

TRENDS IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

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TRENDS IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

The main topics of the lecture:

1. Logistics, the Supply Chain and Competitive Strategy, Competitive Advantage, the Changing Competitive
2. Logistics and Customer Value, the Marketing and Logistics Interface, Customer Service
3. The Supply Chain in Globalization Context, Trends towards Globalization
4. Creating a Sustainable Supply Chain; Reduce, Reuse, Recycle

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The important questions:

- What is the difference between Logistics and Supply Chain Management?
- Many people use 2 terms interchangeably but what is the relationship between both terms?
- Here, on the beginning, you will learn about the meanings of most common Logistics and SCM terms.
- We will seek adequate answers to 10 identifying matters.

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1. What is the Difference Between Logistics and Supply Chain Management?

- ✓ "Logistics typically refers to activities that occur within the boundaries of a single organization and **supply chains** refer to networks of companies that work together and coordinate their actions to deliver a product to market.
- ✓ Also, traditional **Logistics** focuses its attention on activities such as procurement, distribution, maintenance, and inventory management.
- ✓ **Supply Chain Management (SCM)** acknowledges all of traditional logistics and also includes activities such as marketing, new product development, finance, and customer service"
(from Essential of Supply Chain Management by Michael Hugos)

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2. What is Logistics?

- ✓ We will dig deeper to see more simple meaning of logistics as below,
- ✓ "Logistics is about getting the right product, to the right customer, in the right quantity, in the right condition, at the right place, at the right time, and at the right cost (the seven Rs of Logistics)" - from Supply Chain Management: A Logistics Perspective By John J. Coyle et al.
- ✓ In the past, various logistics tasks are under different departments but now they are under "logistics department" and report to the same logistics head,
- ✓ We would like to point out that the word "logistics" ends with the "s". Without the "s" (logistic), it means a kind of mathematical function showing exponential growth.

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3. What is Logistics Management?

- ✓ We will also explore more deeply about Logistics management as below,
- ✓ "Logistics Management deals with **efficient** and **effective** management of day-to-day activity in producing the company" s finished goods and services" - from Integral Logistics Management by Paul Schönsleben.

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4. What is the Difference between Inbound and Outbound Logistics?

- ✓ Another interesting (but less common) term is inbound and outbound logistics. Let's find out its meaning as below,
- ✓ "**Inbound Logistics** refers to movement of goods and raw materials from suppliers to your company. In contrast, **Outbound Logistics** refers to movement of finished goods from your company to customers"
- ✓ Purchasing and warehouse function communicates with suppliers and sometimes called "**supplier facing function**". Production planning and inventory control function is the center point. Customer service and transport function communicates with customers and sometimes called "**customer facing function**".

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5. What is Transport and Logistics?

- ✓ The term transport and logistics is broadly used to refer to one type of industry classification as below,
- ✓ "Transport and Logistics refers to 2 types of activities, namely, **transportation** (traditional services such as air/sea/land transportation, warehousing, customs clearance) and **Logistics** (value-added services which including information technology and consulting)"

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6. What is International Logistics and Global Logistics?

- ✓ **International Logistics, Global Logistics and Global Supply Chain** is one of the most ambiguous group of terms out there. They are used interchangeably and often referred to international production and transportation activities. However, more concise definition of international logistics or global logistics is as below,
- ✓ "**International Logistics** (also known as **Global Logistics**) focuses on how to manage and control overseas activities effectively as a single business unit. Therefore, company should try to harness the value of overseas product, services, marketing, R&D and turn them into **competitive advantage**".

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7. What is 3PL or Third Party Logistics?

- ✓ The concept of **Third Party Logistics** or **3PL** appeared on the scene in 1980s as the way to reduce costs and improve services which can be defined as below,
- ✓ "**3PL or Third Party Logistics** refers to the outsourcing of logistics activities, ranging from a specific task such as trucking or marine cargo transport to broader activities serving the whole supply chain such as inventory management, order processing and consulting."
- ✓ In the past, many 3PL providers didn't have adequate expertise to operate in complex Supply chain structure and process. The result was the inception of another concept.

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8. What is 4PL or Fourth Party Logistics?

- ✓ **Fourth Party Logistics** or **4PL** is the concept proposed by Accenture Ltd in 1996 and it was defined as below,
- ✓ "**4PL or Fourth Party Logistics** refers to a party who works on behalf of client to do contract negotiations and management of performance of 3PL providers including the design of the whole Supply chain network and control of day-to-day operations."
- ✓ You may wonder if a 4PL provider is really needed. According to the research by Nezar Al-Mugren from the University of Wisconsin-Stout, top 3 reasons why customers would like to use 4PL providers are as below,
 - **Lack of technology** to integrate supply chain process,
 - **The increase** in operating complexities,
 - **The sharp increase** in global business operations.

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9. What is Supply Chain?

- ✓ We know for the fact that **Supply chain** refers to "network" but let's have a closer look at it as below,
- ✓ "**Supply Chain** is the **network** of organisations that are involved, through upstream and downstream linkages, in the different processes and activities that **produce value** in the form of products and services in the hands of the ultimate consumer" - from Logistics and Supply Chain Management by Martin Christopher.

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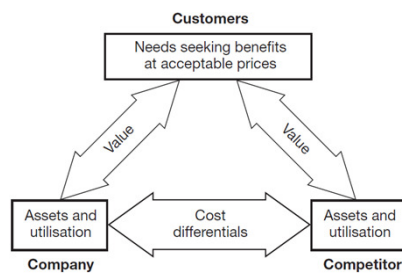
10. What is Supply Chain Management?

- ✓ Each researcher defines **Supply chain management** differently. However, we would like to provide the simple supply chain management definition as below,
- ✓ "**Supply chain management** (SCM) refers to the coordination of production, inventory, location, and transportation among the participants in a **Supply chain** to achieve the best mix of responsiveness and efficiency for the market being served" - from Essential of Supply Chain Management by Michael Hugos.

1. Logistics, the Supply Chain and Competitive Strategy

- **Competitive advantage:**
 - ✓ A central theme of this part of lecture is that effective logistics and supply chain management can provide a major source of competitive advantage,
 - ✓ In other words a position of enduring superiority over competitors in terms of customer preference may be achieved through better management of logistics and the supply chain,
 - ✓ The foundations for success in the marketplace are numerous, but a simple model is based around the triangular linkage of the company, its customers and its competitors – the 'Three Cs'. **Figure 1** illustrates the three-way relationship.

Figure 1 Competitive advantage, the 'Three Cs'



1. Logistics, the Supply Chain and Competitive Strategy

- **Competitive advantage:**
 - ✓ The source of competitive advantage is found **firstly** in the ability of the organisation to differentiate itself, in the eyes of the customer, from its competition, and **secondly** by operating at a lower cost and hence at greater profit,
 - ✓ Seeking a sustainable and defensible competitive advantage has become the concern of every manager who is alert to the realities of the marketplace,
 - ✓ It is no longer acceptable to assume that good products will sell themselves, neither is it advisable to imagine that success today will carry forward into tomorrow.

1. Logistics, the Supply Chain and Competitive Strategy

- **Competitive advantage:**
 - ✓ Let us consider the bases of success in any competitive context,
 - ✓ At its most elemental, commercial success derives from either a cost advantage or a value advantage or, ideally, both,
 - ✓ It is as simple as that – the most profitable competitor in any industry sector tends to be the lowest-cost producer or the supplier providing a product with the greatest perceived differentiated values.

1. Logistics, the Supply Chain and Competitive Strategy

- **Competitive advantage:**
 - ✓ Put very simply, successful companies either have a cost advantage or they have a value advantage, or – even better – a combination of the two.
 - ✓ Cost advantage gives a lower cost profile and the value advantage gives the product or offering a differential 'plus' over competitive offerings,
 - ✓ Let us briefly examine these two vectors of strategic direction.

1. Logistics, the Supply Chain and Competitive Strategy

1. Cost advantage:

- ✓ In many industries there will typically be one competitor who will be the low-cost producer and often that competitor will have the greatest sales volume in the sector,
- ✓ There is substantial evidence to suggest that 'big is beautiful' when it comes to cost advantage,
- ✓ This is partly due to economies of scale, which enable fixed costs to be spread over a greater volume, but more particularly to the impact of the 'experience curve',
- ✓ The experience curve is a phenomenon with its roots in the earlier notion of the 'learning curve'.

1. Logistics, the Supply Chain and Competitive Strategy

1. Cost advantage:

- ✓ However, the blind pursuit of economies of scale through volume increases may not always lead to improved profitability – the reason being that in today's world much of the cost of a product lies outside the four walls of the business in the wider supply chain.
- ✓ Hence it can be argued that it is increasingly through better logistics and supply chain management that efficiency and productivity can be achieved leading to significantly reduced unit costs,
- ✓ Logistics and supply chain management can provide a multitude of ways to increase efficiency and productivity and hence contribute significantly to reduced unit costs.

1. Logistics, the Supply Chain and Competitive Strategy

2. Value advantage:

- ✓ It has long been an axiom in marketing that 'customers don't buy products, they buy benefits',
- ✓ Put another way, the product is purchased not for itself but for the promise of what it will 'deliver',
- ✓ These benefits may be intangible, i.e. they relate not to specific product features but rather to such things as image or service,
- ✓ In addition, the delivered offering may be seen to outperform its rivals in some functional aspect.

1. Logistics, the Supply Chain and Competitive Strategy

2. Value advantage:

- ✓ Unless the product or service we offer can be distinguished in some way from its competitors there is a strong likelihood that the marketplace will view it as a 'commodity' and so the sale will tend to go to the cheapest supplier,
- ✓ Hence the importance of seeking to add additional values to our offering to mark it out from the competition,
- ✓ What are the means by which such value differentiation may be gained?

1. Logistics, the Supply Chain and Competitive Strategy

2. Value advantage:

- ✓ Essentially the development of a strategy based upon added values will normally require a more segmented approach to the market,
- ✓ When a company scrutinises markets closely it frequently finds that there are distinct 'value segments',
- ✓ In other words, different groups of customers within the total market attach different importance to different benefits,
- ✓ The importance of such benefit segmentation lies in the fact that often there are substantial opportunities for creating differentiated appeals for specific segments.

1. Logistics, the Supply Chain and Competitive Strategy

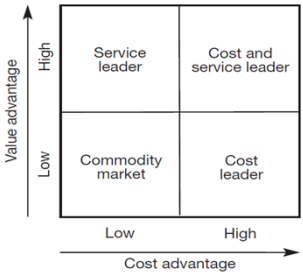
2. Value advantage:

- ✓ Equally powerful as a means of adding value is service. Increasingly it is the case that markets are becoming more service-sensitive and this of course poses particular challenges for logistics management,
- ✓ There is a trend in many markets towards a decline in the strength of the 'brand' and a consequent move towards 'commodity' market status,
- ✓ Additionally, there is increasingly a convergence of technology within product categories, which means that it is often no longer possible to compete effectively on the basis of product differences,
- ✓ Thus the need to seek differentiation through means other than technology, many companies have responded to this by focusing upon service as a means of gaining a competitive edge.

1. Logistics, the Supply Chain and Competitive Strategy

- **Seeking the high ground:**
 - ✓ In practice what we find is that the successful companies will often seek to achieve a position based upon both a cost advantage and a value advantage,
 - ✓ A useful way of examining the available options is to present them as a simple matrix (**Figure 2**),
 - ✓ Let us consider these options in turn.

Figure 2 Logistics and competitive advantage



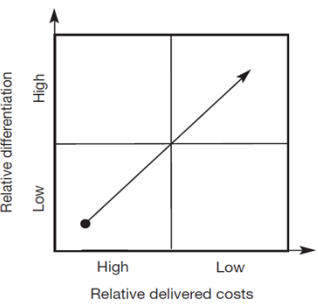
1. Logistics, the Supply Chain and Competitive Strategy

- **Seeking the high ground:**
 - ✓ However, an increasingly powerful route to achieving a cost advantage comes not necessarily through volume and the economies of scale but instead through logistics and supply chain management,
 - ✓ In many industries, logistics costs represent such a significant proportion of total costs that it is possible to make major cost reductions through fundamentally re-engineering logistics processes,
 - ✓ The other way out of the 'commodity' quadrant of the matrix is to seek a strategy of differentiation through service excellence.

1. Logistics, the Supply Chain and Competitive Strategy

- **Seeking the high ground:**
 - ✓ Customers in all industries are seeking greater responsiveness and reliability from suppliers; they are looking for reduced lead times, just-in-time delivery and value-added services that enable them to do a better job of serving their customers,
 - ✓ **Figure 3** clearly presents the challenge: it is to seek out strategies that will take the business away from the 'commodity' end of the market towards a securer position of strength based upon differentiation and cost advantage.

Figure 3 The challenge to Logistics and Supply chain management



1. Logistics, the Supply Chain and Competitive Strategy

- **Seeking the high ground:**
 - ✓ One thing is certain: there is no middle ground between cost leadership and service excellence,
 - ✓ Indeed the challenge to management is to identify appropriate logistics and supply chain strategies to take the organisation to the top right-hand corner of the matrix,
 - ✓ Companies who occupy that position have offers that are distinctive in the value they deliver and are also cost competitive,
 - ✓ Clearly it is a position of some strength, occupying 'high ground' that is extremely difficult for competitors to attack.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Marketing and Logistics Interface:

- ✓ Even though the textbooks describe marketing as the management of the 'Four Ps' – product, price, promotion and place – it is probably true to say that, in practice, most of the emphasis has always been placed on the first three,
- ✓ 'Place', which might better be described in the words of the old cliché, 'the right product in the right place at the right time', was rarely considered part of mainstream marketing,
- ✓ There are signs that this view is rapidly changing, however, as the power of customer service as a potential means of differentiation is increasingly recognised.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Marketing and Logistics Interface:

- ✓ In more and more markets the power of the brand has declined and customers are more willing to accept substitutes,
- ✓ Even technology differences between products have been reduced so that it is harder to maintain a competitive edge through the product itself,
- ✓ In situations like this it is customer service that can provide the distinctive difference between one company's offer and that of its competitors.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Marketing and Logistics Interface:

- ✓ Two factors have perhaps contributed more than anything else to the growing importance of customer service as a competitive weapon.
- ✓ One is the continual increase in customer expectations; in almost every market the customer is now more demanding, more 'sophisticated' than he or she was, say, 30 years ago.
- ✓ Likewise, in industrial purchasing situations we find that buyers expect higher levels of service from vendors, particularly as more companies convert to just-in time logistics systems.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Marketing and Logistics Interface:

- ✓ The second factor is the slow but inexorable transition towards 'commodity' type markets,
- ✓ By this is meant that increasingly the power of the 'brand' is diminishing as the technologies of competing products converge, thus making product differences difficult to perceive – at least to the average buyer,
- ✓ Faced with a situation such as this the customer may be influenced by price or by 'image' perceptions but overriding these aspects may well be 'availability' in other words, is the product in stock, can I have it now?

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Marketing and Logistics Interface:

- ✓ Since availability is clearly an aspect of customer service, we are in effect saying that the power of customer service is paramount in a situation such as this,
- ✓ This trend towards the *service-sensitive* customer is as apparent in industrial markets as it is in consumer markets,
- ✓ Hence companies supplying the car industry, for example, must be capable of providing just-in-time deliveries direct to the assembly line,
- ✓ Similarly a food manufacturer supplying a large supermarket chain must have an equivalent logistics capability, enabling it to keep the retail shelf filled whilst minimising the amount of inventory in the system.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Marketing and Logistics Interface:

- ✓ The evidence from across a range of markets suggests that the critical determinant of whether orders are won or lost, and hence the basis for becoming a preferred supplier, is customer service,
- ✓ Time has become a far more critical element in the competitive process,
- ✓ Customers in every market want ever shorter lead times; product availability will overcome brand or supplier loyalty - meaning that if the customer's preferred brand is not available and a substitute is, then the likelihood is a lost sale.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Delivering customer value:

- ✓ Ultimately the success or failure of any business will be determined by the level of customer value that it delivers in its chosen markets.
- ✓ Customer value can be defined quite simply as the difference between the perceived benefits that flow from a purchase or a relationship and the total costs incurred.
- ✓ Another way of expressing the idea is:

$$\text{Customer value} = \frac{\text{Perceptions of benefits}}{\text{Total cost of ownership}}$$

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Delivering customer value:

- ✓ Total cost of ownership' rather than 'price' is used here because in most transactions there will be costs other than the purchase price involved,
- ✓ For example inventory carrying costs, maintenance costs, running costs, disposal costs and so on,
- ✓ In business-to-business markets particularly, as buyers become increasingly sophisticated, the total costs of ownership can be a critical element in the purchase decision,
- ✓ 'Life-cycle costs', as they are referred to in the military and defence industries, have long been a critical issue in procurement decisions in those markets.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Delivering customer value:

- ✓ One way to define 'competitive advantage' is simply that the successful companies will generally be those that deliver more customer value than their competitors,
- ✓ In other words, their ratio of benefits to costs is superior to other players in that market or segment,
- ✓ Logistics management is almost unique in its ability to impact both the numerator and the denominator of the customer value ratio.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Delivering customer value:

- ✓ This point becomes clearer if we expand the ratio as follows:

$$\text{Customer value} = \frac{\text{Quality} \times \text{Service}}{\text{Cost} \times \text{Time}}$$

- ✓ Each of the four constituent elements can briefly be defined as follows:
 - **Quality:** The functionality, performance and technical specification of the offer.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Delivering customer value:

- **Service:** The availability, support and commitment provided to the customer
- **Cost:** The customer's transaction costs including price and life cycle costs
- **Time:** The time taken to respond to customer requirements, e.g. delivery lead times.
- ✓ Each of these four elements requires a continuous programme of improvement, innovation and investment to ensure continued competitive advantage.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Customer service:

- ✓ It has been suggested that the role of customer service is to provide 'time and place utility' in the transfer of goods and services between buyer and seller,
- ✓ Put another way, there is no value in the product or service until it is in the hands of the customer or consumer,
- ✓ It follows that making the product or service 'available' is what, in essence, the distribution function of the business is all about
- ✓ 'Availability' is in itself a complex concept, impacted upon by a galaxy of factors which together constitute customer service.

2. Logistics and Customer Value, the Marketing and Logistics Interface

- **Customer service:**
 - ✓ These factors might include delivery frequency and reliability, stock levels and order cycle time, for example,
 - ✓ Indeed it could be said that ultimately customer service is determined by the interaction of all those factors that affect the process of making products and services available to the buyer,
 - ✓ In practice, we see that many companies have varying views of customer,
 - ✓ LaLonde and Zinszer² in a major study of customer service practices suggested that customer service could be examined under three headings:

2. Logistics and Customer Value, the Marketing and Logistics Interface

- **Customer service:**
 - ✓ LaLonde and Zinszer in a major study of customer service practices suggested that customer service could be examined under three headings:
 - **Pre-transaction elements**
 - **Transaction elements**
 - **Post-transaction elements**
 - ✓ The pre-transaction elements of customer service relate to corporate policies or programmes, e.g. written statements of service policy, adequacy of organisational structure and system flexibility.

2. Logistics and Customer Value, the Marketing and Logistics Interface

- **Customer service:**
 - ✓ The transaction elements are those customer service variables directly involved in performing the physical distribution function, e.g. product and delivery reliability,
 - ✓ The post-transaction elements of customer service are generally supportive of the product while in use, for instance, product warranty, parts and repair service, procedures for customer complaints and product replacement,
 - ✓ **Table 1** indicates some of the many elements of customer service under these three headings.

2. Logistics and Customer Value, the Marketing and Logistics Interface

Table 1 The components of customer service

Pre-transaction elements

For example:

- *Written customer service policy*
(Is it communicated internally and externally? Is it understood? Is it specific and quantified where possible?)
- *Accessibility*
(Are we easy to contact/do business with? Is there a single point of contact?)
- *Organisation structure*
(Is there a customer service management structure in place? What level of control do they have over their service process?)
- *System flexibility*
(Can we adapt our service delivery systems to meet particular customer needs?)

2. Logistics and Customer Value, the Marketing and Logistics Interface

Transaction elements

For example:

- *Order cycle time*
(What is the elapsed time from order to delivery? What is the reliability/variation?)
- *Inventory availability*
(What percentage of demand for each item can be met from stock?)
- *Order fill rate*
(What proportion of orders are completely filled within the stated lead time?)
- *Order status information*
(How long does it take us to respond to a query with the required information? Do we inform the customer of problems or do they contact us?)

2. Logistics and Customer Value, the Marketing and Logistics Interface

Post-transaction elements

For example:

- *Availability of spares*
(What are the in-stock levels of service parts?)
- *Call-out time*
(How long does it take for the engineer to arrive and what is the 'first call fix rate'?)
- *Product tracing/warranty*
(Can we identify the location of individual products once purchased? Can we maintain/extend the warranty to customers' expected levels?)
- *Customer complaints, claims, etc.*
(How promptly do we deal with complaints and returns? Do we measure customer satisfaction with our response?)

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Customer service:

- ✓ In any particular product/market situation, some of these elements will be more important than others and there may be factors other than those listed above which have a significance in a specific market,
- ✓ Indeed the argument that will be developed later is that it is essential to understand customer service in terms of the differing requirements of different market segments and that no universally appropriate list of elements exists,
- ✓ Each market that the company services will attach different importance to different service elements.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Customer service:

- ✓ It is because of the multivariate nature of customer service and because of the widely differing requirements of specific markets that it is essential for any business to have a clearly identified policy towards customer service,
- ✓ It is surprising perhaps that so few companies have defined policies on customer service, let alone an organisation flexible enough to manage and control that service, when it is considered that service can be the most important element in the company's marketing mix.

2. Logistics and Customer Value, the Marketing and Logistics Interface

• Customer service:

- ✓ A considerable body of evidence exists that supports the view that if the product or service is not available at the time the customer requires it and a close substitute is available then the sale will be lost to the competition,
- ✓ Even in markets where brand loyalty is strong a stock-out might be sufficient to trigger brand switching,
- ✓ It is because of the multivariate nature of customer service and because of the widely differing requirements of specific markets that it is essential for any business to have a clearly identified policy towards customer service.

3. The Supply Chain in Globalization Context, Trends towards Globalization

• Trends towards Globalization:

- ✓ Global brands and companies now dominate most markets,
- ✓ Over the last two decades there has been a steady trend towards the worldwide marketing of products under a common brand umbrella (e. g. Coca-Cola, IBM or Toyota),
- ✓ At the same time the global company has revised its previously localised focus, manufacturing and marketing its products in individual countries,
- ✓ Now instead will typically source on a worldwide basis for global production and distribution.

3. The Supply Chain in Globalization Context, Trends towards Globalization

• Trends towards Globalization:

- ✓ The logic of the global company is clear: it seeks to grow its business by extending its markets whilst at the same time seeking cost reduction through scale economies in purchasing and production and through focused manufacturing and/or assembly operations,
- ✓ However, whilst the logic of globalisation is strong, we must recognise that it also presents certain challenges:
 - Firstly, world markets are not homogeneous, there is still a requirement for local variation in many product categories,
 - Secondly, unless there is a high level of co-ordination the complex logistics of managing global supply chains may result in higher costs and extended lead times.

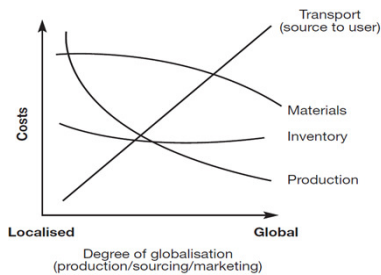
3. The Supply Chain in Globalization Context, Trends towards Globalization

• Trends towards Globalization:

- ✓ These two challenges are related:
 - on the one hand, how to offer local markets the variety they seek whilst still gaining the advantage of standardised global production and,
 - on the other, how to manage the links in the global chain from sources of supply through to end user,
- ✓ There is a danger that some global companies in their search for cost advantage may take too narrow a view of cost and only see the purchasing or manufacturing cost reduction that may be achieved through using low-cost supply sources,
- ✓ In reality it is a total cost trade-off where the costs of longer supply pipelines may outweigh the production cost saving (Figure 4).

3. The Supply Chain in Globalization Context, Trends towards Globalization

Figure 4 Trade-offs in global logistics



3. The Supply Chain in Globalization Context, Trends towards Globalization

• Trends towards Globalization:

- ✓ The trend towards global organisation of both manufacturing and marketing is highlighting the critical importance of logistics and supply chain management as the keys to profitability,
- ✓ The complexity of the logistics task appears to be increasing exponentially, influenced by such factors as the increasing range of products, shorter product life cycles, marketplace growth and the number of supply/market channels.

3. The Supply Chain in Globalization Context, Trends towards Globalization

• International Aspects of Business Logistics

- ✓ It is expected that the source of competitive advantage in the 21st century will be training and skills of workers. Other challenges lie ahead logistics strategies and supply of businesses.
- ✓ The growth of interest of corporate management of logistics: the rising cost of logistics, the opportunity to use logistics as a means of competition, the increasing demands of customers and end-effects logistic to operational costs, the margins and the return on assets (the key elements increasing the productivity of capital).

3. The Supply Chain in Globalization Context, Trends towards Globalization

• Global issues:

- ✓ Contemporary society is developing so dynamic and often unpredictable ways to categorize global problems causing considerable difficulties,
- ✓ Global issues are an integral part of economic development and growth of the company itself,
- ✓ The primary task of the company should therefore be to create an arrangement that would be the process of globalization in harmony,

3. The Supply Chain in Globalization Context, Trends towards Globalization

• Global issues:

- ✓ Any problem that can be called Global has two levels - economic and non-economic,
- ✓ By the most part those problems prevailing economic plane above the non-economical, where notably the military aspects, administrative, ideological, ecological and health,
- ✓ In view of the above it is to be clearly and precisely define what actually the problem is global and what is not.

3. The Supply Chain in Globalization Context, Trends towards Globalization

• Entrance on international Markets:

- ✓ Systematized the general factors that affect international businesses entering global markets, can be classified as follows:
 - Market potential,
 - Geographical diversification,
 - Excess production capacity and low cost advantage as a result of achieving economies of scale and effects of experiential curve,
 - Generating growth in foreign markets through products on the domestic market, approaching the end of its life cycle,
 - Sources of new products and ideas,
 - Foreign competitors in the domestic market.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Process management with business input to another country:**
 - ✓ Framework as recommendations in answer to the question may be mentioned:
 - Start from the broadest possible perspective,
 - Select the right product,
 - Select the appropriate resources,
 - Propose Supply chain,
 - Make a model to be evaluated,
 - Take a final decision.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Proposal global Supply chain:**
 - ✓ The experiences from practice worldwide deployment of production capacities, presented consulting offices in this area can be divided into **six steps** and within specified recommendations for decision-making.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Step 1: General view of the problem in all respects:**
 - ✓ Consider whether a new Supply chain cost reduction shall not exceed the cost of production and not destroy the level of customer service in the domestic market,
 - ✓ To define strategic goals and to decide whether low-cost production is indeed a key objective or only short-term means,
 - ✓ Define the risks arising from the fact that the company will outsource the work, which was considered to be the main,
 - ✓ Evaluate the impact of the current and potential customers,
 - ✓ Address the guarantee for achieving superior quality in a spatially remote enterprise.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Step 2: Choosing the right product:**
 - ✓ **In terms of demand for the product:**
 - Come into consideration products whose price is the key factor,
 - For products with highly variable demand, it is necessary to count on a high level of stocks; inventory costs, including the cost of storage can easily exceed the cost of individual savings in production,
 - ✓ **In terms of product life cycle:**
 - Suitable products at the stage of maturity, it means with readily predictable demand for which it is important to reduce costs,
 - ✓ **From the labour costs and material costs point of view to give preference to products with a high share of the work:**
 - If the proportion of labour costs is less than 20% of the product value, then increase the cost of the Supply chain absorb the savings achieved.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Step 2: Choosing the right product:**
 - ✓ **In view of the strong points of supply and demand:**
 - Consideration should be given, for example, whether there are unique sources of dominance or customer demand,
 - Final assembly and product individualization is conveniently carried out as close as possible to customers,
 - ✓ **In terms of production variability:**
 - Suitable products are composed of a small number of different components with simple and quick installation and with high added value.
 - ✓ **In terms of distribution of production capacities:**
 - The best solution is usually the only moving part of the production volume of the types of products and retention of capacity in situ to cover urgent requirements of specific customers.

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- **Step 3: Select the appropriate source:**
 - ✓ An important consideration when choosing a country is not only the height of wage rates, but also the level of logistics infrastructure. It is considered necessary in the long term and not only in the medium term,
 - ✓ Should be analysed convenience of operating their own capacity or outsourcing capacity operating of own capacities. Operating its own capacities is a long-term commitment and substantial investment, but it is likely to bring lower unit costs and good protection technology - but only if is found effective local management team,
 - ✓ It is necessary to find such suppliers, the delivery of which will give the trust and in quality, timeliness and continuity, because it is not easy to quickly solve problems arising from long distance.

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- **Step 4: Design the Supply chain:**
 - ✓ **In terms of the equipment:**
 - It is important to pre-allocate the right equipment in the logistics chains, including production facilities, and avoid the problem of inadequacy and additional rationalization costs,
 - ✓ **In terms of establishing a communication must answer questions:**
 - How will the extended Supply chain driven,
 - As the enterprise's information system will deal with extended chain and how to handle ties with the suppliers, as will be provided an overview of the processes in the chain, unless it can be direct physical inspection of each workplace,
 - How are suppliers adjust to pull principle.

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- **Step 4: Design the Supply chain:**
 - ✓ **In terms of planning and scheduling:**
 - It should come from the required customer service levels and considers that the planning of supply with 100 percent confidence would require a huge inventory,
 - It is necessary to calculate the variability of demand, with possible delivery times and the order quantity,
 - ✓ **In terms of logistics:**
 - It is essential to tackle local transport, storage, import and export, either by their own or through a competitive logistics provider.

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- **Step 5: Model evaluation results:**
 - ✓ **Supply chain model should include:**
 - Model stock levels, delivery times, and the corresponding parameters customer service levels,
 - Model financial implications of the extended supply chain, encompassing design unit costs savings,
 - Conclusion of costs in production, the additional costs of operations, key indicators of time for which cumulative revenues exceed cumulative costs, which among other things allows you to test the sensitivity of rated power to change the input,
 - The Supply chain must be understood and studied as a whole by "suppliers of our suppliers" to "customers of our customers."

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- **Step 6: The final decision:**
 - ✓ **It should be choosing between options:**
 - Adopt the draft documented the likely financial effect,
 - Adopt the draft as a way to reduce costs and increase turnover, but conditionally change in approach to the possible shifting of other product groups, respectively operations than as initially identified,
 - Dismissal due to the additional costs and risks of customer service, which outweighed the cost effects - which means focusing on improving the existing system.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **The future of Logistics management – megatrends:**
 - ✓ The literature on the future of logistics is rich with some publications while not appreciate the impact of the crisis on the world economy, so it is quite difficult from them to formulate realistic conclusions from the current perspective,
 - ✓ After analysing expert estimates, surveys and other sources we can classify base megatrends development of logistics management in the future in five areas.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Trends in Strategies:**
 - ✓ In addition to changes in priority objectives, we expect a change in the position of logistics in the company structure,
 - ✓ The importance of logistics is not only reflected in a separate organizational unit of logistics in business but also in its growing share in the creation of strategy and planning,
 - ✓ The future of business lies in identifying opportunities for logistics solutions and their use as a competitive advantage for marketing support.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Trends in costs:**

- ✓ As is evident from various surveys is the most sensitive cost item in the company strategy,
- ✓ The future plans are also expected further development of lean logistics and just-in-time associated with outsourcing services,
- ✓ For a better understanding of logistics costs and management transition is recommended for application methods Activity-Based Costing (ABC), which is used to capture costs by logistics activities and their use in their management within the concept of Activity-Based Management (ABM).

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Trends in cooperation of Companies:**

- ✓ Another megatrend is the consolidation of markets in sectors with high capital intensity. This will also include logistics and warehousing,
- ✓ It is expected that the wave of mergers and acquisitions an emerging since the beginning of the new millennium will continue in the future. In this way, achieved concentrations of the market can indeed provide a cost savings, but it also carries the risk of oligopolistic markets,
- ✓ Big companies will become even more a small business usually do not survive in the competition.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Trends in cooperation of Companies:**

- ✓ Medium-sized companies must specialize and find new market space,
- ✓ In the future, may be such segments as the sector reverse logistics, spare parts logistics, storage and packaging, or financial services in logistics,
- ✓ Development of cooperation within the Supply chains necessitates a uniform system for communication among participants,
- ✓ The need for standardization on a national, European and global level is an important issue and challenge the near future.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Technology trends:**

- ✓ Technologies enable the logistics industry to create significant added value,
- ✓ Advances in information technology and the spread of the Internet have opened up opportunities to link individual information networks,
- ✓ Data centres in the world are able to record, process, store, and at the request of an authorized person to view the information anywhere,
- ✓ Further development of new technology: JIT, QR, ECR, EDI, Cross-docking, RFID etc.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Trends in Environmental Protection:**

- ✓ Logistics should be so from that aspect to focus on the following areas:
 - Green logistics - optimizing processes with respect to their environmental footprint, life cycle analysis of products, support reusable resources (plastic pallets, crates instead of cardboard),
 - Externalities from transport - air pollution, greenhouse gas emissions, congestion, destruction of existing infrastructure, construction of roads going in farmland,
 - Disposal of hazardous materials and separation of recyclable waste.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Trends in Environmental Protection:**

- ✓ In the production of at least promote energy-consuming products produced by recycling materials,
- ✓ Documenting the environmental impact of material resources and processes (few companies no certificate from their suppliers),
- ✓ Type of packaging materials and technologies must face more stringent requirements for multiple usability and recyclability,
- ✓ Support for multimodal solutions, support the transport modes with lower external costs (rail, river transport) - congestion main directions and traffic jams in cities.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Megatrends – summary:**
 - ✓ Logistics is characterized by secondary demand, which means that the customer must be satisfied both with the subject of primary demand, which becomes the basis for the competitiveness of the 21st century, while the qualitative characteristics of logistics performance,
 - ✓ Modern thinking process induced the need to manage the entire production process to delivery,
 - ✓ And thus began the supply chains, whose ultimate goal is to optimize processes through integration of their own individual systems into one unit in order to achieve mutually beneficial synergistic effect, which may take the form of cost reduction, risk reduction, reducing the time or elimination of certain practices.

3. The Supply Chain in Globalization Context, Trends towards Globalization

- **Megatrends – summary:**
 - ✓ The current globalization trends with revolution technology solutions open up unprecedented opportunities for cooperation,
 - ✓ Interconnectedness while it also brings the risk of failure of cooperation must therefore be found in a competitive environment healthy balance between cost optimization and quality production,
 - ✓ Those conclusions correspond with the indicated critical megatrends logistics management and respect can be beneficial for the company.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **The triple bottom line:**
 - ✓ Perhaps one of the biggest issues to rise to prominence across every aspect of business and society in the opening years of the twenty-first century has been ‘sustainability’,
 - ✓ The growing concern with the environment, in particular the possibility of climate change through global warming, has led to a focus on how human and economic activity has the potential to adversely impact the long-term sustainability of the planet.

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- **The triple bottom line:**
 - ✓ The definition of sustainability that is most widely used originates from the United Nations Brundtland Commission, which reported in 1987,
 - ✓ Sustainability, the Commission suggested, was about: *meeting the needs of the present without compromising the ability of future generations to meet their own needs,*
 - ✓ This definition can be further augmented by adopting the parallel idea of the ‘triple bottom line’,
 - ✓ The triple bottom line concept emphasises the importance of examining the impact of business decisions on three key arenas:

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- **The triple bottom line:**
 - ✓ *Environment* (e.g. pollution; climate change; the depletion of scarce resources, etc.),
 - ✓ *Economy* (e.g. effect on people’s livelihoods and financial security; profitability of the business, etc.),
 - ✓ *Society* (e.g. poverty reduction; improvement of working and living conditions, etc.),
 - ✓ These three elements – the 3Ps of people, profit and planet – are inevitably intertwined and they serve to remind us that for a business to be truly sustainable, it must pay regard to the wider impact of the activities it undertakes if it seeks to remain viable and profitable (Figure 5).

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

Figure 5 The triple bottom line: planet, people, profit

Environmental (planet)	Social (people)	Economic (profit)
<ul style="list-style-type: none"> • Climate change • Energy use • Water • Biodiversity • Chemicals, toxins • Air pollution • Water management • Ozone depletion • Oceans and fish stock 	<ul style="list-style-type: none"> • Human rights • Education • Labour standards • Access to products and services • Health • Community impact • Diversity 	<ul style="list-style-type: none"> • GDP • Return on investment • Tax • Corruption • Poverty alleviation • Employment and wages • Corporate ethic

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- **The triple bottom line:**
 - ✓ In the context of supply chains we can build on the triple bottom line philosophy to encompass the wider idea that sustainability is concerned with ensuring the longterm viability and continuity of the business as well as contributing to the future well-being of society,
 - ✓ Indeed, it can be argued that these two goals are mutually supportive, i.e. supply chain strategies that benefit the wider environment are likely also to involve the business in less cost in the long term as the result of a better use of resources.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Reducing the transport-intensity of supply chains:**
 - ✓ As global economic growth continues, so too does international trade increase and hence transport,
 - ✓ The continued upward trend in global sourcing has inevitably led to products travelling greater distances,
 - ✓ The end result is an increase in what might be termed the *transport-intensity* of the supply chain,
 - ✓ Transport intensity can be measured in a number of ways, but at its simplest it is a reflection of the miles/kilometres travelled per unit of product shipped.

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- **Reducing the transport-intensity of supply chains:**
 - ✓ Since the transport of raw material and finished goods globally is estimated to consume 15 million barrels of oil each day – almost one fifth of the world's daily production⁶ – there is clearly a correlation between transport intensity and a supply chain's carbon footprint,
 - ✓ Not only is there an economic benefit to be gained by improving transport intensity but also a potential positive environmental impact – this is the concept of *eco-efficiency* which is now rapidly becoming a major issue in global commerce.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Reducing the transport-intensity of supply chains:**
 - ✓ What practical steps can organisations take to improve the transport-intensity of their supply chains?
 - **review product design and bill of materials**
Product design can impact transport-intensity through the physical characteristics of the product, its density, the choice of materials (including packaging materials), the ease of recycling, reuse and end-of-life disposal.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Reducing the transport-intensity of supply chains:**
 - **review sourcing strategy**
As we have previously noted, many sourcing decisions have led to a migration to low-cost country locations. This often has led to products being moved greater distances. Global sourcing decisions will increasingly need to factor the carbon footprint into the total cost of ownership.
 - **review transport options**
Clearly different transport modes have different impacts on carbon and other emissions. The design of vehicles and vessels is also increasingly influenced by the need to improve fuel efficiency. There are also arguments for increasing the size of vehicle or the vessel to achieve lower transport intensity per unit.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Reducing the transport-intensity of supply chains:**
 - **Improve transport utilisation**
Research has highlighted that vehicle capacity is often poorly utilised.
It is suggested that empty running because of the lack of return loads means that up to a third of the trucks on the roads of Europe are running empty.
More use of shared distribution, better vehicle routing and scheduling, and better loading can also dramatically improve transport-intensity.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Reducing the transport-intensity of supply chains:**

- *Use postponement strategies*

If standard, generic products can be shipped in bulk from their point of origin and then assembled, customised or configured for local requirements nearer the point of use, there may be an opportunity to reduce overall transport-intensity.

A further incentive to reduce the transport-intensity arises from the continued upward pressure on oil-based fuel costs, which will only intensify as oil reserves become depleted.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Reduce, reuse, recycle:**

- ✓ The 3Rs of sustainable supply chain management – reduce, reuse and recycle are now starting to receive much more attention in most companies today,

- ✓ There is a growing realisation that not only is a strategy focused on improving the environmental impact of economic activity good for all who live on this planet, but because such strategies consume fewer resources the overall profitability of the business should also improve.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Reduce, reuse, recycle:**

- ✓ many companies are now actively seeking to create marketing strategies that emphasise the 'greenness' of their supply chains,

- ✓ Whilst the more cynical observers may dismiss these moves as opportunism – what some have dubbed 'greenwash' – there can be no question that customers and consumers in markets around the world are starting to demand that suppliers reduce their various footprints.

- ✓ Strong evidence is emerging that consumers are increasingly basing their purchasing on ethical and environmental criteria.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Reduce, reuse, recycle:**

- ✓ Further pressure on businesses to reduce their environmental footprints is coming from government regulation, often in the form of Emission Trading Schemes (ETS) or so-called 'Cap and Trade' legislation,

- ✓ For example, the European Union's Emissions Trading Scheme has recently been extended to cover a greater range of industries and is based on the principle that companies have a basic allowance for carbon emissions – if they go beyond that level they have to buy additional allowance from other companies who do not fully use their own allowance,

- ✓ Similar schemes are currently contemplated by governments around the world and in time their impact is likely to be significant.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Reduce, reuse, recycle:**

- ✓ Since, as we have noted, most of a typical business's total environmental footprint lies in its wider supply chain, particularly upstream of its own operations, the need for supply chain managers to become more involved in managing this footprint becomes apparent,

- ✓ Unless upstream suppliers are able to reduce their own footprint the additional costs that they will incur will inevitably end up in their cost of goods sold – and ultimately in the price of the products in the final marketplace.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **The impact of congestion:**

- ✓ One of the key issues when considering sustainable supply chain solutions is traffic congestion and the related infrastructure issues,

- ✓ In probably the majority of countries, developed and developing, the creation of logistics infrastructure has not kept pace with the level of economic activity,

- ✓ This is true for all types of infrastructure including roads, ports and railways,

- ✓ Gridlock on motorways, container vessels waiting to unload at ports and bottlenecks on the railways are common occurrences in many countries and add to carbon emissions as well as adding cost to suppliers and customers alike.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **The impact of congestion:**
 - ✓ There have been a number of causes of this problem, including increased global trade, lack of investment in capacity and the widespread adoption of just-in-time practices:
 - *increased global trade:*
With the growth in offshore manufacturing and the emergence of new markets alongside the removal of trade barriers, the flow of products across borders has increased dramatically.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **The impact of congestion:**
 - At the same time the size of many container vessels has increased significantly – the new generation of container ships can carry upwards of 10,000 TEUs (20 foot equivalent), which if laid end-to-end would stretch for 60 kilometres or 37 miles.
When unloaded each of these containers may need to be stacked on the dockside before being loaded out to trains or trucks, further adding to congestion.
Furthermore, in recent years the increase in container security requirements has led to additional delays at both the points of origin and destination.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **The impact of congestion:**
 - *lack of capacity*
Paradoxically in some developed countries environmental concerns have led to unwillingness to build more infrastructure such as new motorways or port extensions.
Also, there has been resistance in certain countries to introduce bigger trucks which might actually reduce congestion, since fewer would be required.
Equally in developing countries the sheer scale of the investment required to meet the demand is daunting.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **The impact of congestion:**
 - *Just-in-time practices*
Over the last 50 years there has been a significant uptake across all sectors and supply chains of the philosophy and practice of just-in-time (JIT).
Essentially this has led to smaller but more frequent movements of products and materials.
Even though many of those who have adopted JIT have attempted to mitigate its effects through aggregation and consolidation there can be no doubting that it has contributed to an increase in shipments and movements.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **The impact of congestion:**
 - In the past it could be argued that the saving in inventory holding costs more than covered the additional transport cost.
However, now that concern with environmental issues has become much more prevalent, JIT in its crudest form will increasingly be questioned.
The challenge for supply chain managers is to find a solution that enables the benefits of JIT to be gained without incurring the potential environmental disadvantages.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Smart Logistics:**
 - ✓ While congestion will probably continue to affect logistics management for many years to come, particularly as economic growth and development continue, there is likely to be some alleviation as a result of the application of what might be termed 'smart logistics' and 'intelligent transport'.
 - ✓ The idea here is to combine the opportunities that exist for greater partnership and collaboration, both vertically and horizontally, in the supply chain with advanced information and communication technology.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Smart Logistics:**

- ✓ Smart logistics works by aggregating and combining individual shipments into consolidated loads for final delivery,
- ✓ 'Cross docking' is an example of this idea whereby different suppliers ship complete truck loads to a distribution centre, typically with each pallet bar-coded or RFID-tagged with product and destination details, for re-sortment and consolidation with other shipments to the same final destination.

4. Creating a Sustainable Supply Chain, Reduce, Reuse, Recycle

- **Smart Logistics:**

- ✓ The same principle can be used utilising 'logistics platforms' on the edge of large cities or conurbations to reduce individual deliveries to congested locations,
- ✓ When advanced IT solutions such as dynamic vehicle routing and scheduling and intelligent agent modelling are used alongside these collaborative strategies,
- ✓ many things become possible – particularly enabling the better management of constrained capacity against a backdrop of uncertain demand.

References

1. Gourdin, K. N., *Global logistics management*, Blackwell Publishing: Oxford UK, pp. 94 – 102, 2006.
2. Grant, D. B. et al., *Fundamentals of logistics management*, New York: McGraw- Hill education. 2006.
3. Erhart, Ch., et al., *Delivering tomorrow towards sustainable Logistics*. Bonn: Deutsche Post DHL, 2010.
4. Chrisopher, M: *Logistics & Supply Chain Management*, (Financial Times Series), 2011.
5. Pernica, P. 2004. *Logistika (Supply Chain Management) pro 21. století*, RADIX, Praha.

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