Excellence in Warehouse Management

How to Minimise Costs and Maximise Value

By Stuart Emmett

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Contents

Introduction

My interest in handling freight goes back to childhood and was fostered and matured during employment. Starting out in shipping and forwarding in the days of conventional cargo shipping in the early 1960s, an early responsibility was in arranging transport to the docks. We were quickly forced to change to roll-on roll-off and lift-on lift-off methods as containers and trailer methods of transport largely took over and also moved activities inland, involving the setting up of inland warehouses for cargo consolidation.

With the UK making the decision to join the EU in 1972, this also changed my work and I moved into consultancy, giving distribution advice to those people who previously had only traded in the UK and now had the view that the whole continent was soon to become a domestic market. This consultancy work was also widened out to include worldwide export/import movements.

After completing studies with the Open University in 1978, I then moved out to Nigeria where I was employed by the country's largest Forwarding and Shipping Agency, with over 1000 staff in Lagos alone. I was involved with different responsibilities: clearing, containers deconsolidation/warehousing, and lighterage/road transport of strategic imports. It was never a dull place in which to work, and fascinating also to be able to work where skills in distribution were highly appreciated and well rewarded.

The time in Nigeria ran its course and on my return to the UK I took one year out to complete an MSc at Cranfield, before joining a third party company in a commercial development role on UK Distribution, working for such companies as Heinz, Pedigree Petfood and Boots the Chemist.

This role continued until 1990 when I moved into training, with work associated largely with the, then, Institute of Logistics and Distribution Management (now the Chartered Institute of Logistics and Transport).

Since 1998 I have been a freelance independent mentor/coach, trainer and consultant trading under the name of Learn and Change Limited (www.learnandchange.com). I now enjoy working all over the UK and on four other continents, principally in Africa and the Middle East, but also in the Far East and South America. Additional to undertaking training, I am also involved with one to one coaching/mentoring, consulting, writing, assessing and examining for professional institutes' qualifications and as an external MSc examiner for Purchasing and Logistics.

The journey, while an individual one, could not have happened without the involvement of other people, and I am grateful when I recall the assistance they offered. Additionally, during the lifetime of learning and meeting people, the original source of an idea or information can be overlooked. If I have, in this book, omitted to give some people the credit they deserve, I apologise and hope they will contact me to enable me to correct that omission in, hopefully, a future edition.

Therefore, anyone who has ever had contact with me can be assured that they will have contributed to my own learning, growing and developing. While thanking you all, my hope is that in this book I have given you back something positive.

I am pleased to say, and acknowledge, that my learning still continues, both with formal pieces of paper as evidence to the CV viewers, but more importantly, in trying to find something new in every day.

I have made great endeavours to ensure that nothing in this book, if used, would be in any way injurious or cause financial loss to the users. The users are, however, strongly recommended to check and verify their own company policy/requirements before applying or using any of the items mentioned. No liability will be accepted by the author for the use of any of the contents.

Throughout this book, there are some Action Times, Challenges/Thinking Points and Case Studies. These are designed to enable the students to think and reflect. Without this, there is unlikely to be any learning. Additionally, I have including typical training topics/content plans to highlight the appropriate knowledge that is needed for the given topics. Again, my hope is that this will encourage study and eventual learning with specific application.

Abbreviations

The following is a list of the abbreviations used in this book. The list does not include Acts or Regulations.

3PLSP	third party logistics service provider company
4PL	fourth party logistics provider
ABC	ABC analysis or 80/20 rule or Pareto analysis
ACOP	approved codes of practice
AFT	articulated fork-lift truck
AGV	automated guided vehicle
APR	adjustable pallet racking
AS/RS	automatic storage and retrieval system
BOM	bills of materials
CBT	counter-balance truck
CCTV	closed circuit television
CPD	continuing professional development
CR	continuous review
CRM	customer management
DIR	drive in racking
DV	demand variability
EDI	electronic data interchange
EOQ	economic order quantity
ERP	enterprise resource planning
FCL	full container load
FLT	fork-lift truck

FMCG	fast-moving consumer goods
FMS	fast, medium, slow
FOQ	fixed order quantity
FOT	fixed order time
G-O	goods to operator
HD	hoist down
HPT	hand pallet truck
HU	hoist up
ICT	information and communications technology
IMS	inventory management system
KPD	key productivity driver
KPI	key productivity indicator
LT	lead time
LTV	lead time variability
MBWA	management by walking about
MESC	materials and equipment standards and codes
EPOS	equipment at point of sale
MHE	material handling equipment
MPS	master production schedule
MRO	maintenance, repair and overhaul
MRP	materials requirement planning
MRPII	manufacturing resource planning
MRPT	man riser picking truck
NART	narrow aisle reach truck
NRA	no-returns agreement
O–G	operator to goods
OTIF	on time, in full
PMPR	powered mobile pallet racking
PPE	personal protective equipment
PPT	powered pallet truck
PR	periodic review
PU	put down
QC	quality control
R&D	research and development
R&R	rent and rates
RA	returns agreement
RDC	regional distribution centre

RFID	radio frequency identification
RL	reverse logistics
ROL	re-order level
ROP	re-order point
RT	reach truck
SD	standard deviation
SKU	stock keeping unit
SLT	supply lead time
SLTV	supply lead time variability
SM	standard minute
TAC	total acquisition cost
TRAMS	transport management system
ULD	unit load device
VDU	visual display unit
VOQ	variable order quantity
VOT	variable order time
WMS	warehouse management system
XML	extensible mark-up language

Acknowledgements

I am grateful for help and assistance from friends and colleagues in checking contents and giving suggestions for this book. In particular to Jeremy Mant on the inventory topics and I shall be forever grateful to Barry Crocker of Salford University for his support and expert editorial eye on the text.

1

The Role of Warehousing and Stores

WAREHOUSING AND THE SUPPLY CHAIN

Warehousing is actively involved in the supply chain. In demand-driven supply chains this may be mainly by storing goods, or involve more sorting activities; both being required to largely feed external customers. In the supply-driven supply chains, then warehouses get renamed as stores, and hold stocks required to feed internal activities like production.

Warehouses are therefore an integral part of the supply/demand chain/pipeline infrastructure.

The term 'supply chain' is the process that integrates, coordinates and controls the movement of goods and materials from a supplier to a customer to the final consumer (Figure 1.1). The essential point with a supply chain is that it links all the activities between suppliers and customers to the consumer in a timely manner. Supply chains therefore involve the activities of buying/sourcing, making, moving and selling. Therefore, the supply chain 'takes care of business' following from the initial customer/consumer demand. Nothing happens with supply until there is an order; it is the order that drives the whole process. Indeed some people logically argue that the term 'supply chain' could be called the demand chain.

Additionally, as supply chain management is all about the flow of goods and information, then perhaps a better analogy than chain is a pipeline, as this better emphasises flow. Also to emphasise the flow aspects,

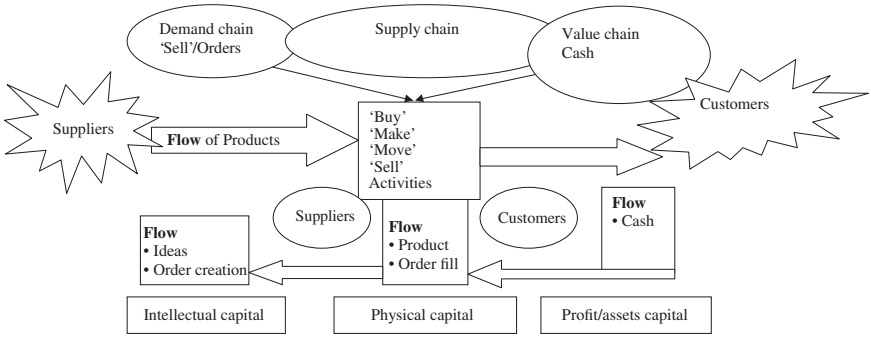

Figure 1.1 *The supply chain*

warehouses should perhaps be better thought of as undertaking sorting and not storing products.

It is also important to realise that each company has not one supply chain but many, as it deals with different suppliers and has different customers. For each finished product, while some of the buying, making, moving and selling processes will be identical or very similar, the total supply chain for each product will be different. Multiple supply chain management is therefore a better description but it is a cumbersome one. In supply chain management, therefore, there are many different supply chains to manage, with the varied goods being 'combined' in the warehouse.

CHALLENGE

How many supply chains exist in your company?

TRAINING TOPICS

Topic: Supply chains – Awareness of the key impacts and developments
Duration: 1 day

Course content

- ***Understanding what the supply chain is about***
  - Definitions: The interrelations and connections of buying, making, moving, and selling activities
  - History of the supply chain and its development
  - A view of the future.

- ***The key aspects***
  - The cost/service balance
  - Customer service principles
  - Lead times throughout the supply chain
  - Adding value
  - Production options/changes
  - Trade-off opportunities.

- **The benefits of adopting a supply chain approach**
  - The sub-functional conflicts
  - Benefits within functions
  - A supply chain view of total acquisition costs.

- **Why traditional ways are changed**
  - Demand amplifications and the 'Forester' effect
  - Uncertainty and unresponsiveness.

- **Impacts to the supplier/customer relationships**
  - Practical effects on lot sizes/order quantities
  - Reducing costs
  - Sharing developments
  - Eliminating internal and external barriers
  - Interfacing versus integrating relationships.

- **Supplier relationship case studies**
  - Manufacturing and retailer case studies
  - Lessons and key aspects from experience.

- **Implementing a supply chain management approach**
  - The changes needed
  - Potential action needed.

- **What happens if we do nothing?**
  - The 'do nothing' future of adversary relationships
  - Higher stock levels
  - Competition gains
  - Silo closed management approaches.

- **A 5-step approach to supply chain development**
  - The model ('should we?; benefits and drawbacks; internal issues; key issues; and finally')

DEFINITIONS

Definitions can be important to clarify thought and are especially so when one person understands a term to mean one thing but another person understands the same term to mean something different. This has been happening, for example, in the UK from the early 2000s with the word 'Logistics'. This term, which originally encompassed the whole supply chain, is now being referred to by many companies as a new name for transport, or for warehousing/stores or for distribution. Third-party transport companies are also beginning to call themselves supply chain management companies. Confusing, isn't it?

In the UK, one can observe the new name on a freight transport vehicle that was previously called 'Fred Smith Transport' and is now called 'Fred Smith Logistics'. Logistics can therefore be a confusing word and, additionally, some people use the term 'logistics' to describe their own internal company process, and use the supply chain term, when they are dealing with external suppliers/customers. At the risk of further confusion, others also call their internal logistics processes an internal supply chain!

Distribution is meant to be about delivering the right goods to the right place at the right time and at the right cost. This definition is the 'rights of distribution' and represents, in a simple way, the objectives for distribution. Distribution therefore involves the combining of transport with warehousing, and is a term that is often applied to finished goods. However, it may also be used by suppliers who are delivering product to their customers, perhaps of raw materials and semi-finished work-in-

progress goods. Suppliers are also concerned with getting the 'rights' correct and, as far as that supplier is concerned, the raw materials can, for them, be the finished goods.

Meanwhile, when readers hear the three terms 'logistics', 'supply chain' and 'distribution', they are strongly recommended to ensure that they have the full understanding of what the originator means when each term is being used. This can be very important and prevent confusions; for example, 'Fred Smith Logistics' is unlikely to have a clue about whether to outsource the manufacture of sub-assemblies or whether these can be manufactured internally. This would often be a strategic supply chain decision (but then again, some would say it is strategic logistics decision).

THINKING POINT

How are the terms 'logistics', 'supply chain' and 'distribution' used in your company and with the suppliers/customers with whom you deal?

With warehousing and stores, we can usefully define a warehouse as 'a planned space for the storage and handling of goods and materials'. It should not be 'a place where buyers keep their mistakes' – an observation from a major retail company in the early 1990s. Throughput and sorting are often of more importance than storing (especially in demand driven operations). The effective and efficient use of both time and the warehouse/site space are also important. The emphasis should therefore be on the planning of all the warehouse activities, including receiving, storing, assembling, kitting, picking and the despatching of customers'/users' orders. The warehouse is therefore able to consolidate, break bulk, cross-dock and provide value added services.

STRATEGIC ASPECTS OF WAREHOUSING

Warehouse management is often thought of as being just an operational day-to-day job. However, it should also be involved in the longer

strategic aspects of the business. Warehousing has a critical part to play in supply chain management and it can only play this part if it is involved in the strategic aspects of the business. This will involve being aware of the expected development of the business in terms of the future:

- production
- product
- suppliers
- customers
- and all the associated product volumes and throughputs.

Strategic questions on warehousing

- Do you need a warehouse?
- Is it in the right place for the supply/demand balance, transport, labour, and all other services needed?
- Are all the future supply and demand requirements known?
- Is the labour force stable?
- Is absenteeism above the national average?
- Are communications good?
- Is accuracy 100%?
- What is the real time visibility of information for inventory, productivity, cost and service?
- What is the shortest response time for customer orders?
- What are the levels of productivity and how do we know they are 'world class'?
- When did you last plan an ideal 'layout'?

By answering these questions, warehouse management is able to proactively assess situations and make important contributions to the decision-making process.

THINKING POINT

Who takes such a strategic view of warehousing for your company?

CUSTOMERS

We have mentioned earlier the importance of the customer order, as it is only the order from the customer that triggers all the activity in the supply chain, logistics or distribution processes. Without a customer order, none of these process or activities is required. The customer may be interested in buying products, but is really more interested in buying delivered products. Additionally, the time scale from ordering to receiving the delivery has in recent years often been shortened. A normal expectation in the UK, for example, is for next day delivery with many products, with some suppliers (for example, of stationery) offering the same day delivery to major national locations for orders received before noon.

This clearly puts pressure on the warehouse pick/pack/despatch operations, as well as on the transport operations, but it also shows a response to market requirements/expectations and one that offers a competitive advantage to the first company to deliver such a service.

Customer service levels are therefore variable and each customer service variable (such as same day delivery) has an associated cost. The relationship between cost and service is rarely a straight line, but is more of an exponential curve. So, a 10% increase in service may mean a cost increase of 15 or over 50%.

Customer value

Customers will place a value of many aspects of the total service offering. Value is also placed by customers against quality, the cycle lead time and the cost and the service levels. As perception is reality, customers can see these as being interrelated or may view them independently. It is therefore important for a business to understand the specific reality as seen by the customer.

The following are the aspects of the four customer value criteria:

1. Quality is 'performing right first time every time' and involves:
   - meeting requirements
   - fitness for purpose
   - minimum variance

- elimination of waste
- continuous improvement culture.

2. Service, is about 'continually meeting customer needs as the market changes', and involves:
   - support available
   - product availability
   - flexibility
   - reliability
   - consistency.

3. Cost, is about knowing what the costs really are and then looking at how to reduce them. This involves the:
   - design of product
   - manufacturing process
   - distribution process
   - administration process
   - stock levels.

4. Cycle lead time is about knowing what the lead times really are and then looking for ways to reduce them. This involves considering:
   - time to market
   - time from order placement to time available with the customer
   - response to market forces
   - days of stock cover.

A business, therefore, ideally will try to improve its quality and service, while reducing cost and lead times. All of the aspects are interrelated and connected and, for example, it doesn't matter to the majority of customers whether the goods are transported by road, rail, sea, air or multimodal or intermodal means, or whether they are stored, kitted or cross-docked in warehouses. The four factors above are what they really value. The method of distribution is purely a means to these ends and outcomes.

CHALLENGE

Find out how your customers rate the above quality, service, cost and lead-time factors

THE VALUE CHAIN

Michael Porter of Harvard Business School in his book *Gaining Competitive Advantage* introduced this concept in 1985. From Figure 1.2 you will see that this has significant implications for logistics/supply chain/distribution.

The value chain divides into primary and support activities as follows:

- Primary activities
  - Inbound logistics covering stores, warehousing, handling and stock control.
  - Operations covering production and packing and all activities that transfer inputs into outputs.
  - Outbound logistics include transport and warehouse networks to get products to customers.
  - Marketing and sales cover the methods by which customers know about and purchase products.
  - Service includes the support for all activities such as installation or returns.

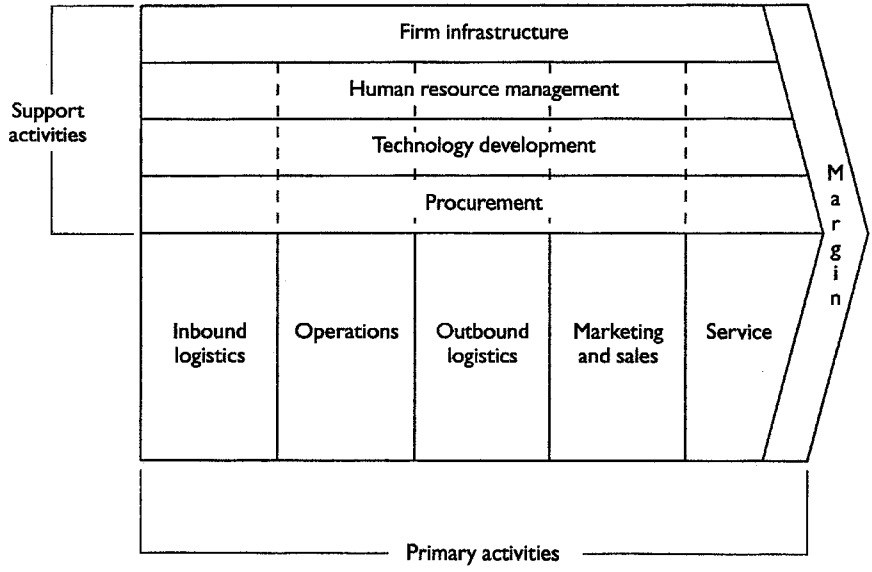

Figure 1.2 *The value chain*
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- Support activities
  - Procurement includes the buying and purchasing of products as well as all other resources.
  - Technology covers such items as information and communications technology (ICT) and research and development (R&D).
  - Human resource management covers all aspects concerned with personnel.
  - Infrastructure covers finance, legal and other general management activities.

Porter then expanded this concept of a value chain into a *value system*. This consists of a series of linked value chains. By this joining together of value chains into a value system, in effect we create a supply chain. Where the value actually is, according to Porter, is dependent on the way a customer uses the product and not just totally on the costs incurred in buying, making and moving it. These costs, including all the raw materials and activities that create the product, then represent its value. But it is only when the product is purchased that this value can be measured; and, finally, it is not until the product reaches the final customer/consumer that the real value is to be found.

Part of the difficulty here is that each individual organisation in the supply chain will attempt to define value by looking only at its own profitability. Each company will in turn carry on this definition to their suppliers and as the definition of value moves back up the chain, it will become distorted. Indeed, one of the reasons for companies to try to work together more closely with suppliers and customers is to have a constant view of value throughout the supply/value chain.

Therefore, we have seen that costs are added during the buying, making and moving activities and that ultimate/real value is only found when the product is with the customer. Meanwhile, value has been added by improving the product, by changing its form, moving it to a different place and all this has occurred over time. Therefore, we can see that value is added by:

- making it faster by changing the form
- moving it faster to the place required
- doing it faster by time changes

and that

- ultimate value comes after the movement to the customer.

Figure 1.3 shows how cost and value are added in the supply chain process.

Clearly, this diagram shows that goods being stored are incurring cost and are not adding value. Indeed, one challenging definition of a warehouse is that, in supply chain terms, a warehouse is an admission of defeat as we are planning to stop the flow of goods and materials and, therefore, are increasing cost and not adding value. While it will generally be the case that stored goods will not increase in value, this may apply to a very limited range of products, such as with bullion in non-inflation times and with works of art. The diagram, however, emphasises that movement to the customer as quickly as possible while accounting for associated cost levels is what really counts in adding value.

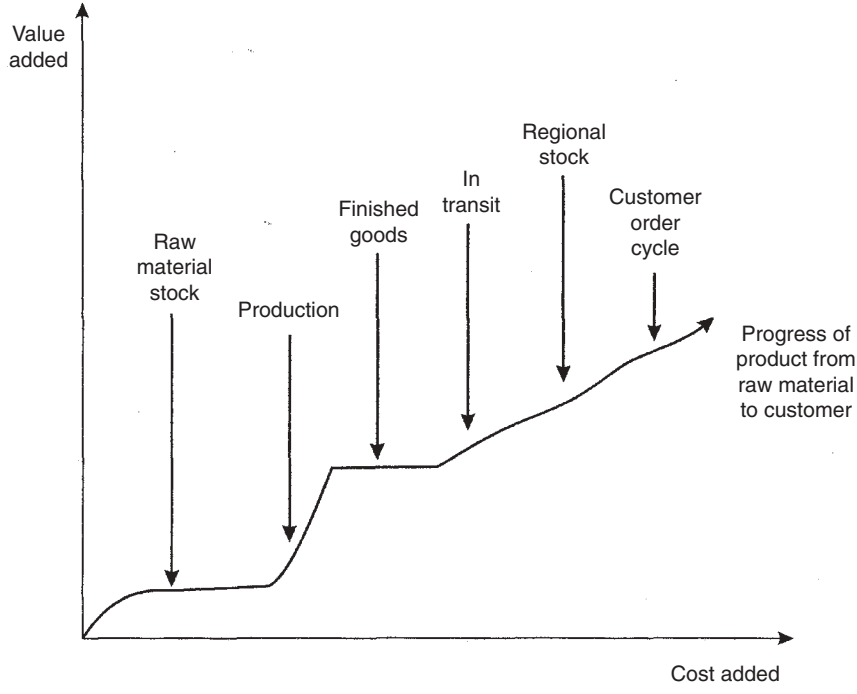

Figure 1.3 *Cost and value adders in the supply chain*
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THINKING POINT

How can you add value to your company's customer offering?

WAREHOUSE LOCATION

The location of the warehouse(s) can be a critical decision. Clearly for a business that is involved in manufacturing, its raw materials stores are likely to be the production sites, and the stores location is therefore determined by the location variables of the production sites. However, this is not an absolute and, for example, the Nissan car factory based at Washington, Tyne and Wear, holds little raw material stock on site as it follows a synchronised just in time (JIT) system with its suppliers (mainly located in the West Midlands), so that raw materials are received and the line is fed immediately.

The following represents the reasons why it may be necessary to move a warehouse:

- Financial savings: for example, from government grants. Hopefully this involves full trade-off decision-making, including for example any impacts to customer service levels and resultant financial implications.
- Cost savings: for example, by being closer to customers and saving in transport costs.
- Expansion: for example, the need to hold more product lines due to entries into new markets.
- Consolidating: for example, the closing down of regional centres or the consolidation of separate local sites into one location.
- Improve performance: old buildings may be difficult to convert to allow the use of more modern, up-to-date activities and systems.
- Facilitate change in operations or organization: for example, to conduct added value activities.
- Communications: for example, incorporating all of a company's business activities on the one site.
- Image: for example, to a 'showcase' site.
- Expiry of current lease.

In making the move, the following need to be considered:

- Impact to workforce: for example, potential redundancies of existing staff and recruitment of new staff.
- Recruitment opportunities: for example, availability with the possible attendant need for medium-term training.
- Proximity to the transport network: for example, locations in Northamptonshire and Leicestershire are popular warehouse areas due to the M1/M6/M69 and A1/A14 intersection road network and their central location with the UK population; that is, the source location of demand/where people live who buy things.
- Availability of social, recreational and cultural amenities: for example, a 'new town' may not have a source of supply.
- Housing for staff and personnel.
- Tax breaks: for example, when buying new assets.
- Real estate values: for example, regional variations are high, with London Heathrow being the most expensive.
- Neighbouring property development: for example, compatibility.
- Environmental impacts: for example, planning permission may not allow high rise structures.
- Local authorities: for example, warehouses are frowned upon in some areas as they are seen to take up a high amount of land for proportionally low employment.
- Customer perception: for example, how will they see the change?
- Customer reactions: for example, will they be concerned about service disruptions?
- Disruption to service: for example, coordinating with the supply/inbound stock to the existing location and the stock build-up in the new location before going 'live'.

When moving, surveys reveal that employees' preferences are in the following ranked order:

- near to public transport
- a safe area
- near to shops
- pleasant surroundings
- close to cafés, pubs and restaurants.