carriers. An optimal strategy needs to be worked out for cost effective and hassle-free delivery.

**Consolidating shipments:** This can consolidate shipments and get bulk rates, but this may delay deliveries impacting consumer satisfaction. Different types of transport are used to develop better strategies in which containers are filled to the best of their ability. An optimal route needs to be drawn.

**Fleet management routing software:** It can help to ensure that freight carriers ply on the shortest, most efficient routes – avoiding traffic congestions, considering road restrictions by vehicle type and time of day. This not only reduces the total miles driven, wear and tear and maintenance costs, but also lowers violations and safety risks, which can result in reduced insurance premiums.

**Fuel Costs:** One of the main reasons for the increase in transportation cost is the increased fuel price. Logistics companies may not be able to control the fuel prices but controlling fuel expenses is within their reach. The decrease in transportation costs can make positive changes in the business profit margin too. The business process can be made efficient by the proper planning and management of transportation costs such that the company can run the project within stipulated budget. Higher fuel prices will significantly affect the cost of wages and transportation for shippers. Working with a third-party logistics supplier (3PL) will help a company in dealing with these changes as they have the flexibility and experience to secure discounted transportation rates. To better optimise transportation costs, logistics managers need to have a clear view of future orders.

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## 13.4 CUSTOMER MANAGEMENT

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Customer service is the prime challenge in every industry and proper customer management is one of the threats confronting the industries. In logistics management also, the customers expect complete and proper transparency in product quality and delivery. In the dynamic business environment with complex supply chains, the customer expectations have changed in terms of delivery times and service quality. They want to get notified about the reliable information including exact place, expected date and time, and other details about the delivery.

**Enhancing Customer Service:** Customers expect their logistics partners to solve problems and help them grow in a competitive environment. Logistic supply providers (LSPs) must have the right people with the right skills and attitude, focus on enhancing and standardising the customer experience across all locations and channels, be it in-person interactions, phones, online chats, emails or social media.

**Better Customer Service:** Today's customers expect certain features relating to customer service especially when they order online. They want to receive tracking information and real-time updates to keep them aware of where their order is along the shipping and delivery schedule. They also want the option to pay for faster shipping, such as two-day or same-day shipping. Anything more than this is considered unacceptable and may deter customers from following through with the purchase. A third-party logistics provider (3PL) can help in achieving transparency throughout the supply chain so that the customers can be provided with the required information.

**Reverse logistics:** This is required by every e-commerce business. Customers need a way to return items they have purchased if they are dissatisfied with them, and this process needs to run smoothly. Without an efficient reverse logistics platform, one cannot achieve customer satisfaction. However, a reverse logistics strategy can be challenging and costly, without the right support. A 3PL provider can help face these challenges with their pre-existing robust solutions. They can help process returns in a timely manner to satisfy the customers and can help decide what to do with returned items to prevent any revenue loss. These solutions may include repackaging unused items for resale or refurbishing items to sell at a discounted price.

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### 13.5 BUSINESS PROCESS PLANNING

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**Planning:** It is inevitable for the success of every industry to plan for better logistics management to enable the company to operate within its budget in achieving productivity. Planning involves procuring the goods, storage facilities, and delivery of products to the exact location. The other parameters in this are time, transportation, and the costs. A supply chain operative should be able to devise the flow chart for the whole operation. The purpose of planning is to attain maximum work in the least possible time, with maximising the profits.

**Contingency plan:** Proper planning is to be done to meet unforeseen circumstances. Logistics planning process is incomplete without a contingency plan. In the process of management of logistics eventualities can be related to:

- The products
- Unavailability of the transportation
- Freight related matters
- Any internal issue in the organisation
- External factors impacting the organisation

**Improving Business Processes:** The enterprises rely on their logistics supply provider to derive cost reductions and business process improvements. LSPs are expected to have the knowledge and experience to look beyond supply chain and logistics operations to drive changes within the overall operations framework. They also need to be financially stable, flexible, and open to taking reasonable risks for long term gains. The logistics business is highly competitive where industry benchmarking plays a key role in business process improvements, to be the best and the fastest.

**Offering segmented and personalised services:** Logistics today is not only about delivery within the agreed period, but more specialised services should

also be offered. Logistics processes are turning into many small segments in the supply chain. Therefore, it is necessary to offer specific services as well as package price offers for overall freight management.

**Metrics:** For new strategies in the system, measurement of output is needed. Logistics network optimisation is incomplete without integrating measurement, analysis, and feedback. The measurement tools and software should be integrated that easily determines and classifies the information as per the requirement. Cycle-time, Cost and Service metrics related to different operations can be considered and incorporated.

The increase in new opportunities makes it imperative to keep in tune with new advances in business processes. The challenge is to adapt and implement the changes to offer better service and to increase efficiency in operations. However, this can be costly and challenging without the right assistance. A third-party or fourth-party logistics (4PL) provider will work as an extension in dealing with any broken or weak links in the supply chain. They help improve logistics process by offering appropriate planning, strategy, and services that work in the company's favour.

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## 13.6 IMPROVING SUPPLY CHAIN TRANSPARENCY

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Supply chain transparency is crucial in minimising order errors and to retain the customers and earn their loyalty. This ensures that information about every aspect of inventory is available and allows better customer service by improving performance and reducing errors. Improved supply chain transparency uses specific information to establish relationships between lead events and forecasted activity. It highlights the need for changes in flow or deployment decisions pertaining to material or products, to minimise or prevent potential problems.

To have accurate and on time deliveries, logistic companies need to have transparency on all aspects of the supply chain such as:

- Tracking shipments to ensure they are following the prescribed route and schedule, and in case of disruptions, notifications and alerts be activated so that prompt action can be taken. Customers need to get updates, namely, shipping notifications, expected time of delivery, and be able to track shipments on a web portal.
- Entire workflow in a warehouse i.e. receipt of inventory, storage, order management and completion, and shipment.

Transparency is critical to every e-commerce and retail business, which can be provided by a third-party provider through use of technology in the warehouse. They can help make more efficient use of time, improve forecasting of inventory movement, increase security and quality control, etc.

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## 13.7 WORKFORCE MANAGEMENT

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A workforce team is an essential aspect of an organisation that is responsible for its growth. They must have the ability to communicate at any point in time to ensure coordination and a smooth workflow. Work force management

requires great precision in terms of schedules, job responsibilities, good communication, and consistency in the implementation of logistics operations, etc. A LSP can help manage the employees better by providing managers in major locations, ensuring quality communication, and scheduling solutions.

From the delivery person to the warehouse manager, everyone should aim to give their best in their respective field of work. Proper training of the employees by regular training workshops keep the employees updated with the latest trends in the logistics industry. This helps in increased efficiency and satisfaction of the clients. A logistics manager with impeccable interpersonal skills is crucial for the organisation in tapping the business opportunities.

**Check Your Progress Exercise 1**

- Note:** 1) Use the space given below for your answers.  
2) Check your answers with those given at the end of the Unit.

1) What are the challenges to effective logistics management?

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2) Elaborate on the challenges to efficient transportation.

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**13.8 TECHNOLOGICAL DEVELOPMENTS**

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**Technological Advancements:** It has become imperative for logistics companies to adopt new and innovative technology solutions. With scarce labour, intense competition and demanding customers, technological advancements can increase productivity by minimising time, cost, and errors in various phases of logistics management. Some of these are:

- a) Automation systems or data driven software solutions such as advance packaging, labeling, warehouse sorting etc. have become imperative.
- b) Shipment tracking systems enable monitoring shipments round the clock, get alerts and notifications, and set up customised reporting.
- c) Data analytics can help with improving customer experience, operational efficiency, and safety.
- d) Use of Robotics and autonomous machinery. These help in drastically cutting down time taken for order completion and delivery.

- e) Internet of things (IoT) can have an important role in reducing risks and ensuring safe delivery of goods. The best fleet management system connects with specialised sensors built into new generation trucks. This software provides real time in-transit visibility of trucks, shipments on board, and key vehicle parameters.
- f) Cloud computing enables many of the above software solutions relatively inexpensive. However, trained manpower resources are required to make use of it and derive benefits from them.

**Adopting Technology:** The cost of adopting new technology used in the supply chain is high, but it is a requirement to survive in the competitive industry. A third-party logistics partner will resolve this issue, as many of these organisations are already equipped with the necessary technology to increase efficiency. Some of these technologies include radiofrequency identification for barcoding and scanning (RFID), communication technology such as electronic data interchange (EDI) and GPS, and material handling technology. Implementing these technologies on your own is extremely expensive and it is advantageous to partner with a 3PL provider. We have referred to these technologies in earlier units of the Course.

**Automation:** The logistics firm should embrace the technology for increasing productivity. There is valuable software that can be deployed in the logistics process, like:

- a) The business process software can be integrated that provides timely updates regarding the movement of goods. This saves a considerable amount of time because manual interference is eliminated. Also, accurate tracking helps in improving overall process management. The operator and the client will get details regarding:
  - The goods that are dispatched from the supplier.
  - Procurement of the goods at the warehouse.
  - Delivery of the goods at the destination
- b) The account details and employee details can be managed using specific software developed for these tasks.

### ***Digital trends in Logistics Management***

- a) **Drones:** These boost warehouse safety by using artificial intelligence to visually perceive any accidents that may occur. Also speedens up the delivery process by cutting down common operational costs.
- b) **Robotics:** They detect package defect before its shipping by sorting the packages at double the speed.
- c) **Cloud integration:** These provide real time data to specific distributed locations and to people across all geographical locations.
- d) **Autonomous tracking:** It uses sensors in the vehicle to evaluate road conditions. Access to alternative routes based on location and shipment overload inside fleet.

- e) **Internet of things (IoT):** It manages and accelerates productivity within the supply chain for their specific processes.
- f) **3-D printing:** It creates complex designs and effortlessly customisable products specific to unique customer needs.
- g) **Blockchain:** This tracks the products' lifecycle and ownership from delivery to store shelf by using advanced technology for transparency.

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## 13.9 REGULATORY COMPLIANCES

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**Government regulations:** Logistics management in companies has several government-related issues as in certain ways, they need to abide by the laws, rules and regulations, framed by the national, state, and local authorities. For example, governments wield tremendous power over global shipments with multiple agencies involved in trade shipments and having the authority to hold and release the shipments. Even after the shipments are cleared in the ports, different departments need to give their approval. In addition, permit laws and taxation on international and domestic shipping also impact logistics.

**Awareness and Compliance with regulations:** Some clients have no idea how much logistics managers need to know the regulations and laws. Sometimes the package price for the logistics service may seem high, but in fact it is like one paying a “guarantee fee” for the valuable supplies. The rules vary from country to country, and goods can travel to many different destinations. This means that every logistics expert should be aware of current laws and upcoming updates. A slight mistake in documentation, or lack of awareness thereof, can be very costly to the business. Whether one is dealing with transport of hazardous substances or recyclables, priority should be to follow the regulations. It is essential to be aware of these regulations and ensure their adherence.

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### 13.10 ENVIRONMENTAL ISSUES

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Reducing greenhouse gas emissions is a major goal for many companies, especially after numerous studies have shown the negative impact, big business supply chains have on the environment. We have already discussed about this in detail in Unit 11 of this Course.

Companies that adapt and reduce their carbon footprints succeed better because both partners and consumers are more aware than ever before. Choosing a third-party logistics provider that strives to find ways to reduce gas emissions and waste can be a better option. Solutions include using global positioning systems (GPS) to find more efficient routes to ship and deliver, or recycling materials from returned goods to put back into manufacturing, instead of disposing them as waste.

There is a considerable focus on reducing emissions, primarily due to anti-idling (Idling means running a vehicle when it is not in motion) and emission reduction regulations by governments, but also on account of public awareness on environmental issues.

Companies can comply by adopting route and load optimisation, tracking and reporting emissions, upgrading engines, and choosing alternative fuels. For

example, in transportation, the latest truck models come with the best engine performance, emission compliance and much better mileage. These offer great savings in the long run but require steep upfront costs.

Environmental sustainability is assuming importance globally, and those within the supply chain are no different. More and more shippers are embracing sustainability programmes, and carriers and third-party logistics companies are focusing on greening efforts to attract shippers. In addition, those within the supply chain are becoming more sophisticated in how they demonstrate and document their carbon emissions, miles per gallon, data, and efficiency metrics. Evaluating the entire network, including sourcing locations and product demand, can drive the overall efficiency within the supply chain, resulting in emissions reductions. Shippers are becoming more and more flexible with their networks, but often business rules can inhibit network optimisation.

There are multiple ways shippers and 3PLPs are integrating sustainable environmental processes into the traditional supply chain. They are involved in tracking and reporting emissions; route optimisation and load consolidation; alternative fuels, including electric vehicles and natural gas; autonomous vehicles or platooning technology (groups of vehicles that communicate via wireless connection that assist with vehicle movements).

### Check Your Progress Exercise 2

**Note:** 1) Use the space given below for your answers.

2) Check your answers with those given at the end of the Unit.

1) Describe the technological advancements and digital trends related to logistics.

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2) Regulatory and environmental issues are important in logistics- Elaborate.

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## 13.11 CONCLUSION

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The aim of effective logistics management is to improve the efficiency of the operations, ensuring customer satisfaction and increase productivity by process optimisation. Tracing goods to their origins will also meet consumer demands while enhancing the safety and integrity of products. For better control, logistics companies today need to ensure real-time tracking, cost efficiencies, timely delivery, anticipate problems, have backup plans in place and heightened security.

Given stiffening competition, there is a pressing need for improvements in the areas of capacity forecasts, inventory management, alignment of manufacturing and logistics, systems integration, and information sharing. They must remain flexible, and committed to upgrading technology, people, and processes. These challenges can be successfully met by services that include real-time inventory management, e-commerce execution, implementation solutions, and fulfillment markets. There are endless benefits to working with logistics supply provider company which uses the best quality software systems for effective logistics management.

Logistics management should cater for changing customer needs and on time delivery. A software solution for better managing logistics should increase transparency of operations/activities, improve customer satisfaction, reduce invoicing time with built-in accounting, improve cost efficiencies, real time tracking and provide customised reports. For these block chain becomes a vital part of logistics management.

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## 13.12 GLOSSARY

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**Block Chain:** It is a digital record of transactions that is distributed across the entire computer network system in the chain. They are linked together.

**Cloud Computing:** It is the delivery of computing services including servers, databases, data storage, networking, and software. Cloud based storage makes it possible to save files to a remote database and retrieve them on demand. Google drive is an example of this.

**Cycle time:** It is the amount of time a team spends working on producing an item, till the product is ready for shipment.

**Data Analytics:** It is the science of analysing raw data to make conclusions about that information that helps in decision making.

**Global Positioning System:** It is a global navigation satellite system that helps military and civil users in determining accurate geographical locations.

**Internet of Things (IOT):** It refers to a system of interrelated, internet connected objects that can collect and transfer data over a wireless network using sensors without human intervention.

**Metrics:** These are measures of quantitative assessment commonly used for comparing and tracking performance or production.

**3 D Printing:** It is three-dimensional printing that creates a physical object from a digital design. It is an additive process whereby an object is created by laying down successive layers of material until the object is created.

**Real time Tracking:** It invokes use of technology to automatically identify and track the location and activities of people and objects within an area.



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## 13.14 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

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### Check Your Progress Exercise 1

- 1) Your answer should include the following points:
  - Efficient transportation
  - Customer management
  - Business process planning
  - Improving supply chain visibility
  - Workforce management
  - Technological developments
  - Regulatory compliances
  - Environment issues
- 2) Your answer should include the following points:
  - Cutting transportation costs
  - Reducing Carriers
  - Consolidating Shipments
  - Fleet management routing software
  - Fuel Costs

## Check Your Progress Exercise 2

- 1) Your answer should include the following points:
  - Drones
  - Robotics
  - Cloud integration
  - Autonomous tracking
  - Internet of Things (IoT)
  - 3-D printing
  - Blockchain
- 2) Your answer should include the following points:
  - Government wields considerable over global shipments with multiple players involved in trade and shipments.
  - Compliance with regulations laid down by government.
  - Awareness of current laws, rules, and regulations about various types of material transportation.
  - Adherence to environmental regulations to reduce greenhouse gas emissions, carbon footprint.
  - Promoting environment sustainability measures such as route optimisation, load consolidation, upgrading engines, use of alternate fuels, use of electric vehicles, etc.

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