

## CHAPTER 4

# Managing logistics internationally

### Objectives

*The intended objectives of this chapter are to:*

- identify challenges that internationalisation presents to logistics management;
- analyse the structure and management of a global logistics network.

*By the end of this chapter you should be able to:*

- understand the forces which are shaping international logistics;
- understand challenges of international logistics networks;
- understand how to begin to balance these in organising for international logistics – bearing in mind risks and sustainability considerations

### Introduction

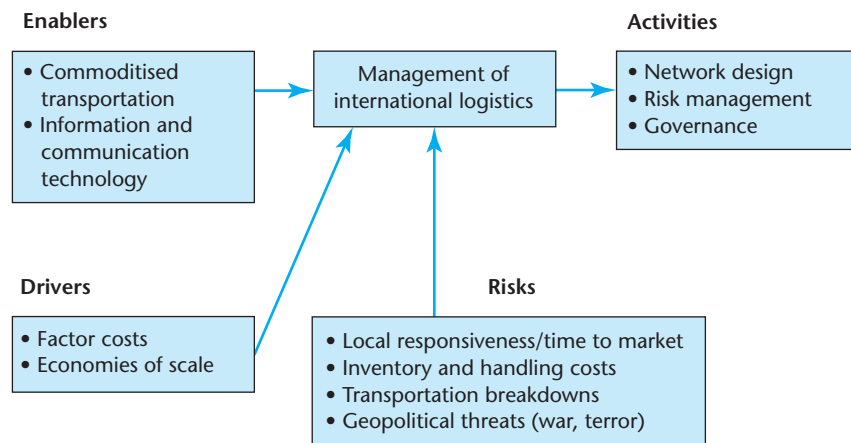
The early roots of logistics are in international transport, which was a central element of many fundamental models in economic theory. In traditional location theory, for example, transport costs were optimised in relation to distance to market and production locations. The origins of internationalisation can be traced back to the expanding trade routes of early civilisations. Discoveries made in excavations from Europe, Asia, Africa and the Americas reveal artefacts made hundreds or even thousands of miles away from the site, at the edges of their respective known worlds. Developments in transport, navigation and communication have progressively expanded our horizons. Measured in transport time and costs, the world has shrunk to the dimensions of a 'global village'. Many take for granted the availability of products from around the world and safe, fast inter-continental travel on container carriers and aircraft. It is in this context that a clear link exists between logistics and economic development. The connectivity of all regions of the world is essential for international trade. As a result, many projects aimed at supporting regional economic development focus on the infrastructure needed to support integration into the global economy.

The logistics dimension of internationalisation conjures up a vision of parts flowing seamlessly from suppliers to customers located anywhere in the world, and a supply network that truly spans the entire globe. Often basic products such as deep-freeze pizzas combine a multitude of locations from which ingredients are sourced, and an international transport network that links production

locations to warehouses and multiple stores. The enormous geographical span of this logistics system cannot be recognised in the price of the product. This can be explained by transport having become just a commodity in the global village. At the micro level of the individual company, however, the reality is that there are few examples of truly global supply chains. There are many barriers to such a vision. For example, local autonomy, local standards and local operating procedures make the integration of information flow and material flow a challenging task. Local languages and brand names increase product complexity. Global supply chains are made more complicated by uncertainty and difficulty of control. Uncertainty arises from longer lead times and lack of knowledge over risks and local market conditions. Coordination becomes more complex because of additional language and currency transactions, more stages in the distribution process, and local government intervention through customs and trade barriers. But there are many instances where a truly globalised logistics system is not necessary, and where ‘internationalisation’ is a more accurate description. Internationalisation is an increasing feature of the majority of supply chains. International sourcing of component parts and international markets for finished goods are extending as world trade increases. The move of supply and production to ‘off-shore’ locations has been steady and stable. However, this does not mean that internationalisation is without risks. Challenges in migrating supply to remote locations, breakdowns in product flow, environmental considerations resulting from greater shipping distances and corporate social responsibility considerations are added challenges and considerations.

The factoring in of risks, environmental and social considerations into the design of international logistics operations has made longstanding logistics formulas more problematic to apply. And it has helped the mindset of logistics managers to move beyond ‘available everywhere at low cost’ towards a more qualified approach of ‘available at a certain price and within a defined risk/reliability’.

Within the context of this changing global landscape for logistics, the overall aim of this chapter is to analyse the internationalisation of logistics, and to explore how to begin to organise international supply chains. Figure 4.1 shows the framework for this chapter: drivers and enablers need to be countered by risk



**Figure 4.1** Decision framework for international logistics

factors in organising logistics internationally. Essentially, this means developing and designing an international logistics network, managing risks and developing international governance structures, while keeping social responsibility and environmental concerns in mind.

### Key issues

**This chapter addresses seven key issues:**

- 1 Drivers and logistics implications of internationalisation:** the trade-off facing internationally operating businesses.
- 2 The tendency towards internationalisation:** three strategies for improving the transition to global supply chains.
- 3 The challenges of international logistics and location:** barriers to international logistics.
- 4 Organising for international logistics:** proposes principles by which international logistics networks can be organised, including offshoring considerations.
- 5 Reverse logistics:** developing the 'returns' process.
- 6 Managing for risk readiness:** two levels of risk readiness and several specific steps to take.
- 7 Corporate social responsibility in the supply chain:** the need to include social responsibility in supply chain design.

## 4.1 Drivers and logistics implications of internationalisation

*Key issue: What are the trade-offs between responsiveness to local markets and economies of scale?*

The business approach towards internationalisation is not taking place according to any common pattern. In assessing the nature of cross-border logistics, three questions can be asked:

- Does internationalisation imply a universal global approach to supply chain management?
- Does internationalisation require a 'global' presence in every market?
- Does internationalisation distinguish between the companies that globally transfer knowledge and those that do not?

The arguments presented in this section suggest that the answer to each of these questions is 'no'.

The 'single business' concept of structuring the supply chain in the form of uniform approaches in each country is losing ground. 'McColonisation' was effectively abolished when McDonald's announced localisation of its business in such areas as marketing and local relations. In response to local crises in quality, and suffering from local competition, the corporate headquarters were downsized to help empower the local organisation. (This also means localising the focal firm's human resource practices, a point we return to in Chapter 8.) The same applied to the Coca-Cola Company, which abandoned 'CocaColonisation' – based on a

universal product, marketing, and production and distribution model – for the same reasons. In favour of local brands and product varieties, Procter & Gamble is doing the same. In supply chains we find regional variations in the application of international principles.

This does not mean to say that localisation is the new mainstay. Unilever, a traditionally localised competitor of Procter & Gamble, has announced a decrease in the number of brands, and has rationalised operations away from strict localisation over the past decade, and probably will continue to do so for a while. Somewhere between local and global extremes, Procter & Gamble and Unilever will meet each other in a new competitive area.

Looking at the different drivers of internationalisation, three basic global shifts in international investment and trade have been identified, with a possible fourth coming to the forefront in modern markets, as listed in Table 4.1. Such shifts of course have an impact on international trade and the flow of goods. In particular, destinations change as well as logistics requirements. The ‘fourth generation’ recognises the logistics trade-off between responsiveness to local markets, environmental and risk concerns with the benefits of internationalisation.

**Table 4.1** The fourth-generation global shift in Europe

Generation	First	Second	Third	Fourth
Period	1950s–1960s	From 1960	From 1980	Emerging now
Primary drivers	Labour shortage	Labour costs and flexibility	Market entrance	Responsiveness to customer orders, risk reduction, and social and environmental responsibility
Shift of labour and investment towards	European countries without labour shortage	Newly industrialised countries, low labour cost countries	Eastern Europe, China, Latin America	Market region for responsiveness and lower risk. To low-cost region for social responsiveness initiatives
Transport routes	Still significantly continental	Increasingly intercontinental	Adding additional destination regions	Beginning to refocus on continental
Nature of international flow of goods	Physical distribution of finished products from new production locations	Shipping parts to production locations and exporting finished products	Physical distribution towards new market regions	Shipping (semi-) finished products to markets, reduction of eco footprint and risk exposure where possible

At a company level, generic drivers of internationalisation include:

- a search for low factor and supply costs (land, labour, materials);
- the need to follow customers internationally in order to be able to supply locally and fast;
- a search for new geographical market areas;

- a search for new learning opportunities and exposure to knowledge (such as by locating in Silicon Valley – a ‘hot spot’ in development of international electronics, software and internet industries).

The importance of these drivers varies by company and with time. Considering the sequence of global shifts, proximity to production factors such as labour and low material costs can be considered more basic than market- or even knowledge-related drivers. Furthermore, the importance of the respective drivers is dependent upon the internationalisation strategy of the company involved. Table 4.2 provides examples of strategic contexts, and – in the bottom row – the logistics implications of those strategies. The multi-domestic and global strategies represent two extremes, while the integrated network strategy represents a balance between them. The consequences of this ‘balancing act’ for logistics are analysed below. Case study 4.1 about Airbus offers illustrations of how complex and comprehensive supply chain management in an international context can be and how hard it can be to manage against risks for service and value.

**Table 4.2** Dimensions of different internationalism strategies

Dimension	Setting in a pure multi-domestic strategy	Setting in a pure global strategy	Setting in an integrated network strategy
Competitive moves	Stand-alone by country	Integrated across countries	Moves based on local autonomy and contribution of lead subsidiaries, globally coordinated
Product offering	Fully customised in each country	Fully standardised worldwide	Partly customised, partly standardised
Location of value-adding activities	All activities in each country	Concentration: one activity in each (different) country	Dispersal, specialisation, and interdependence
Market participation	No particular pattern; each country on its own	Uniform worldwide	Local responsiveness and worldwide sharing of experience
Marketing approach	Local	Integrated across countries	Variation in coordination levels per function and activity
Logistical network	Mainly national; sourcing, storage and shipping on a national level and duplicated by country	Limited number of production locations that ship to markets around the globe through a highly internationalised network with limited localised warehouse and resources	Balanced local sourcing and shipping (e.g. for customised products and local specialities) and global sourcing and shipping (for example for commodities)

(Source: Based on Yip, 1989, and Bartlett and Ghoshal, 1989)

## CASE STUDY 4.1

### Launching a new aeroplane at Airbus

When Airbus introduced its Airbus A380 double decker superplane in January 2005 to the press and the world it was an impressive show that brought out government leaders and made headlines all over the world. A little while later, however, delays to the

actual delivery of the first planes were announced. The causes for this were largely found in the international supply chain and its design.

In October 2006, the then Airbus president and CEO Christian Streiff said: 'This is a very long and complex value chain. While everyone on board was on top of their job, the production process . . . not the aeroplane . . . but the production process has one, big flaw – one weak link in the chain: that of the design of the electrical harnesses installation in the forward and aft fuselage. To be clear: this is the weak link in the manufacturing chain, this is the reason why ramping up the production is hampered. But the electrical harnesses are not the root causes why we at Airbus are in a crisis. The issue of the electrical harnesses is extremely complex, with 530 km of cables, 100,000 wires, and 40,300 connectors.'

This quote clearly points to the supply chain and design as the cause for delays. In addition to the wiring issues there were some further supplier-related challenges as well. A lot of different locations are an inherent aspect of the supply chain, not least because customers and sponsoring countries require a share of the production process to be located in their countries. So many locations, and design and make tasks are involved. This created a lot of challenges that needed detailed coordination. For example, one small component was supposed to be built in a plant in Italy for which a location was selected, but no permit had been granted by local authorities. It turned out that there were some very old olive trees on this site that had protected status. This is just one example of how local considerations can be specific and detailed, hard to predict yet potentially having a big impact on the supply chain. Additionally a Japanese supplier of seats was said to have caused further delivery delays. A complex project such as developing and building a new plane across multiple countries and locations can be very challenging in terms of scale and scope.

When Airbus launched the A380, the early signs of supply chain shortfalls already existed, but they were well hidden. Under the paint, screws were missing. Behind the panels, lots of parts were missing. The launch was a great spectacle, but you cannot hide a supply chain that is not working behind some paint . . . .

(Source: quote from: <http://blog.seattlepi.com/aerospace/archives/107302.asp>)

### Question

- 1 Brainstorm in groups how locating parts of the supply chain around the world might be more difficult than locating it on a single site and location.

## 4.1.1 Logistical implications of internationalisation

Internationalising logistics networks holds consequences for inventory, handling and transport policies.

### Inventory

Centralising inventories across multiple countries can hold advantages in terms of inventory-holding costs and inventory levels that are especially relevant for high-value products. On the other hand, internationalisation may lead to product proliferation due to the need for localisation of products and the need to respond to specific local product/market opportunities.

### *Handling*

Logistics service practices may differ across countries as well as regulation on storage and transport. Adjusting handling practices accordingly is a prerequisite for internationalisation. Furthermore, the opportunity to implement best practice across various facilities may also be possible. Both of these practices assist the process of internationalisation.

### *Transport*

Owing to internationalisation, logistics pipelines are extended and have to cope with differences in infrastructure across countries, while needing to realise delivery within the time-to-market. This may drive localisation. On the other hand, the opportunity for global consolidation may drive international centralisation.

Within this final, central, consideration in the globalise–localise dimension of logistics, global businesses face a challenge that can be summarised in terms of a simple trade-off between the benefits of being able to consolidate operations globally on the one hand, and the need to compete in a timely manner on the other.

## 4.1.2 Time-to-market

Time-to-market has particular significance for the management of the global logistics pipeline. The subject of time is considered in depth in Chapter 5, although we shall touch on the following issues here:

- product obsolescence;
- inventory-holding costs.

### *Product obsolescence*

The extended lead time inherent in international logistics pipelines means that products run the risk of becoming obsolete during their time in transit. This is especially true for products in industries with rapid technological development, such as personal computing and consumer electronics, and for fashion goods such as clothing and footwear.

### *Inventory-holding costs*

Lead time spent in the logistics pipeline increases the holding cost of inventory. In addition to the time spent in physical transit, goods travelling internationally will incur other delays. These occur at consolidation points in the process, such as in warehouses where goods are stored until they can be consolidated into a full load, such as a container. Delay frequently occurs at the point of entry into a country while customs and excise procedures are followed. We review these issues in more depth in Chapter 7.

### 4.1.3 Global consolidation

Global consolidation occurs as managers seek to make best use of their assets and to secure lowest-cost resources. This approach leads to assets such as facilities and capital equipment being used to full capacity, so that economies of scale are maximised. Resources are sourced on a global scale to minimise cost by maximising purchasing leverage and to pursue economies of scale. The types of resource acquired in this way include all inputs to the end-product, such as raw materials and components, and also labour and knowledge. Familiar features of global consolidation include:

- sourcing of commodity items from low-wage economies;
- concentration at specific sites;
- bulk transportation.

#### *Sourcing commodity items from low-wage economies*

Two sourcing issues are used by internationally operating organisations:

- consolidation of purchasing of all company divisions and companies;
- sourcing in low-wage economies.

Internationally operating organisations seek to consolidate the purchasing made by all their separate divisions and operating companies. This allows them to place large orders for the whole group, which enables them to minimise costs by using their bargaining power and by seeking economies of scale. At its extreme, a company may source all of its requirements from its range of a given commodity, such as a raw material or a component, from a single source.

Internationally operating companies are on a constant quest to find new, cheaper sources of labour and materials. This trend led to the move of manufacturing from developed industrial regions to lower-cost economies. Examples of this are:

- Western Europe to Eastern Europe;
- USA to Mexico;
- Japan to China, India and Vietnam.

These developing economies have seen impressive growth over recent years. This has led to increased prosperity for their people and rising standards of living. However, these advances in social standards raise the cost of labour and other resources. Therefore, the relentless search for the lowest production cost has led to some companies re-sourcing commodity items to lower-wage countries in Asia, North Africa and South America.

In some cases this movement of facilities around the globe has come full circle, with Asian companies setting up plants in the UK not only to gain access to the EU market but also to take advantage of lower overall costs.



**CASE STUDY**  
**4.2**
**Logistics in the news**

*The subject of air miles appears regularly in media headlines today. Here are two contrasting views of what is happening.*

Supermarkets and food producers are taking their products on huge journeys, despite pledging to cut their carbon emissions. Home-grown products are being transported thousands of miles for processing before being put on sale back in Britain. Jason Torrance, campaigns director of Transport 2000, the environmental transport group, said 'we are producing food in one corner of the world, packing it in another and then shipping it somewhere else. It's mad.'

Dawnfresh, a Scottish seafood company that supplies supermarkets and other large retailers, cut 70 jobs last year after deciding to ship its scampi more than 8,000km to China to be shelled by hand, then shipped back to Scotland and breaded for sale in Britain. The company said it was forced to make the move by commercial pressures. 'This seems a bizarre thing to do but the reality is that the numbers don't stack up any other way', says Andrew Stapley, a director. 'We are not the first in the industry that has had to do this. Sadly, it's cheaper to process overseas than in the UK, and companies like us are having to do this to remain competitive.'

(Source: Jon Ungoed-Thomas, *Sunday Times*, 20 May 2007)

Commissioned by World Flowers, a study was carried out by Adrian Williams of Cranfield University's Natural Resources Department to establish the actions needed to reduce Sainsbury's [a retailer] carbon footprint regarding Kenyan roses. Results have provided a fresh challenge to much current thinking on local sourcing and the impact of air freight. The high environmental cost of heating and lighting for growing roses in the Netherlands outweighed emissions caused by flying them in from Kenya, with its naturally warm all-year temperatures. It also indicated that carbon dioxide (CO<sub>2</sub>) emissions from Kenyan roses were just 17 per cent of Dutch roses, including the larger impact of CO<sub>2</sub> emissions to high altitude by air freighting. The study found that 6kg of CO<sub>2</sub> was produced per dozen Kenyan roses, as opposed to 35kg for production in the Netherlands. Whereas 99 per cent of the Dutch emissions were caused by producing the roses, only 7 per cent of the emissions from the Kenyan flowers were accounted for by growing them there. In contrast, nearly 99 per cent of the CO<sub>2</sub> emissions from the Kenyan roses were accounted for by the 6,000km clocked up by air freighting them to the UK.

(Source: <http://www.cranfield.ac.uk/cww/perspex>)

**Question**

1 What are the pros and cons of sourcing commodity items in low wage economies?

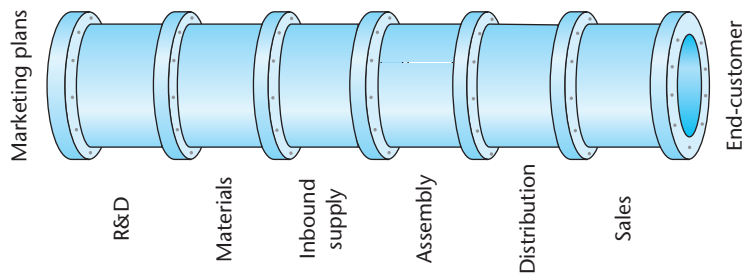
**Concentration at specific sites**

Consolidation of purchasing applies not only to commodity goods but also to high-value or scarce resources. Research and development skills are both high value and scarce. Therefore there is an incentive to locate at certain sites to tap into specific pools of such skills. Examples of this are 'Silicon Valley' in California and 'Silicon Fen' near Cambridge as centres of excellence in IT. Companies originally located in these areas to benefit from research undertaken in the nearby universities.

Companies become more influential in directing such research and benefiting from it if they have a significant presence in these locations. This is helped if global research is consolidated onto a single site. While this may mean missing out on other sources of talent, consolidated R&D gives a company a presence that helps to attract the bright young minds that will make their mark in these industries in the future, and it allows synergies to develop between research teams.

### Activity 4.1

An international logistics pipeline is represented in Figure 4.2 as a set of logistics processes that are connected together like sections of a pipe. However, the sections may be in different countries – requiring planning and coordination of the processes on a global scale. The international pipeline therefore has a number of special characteristics, some of which are suggested in Case study 4.2 on the previous page. Use Table 4.3 to make a list of the characteristics that you believe make a global logistics pipeline different from one that operates only nationally.



**Figure 4.2** The international logistics pipeline

**Table 4.3** Characteristics of the international pipeline

Elements of the pipeline	Special characteristics of the international pipeline
Research and development	
Material/component sourcing	
Inbound supply	
Assembly	
Distribution	
Selling/retailing	

### *Bulk transportation*

One of the more obvious advantages of operating a company in a global manner is the cost advantage of consolidated transportation. Taking Procter & Gamble as an example, 350 ship containers, 9,000 rail car and 97,000 truck loads are transported every day. The opportunity for cost saving by coordinating these movements and maximising utilisation is significant.

#### 4.1.4 Risk in international logistics

In addition to time-to-market and inventory risks, events of recent years have forced companies to adapt to the new supply chain reality of expecting the unexpected. Companies are not only responding to current volatility and geopolitical risks, they are also developing new risk management approaches based upon the realisation that decades of globalising supply chains has come at a price: a heightened and different risk profile.

##### *Geopolitical threats*

The 2003 SARS crisis and the second Gulf War were major events in and of themselves; they were also consecutive and had huge impacts on supply chain continuity and execution feasibility. Major trade routes had to be altered and global travel was limited. In addition, structurally heightened government security measures and screening are indicators of risks involved in international logistics. Logistics making the global economy a reality can never be a given that deserves no second thought.

##### *Transportation breakdowns*

Transportation may be a commodity, but that does not mean that nothing can go wrong. A several-week strike in the US west coast ports in 2002 lasted long enough to almost cripple the US economy. With hundreds of cargo ships floating outside the ports, shipments were not arriving at US destinations. This meant that factories were shut down and stores were emptying. It also had a ripple effect on global trade overall. For example, return shipments were delayed because no ships were leaving the ports either. In addition, with so many ships and containers tied up, other routes could not be served. And in fact a resulting global shortage of containers caused a slowdown of shipments in many other port regions. So shipments on other routes, in different harbours and even shipments using different modalities were affected.

Risk and security concerns are not a one-time issue but require continuous risk management. Helferich and Cook (2002) found that this is necessary because, for example:

- only about 61 per cent of US firms had disaster recovery plans;
- those that do typically cover data centres, only about 12 per cent cover total organisational recovery;
- few plans included steps to keep a supply chain operational;
- only about 28 per cent of companies have formed crisis management teams, and even fewer have supply chain security teams;
- an estimated 43 per cent of businesses that suffer a major fire or other major damage never reopen for business after the event.

According to Helferich and Cook (2002) this can partially be explained by the fact that there are competing business issues, managers might not recognise their vulnerability and might assume that the government will bail them out. Peck (2003) has published a self-assessment for supply chain risk and an operational-level tool kit.

## 4.2 The tendency towards internationalisation

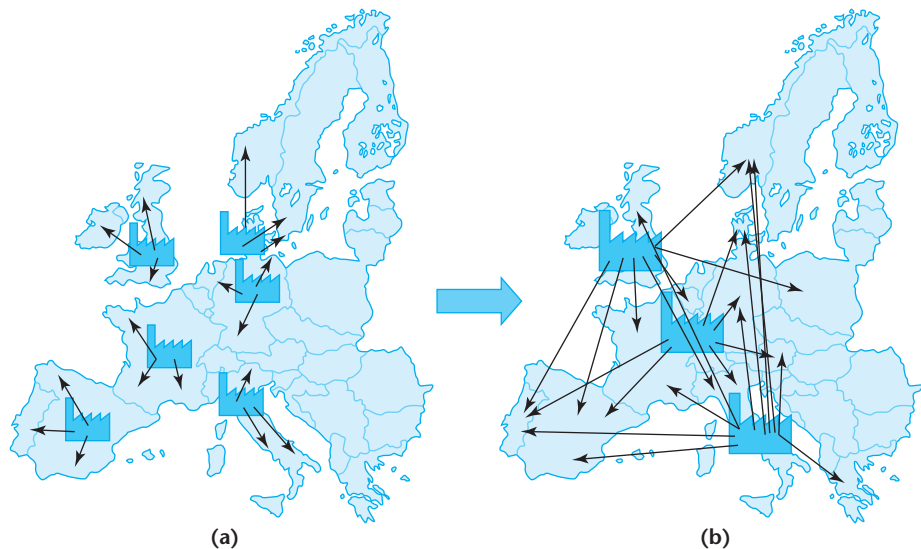
**Key issue:** How can we picture the trade-offs between costs, inventories and lead times in international logistics?

In order to remain competitive in the international business environment, companies seek to lower their costs while enhancing the service they provide to customers. Two commonly used approaches to improve the efficiency and effectiveness of supply chains are focused factories and centralised inventories.

### 4.2.1 Focused factories: from geographical to product segmentation

Many international companies, particularly in Europe, would have originally organised their production nationally. In this situation, factories in each country would have produced the full product range for supply to that country. Over time, factories in each country might have been consolidated at a single site, which was able to make all the products for the whole country. This situation, in which there is a focus on a limited segment of the geographical market, is shown in Figure 4.3a.

The focused factory strategy involves a company's consolidating production of products in specific factories. Each 'focused factory' supplies its products internationally to a wide market and focuses on a limited segment of the product assortment. This situation is shown in Figure 4.3b.



**Figure 4.3** (a) Focused markets: full-range manufacture for local markets  
(b) Focused factories: limited range manufacturing for all markets

Traditional thinking is that this organisational strategy will deliver cost advantages to a global company. While this is true for production costs, the same is not necessarily true for inventory-holding costs and transport costs.

### Activity 4.2

Focused factories have an impact on the important trade-off between cost and delivery lead time. Make a list of the advantages and disadvantages of focused factories. One example of each has been entered in the table below to start you off.

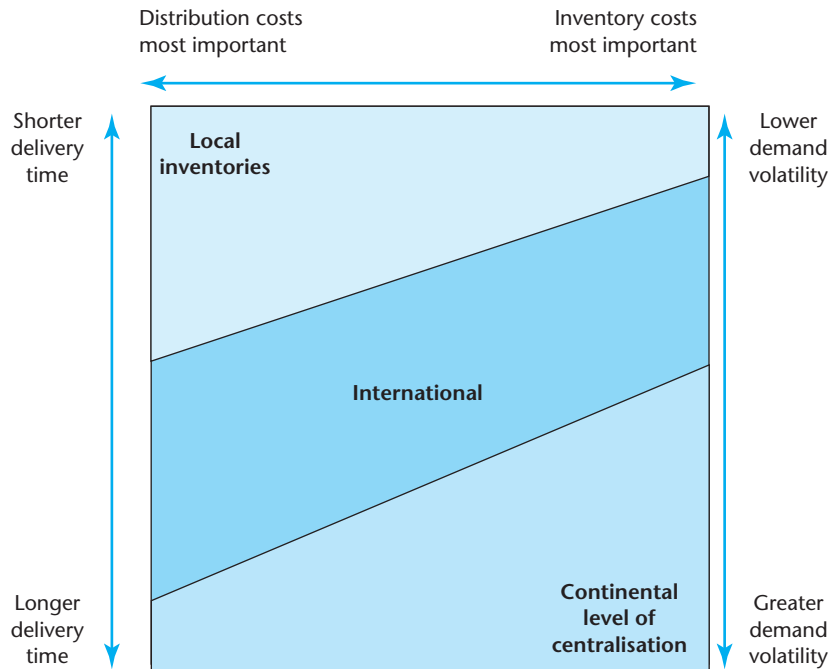
	Cost	Lead time
<b>Advantages</b>	Lower production costs through economies of scale	Specialised equipment may be able to manufacture quicker
<b>Disadvantages</b>	Higher transport cost	Longer distance from market will increase lead time

## 4.2.2 Centralised inventories

In the same way that the consolidation of production can deliver cost benefits, so can the consolidation of inventory. Rather than have a large number of local distribution centres, bringing these together at a small number of locations can save cost. Savings can be achieved in this way by coordinating inventory management across the supply pipeline. This allows duplication to be eliminated and safety stocks to be minimised, thereby lowering logistics costs and overall distribution cycle times. Both may sound contrary to the fact that the transport pipeline will extend, owing to the longer distribution legs to customers from the central warehouse in comparison with a local warehouse. Nevertheless, through centralising inventory, major savings can be achieved by lowering overall speculative inventories, very often coupled with the ability to balance peaks in demand across regional markets from one central inventory. Figure 4.4 characterises the different operating environments where centralised inventory may be a more relevant or a less relevant consideration, based upon logistics characteristics.

In product environments where inventory costs are more important than the distribution costs, centralised inventories are a relevant concern. This is typically the case for products of high value (measured in costs per volume unit). Microchips are an extreme example: these products are of such high cost per volume unit that distributing from the moon could still be profitable! Distribution costs have a marginal impact on logistics costs per product, assuming of course that transport costs are mainly a function of volume and weight. Products that require special transport, such as antiques, art, confidential documents or dangerous chemicals, may represent a different operating environment.

A second dimension that needs to be taken into consideration is that of distribution lead times. Here, we focus on physical distribution from warehouse to customer, and not on the inbound pipeline. Centralising inventory may lead to lower factory-to-warehouse distribution costs because shipments can be



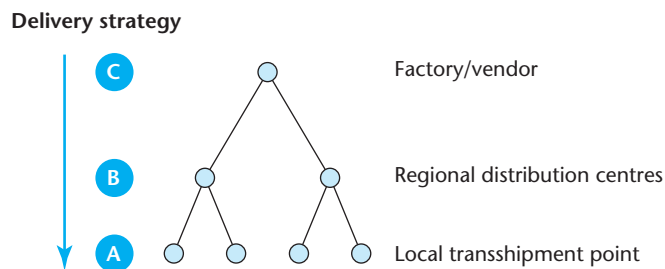
**Figure 4.4** Inventory centralisation against logistics costs and service dimensions

consolidated into full container loads. Where service windows to customers are very compressed there may not be sufficient time to ship products from a central warehouse and allow for the required transit time within the service window. This is why, for example, hospitals and pharmacies retain in-house stocks of products, almost irrespective of their inventory costs. Critical medicines and surgical appliances need to be available instantly and locally, regardless of inventory costs.

In general, transport costs have continued to decline over time as a relative cost item because of innovations in transport technology, the commoditisation of transport (such as container ships), and the oversupply of transport capacity for basic transport. These factors in themselves contribute to the increasing internationalisation of logistics: physical distance becomes less important, even for bulky products. However, the lead-time dimension loses some of its relevance, from a transport point of view. Customer demand can be very volatile and unpredictable. *Accuracy* of delivery (the right quantity) can therefore be a more demanding challenge than *speed* (the right time). Speed is available through different transport modes (container ship, air cargo, express, courier, for example) at reasonable prices. In very volatile markets, control over international inventories by means of centralised inventories can be crucial. Overall delivery reliability ('on time in full') tends to increase significantly, to the benefit of an organisation's performance in terms of service requirements. The ability to balance peaks across market regions from a central inventory is among the additional advantages. Different levels of inventory centralisation can be applied according to different dimensions. Taking the European market as an example, the range is

from local inventories (by country or even by location) through international (a selection of countries) to the complete continent. Many companies now include the Middle East and Africa as a trading bloc (Europe, Middle East and Africa–EMEA).

Centralised inventory management and focused factories enable different delivery strategies to be combined. Figure 4.5 depicts a simple distribution network that enables three different delivery strategies (listed in Table 4.4) to be applied as appropriate. For example, an opportunity to think globally arises where the key product relies more on the designer label and its promotion and marketing and less on its manufacturing origins. The key to success in clothing is often about fashionable design and labelling. Low labour costs (rather than material costs) of production can then be achieved by outsourcing to low-wage economies, often in the Far East.



**Figure 4.5** Delivery strategies in a global network

**Table 4.4** Three different delivery strategies

Delivery strategy	Description	Pros	Cons
A	Direct shipment of fast-moving, predictable lines. Held locally, probably pre-configured	Short lead time to customer	Multiple inventory points leading to duplication of stocks
B	Inventory of medium velocity, less predictable demand lines held at generic level awaiting final configuration	Lower overall levels of inventory, consolidated shipments to distribution centres and concentrated handling	Longer lead time to customers
C	Slowest-moving lines, least predictable. Perhaps one shared global inventory or make to order	Low overall inventory levels	Long lead time to customers

### CASE STUDY 4.3

## Centralised distribution at Nike

‘centralised and specialised, but not standardised’

Nike has a central customer service centre (distribution centre) located at Laakdal in Belgium. The centre is 200,000 square metres in size and serves 45,000 customers in EMEA with footwear, apparel and equipment. The centre receives products from supplier

factories around the world for distribution to retail clients both before the start of all four seasons each year, as well as during a given season. Prior to the start of a season, when work is at a peak, the workforce stands at some 2,300 operational staff. Off peak, that drops to 1,350 staff. Deliveries are very time critical, given the seasonal nature of the business. Retailers demand in-store availability on day one of a new season. The centre is a clear example of a company deciding to centralise receiving, storage and shipment to customers at one location in Europe. The benefits including consolidation of inbound shipments, lower inventory levels and better delivery service (in comparison to fragmented warehouses scattered around Europe). This does not mean, however, that the logistics operations are standardised for all flows of goods and all customers.

Not every shipment is handled in a standard way through a single distribution pipeline:

- About a quarter of the volume of shipments is shipped to customers directly. These are larger shipments such as full pallets for larger customers – for which there is no need to consolidate with other shipments. As a result it is cheaper and quicker to make these shipments directly.
- New growth areas that are served from the centre are Russia, Turkey and South Africa. For Russia, the first satellite centre with small inventories was recently opened to enable faster local replenishment of selected products.
- Selected shipments to selected retailers are dealt with by a materials handling operation at the centre. This mainly involves labelling and re-packing operations.
- Some retailers share weekly point of sale data with Nike, enabling it to replenish inventories based upon actual sales.

### Questions

- 1 What are the reasons for a company, such as Nike, with a centralised distribution centre to ship some products directly to customers, not through the distribution centre?
- 2 What are the reasons to start satellite centres when a company such as Nike has a centralised distribution centre?
- 3 What are the pros and cons of locating materials handling operations such as labelling and packing in a distribution centre, as opposed to in the factory?
- 4 What are the pros and cons for a company such as Nike to take on these materials handling services as opposed to leaving them to retail customers?

## 4.3 The challenges of international logistics and location

**Key issues:** What are the risks in international logistics in terms of time and inventories, and how can they be addressed?

International logistics is complex, and different from localised logistics pipelines. The main differences that need to be taken into consideration are:

- extended lead time of supply;
- extended and unreliable transit times;



- multiple consolidation and break points;
- multiple freight modes and cost options;
- price and currency fluctuations.

Information technologies can help to circumvent these challenges in general, and the proper location of international operations in particular can help to resolve some of these challenges. Another key point is that the benefits of sourcing from low-cost locations could be lost by the operating costs and challenges of international logistics. Hence it is key to consider these prior to making decisions about global sourcing and offshoring.

### 4.3.1 Extended lead time of supply

In an internationally organised business most products produced in a particular factory will be sold in a number of different countries. In order to manage the interface between the production and sales teams in each territory, long lead times may be quoted. This buffers the factory, allowing it to respond to the local variations required in the different markets.

### 4.3.2 Extended and unreliable transit times

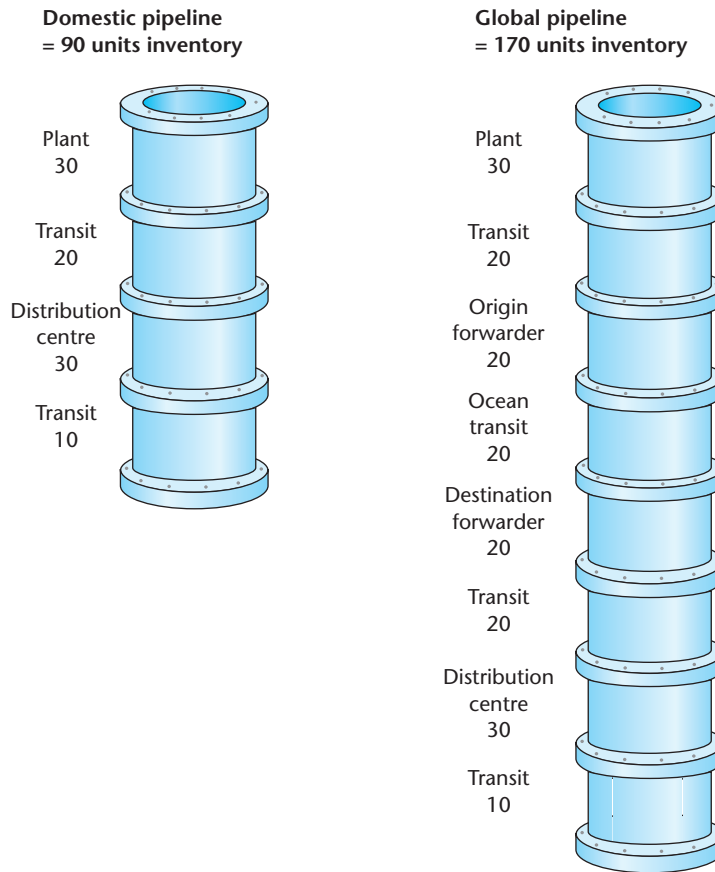
Owing to the length and increased uncertainty of international logistics pipelines, both planned and unplanned inventories may be higher than optimal. A comparison of the length of domestic and international product pipelines and their associated inventories is shown in Figure 4.6, which uses a similar 'pipeline' illustration to activity 4.1. Variation in the time taken for international transport will inevitably lead to increased holding of inventory with the aim of providing safety cover.

### 4.3.3 Multiple consolidation and break points

Consolidation is one of the key ways in which costs in pipelines can be lowered. Economies of scale are achieved when goods produced in a number of different facilities are batched together for transport to a common market.

The location of consolidation points depends on many factors that are not really appropriate to consider in a simple assignment such as this. That said, the following is one solution. Products manufactured in India should be consolidated at the site on the east coast (near Madras) for shipping to Singapore. Here they are combined with the output from the Thai and Singapore factories and shipped to Hong Kong. Products are consolidated at a Chinese port, possibly Shanghai, and transported by rail or sea to Hong Kong. All the other manufacturing sites deliver direct to Hong Kong, where products from all the various facilities are consolidated and shipped to Los Angeles.

It is worth noting that, after arrival in LA, this process runs in reverse. The consignment will be broken down at various 'break points' throughout North America and the goods distributed to market via hubs.



**Figure 4.6** Comparison of domestic and international logistics pipelines

(Source: After van Hoek, 1998)

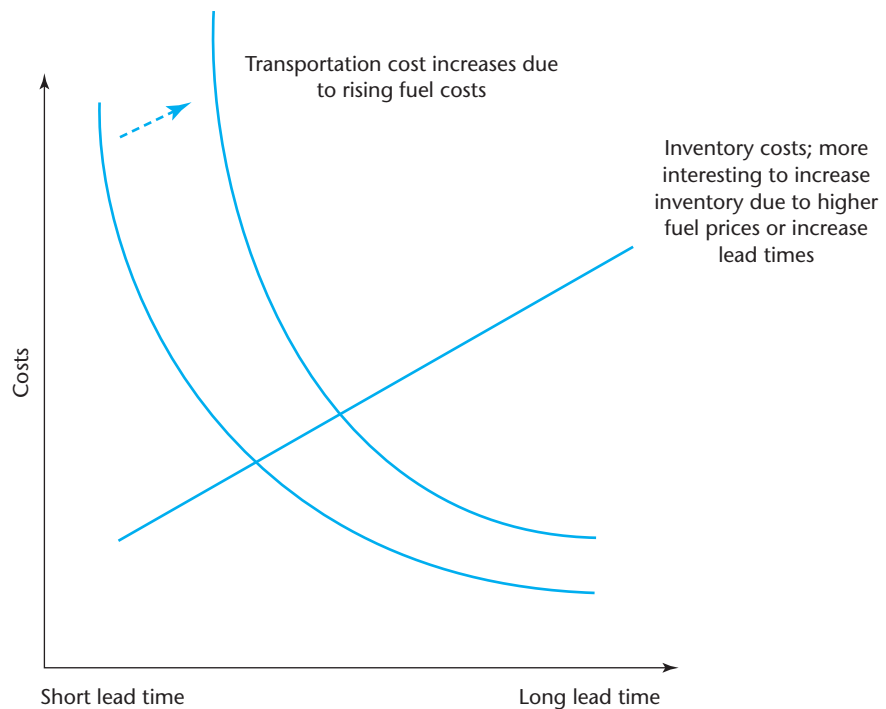
#### 4.3.4 Multiple freight modes and cost options

Each leg of a journey between manufacture and the market will have a number of freight mode options. These can be broken down in simplistic terms into air, sea, rail and road. Within each of these categories lies a further range of alternative options. Each of them can be assessed for their advantages and disadvantages in terms of cost, availability and speed. When the journey along the supply chain involves multiple modes, the interface between them provides further complication.

#### 4.3.5 Price and currency fluctuations

When operating around the globe, fluctuations in currencies along the supply chain can have an impact on how the supply chain is configured. While it can

take years to develop a global supply chain structure and operational footprint, currencies fluctuate daily – and sometimes wildly. Such fluctuations do not favour operations in countries with an unstable currency, and explain why some countries and industries do most of their business in a single currency, even if not their own. For example, price fluctuations of fuel have impacted the feasibility of international shipping against the benefits of lower, centralised inventories. Figure 4.7 shows that inventory holdings become less cost justifiable as the costs of shipping increase. Essentially, global transport is not free.

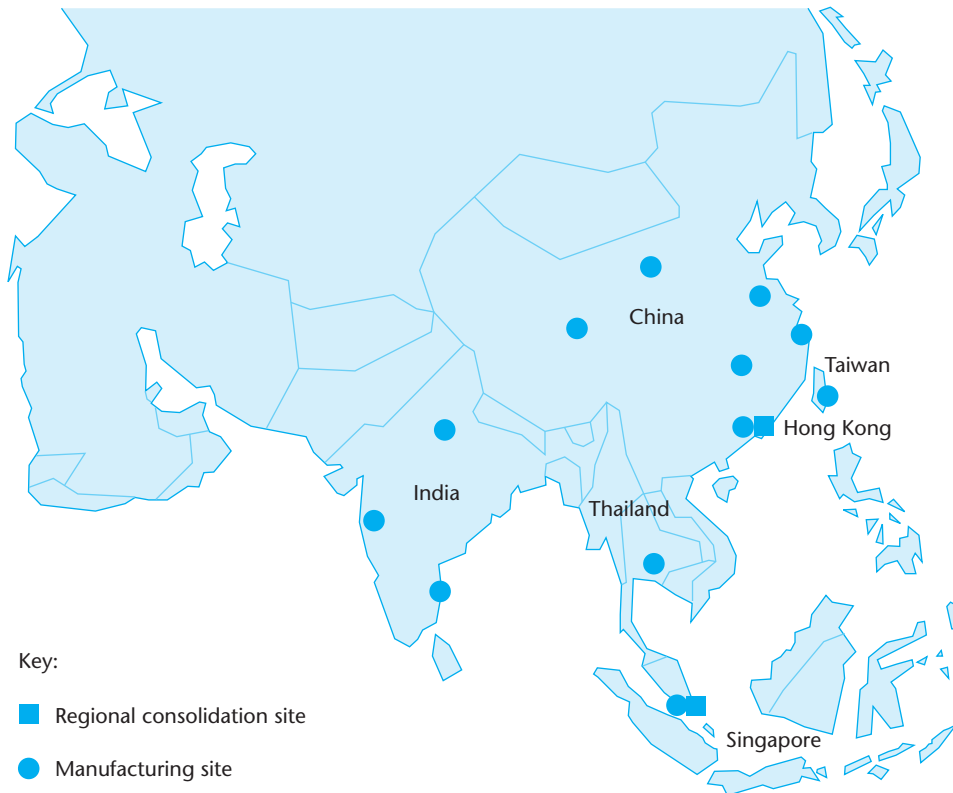


**Figure 4.7** The trade-off between cost and lead time for international shipping

### Activity 4.3

A footwear company has a number of manufacturing facilities around Asia, as shown in Figure 4.8. There are five manufacturing sites in China, three in India, and one each in Thailand, Singapore and Taiwan. Singapore and Hong Kong also have the facility to act as regional consolidation sites.

Draw arrows on the map showing where the flow of exports to the North American market could be consolidated. Write a brief description that explains your reasons for choosing these consolidation points and the flows between them.



**Figure 4.8** Location of Asian facilities

### 4.3.6 Location analysis

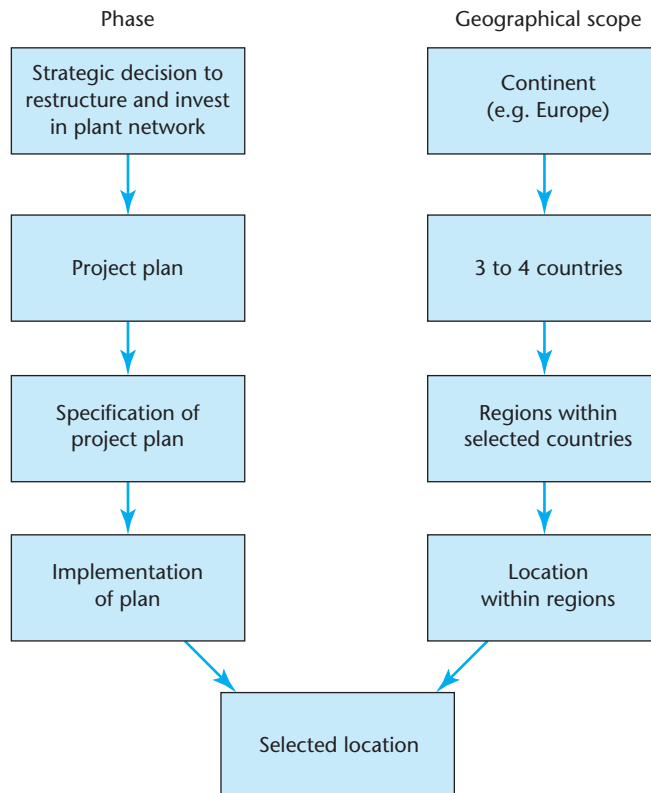
A structural component of international logistics pipeline design is the location design, or, in other words, deciding where operations are going to be performed. As Figure 4.9 shows, there is a sequence to the decision-making process involved that incorporates the business (left-hand side) and geographical decision making (right-hand side). Business decision making evolves from a strategic commitment through a decision support analysis project to implementation of the resulting plan at a selected location. In parallel, the location analysis starts at the level of relevant continent, through consideration of relevant countries and regions, to the selection of a location.

#### Activity 4.4

Consider each of the four freight modes in terms of their cost, speed and availability, and write in the respective box in the table 'high', 'medium' or 'low'. Explain your answers in the 'Rationale' box on the right.

Freight mode	Cost	Speed	Availability	Rationale
Air				
Sea				
Rail				
Road				

Note that these comparisons are fairly subjective, and your answers will reflect your experience of the different freight modes in your industry, product type and geographic location.



**Figure 4.9** Phases in the location selection process

The typical four-phase decision-making process can be structured using the following steps:

- 1 Deciding upon the appropriate level of centralisation–decentralisation using, for example, Figures 4.4 and 4.9.
- 2 Selecting relevant location criteria.

- 3 Selecting criteria weightings.
- 4 An economic trade-off analysis of structures and relevant locations.

Table 4.5 displays a representative trade-off table for two locations by relevant weighted criteria.

**Table 4.5** Trade-offs between two locations

Location criteria	Weight	Score region A	Score region B
Railways	1	4	1
Water connections	1	4	1
Road connections	2	2	4
Site availability	2	2	3
Central location	3	1	2
A . . .	. . .		
Total		19	22

Key: Score on a five-point scale ranging from poor to excellent.

## 4.4 Organising for international logistics

**Key issue:** How can supply chains be better organised to meet the challenges of international logistics?

There are at least three elements in organising for international logistics. These are:

- layering and tiering;
- the evolving role of individual plants;
- reconfiguration processes.

These will be outlined in the following subsections.

### 4.4.1 Layering and tiering

Internationalisation is often looked at from the point of view of asset centralisation and localisation. However, the wider organisational setting needs to be taken into account as well.

A commonly used maxim is *global coordination and local operation*, which relates to laying out the flow of information and coordination differently from the map of the physical operations. For example, Hewlett-Packard (HP) operates a globally consistent and coordinated structure of product finalisation and distribution in contrast to its continental operations. The company runs a final manufacturing and central distribution operation in Europe, the US and Asia for each continent.

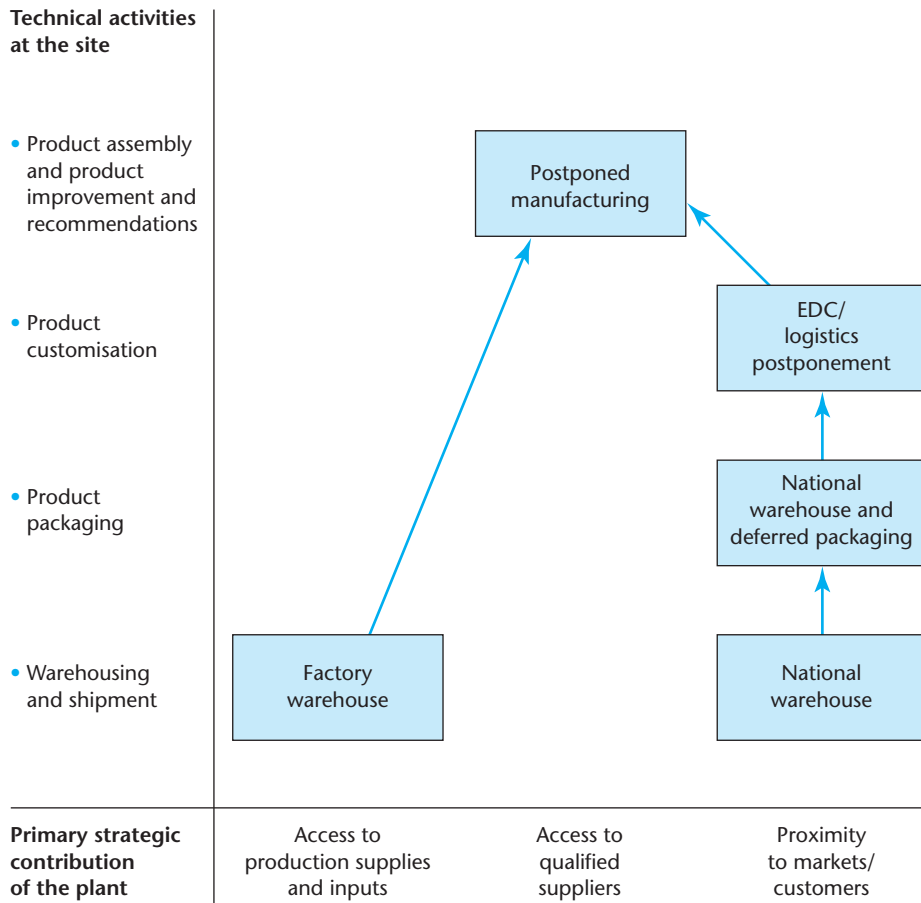
The operations are structured and run exactly the same, with the only difference being the way that products are configured to suit end-customers in the specific regions. This final configuration process (which in the case of HP may include fitting power leads and local instructions) is referred to as *postponement*, which we review in more detail in Chapter 6. Regional facilities are often owned and operated on a dedicated basis by a contract manufacturer and *third party logistics providers* (3PL, reviewed in Chapter 7). HP brings only limited management expertise to these regional operations to assure global coordination. Thus, although HP operates in a globalised way, its products are tuned to local markets by means of local logistics operations. Therefore developments in ICT do not eliminate the need for such local operations.

Another example can be found in the automotive industry. In this industry, major original equipment manufacturers (OEMs) structure their plant networks globally, while making suppliers build their plants in the immediate vicinity of the OEM plant. The distance or broadcasting horizon between the two plants is defined by the time between the electronic ordering of a specifically finalised single module on the online system and the expected time of delivery in sequence along the assembly line. Time horizons for order preparation, finalisation, shipment and delivery tend to be in the area of an hour and a half or less. This causes localisation of the supplier or co-location, while the OEM plant services a continental or even global market.

#### 4.4.2 The evolving role of individual plants

Ferdows (1989) projects the theories by Bartlett and Ghoshal (1989) onto the role of individual plants/factories in achieving the targeted international capabilities of global efficiency, local responsiveness and worldwide learning, or a combination of the three. Using the same type of approach, with location considerations on the horizontal axis and performed activities on the vertical axis, van Hoek (1998) adjusted the model for distribution centres. The model indicates the way in which the growth of performed activities changes the demands placed on the capabilities of the plant and changes the location requirements. Location is concerned with the response of governments to globalisation: adjusting local taxes, incentives and infrastructure to favour selection of their territory.

In Figure 4.10 a traditional warehouse is projected to possibly develop into a semi-manufacturing operation with product finalisation among its responsibilities and added value. This also contributes to the creation of a flexible facility for responding to local markets. The model also indicates a possible downgrading of the plant, with its two-way arrows showing development paths. These developments could be driven by poor location conditions, an inability to reach supply chain objectives, or the ability to reach the supply chain objectives more easily at other plants in the company's network. This suggests that the role of individual plants could be seen as an internal competitive issue for plant management. Most relevant, the evolutionary roles and functions of individual plants within the evolving supply chain are specific issues of concern for the realisation of global objectives.



**Figure 4.10** Changing role of distribution centres

### 4.4.3 Reconfiguration processes

Related to this last point, the achievement of the required changes in international logistics pipelines is a central issue. In the research presented in Figure 4.6 (van Hoek, 1998), it was found that, across companies, large differences can be found in reconfiguration paths. This was found even in cases where the same supply chain structure (a traditional factory warehouse, as displayed in Figure 4.10) was targeted. Differences included:

- *Supply chain scope/activities involved.* Was only final manufacturing relocated, or did sourcing undergo the same treatment?
- *Focus.* Were activities moved into the market, e.g. localised or centralised within the market? Did the move have a single or multiple focus?
- *Tendency.* Were activities moved out of the (European) market or vice versa, with single or multiple tendencies?



- *Timetable.* Was it a single-step process or did it involve various steps spanning out the process over a longer period of time?
- *Pace.* Was it an overnight change or the result of a gradually changing process?
- *Authority.* Was it directed from a global base (top down) or built up region by region (bottom up)?

The differences can be explained through differences in the supply chain characteristics of companies, among which are:

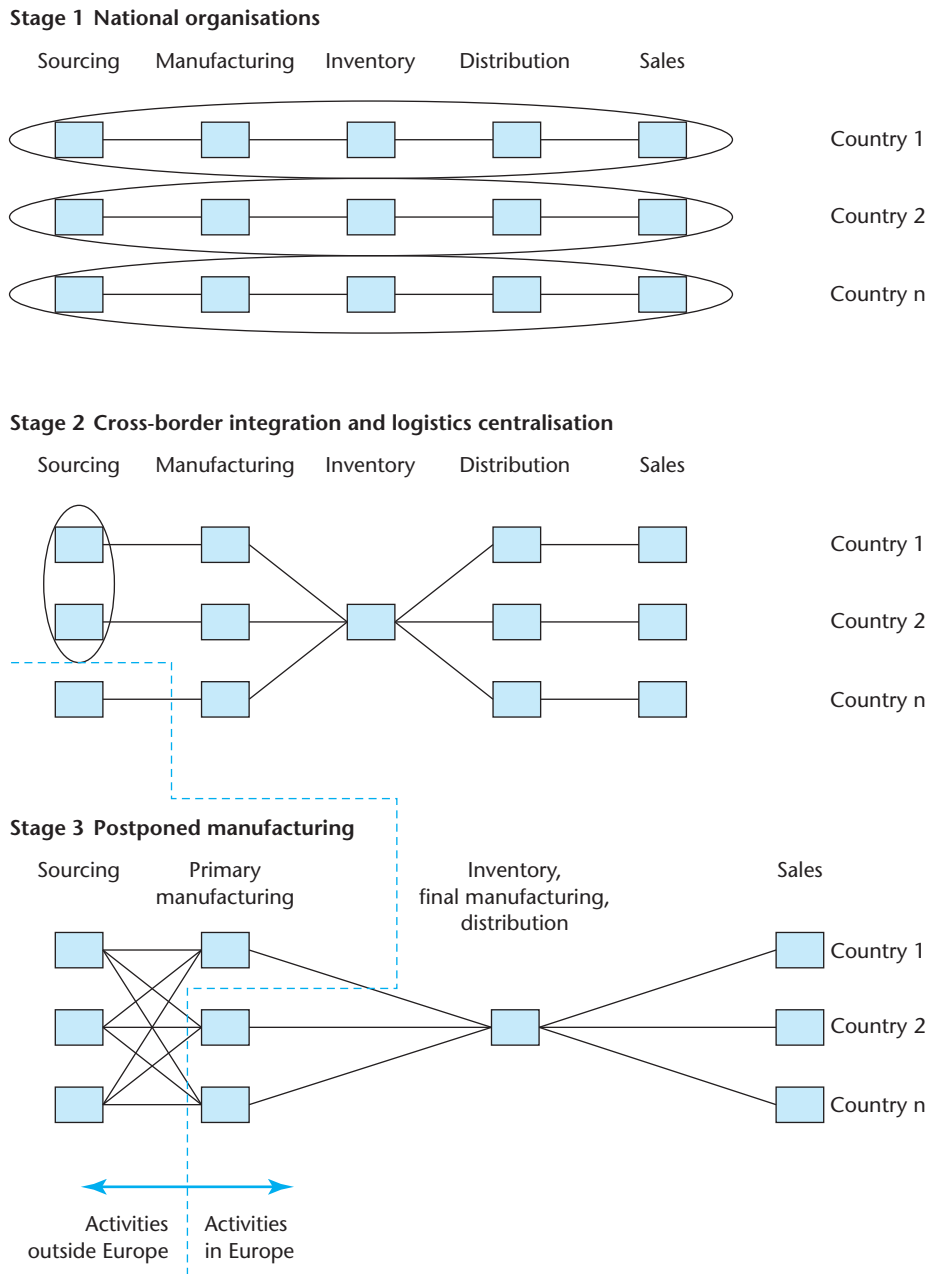
- *Starting point:* Is the base structure localised or globalised?
- *Tradition:* Does the company have a long preceding history with the baseline in the market, or can it be built up from scratch, in supply chain terms (brownfield or greenfield)?

Table 4.6 summarises the differences found in companies implementing postponed manufacturing as an example of a reconfiguration process. The same argument could be applied to the difference between a central European warehouse and a country-based, localised distribution network.

**Table 4.6 Differences in reconfiguration processes for companies depending upon starting point (global or local)**

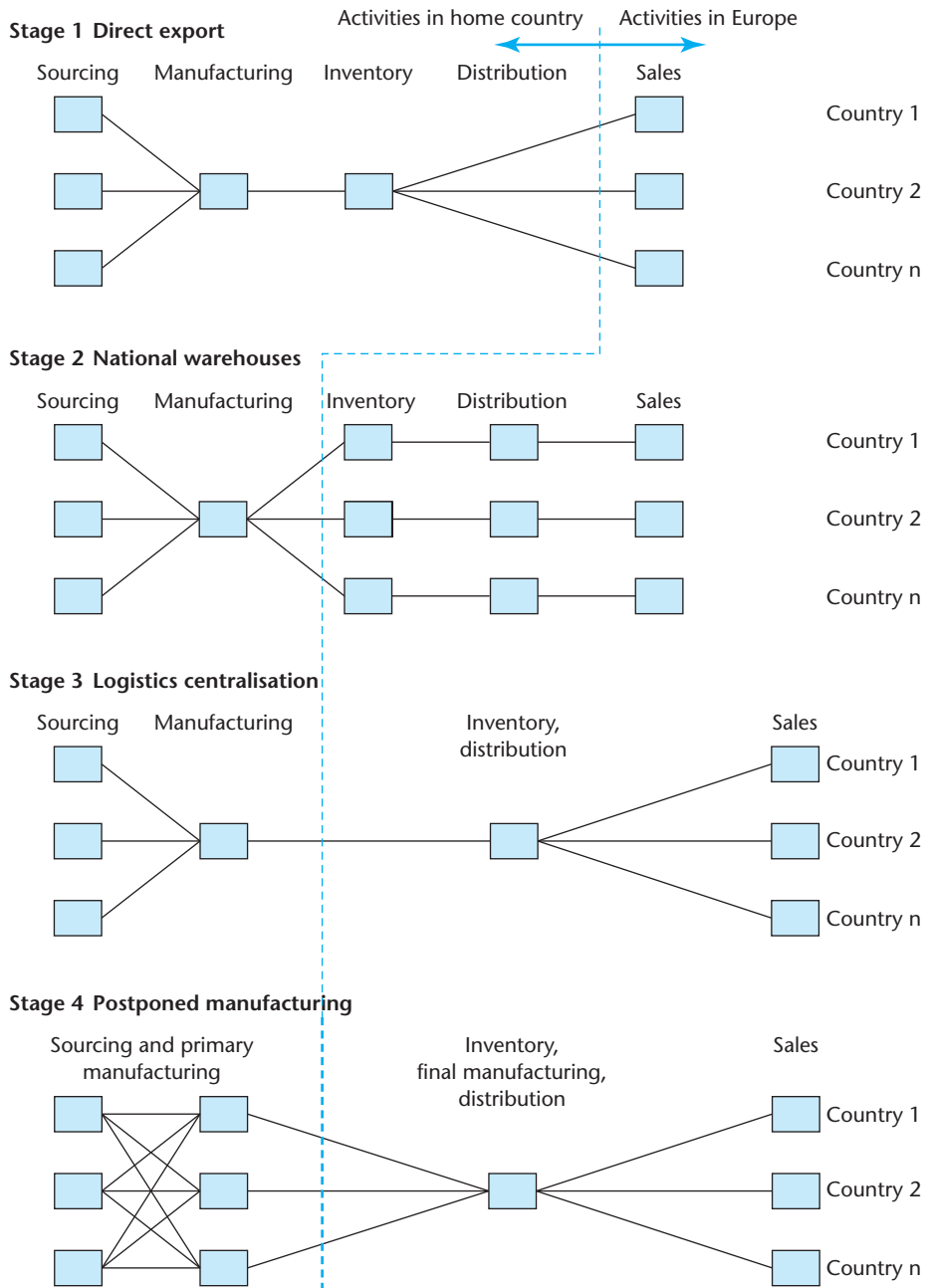
Starting point	Global structure	Localised structure
Heritage in market	Little, greenfield approach	Extensive, brownfield approach
Supply chain scope	Narrow, involving inventory and final manufacturing	Broad, involving inventory, manufacturing, and sourcing
Focus	Decentralising final manufacturing and inventory into market	Centralising inventory and final manufacturing at continental level and globalising manufacturing and sourcing
Tendency	Single, placing activities into market	Multiple, relocating within market and moving outside market
Timetable	Short (1–10 months)	Long (number of years)
Authority	Global, top-down directions	Local, bottom-up iterative process

Figures 4.11 and 4.12 represent the reconfiguration process from local distribution through logistics centralisation to postponed manufacturing (final manufacturing in the warehouse). The differences in the implementation path are based upon the different starting points. The path with a localised starting point goes through centralisation within Europe starting from autonomous, duplicated local structures. The path with a global starting point builds a small European presence and then migrates through the increase of European presence centrally (representing a further location into Europe, rather than a further centralisation from within Europe).



**Figure 4.11** Stages in the implementation of postponed manufacturing: local starting point

(Source: van Hoek, 1998)



**Figure 4.12** Stages in the implementation of postponed manufacturing: global starting point

(Source: van Hoek, 1998)

Case study 4.4 explores issues and trade-offs found in developing competitive solutions when organising for international logistics.

## CASE STUDY 4.4

### The trade-off between time and cost in global supply chains: lessons from the apparel industry

#### Vertical integration v outsourcing

The enormous success of vertical retailers such as H&M, Zara, Gap and Next in the apparel industry in the last ten years has forced manufacturers of brand labels such as Esprit and Levi, and department stores such as El Corte Ingles and Marks & Spencer, to speed up their supply chains. Partly, this has been achieved by integrating their processes and systems upstream (towards their suppliers) and for wholesale brands downstream (towards their wholesale customers) in the supply chain.

The competitive environment in the apparel industry is increasingly tough. Retail prices are under pressure; there is increasing polarisation of pricing, with growth in the premium luxury brands at one end and low cost segments at the other, resulting in a constriction in the middle ground, driven by vertical retailers such as Primark and Matalan; competition is extending from products that were traditionally limited to upper, middle or lower segments of the market – and increasingly with ‘fashion’ product from the sports industry; gross margins are shrinking; retail store costs and personnel costs are going up. Those who do not manage their assortment planning and inventories well are continuously under pressure to mark down their merchandise. *Vertical retailers* have found an answer to this hostile environment by:

- increasing the probability of designing a bestseller product by dramatically shortening its time-to-market, designing and delivering product closer to the on-market trend (see Chapter 5);
- piloting products in the stores and then replenishing the best sellers within two to three weeks by utilising new types of make-to-order processes;
- driving the inventory sales productivity (as measured by stock turn, sales per square metre and mark down percentage) by keen assortment planning, sales performance feedback and delivery planning;
- integrating the IT systems from point of sale back into garment production factories and from there towards fabric suppliers, using product lifecycle management systems that incorporate data and workflow along the supply chain;
- identifying a product category mix that, where possible, can take advantage of longer lead time, higher margin products;
- focusing on quality of workmanship through fitting and process quality.

Brand label manufacturers traditionally do not own their retail stores, and department stores do not have own their factories. This easily leads to competitive disadvantage in comparison with the vertical retailers, who have their own retail stores and have tight control over their manufacturers. To survive in today's marketplace against the vertical retailers, brand labels and department stores need to integrate their processes and systems from point-of-sale back into the factory. How can this be done?

### Core competencies and time-to-market

Companies such as Esprit have initiated strategies to become vertical retailers themselves. They have also set up their own e-commerce website, a direct distribution channel to their consumers. This strategy not only generates additional revenue but also supports direct and immediate product performance feedback. Elements of this strategy are to focus on core competencies and to offload all non-core activities to specialists who can such activities better and at a lower price. Another element of the strategy is to increase the number of collections from four to between six and twelve per year. This enables them to be closer to market and thus to forecast and fulfil product demand more accurately. Of course, closeness to market increases the pressure on faster, timely product development and product delivery. The product lifecycles of the individual collections are shorter, which leads to enhanced requirements for responsiveness on all supply chain partners. There can be no buffers, and deliveries have to be on time and in full. As a result of this each partner in the chain has increased needs for information, flexibility and transparency. Therefore, vertical retailers must have an excellent supply chain that is fast, flexible, reliable and which provides full transparency at low cost. That's in addition to having good products and closeness to market!

### Developing a global SCM network

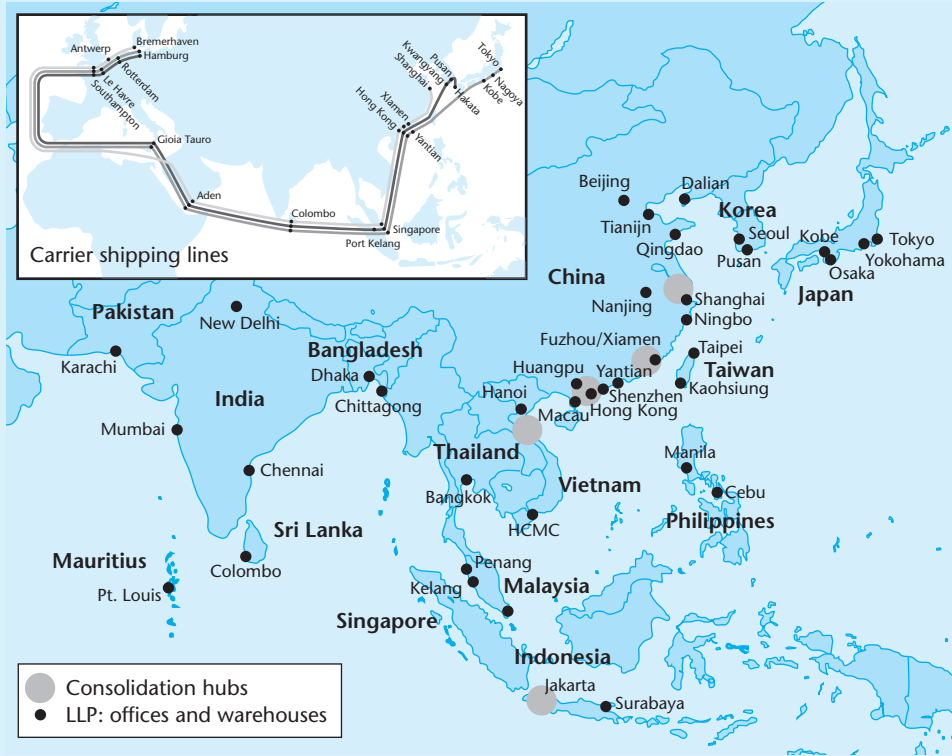
Re-engineering supply chain processes as part of the verticalisation strategy forces apparel and sports companies to focus on outsourcing all non-core activities and development of a global supply network. Outsourcing of non-core activities, such as managing warehousing and distribution centres, frees up management time which can be utilised for managing the supply chain end-to-end. The development of a global supply network consists basically of four components:

- enforcing end-to-end supply chain thinking within the focal firm, its suppliers and its logistics service providers;
- setting up a physical infrastructure with selected lead logistics providers (LLPs) who manage the logistics hubs at sourcing origin and market destination (see Figure 4.13);
- using central databases on the internet (SCM portal and Supplier portal) where all logistics partners, suppliers and buyers can view order status and workflow, product specifications and development in real time;
- empowering LLPs to manage selected service level agreements on behalf of the focal firm in terms of cost and time

Besides development of the above components of the supply chain, it is important to consider *trade-offs*. These are decisions that have to be made for each step in the supply chain. Figure 4.14 provides an overview of the steps and trade-offs in the supply chain from sourcing areas in Asia, Eastern Europe and South America towards a European market destination.

### The trade-off between time and cost

Which trade-offs are to be made? For example, when sourcing in Asia whilst selling in Europe, what process set ups are possible? When focusing on *cost* the focal firm needs to make sure that shipments are in full container loads, shipped by sea, packed as cross-



**Figure 4.13** Example of physical infrastructure set-up with LLP origin in Asia

(Source: Leeman, 2007)

	ASIA	EUROPE	AMERICA
Consolidator	Hubs, consolidation	Hubs, consolidation	Hubs, consolidation
Carrier	Sea>land>air	Land>air>sea	Sea>air>land
Warehousing	Cross-dock	Pick/pack, cross-dock	Pick/pack, cross-dock
Transport	Express, pallets	Express, pallets	Express, pallets

SCM tools to manage the time, dependability and cost of the network infrastructure

**Figure 4.14** SCM tools and trade-offs in the supply chain

dock shipments which are then transported to retail stores via a cross-dock warehouse as consolidated shipments once a week. However, this slows down the process time substantially to approximately 20 days. Also, different countries of manufacture have considerably different levels of duty tariff when landing product in Europe and this needs to be considered in the total acquisition cost. When focusing on *time*, the focal firm needs to ensure that shipments are packed by retailer store at the factory, shipped by air and transported directly to stores upon arrival without going through a cross-dock warehouse. Of course, this process is fast (two–five days) but it is also very costly, and can only be justified with exclusive branded products with high gross margins. Also, Asian manufacturing is in developing countries and therefore local infrastructure and the time required to move product to the hub needs consideration. The product category mix, levels of assortment and replenishment product volumes also require that logistics managers plan for timely availability of capacity at suppliers. It is also becoming important to global brands to plan for how quickly they can manufacture and replenish for growing *local* Asian markets from the same supply base. Therefore, companies such as Esprit and Nike have a *range* of supply chain solutions. Some of these set delivery windows which focus on time, while others organise supply chain processes to focus on minimising cost.

(Source: Based on Leeman 2007; updated by Mark Baker, 2010)

### Questions

- 1 What are the strategic drivers that are forcing focal firms in the apparel industry to change their supply strategy?
- 2 Why is time-to-market so important in the apparel industry? How does it impact supply chain processes?
- 3 Which trade-offs must be made when setting up a global SCM network for the apparel industry? Also discuss the trade-offs regarding sourcing countries versus quality.

Case study 4.5 offers an example of an approach to outsourcing that provides an insight into the hidden difficulties that may be faced when moving from 'local' to 'low cost' supply.

#### CASE STUDY 4.5

### Moving offshore – not so easy or straightforward: the experience of Smiths Aerospace

Smiths Aerospace is a largely UK-based supplier to both military and civilian aircraft and engine manufacturers, and is owned by General Electric of the US. Several years ago, Smiths launched an initiative to outsource production of parts from UK suppliers to Chinese suppliers in a drive to benefit from lower costs. Among the beneficiaries of

the new initiative was the Mechanical Systems division, which intended to source high volume, low cost products from lean, low cost suppliers in China. The remaining volume was to be sourced from domestic suppliers which could operate more flexibly (section 1.3.2). The scope of the restructuring included machined civilian aircraft parts from four UK sites under the Mechanical Systems Division: based in four locations in the UK: Wolverhampton, Cheltenham, Hamble and Dowty Propellers (Gloucester).

Global supply chain teams based in the UK and the US, in conjunction with each of the Smiths Aerospace divisions, were given responsibility for the deployment of the outsourcing programme. The reconfigured supply chain will result in the transition of approximately 5,000 to 15,000 parts from traditional suppliers to low cost economy suppliers over a five-year period. Plans state that, on average, 40 per cent of the spend will remain within the UK because of high switching costs. As the long-term contracts expire, the parts will either be manufactured internally or outsourced depending on intellectual property rights and technology protection. However, several years into the initiative, only parts of the original plans have been accomplished. Much of the delay was attributable to the change process, which was not so simple as originally envisioned. There were also challenges with how that change was being managed. For example, in the words of one company executive:

‘Failure to manage exit from the existing supplier, and failure to coordinate the transition, led to catastrophic failure of supply’.

In this restructuring initiative, several keys to a successful supply chain initiative have been met:

- The initiative directly relates to corporate strategic priorities and there is top executive recognition of its importance.
- There are clear considerations for switching production to China.
- There is a clear business (four units two of which serve as pilots) and operating scope defined (those that require less flexibility).
- There is a launch point for ‘quick wins’ (high volume, labour intensive parts)
- Teams around the world have been allocated to the initiative.

However, as is also clear from the above quote from the executive, there are real risks involved. As much as there have been many companies moving supply chain operations to China, there are also clear negative impacts on supply chain performance that need to be considered and incorporated into the change plan.

### Questions

- 1 Which are risks in relocating parts of the supply chain and how can they be incorporated into the plan for change?
- 2 Despite the recognised need to coordinate the transition process, the sites lacked a documented method to specify *how* this would take place. There were also challenges with the change process itself. Propose what steps might have been included to address these shortcomings.



## 4.5 Reverse logistics

**Key issue:** factoring in the return flow of goods when designing international networks.

Reverse logistics deals with the flow of goods that go back up the supply chain for a number of reasons, including: product returns, repairs, maintenance and end-of-life returns for recycling or dismantling. Reverse logistics has both a service (repair, recalls, etc.) and an environmental component. Corporate social responsibility considerations will be covered in more detail in section 4.7. Meanwhile, Table 4.7 – from the Reverse Logistics Executive Council – compares reverse logistics with forward logistics.

**Table 4.7** Comparing forward and reverse logistics

Forward logistics	Reverse logistics
Forecasting relatively straightforward	Forecasting more difficult
One to many distribution points	Many to one distribution points
Product quality uniform	Product quality not uniform
Product packaging uniform	Product packaging often damaged
Destination/routing clear	Destination/routing unclear
Pricing relatively uniform	Pricing dependent on many factors
Importance of speed recognised	Speed often not considered a priority
Forward distribution costs easily visible	Reverse costs less directly visible
Inventory management consistent	Inventory management not consistent
Product lifecycle manageable	Product lifecycle issues more complex
Negotiation between parties straightforward	Negotiations complicated by several factors
Marketing methods well known	Marketing complicated by several factors
Visibility of process more transparent	Visibility of process less transparent

(Source: Reverse Logistics Executive Council, <http://www.rlec.org>)

Reasons why reverse logistics is often only partially incorporated into international network design include:

- no infrastructure: companies often try to use the same outbound distribution system to handle returns without considering whether it is fit for purpose;
- reverse logistics is often a ‘corner-of-the-desk concern’, and does not receive sufficient resources;
- much attention on the subject is driven by legislation, not yet by recognised business value;
- focal firms see reverse logistics as a cost of doing business;
- the subject is intuitively not popular: it means something has gone wrong, so people are tempted to ignore it or hide it;
- it is hard to forecast the reverse flow and composition – what is going to come back.

Opinions indicate that there are operational shortcomings such as using the same infrastructure for the return flow, and the difficulty of forecasting reverse flow. These might be explained by a lack of management attention, and by lack

of appreciation of the full costs of reverse logistics. On the other hand, potential downsides of a reactive approach include image risks, service shortfalls and being a nuisance to customers. Suggested ways forward include considering the full impact of reverse logistics and approaching it as a business:

- consider reverse logistics for its full cost and negative potential market impact;
- seek green as a business ('green is green');
- design for disassembly and recycling;
- outsource reversed operations to a specialist 3PL;
- create dedicated (parts of) operations.

Cisco Systems offers a good case example of the migration from reversed logistics as a burden to it as a business opportunity.

#### CASE STUDY 4.6

### Cisco Systems value recovery programme

In 2005, Cisco Systems dealt with US\$500 million of returned products and parts through a cost centre whose annual operating cost was just US\$8 million. All returns were treated as defective product and service returns with the rationale being that all returns were without value. Furthermore, 95 per cent of all returns were scrapped. The 5 per cent of returns that were re-used were therefore more accidental than by design. The US\$500 million in scrap products and parts was equal to a volume of 12 football fields covered knee high with defective products and parts.

Cisco Systems made the transition towards a profit-making value recovery operation by setting criteria for value recovery and screening all returns for embedded value. The criteria include:

- Can a cosmetic 'touch up' or software upgrade be performed?
- Can they be broken down into spares or parts or go into the secondary market or even be donated to philanthropy?

The lessons learned from this programme for Cisco Systems included:

- 1 Do not treat all returns the same. There are products and parts that are beyond saving but more often than not things can be used in different ways to generate value.
- 2 Uncovering this value requires getting into the details of the product to identify possible ways to recover value and assess the opportunity to do this with a specific product.
- 3 Most returns are not defective but are returned for other reasons.
- 4 Take a broad view of the opportunity. Think of reverse logistics as a business and approach it like a general manager, not looking only for pennies or operational issues, but instead looking for what value can be brought to other parts of the organisation such as the corporate social responsibility (CSR) department and social efforts.
- 5 Learn from other functions. It may require you to take pages from the service manual, learn from finance on quantifying value (returns can provide a tax write-off when they are donated to philanthropic causes) and learn from the sales department in running a value recovery programme effectively (focus on solution selling, segment the business for opportunities, establish return quotas and value recovery targets).

As a result of the programme, 44 per cent of returns are now re-used and returns have moved from a cost centre to a net contribution of US\$85 million. This is on top of the non-financial environmental and social benefits.

*Note: A further description of this programme is available from the CSCMP website, <http://cscmp.org> It contains a further write-up of this supply chain innovation award winning case.*

### Question

- 1 Do you consider Cisco's value recovery criteria can be applied to any supply chain? Consider a supply chain for fashion goods (illustrated in Case study 4.4) as an example.

## 4.6 Managing for risk readiness

**Key issue: developing appropriate responses to risk in both the short and long term.**

Supply chain disruptions such as transportation breakdowns and geopolitical risks can have many impacts: empty distribution channels, stores and goods stuck upstream leading to lost sales, revenue and customers. And they can be the result of plant shutdowns due to supplier discontinuity or collapse, bottlenecks in the transportation system or many other events in the supply chain. There are at least two levels at which companies are responding to risk in international logistics; preparing for immediate response to risks and structurally preparing for risk in international supply chains.

### 4.6.1 Immediate risk readiness

Recent events have shown that immediate responses to risks can include four things:

- raised inventory levels to assure a cushion for supply disruptions of key parts and supplies;
- redrawing transportation scenarios in the light of the possible logistics melt-down of global trade routes;
- supplier hedges are put into place; and
- global sourcing and supplier rationalisation efforts are being reconsidered actively.

#### *Inventory policies to reflect volatility levels*

Shortly before the second Gulf War, GM and Toyota asked their just-in-time suppliers to raise inventory levels in order to avoid early and extensive plant shutdowns. It added short-term costs but as a hedge against supply disruptions it can be a real money saver down the line while assuring service to the customer that

competitors might not be able to offer. LaCrosse Footwear raised its safety stock sixfold for certain products in order to ensure the ability to ship to customers on short notice.

### *Re-do transportation network redesign*

Based upon possible risks or a real situation, scenarios for transportation routes at risk can be developed together with contingency plans on a route-by-route and plant-to-plant basis. Airlines altered services to the Middle East before the Gulf War, for example. Here are three other examples:

- Hewlett Packard maintains the ability to shift production between assembly facilities in Europe, North America, South America and Asia as part of a formal continuity plan to be implemented in a crisis.
- Chrysler quickly shifted component shipment from air to express truck service in response to transportation bottlenecks after 9/11.
- Continental Tyres' crisis team put together a list of all customers' orders, parts and suppliers outstanding, identified critical shipments by the afternoon of 9/11, and expedited those critical parts by land transport and through contingency relationships with transport firms.

### *Reconsider sole and global sourcing arrangements*

Despite the benefits of supplier rationalisation and focused factories, risk management does imply there is real rationale for lining up alternative suppliers in different locations, and for manufacturers to develop a thorough understanding of their suppliers' capabilities and vulnerabilities. Companies are responding in two ways: considering alternative and back-up sources; and proactively auditing the supply base for financial and operational sustainability in these tough times. Hewlett Packard, for example, has secondary suppliers for all critical components as part of its continuity plan.

## 4.6.2 Structural risk readiness

Because risk needs to be an ongoing focus, companies are increasingly devoting dedicated teams to risk management in the supply chain. These teams can do several things:

- develop contingency plans and risk protocols;
- audit preparedness;
- train plant management and staff;
- report to senior management on risk profiles and preparedness.

Most important, however, is not to leave risk management in the supply chain solely the responsibility of a team, but to use the team to create an ongoing organisation-wide focus and effort. Most often teams *help* plant management and various functions in the organisation, instead of telling them what to do. Henkel, the German consumer goods company, for example, has appointed risk

teams to work with various departments in assessing risk. It raises fundamental awareness across the organisation, and is the basis for developing contingency plans proactively.

## 4.7 Corporate social responsibility in the supply chain

**Key issue: Companies operating international or global supply chains need to incorporate social responsibility into their supply chain design.**

In Chapter 1, we included corporate social responsibility (CSR) under the overall concept of sustainability and the ‘triple bottom line’. CSR has developed a momentum of its own, and now largely overlaps sustainability. Here, we explore the concept of CSR as it is being developed by various focal firms, especially in the context of international logistics. Broadly defined, CSR in the supply chain deals with the social and environmental consequences of supply chain operations. Making a global supply chain environmentally sustainable and socially considerate is harder than just doing so for a focal firm. This is due to global reach and the fact that multiple companies are involved. As a result, it is harder to assess and improve operating policies across the entire supply chain. Yet this is a key opportunity to bring CSR to life.

Two examples illustrate the issues:

- In 2006 the ship *Probo Koala* was redirected from the port of Amsterdam in the Netherlands to Côte d’Ivoire, where it dumped its waste. But a Dutch inquiry found the ‘waste’ was more than 500 tonnes of a mixture of fuel, caustic soda and hydrogen sulphide. The waste was dumped in 12 sites around the capital of Côte d’Ivoire, Abidjan. The gas released by these chemicals was blamed by the United Nations and the government of Côte d’Ivoire for the deaths of 17 and the injury (ranging from mild headaches to severe burns of skin and lungs) of over 30,000 Ivorians. A November 2006 Ivorian government report into the incident said that Trafigura was to blame for the dumping of waste, and was aided by Ivorians. A government committee concluded that Trafigura knew that the nation had no facilities to store such waste and knowingly transported it from Europe to Abidjan. In late 2008 a criminal prosecution was begun in the Netherlands by the Dutch Public Prosecutors office: Trafigura (the ship’s owner), the captain of *Probo Koala* and the port of Amsterdam authorities were charged with ‘illegally transporting toxic waste into and out of Amsterdam harbour’ and falsification of the chemical composition of the ship’s cargo (Leigh and Hirsch, 2009).

### Activity 4.5

Review the evidence for this disaster which is detailed at:

[http://en.wikipedia.org/wiki/2006\\_C%C3%B4te\\_d'Ivoire\\_toxic\\_waste\\_dump](http://en.wikipedia.org/wiki/2006_C%C3%B4te_d'Ivoire_toxic_waste_dump)

Who was to blame for the *Probo Koala* disaster in Côte d’Ivoire in 2006? What are the CSR implications of what happened?

- Nike came under heavy scrutiny from customers in the 1990s for its use of low cost labour, predominantly in Asia. There were suspicions of use of child labour (Case study 4.7), and other unethical labour practices among Nike suppliers. Nike launched a comprehensive CSR effort – including the appointment of a vice-president for CSR – and now is considered to be a leader for improving supplier practices and for responsible behaviour along the supply chain.

CSR has caught both public and political attention, and companies are developing approaches that span the spectrum displayed in Figure 4.15. Worst practice in CSR is for companies to publish a CSR report and to engage in PR efforts to make the company look responsible, yet hide behind the approach:

**I can't see everything in my supply chain that happens on the other side of the globe in another company, so I can't manage that.**

So not much changes in day-to-day operations – other than telling suppliers that they 'need to be responsible for their actions'.

Telling suppliers to 'shape up' cannot be expected to have much of an impact. One example of a weak response to CSR is that of a focal firm which said, 'we ask our suppliers to adhere to the rules, and if we have a continued suspicion of improper conduct we send them a letter'. Not only does that not help suppliers to develop, it also does not take active ownership of the challenge. Even worse – while this was happening – the firm continued to award business based on supplier price levels, with no consideration for the impact of these price levels on labour practices. But progress can be made in comparatively difficult circumstances, as Case study 4.7 illustrates.

#### CASE STUDY 4.7

### Eliminating child labour from the Sialkot soccer ball industry

Nearly 75 per cent of soccer balls were produced in Pakistan, mostly in the Sialkot district, Pakistan's 'export capital' close to the border with India. However, an International Labour Organisation (ILO) study in 2002 showed that more than 7,000 children aged between seven and 14 were stitching footballs on a full-time basis, working between ten and 11 hours/day and earning between PKR 20 and 22 per ball (€1 = PKR 81). Production ranged from three to five balls/day per person. An article in *Life* magazine appeared in June 1996, featuring Tariq, a 12-year-old, stitching balls in Sialkot. This resulted in pressure on international brands such as Adidas, Reebok and Nike to ensure that their products were not produced with child labour. The ILO brokered the *Atlanta Agreement* (2001) to eliminate child labour from the soccer ball industry through improved monitoring.

However, monitoring was difficult to implement. Local 'manufacturers' outsourced work to middlemen, who in turn dealt with home-based stitchers. These could be whole families, including children. Payment was on a 'fixed price' basis, so there was no cost advantage whether the worker was adult or child. The anonymous nature of the network meant that manufacturers had no idea what age of worker was involved.

An independent monitoring committee was set up, and manufacturers were invited to register. Once registered, manufacturers had to declare details of their entire network – including the number of stitchers, daily production, location of stitching centres and names of the middlemen. This was to be done gradually over a period of 18 months. And, once declared, stitching centres were to be subject to random visits. If child labour was discovered,

the manufacturer was instructed to fix the situation. Repeated violations resulted in the manufacturer being withdrawn from the register and reported to international buyers and retailers. Within a few years, practically all of the manufacturers had registered.

Saga Sports, the largest manufacturer, decided to go a step further. It would stop the use of child labour completely by eliminating outsourcing and concentrating production in custom-built stitching facilities which Saga would manage. While Pakistani law allowed children to start work at the age of 14, Saga decreed that it would only employ workers aged 18 or over. Age would be verified against national identity cards and birth certificates. Once confirmed, employees benefited from a pay structure 'equivalent to university teachers in Pakistan'. Employee benefits, such as free health checks and medical help, meals and transport, were introduced. Saga saw these benefits as compensation to families who had lost income as a result of the elimination of child labour.

While Saga's actions have helped to purge child labour from the football stitching industry in an exemplary way, there are other sectors in which children can earn money. Sialkot is also famous for leather goods and surgical goods, where international pressures are more difficult to focus. Easy availability of work, lack of meaningful education opportunities and a 'poverty of thought' prevalent in the community could mean that the problem may only be transferred elsewhere.

(Source: Adapted from Hussain-Khaliq, 2004)

### Question

- 1 What further changes are needed for there to be a sustainable change in the incidence of child labour in developing countries such as Pakistan?

More progressive firms are now beginning to use CSR as a market lever – not only to make them look good in the eyes of the consumer, but to expand the firm with new products at premium prices. An example is 'fair trade' products. Such firms are taking active ownership over the challenge – for example, NEC goes into considerable detail to specify CSR actions for suppliers in a lengthy handbook it has published. Nike has appointed a CSR vice-president, as noted above. Finally, companies such as NEC, Nike and HP invest time and resources in helping suppliers develop into more CSR-adept firms. They visit suppliers, conduct

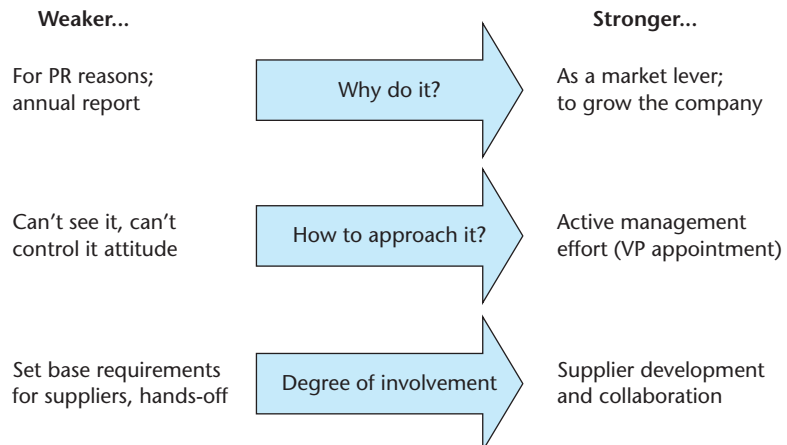


Figure 4.15 CSR practices in the supply chain

audits to identify improvement opportunities and proactively carve out opportunities to collaborate on achieving improvements.

Examples of CSR efforts include:

- incorporating CSR standards and suggested efforts in purchasing policies (see the NEC example above and Table 4.8);

**Table 4.8** NEC CSR supplier requests

Risk management priority	Action item
CSR general requirement	Promote positive CSR activities Contribute to the society and community
Product quality and safety	Ensure product safety Establish and apply a quality management system
The environment	Control hazardous chemicals in products Control hazardous chemicals in manufacturing Establish and apply an environmental management system Minimise environmental pollution (water, soil, air) Obtain environmental permits Promote resource and energy saving by reusing, reducing and recycling Promote greenhouse gas reduction Promote waste reduction Disclose environmental preservation activities
Information security	Secure computer networks against threats Prevent the leakage of personal information Prevent the leakage of confidential information of the customer and third party
Fair trading	Prohibit corruption and bribery Prohibit abuse of a superior position Prohibit the offering and receiving of inappropriate profit and advantage Prohibit impediment to free competition Provide correct information on products and services Respect intellectual property Use appropriate company information Detect injustice promptly
Occupational health and safety	Apply safety measures for equipment and instruments Promote safe activities in the workplace Promote hygiene in the workplace Apply appropriate measures for occupational injuries and illnesses Properly manage disasters and accidents Be careful about physically demanding work Promote safety and hygiene in all company facilities Promote health maintenance programmes for employees
Human rights	Prohibit forced labour Prohibit inhumane treatment and infringements of human rights Prohibit child labour Prohibit discrimination Pay appropriate wages Control working hours Respect the right to freedom of association

(Source: NEC Group CSR Guideline for Suppliers, [http://www.nec.co.jp/purchase/pdf/sc\\_csr\\_guideline\\_e.pdf](http://www.nec.co.jp/purchase/pdf/sc_csr_guideline_e.pdf))



- conducting supplier audits to identify improvement opportunities, and following up on issues that are found (do not say you can't see it when you can go and look);
- taking ownership of CSR initiatives by running supplier development sessions, and by collaborating on improvement projects.

#### CASE STUDY 4.8

### Embedding CSR at Akzo

Akzo, the Dutch-based chemicals and coatings company, owner of ICI and many other brands, has appointed a CSR officer to drive and coordinate CSR efforts across the company. To drive ownership, consideration and focus broadly across the company and in all the decisions it makes, two simple things are done:

- 1 Every proposal that the Board is asked to decide upon must be accompanied by a CSR and sustainability evaluation otherwise it will not be considered by the Board.
- 2 Personal targets for senior management across the company include as a KPI the company's position in the Dow Jones sustainability index.

As (a) the largest company in the world by revenue taking sustainability seriously, (b) doing so in a cost effective manner and (c) on an international scale, Wal-Mart is setting some challenging targets with its supply chain partners, as described in Case study 4.9.

#### CASE STUDY 4.9

### Wal-Mart's sustainability programme

Wal-Mart has set three ambitious goals for sustainability:

- 1 To be supplied by 100 per cent renewable energy.
- 2 To create zero waste.
- 3 To sell products that sustain the environment.

In moving towards these goals several key projects have been rolled out, including changing store design to use more natural light as opposed to electrical light, and catching rain from store roofs and AC units for watering the landscape.

On its fleet the company has introduced auxiliary power units so that when waiting idle for more than three minutes the main engine turns off. It is estimated that this alone will lead to US\$23 million in fuel savings per year.

Furthermore, the company worked with its supplier of private label toys to remove excess packaging from 277 children's construction toy skus and to reduce the size of the package. This alone will lead to 727 fewer shipping containers and a US\$3.5 million saving in transportation costs. Additionally the company recognises a marketing advantage as customers frequently ask for sustainability improvements.

#### Activity 4.6

List possible CSR concerns in the supply chain, and the possible impact on the focal firm making and selling the end product (a) if they go wrong and (b) if they go right.

## Summary

### *Why international logistics?*

- A major driver of the internationalisation of business has been labour shortages and costs in established markets, and the availability of low cost production in newly industrialised regions. A further driver has been the need to follow customers into new local markets, and to create new learning opportunities.
- This has created phases in internationalisation of operations, and hence of the logistics pipelines that are associated with them. Logistics pipelines differ from market to market and from company to company over time.
- Global sourcing can create economies of scale for transportation through multiple consolidation as organisations orchestrate their global networks, and focus key areas such as manufacturing and R&D.

### *What are the logistics implications of internationalisation?*

- Despite the obvious benefits of global sourcing, firms should not ignore the logistical complexities and operational costs associated with sourcing globally (including longer shipment times and higher shipping costs) when deciding their internationalisation strategies. Increased complexities and costs are often ignored or only partially recognised in the rush to obtain lower piece part prices.

### *How do we organise for international logistics?*

- New solutions for layering and tiering the supply network are being tried out, such as co-location of suppliers with OEM plants in the auto industry. Meanwhile, the role of individual plants may be modified to allow more flexible response to local markets, for example by carrying out final assembly in local distribution centres.
- The key to success of internationalisation strategies is the rationalisation of sourcing, production and distribution. At the same time, the organisation needs to be sensitive to local markets and preferences. Crucial also is to ensure risk preparedness in international supply chains and to factor in corporate social responsibility policies proactively.

## Discussion questions

- 1 What are the benefits and limitations of international logistics? Illustrate your response by referring to sourcing of standard shirts and fashion blouses (shown in Table 1.1 in Chapter 1) from manufacturers in the Far East. Also, refer to the time v cost trade-off illustrated in Case study 4.4.
- 2 Tiering of the supply network is referred to in section 4.4.1, and in Chapter 1, section 1.1. Describe the advantages of tiering in terms of globalisation, touching on areas such as outsourcing and the focused factory.

- 3 Identify six potential sources and causes of risk in global supply chains. Use the reference to Peck (2003) below to propose counter measures.
- 4 What is meant by the term 'corporate social responsibility' as it applies to international logistics? Illustrate your answer by referring to the *Probo Koala* disaster and the issue of child labour in the Sialkot soccer ball industry described in section 4.7.

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