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**SWP 10/95 A REVIEW OF CURRENT LOGISTICS PRACTICE**

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## A REVIEW OF CURRENT LOGISTICS PRACTICE

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**Key words:**  
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### **ABSTRACT**

A review of the logistics and general literature reveals three forces at work which are changing the nature of global business:

- The globalisation of economies
- The homogenisation of products
- The advancement of technology

Different sectors have a different level of awareness and achievement. Manufacturing is generally still somewhat inward looking, whereas retailing is the source of a good deal of innovation and change. In the United States the "Efficient Customer Response" initiative is a major factor in reshaping the channels of supply from manufacturing to retailing, and the distribution industry more than any other is suffering the effects of change. The more progressive participants in the distribution sector are trying to achieve a more dominant position, by offering a wider range of value-added services than simple transportation and storage of goods. The banking and payment clearing services sector is not seen as a major factor, despite the very significant opportunity to develop and improve payment services, and to link them more tightly with operational activity.

The management of supply chain operations is becoming more sophisticated. Systems thinking, benchmarking and customer service imperatives are all causing a wave of new interest in the best ways to manage supply chain and logistics operations.

The prospects for further significant developments in the future continue to expand, and it is difficult to see any limit or ultimate end to the development of logistics practices around the world.

## INTRODUCTION

There is a very large body of literature dealing with logistics, and references to logistics can be found in a wide variety of sources including academic journals, practitioner journals, conference proceedings, books and in the serious press: this review presents a small selection from each. It is based upon an examination of over 400 articles and abstracts, all concerned in some way with logistics and supply chain operations.

There are few single sources which provide an overview of logistics practice today, but there has been one recent publication which - through a collection of papers - manages to deal with a range of functional, regional and operational issues<sup>1</sup>.

### *Structure*

This review is structured under the following headings:

- Sectoral issues

There are different kinds of business involved in supply chain operations, based in different industries and with different characteristics (for example size, maturity, organisation).

- Supply chain operations

Looking over the whole of the supply chain, there are operational, methodological and even engineering issues concerning how the supply chain is configured and how it is controlled.

- Supply chain economics

In parallel with the operational issues are the economics of supply chains: costs, revenues, and other benefits.

- The customer imperative

It is important to understand the customer's needs and how they are serviced. Many experts opine that the customer's needs are paramount in engineering successful supply chain operations.

### *Themes*

The literature provides evidence of recurring themes which are the source of continuing pressures on business to improve supply chain operations:

- The globalisation of economies

Globalisation has introduced fierce competition on a wider basis than has ever been known before, with suppliers from many countries competing within dramatically enlarged market places.

- The homogenisation of products

The homogenisation of products means that the customer differentiates his suppliers by their services more than by the product. This is one area where the innovative use of technology can really provide competitive advantage.

- The advancement of technology

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<sup>1</sup> Cooper, James (Ed); *Strategy planning in logistics and transportation*; Kogan Page, Cranfield Management Research Series 1993

Technology has reduced certain barriers to entry, speeded up product development and delivery, and enabled value adding through the provision of information. In due course technologies become commonplace and no longer provide advantage - rather, *not* having them leads to disadvantage.

The single European market is a case in point. It starts with a globalisation of national economies (within the European boundary at least), and it demonstrates some homogenisation of products (such as food and wine) and some technology developments (such as the RACE, TEDIS and ESPRIT developments<sup>2</sup>).

The commentary below deals with the available literature under the headings already explained above.

## SECTORAL ISSUES

Any corporate body thinks first of its own affairs: its product, its market place and its assets. Traditionally an organisation operating in one area of business would not seriously consider venturing into a completely different area, but this is now happening much more widely, especially in the "new" area of logistics.

By looking at the provision of goods and services on an end-to-end basis organisations can see the opportunity to take over, or at least influence, the businesses on both sides - up the chain (back to original supply) and down the chain (to the end customer). They can also see ways in which they can redeploy existing competencies in new areas. There are a large number of review articles which try to introduce these sorts of ideas. Recently the arguments have become more cogent and persuasive<sup>3</sup>.

A popular division of supply chain activity is into *manufacturing*, *distribution* and *retailing*, although there are many variations on this theme.

### *Manufacturing*

The industrial manufacturers are still very focused on internal issues such as just-in-time (JIT) and manufacturing requirements planning (MRP). However, supply chain management is now recognised as fundamental to the achievement of the goals offered by these philosophies<sup>4</sup> and progress is being made<sup>5</sup>. Supplier and customer relationships are acknowledged as being of major importance; the balance between customer service and operational efficiency is highlighted as a potential paradox<sup>6</sup>.

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<sup>2</sup> These three European initiatives were funded largely by the European Union. The deal respectively with electronic data interchange, communications infrastructure and software engineering. A large number of reports are available directly from the appropriate offices in Brussels: CEC DG XIII, Rue de la Loi 200, B-1049 BRUXELLES, Belgium.

<sup>3</sup> Cooper, Martha C; Ellram, Lisa M; *Characteristics of supply chain management and the implications for purchasing and logistics strategy*; Intl Journal of Logistics Management 1993, 4, No. 2, 13-24

<sup>4</sup> Maloney, Thomas; *Wanted: A strategy for supply chain management*; Electronic Business, Vol. 14, No. 15

<sup>5</sup> There are a number of surveys available. See for example: *Managing logistics*; prepared and published in the UK by Andersen Consulting and the Chartered Institute of Purchasing and Supply

<sup>6</sup> Introna, Lucas D; *The Impact of Supply Chain Integration on Operating Performance*; Logistics Management Information, Vol. 6, No. 4

## *Distribution*

The warehousing providers and carriers are under constant scrutiny as the waves of interest in third party services come and go, but the predominant message in English language journals is that UK companies are ahead of the European competition and are already taking over contracts in mainland Europe<sup>7</sup>. The reverse does not seem to be true: Europeans are not breaking into the UK market place, although the Americans are attempting to<sup>8</sup>. There are references to the trend to third part outsourcing, largely where businesses wish to focus on their "core business" and dispense with non-core service activities such as distribution. These companies contract their logistics out to a third party, either a freight forwarder to handle the allocation to carriers, or to a carrier company to providing a full logistics service. There are surveys of attitudes to this outsourcing issue which highlight the importance of managing the outsourcing relationship<sup>9</sup>, and there are specific case studies - in the case of Laura Ashley this was critical to their survival as a fashion apparel manufacturer and retailer<sup>10</sup>.

Some carriers do not see themselves as suppliers of a full logistics management service: they are content that this service is provided by freight forwarders or other third parties. There are many promotional articles concentrating on the performance of a particular company<sup>11</sup>, but there are also articles by academics and consultants that suggest different ways for distributors and carriers to segment their market and manage their customers more effectively<sup>12</sup>.

## *Retailing*

The retailing segments that receive the most attention are grocery and fashion. Historically these segments have had the tightest time-to-market requirements because of the nature of the goods, and it is therefore to be expected that they would benefit from improved logistics.

In the grocery industry the message being conveyed is that the UK major multiples are far more advanced in logistics and marketing than their European competitors<sup>13</sup>, hence they are in a strong position to monopolise the emerging Eastern European market where local suppliers not oriented to fending off fierce foreign competition<sup>14</sup>. The UK major multiples should also have an impact on the Western European market place. An aspect of the economics implies that the reverse should occur, the profits that the UK retailers make are proportionately higher than those in the mainland European market place.

The US has had a strong domestic focus but this has still led to many famous examples of success, such as Procter & Gamble and Coca-Cola<sup>15</sup>. Current leading-edge thinking in the USA is still

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<sup>7</sup> Shipman, Alan; *Load Star*; International Management, Vol. 48, No. 6

<sup>8</sup> Muller, E J; *Conquering the global market*; Distribution, Vol. 92, No. 10

<sup>9</sup> Laarhoven, Peter van; Sharman, Graham; *Logistics alliances: the European experience*; McKinsey Quarterly, Spring 1994, pp. 39-49

<sup>10</sup> Anonymous; *Laura Ashley outsources distribution*; Chain Store Age Executive, Vol. 69, No. 8

<sup>11</sup> Shipman, Alan; *Load Star* (ibid)

<sup>12</sup> Richardson, Helen L; *Trust time-definite, reduce inventory*; Transportation & Distribution, Vol. 35, No. 1

<sup>13</sup> Fernie, John; *Distribution Strategies for European Retailers*; Logistics Information Management, Vol. 6, No. 1

<sup>14</sup> Morton, Catherine; *The development of Poland's food marketing system*; British Food Journal, Vol. 95, No. 7

<sup>15</sup> Fuller, Joseph B; O'Connor, James; Rawlinson, Richard; *Tailored logistics: the next advantage*; Harvard

focused on efficient customer response (ECR) as the highest ideal<sup>16 17 18</sup>. Another phrase originating from US practice is "quick response", espoused by management consultancies and others who provide prescriptive methods for achieving it<sup>19</sup>.

In food retailing there are many reports in the practitioner literature but inevitably much of it is promotional, based on the advances of certain chains (such as Tesco's comprehensive use of EDI and ASDA sharing EPOS information with their suppliers, in the UK<sup>20</sup>). Within fashion retailing best practice is seen as highly efficient supply chain management. Speed to market is of primary importance for fashion items, similarly flexibility in production and the high cost of stock out. This has made the industry focus on optimisation of their supply chains for some years. Benetton are still presented as a definitive example, perhaps even the first example, of totally optimised supply chain management<sup>21</sup>.

### **Other sectors**

The defence sector warrants a mention. It is possible to find review articles about supply and logistics in the military sector (for example the Royal United Services Institute Journal in the UK<sup>22</sup>) but the scope of this literature is quite different. Perhaps a more important aspect of the defence sector is the ever burgeoning interest in CALS - computer aided acquisition and logistics support for engineered military requirements (universally referred to as CALS - now interpreted as "Continuous Acquisition and Lifecycle Support")<sup>23</sup>. This initiative is beginning to affect engineering and logistics thinking in other sectors, such as construction and process engineering<sup>24</sup>.

Logistics is not just a corporate issue, nor even an industry one. It is possible to make it into a national issue as in Singapore. The value of trade passing through Singapore is four times as great as its gross domestic product, and so we can see the importance of supply and logistics management to this small but successful country. There are beginning to be some academic studies of the benefits<sup>25</sup>, which is a change from the purely promotional literature. There are also serious studies of developments in Taiwan based upon the renewal of their national 10-year industry plans<sup>26</sup>.

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Business Review, May 1993, pp. 87-98

<sup>16</sup> deRoulet, David G; *ECR: Better information cuts costs*; Transportation & Distribution, Vol. 34, No. 10, pp. 63

<sup>17</sup> Spethmann, Betsy; *Nielsen moves into ECR race*; Brandweek, Vol. 34, No. 32, pp. 9

<sup>18</sup> Partch, Ken; *ECR '93: Playing the consumer card in supply chain management*; Supermarket Business, Vol. 48, nos. 5, pp. 29-34

<sup>19</sup> Anonymous; *Andersen's recipe for Quick Response success*; Chain Store Age Executive, May 1990, p. 207

<sup>20</sup> Anonymous; *At Tesco in the UK ...*; Supermarket Business, Vol. 47, No. 8

<sup>21</sup> Foster, Thomas, A; *Global Logistics Benetton style*; Distribution, Vol. 92, No. 10

<sup>22</sup> Saunders, D J; *UK Logistics Planning - the way ahead*; RUSI Journal, December 1992, pp. 22-26

<sup>23</sup> Smith, Joan M; *An introduction to CALS: the strategy and the standards*; Technology Appraisals 1990

<sup>24</sup> Springtape (producer); *STEP: Opportunities for the UK Process Industry* (video); QMS (Sandhurst, Camberley, UK), 1993

<sup>25</sup> Hock-Hai Teo; *Organisational factors of success in using EDIS: a survey of Tradenet participants*; Electronic Markets, University of St Gallen, October 1993, pp. 13-14

<sup>26</sup> Tan, Raykun R; Lung, Scott S J; *Automating the supply chain in Taiwan*; Long Range Planning Vol 27 No 4 pp 99-111

### ***Financial Services***

There is relatively little literature about the role of the banks in supply management, even in the area of banking products and services directly aimed at corporate banking customers involved in supply chain operations but there are some reviews<sup>27</sup>. It is difficult to find any discussion of the competitive issues or factors that would make one bank's corporate customer services stand above another's, but there is at least one paper looking at financial issues such as credit management within the logistics<sup>28</sup>.

Given the importance of finance in logistics and supply management this lack of literature is surprising.

## **SUPPLY CHAIN OPERATIONS**

The interest in improving supply chain operations has resulted in large part because of the maturing of systems thinking, and the opportunities presented by information technology. Software suppliers provide products of varying quality to assist an organisation in planning its logistics and supply chain operations. This complements the improvements in physical handling and transportation that have taken place in the last two decades.

### ***Systems thinking***

The origin of some models and analysis techniques is in the Forrester concept of system dynamics (originally developed at MIT in the '60s), consequently they focus on the numerical elements of supply chain management<sup>29</sup>. These models represent cause and effect; where the relationship between these two is known, a system dynamics model can be created. Descriptions of models are given, for example a model that Hewlett Packard developed is documented and information is provided that may be relevant to other organisations wanting to improve their Supply Chain performance, both internally and externally<sup>30</sup>.

### ***Information technology and human issues***

The best IT systems available will not make up for the lack of change in company culture and operational behaviour. There are a great many references to the need to manage the less quantifiable human parameters, if supply chain performance is to be maximised. The key problem area is the relationship between different functional areas, bad enough within one organisation but worse when we are working *across* organisations. Technology can only go so far without trust and a shared belief in the available benefits, in all those people using it. Change must be exhibited consistently from the top level management downwards<sup>31</sup>. Co-operative relationships are difficult for organisations that operate in an adversarial environment.

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<sup>27</sup> LeTourneau, Harry D; *What to Expect from Your Bank*; Financial Executive Vol 8 No 3 pp 23-26 May/June 1992

<sup>28</sup> Novack, Robert A.; Rinehart, Lloyd M.; Wells, Michael V; *Rethinking Concept Foundations in Logistics Management*; Journal of Business Logistics, Vol 13 no 2, pp 233-267 1992

<sup>29</sup> Wikner, J; Towill, D R; Naim, M; *Smoothing supply chain dynamics*; Intl Journal of Production Economics 1991, Vol 22, 231-248

<sup>30</sup> Davies, Tom; *Effective Supply Chain Management*; Sloan Management Review, Vol. 34, No. 4

<sup>31</sup> Earl, Richard G; *Quality and Supply Chain Logistics*; Management Services, Vol. 33, No. 6



### ***Good practice***

There are several prescriptive articles that list faults that organisations exhibit, and give the list of required behaviours that will enhance supply chain performance. The means to change from the former to the latter is not so clearly defined<sup>32</sup>. The solution is likely to be specific to the organisation. There are case studies available from organisations that believe they have successfully made the transition from one state to another. They have a degree of practical detail, for instance the change in warehouse locations and the logistics providers<sup>33</sup>.

The question of internal company culture is not always described as clearly. There are articles questioning the ability of organisations to manage staff motivation when TQM is introduced<sup>34</sup>. Some experiences show that a re-focusing - undertaken in conjunction with suppliers and customers - allows the pipeline be reduced in size, and the natural flows within the supply chain to emerge<sup>35</sup>. ISO 9000, the international standard for quality management systems, is infiltrating the transport industry and has benefited at least one small transport operator in the UK<sup>36</sup>.

### ***Benchmarking***

The operational performance achieved by an organisation acting within a supply chain is obviously of concern to its management. Benchmarking - a means of comparing and contrasting performance between and within companies - is often used in supply chain and logistics management.

Benchmarking came to prominence when Xerox, noticing their demise in the photocopier market, decided that comparing their business functions with those of other industries would give them insights into improvement opportunities. They were correct, and improved their market share considerably as a result<sup>37</sup>. They continue to work to improve things<sup>38</sup>.

A CBI and Coopers & Lybrand survey looked at UK business practice in this area. Although many companies benchmark and review their processes they tend to focus on their competitors, not recognising the value of looking outside their industry<sup>39</sup>. This seems to miss the very essence of what Xerox did which was to look beyond the familiar boundaries to find new ideas. There are many books dealing with benchmarking, both general<sup>40</sup> and specific to logistics<sup>41</sup>.

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<sup>32</sup> Kofman, Fred and Senge, Peter M; *Partnering for Profit*; Organisational Dynamics, Oct. '93: Communities of commitment, TQM Magazine, Vol. 5, No. 5

<sup>33</sup> Thomas, Jim; *1 + 1 = Innovation*; Distribution, Vol. 92, No. 9

<sup>34</sup> Hanks, Janice; *Maintaining the momentum*; Management Accounting Oct.' 93

<sup>35</sup> Gattorna, J.L.; Chorn, N.H.; Day, A; *Pathways to customers : reducing complexity in the logistics pipeline*; International journal of Physical Distribution & Logistics Management, Vol. 21, No. 8

<sup>36</sup> Larner, Peter; *Suckling Transport delivers the goods*; BSI News, June 1994, pp. 16-17

<sup>37</sup> Tucker, Frances Gaither, Zivan, Seymour M., Camp Robert C; *How to measure yourself against the best*; Harvard Business Review, Vol. 65, No. 1

<sup>38</sup> Havard, James L; *BPR at Rank.Xerox*; Cranfield BPR Symposium, 23 November 1993

<sup>39</sup> Anonymous; *Benchmarking for success : Identifying competitive practices*; Industrial Relations Review and Report (CBI / Coopers & Lybrand), Vol. 537, pp 5-7

<sup>40</sup> Watson, Gergory H; *Strategic Benchmarking*; John Wiley 1993

<sup>41</sup> Christopher, Martin; *Logistics and supply chain management: strategies for reducing costs and improving services*; Financial Times - Pitman Publishing 1992

The market globalisation and intensified competition have required organisations to compete on quality of service rather than on product features (which have become somewhat universal). This has resulted in the change of work patterns and procedures to enable costs to be reduced and service to be flexible and in keeping with customers' priority needs. For example, smaller consignments and flexible delivery times are often referred to<sup>42</sup>. Cross functional teams are being asked to provide tailored logistics for customer needs<sup>43</sup>. The regularity of deliveries is often less significant than the reliability, and understanding the customer well enough to not provide an over-specified solution is a prerequisite to maintaining the lowest possible cost base. It is often noted that one of most significant parameters in logistics is time; there are case studies dealing with this<sup>44</sup>.

### *Use of EDI and systems*

The take up of EDI is a good indicator of increasing logistics awareness, not because it accompanies it but because it precedes it. It is becoming clear that the first stage in the use of EDI is concerned with simple efficiency but that as experience accumulates it stimulates new thinking about the sharing of information, partnership and supply chain improvement. It has stimulated new thinking about the way to seek out and identify business improvement<sup>45</sup>.

EDI user groups are involving themselves in modelling and thereby providing themselves frameworks with which to manage international business<sup>46, 47</sup>. The seminal work of the Management in the '90s Project at MIT has become well known and defines five levels for the impact of information technology on business generally<sup>48</sup>.

Well researched evidence about the actual take up of EDI in different sectors is now becoming more easily available<sup>49</sup>. The Economist Intelligence Unit have published an excellent study report on the relationship between EDI and supply chain management<sup>50</sup>, and the BT EDI Research Centre has published a detailed survey of the impact of EDI on the European transport sector<sup>51</sup>. Well-researched international reports and case studies are also coming available<sup>52</sup>. Academic researchers are starting

<sup>42</sup> Ojala, Lauri; *Changing logistical patterns and policies in Northern Europe*; Intl Journal of Logistics Management 1993, 4, No. 2, 25-39

<sup>43</sup> Katzenbach, Jon R; Smith, Douglas K; *The rules for managing cross-functional reengineering teams*; Planning Review Vol. 21 No. 2 Mar/Apr 1993 p: 12-13

<sup>44</sup> Richardson, Helen L; *Trust time-definite, reduce Inventory* (ibid)

<sup>45</sup> Bytheway, Andrew J; *The impact of EDI on business process redesign: the Cranfield EDI studies*; Proc 5th World Congress of EDI Users, June 1994, pp. 142-163

<sup>46</sup> Logistics and Transport Users group EDIA; *EDI export model*; UK EDI Association Conference, May 1993

<sup>47</sup> Article Number Association; *Supply chain management model*; Supply chain management (special ANA report) 1993

<sup>48</sup> Scott Morton, Michael S; *The corporation of the 1990s*; Oxford University Press 1991

<sup>49</sup> de Looze, Sherine and Cox, Benita; *Benefits and barriers to adopting EDI in the UK: a sector survey of British industries*; 5th World EDI Users Congress: Research Forum, Brighton, 14 June 1994

<sup>50</sup> Hartley, John; *Electronic data interchange: Gateway to world class supply chain management*; Economist Intelligence Unit Research Report, January 1993

<sup>51</sup> Davies, Tony; *A pan-European research project to investigate the impact of EDI on the European transport industry*; BT EDI Research Centre, May 1993

<sup>52</sup> Swatman, Paula M C and Swatman, Paul; *Business process redesign using EDI: an Australian success story*; 5th World EDI Users Congress: Research Forum, 14 June 1994

to come together to discuss their work. One recent research forum demonstrated very clearly the close linkage between EDI and business process management, and the need to change business processes to gain the fuller benefits of EDI<sup>53</sup>. This has significant implications for supply chain operations.

The development of EDI thinking goes with new thinking about logistics systems, and these are also becoming available<sup>54</sup>. One of the most recent variations on systems thinking - the "object orientation" (which packages computer programs and data into "objects" which are essentially independent and can roam through networks) - is now affecting the design of business systems, and may become a major issue in the future<sup>55</sup>. At least one UK software house has been totally committed to object oriented design for more than eight years, and has formed a strategic alliance with IBM<sup>56</sup>.

Other IT related infrastructure is becoming available. The world-wide Internet facility is coming under intense study as a facility for every business to use, and we will hear more about this in the months and years to come<sup>57 58</sup>.

### ***Supply chain economics***

The present economic environment is about globalisation, homogenisation and cost savings from the application of technology. This commercial environment is what should be shaping the actions of all companies and at the centre is the question of economics: what is good practice worth in strictly financial terms, and how long will it take to recoup an investment in supply chain improvement?

There has been a growth in the philosophy of operations management that has been led by the Americans and Japanese. The Japanese are still considered to be the best exponents of both supply chain management<sup>59</sup> and internal pipeline reduction and JIT<sup>60</sup>, although their internal distribution systems probably do not match up to the perception<sup>61</sup>.

The reported savings achieved with MRP systems are many, but it is acknowledged that the technology to assist in stock control and supplier / customer information sharing is important and that the financial benefits will depend upon the working practices and attitudes changing within the organisations and at their interfaces with their partners.

The downsizing of firms has been as a result of the economic climate and the current perception of the efficient, responsive firm, there are justifications put forward for this view point<sup>62</sup>. Financial

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<sup>53</sup> Bytheway, Andrew J; *A review of EDI Research*. Cranfield Working Paper, 1995

<sup>54</sup> Stenger, Alan J; Dunn, Steven C; Young, Richard R; *Commercially available software for integrated logistics management*; Intl Journal of Logistics Management 1993, 4, No. 2, 61-74

<sup>55</sup> Fox, Bruce; *Objects n' open*; Chain Store Age Executive, October 1993, 69, No. 10, 101-106

<sup>56</sup> Softwright Systems Limited press release, 1993.

<sup>57</sup> Medvinsky, Gennady and Neuman, B Clifford; *Electronic currency for the Internet*; Electronic Markets, University of St Gallen, October 1993, pp. 23-24

<sup>58</sup> Ahrens, Judith D; Esquer, Gerardo A; *Internet's potential as a global information infrastructure: a case study and assessment*; Journal of global information management, Fall 1993, 1, No. 4, 18-27

<sup>59</sup> Dyer, Jeffrey H.; Ouchi, William G; *Japanese style partnerships : Giving companies a competitive edge*; Sloan Management Review, Vol. 35, No. 1

<sup>60</sup> Copacino, William C; *What is 'fluid distribution'?*; Traffic Management, Vol. 32, No. 4

<sup>61</sup> Nakamura, Sadahiko; (*addressing an audience at the Cranfield School of Management, 7th February 1994*)

pressures encourage informed companies to check the purchase of new technology for supplier / customer integration and internal stock management. There are modelling products available that assist in that decision making, by enabling the organisation to try out different scenarios of operation and seeing the results. The effective company of the 90's has to validate its operational behaviour by benchmarking its performance in all business functions, as represented (for example) by the CBI and Coopers & Lybrand survey<sup>63</sup>. As has been mentioned, the full benefit from benchmarking only comes from looking outside the "home" industry; the present trend seems merely to compare with competitors.

At the heart of understanding the economics of supply chain operations is a good cost management system. For many years cost management has been difficult and has often grossly misrepresented the true cost of doing business. With all of the attention today on partnership and mutual benefits, it is critical to know what costs are - not just internally but across the interface between businesses. Activity based costing (ABC) is coming to the fore as the best means of achieving this. As well as the learned literature from the professional journals there is more and more reference to it in the general literature, in the quality press<sup>64</sup> and in popular management guides<sup>65</sup>.

## THE CUSTOMER IMPERATIVE

The introduction of effective MRP and JIT systems provide the customer with cheaper products, and if implemented correctly reduce the likelihood and duration of stock outs. These all represent elements of improved customer service, an added advantage in the shorter pipeline is that it allows the manufacturing line to be changed more quickly.

The introduction of EDI helps the customer in order placement<sup>66</sup> which in time will be cascaded down the supply chain with the concept of a shared data set for the whole supply chain. EPOS information passed back down the supply chain has been used in a similar way to inform the supplier of the goods on the shelf and so predict the order size for the next delivery.

At present some companies are still able to use these elements as the basis of differentiation, but as time goes on it is clear that an industry standard will emerge which will render them quite normal (so that their absence becomes a disadvantage rather than their presence being an advantage). In effect they will become order qualifying criteria rather than the order winning criteria they represent today.

One of the major hurdles to be overcome is the removal of the traditional adversarial culture of Western trading relationships. While technology and systems can be acquired by a supplier for the intended benefit of the customer, the major determinant is the tone and duration of the relationship as seen by the stronger party - ultimately the customer in most cases<sup>67</sup>.

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<sup>62</sup> Allaire, Yvan; Firsirotu, Mihaela E; *Coping with Strategic Uncertainty*; Sloan Management Review, Vol. 30, No. 3

<sup>63</sup> Anonymous; *Benchmarking for success : Identifying competitive practices*; (ibid)

<sup>64</sup> Simon Caulkin; *ABC guide to accounting*; Observer Business Supplement, 19 June 1994, pp. 8-8

<sup>65</sup> Cokins, Gary; Stratton, Alan; Helbling, Jack; *An ABC manager's primer*; Institute of Management Accountants, Montvale NJ, 1992

<sup>66</sup> Anonymous; *At Tesco in the UK...* (ibid)

<sup>67</sup> Price, Frank; *Supplying for Growth*; TQM Magazine, Vol. 5, No. 5

## CONCLUSION

We see convergence in many aspects of life today. The whole world is getting to know itself better than it ever did, and national attitudes and cultures are converging. The engineering disciplines are converging, so that any high-technology product will be a combination of mechanical, electronic and software engineering. The media by which we communicate are converging as we see text, graphics, video, sound and music all becoming available on personal workstations.

What we find from a review of the logistics literature is that business practice is also converging. If logistics is anything, it is the convergence of operations management, marketing, distribution and information systems, not to mention strategy and financial management. To attempt to review such a broad church in such a short space is daunting. If this review achieves nothing else, it has shown that there is an extraordinary mixture of issues - and that widely differing competencies are needed if we are to succeed. That is the challenge that is at the heart of logistical operations today.

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