

**SWP 58/91 "SUPPLY NETWORKS AND THE CHANGING ROLE
OF OPERATIONS MANAGERS"**

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SUPPLY NETWORKS AND THE CHANGING ROLE OF OPERATIONS MANAGERS

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ABSTRACT

This paper reports on the first stage of an investigation into the progress which organisations are making towards fully integrated supply chains and the effect that this is having on the role of the operations manager. Five companies were identified who are currently trying to improve the management of their supply chain. Senior managers in each company were interviewed in order to establish the degree of integration of their supply chains and the way in which the supply chain was managed.

None of the companies had achieved full supply chain integration but each had achieved some progress, yielding improvements in customer service levels and reduced costs. The main change for operations managers was in the focus on end-to-end management of flows of information and materials rather than functionally based performance targets.

INTRODUCTION

It is now widely recognised that manufacturing companies can no longer view manufacturing in isolation and that the production function must be seen as part of a linked service supply chain to deliver a product service mix both to an end consumer and sequentially along the supply chain. The idea of a sequential supplier-customer relationship has become one of the fundamentals of quality management [1]. It is claimed that the realisation of the service supply chain is dependent on a closer relationship between the different activities along the supply chain both within one entity, between functions and between businesses.

The increased application of information technology in the form of electronic data interchange promises to provide a means to make the supply chain more visible to those along it. The potential is for a higher and more dependable level of customer service and a reduction in physical inventories, although the present reality for most companies falls far short of the potential. The move towards the acceptance of logistics, supply chain, and supply networks will lead to changes in the organisational structure of the traditional separate linkages and in the role for operations managers managing different activities along the chain.

The Supply Network Concept

The concept of a supply chain has within it a number of themes:

- * The chain or network links suppliers and their customers in sequence from a primary producer through to the end user. The focus is on materials, their movement, storage, and processing. The aim is to minimise the total quantity of materials for the network as a whole thereby diminishing the Forrester effect.
- * The interlinked network enables a tighter control on delivery and hence a just-in-time approach, the focus being on the management of time as much as of the materials.
- * The network is viewed as a total service-producing unit linked to the needs of the end user. The focus is customer service and hence by association with the PIMS research profitability.
- * The network is a web of information flows which makes the whole of the supply network visible to all and the focus is on information sharing as a means of achieving improved customer service or material reduction.

* Porter views the supply network as a value adding chain and network [3] where the focus is on establishing points of added value and using these for competitive advantage for the individual enterprises. Here the movement along the supply chain may be any mix of information, materials, or people.

* The supply chain linking seeks to capture an effectiveness of delivery which is not possible for the separate parts and so the focus is on the prevention of sub-optimisation.

Understanding the Changing Role for Operations Managers

If we are to understand the changing role for operations managers in supply networks we need to address the following questions and the issues they raise:

- * Why are traditional supply chains inadequate?
- * Why should organisations be looking for something different now?
- * What would a new approach to managing supply chains look like?
- * How would this change the organisational form of companies?
- * What is the operational task of managing this new structure?
- * Which role is most likely to manage the supply network task (logistics, marketing, production)?
- * What are the difficulties which might be expected in making changes?
- * To what extent are the perceived difficulties seen in practice?
- * What helps/hinders change?
- * How can we measure the performance of the supply chain?

Traditional Supply Networks

The concept of the movement of materials between a series of producers and users is of course very old. The establishments of trading routes and military supply chains over considerable distances has accompanied the rise and fall of empires over the centuries. However in the context of industrial manufacturing a particular set structure has evolved which while workable in the past is now less so for many companies.

The sub-optimising effect of separate functions within a manufacturing organisation of purchasing, manufacture, sales, and distribution has been well characterised [2].

EXAMPLES OF SUPPLY NETWORKS

As part of the process of gaining answers to the questions raised above we have begun an investigation of a number of organisations who are often referred to as being either "leaders" in the development of their supply network management or "triers" who have recognised the need for improvement and have started the journey. The following short cases summarise some of the main points as we see them from interviews with senior managers in each company.

Caterpillar

Caterpillar as one of the leading manufacturers of earthmoving equipment in competition with Komatsu, John Deere, and JCB have set out to establish a competitive advantage

through their after sales service and customer support. In the attainment of this goal the management of the supply chain plays a prominent role.

The Supply Network

The supply network in Caterpillar consists of external suppliers who feed both Caterpillar manufacturing plants and the distribution centres who feed into the global network of Caterpillar dealers. Dealers are independent businesses with a restricted geographic coverage. The distribution centres act as both regional base centres for some parts and as handling points for others. Transport is mainly sub-contracted except for the area in the States where Caterpillar are based.

There is no corporate operational control of the supply chain except for setting policy from the centre in Morton in the States. Instead the manufacturing and distribution functions maintain independent control over the sourcing and management of materials.

The scale of the operation is such that there are of the order of 450,000 parts of which about 50% are active, reflecting the need to service products over several decades. The status of all of the materials in Caterpillar are visible to all of the functions and data integrity is claimed to be of the order of 99.96%. Extensive use is made of forecasting models which drive DRP and MRP type planning systems.

Relationship between Manufacture and Distribution

Although manufacturing and distribution are managed separately they have a very supportive relationship with an interchange of emergency parts. Manufacturing will take parts from the line for distribution and manufacturing can automatically borrow from distribution provided stock levels held are above a minimum and also by special negotiation in other circumstances.

The relationship with suppliers consists of an on-going purchasing activity for both manufacturing and distribution which is carried out within the same purchasing function but requires suppliers to receive different schedules from the two Caterpillar functions. The schedules reflect both different patterns of demand and different requirements, manufacturing purchasing units such as pumps and oil filters and distribution requiring the constituent parts of these items as spares. The aim is to present the schedules to suppliers in ways which best meet their own planning systems.

The Relationship between Caterpillar and its Dealers

The Caterpillar dealers hold their own stock which is not visible to Caterpillar although Caterpillar know what is being ordered, what is being sold, and the level of emergency orders.

Initiatives have been taken to encourage dealers to stock fast moving items and rely on the Caterpillar network to supply other items on a 48 hour delivery. The change has been aided by an increase in the dealer ordering frequency from one order on each centre per week to daily ordering. The effect has been to reduce the bin to bin time from 17-19 days down to 4-5 days with 90% of items delivered within 3 days.

Dealers are given information on parts usage in their zone and may make their own arrangement to interchange parts with nearby dealers if the need arises.

In addition to normal replenishment of dealers stock and there is a facility for emergency orders which can be fulfilled from Caterpillar stocks anywhere in the World.

Targets

Caterpillar's main target is to keep customers of the end product up and running, and to fulfil 99.8% of ordered items within 48 hours to the dealers globally and at the same time keeping inventory to a minimum and the supply chain as short as possible.

Rank Xerox

Over a four year period Rank Xerox have halved manufacturing costs, doubled inventory turnover and improved customer satisfaction by up to 20%. One of the factors contributing to these improvements in performance has been greater integration of the supply chain. Currently the supply chain is broken into two parts. The first part covers raw materials acquisition through to manufacturing. The second part, called Logistics, covers all aspects of physical distribution through to the end customer. The operating companies in each country are merely responsible for selling and after-sales support.

Logistics provide Manufacturing with a Rolling Production Plan (RPP) which is revised monthly. The RPP extends over 18 months, the period within leadtime being fairly firm and the rest flexible. Leadtime is from 3 to 8 months depending on the product.

Performance Measures

Rank Xerox measure supply chain performance in three areas - service level, cost and asset levels. Manufacturing service level is measured on adherence to schedule and Logistics service level is measured on off-the-shelf performance. Other important service level measures are order to install time, currently 5 to 20 days depending on the product, and reliability of delivery.

Total cost of logistics is measured as a percentage of revenue. Originally 12% of revenue, this has been reduced to 8% and is targeted to reach 7% in 1993/4. Another important end-to-end measure is total inventory as a percentage of revenue.

One of the features of the Rank Xerox approach is to hold inventory as far back up the supply chain as possible. Inventory in the operating companies has been reduced from 100 days to about 10 days. The company is trying to move towards finishing to customer order, configuring a neutral product as late as possible. One of the problems that they are encountering is that these changes which improve the performance of the business as a whole make the inventory performance of manufacturing look worse. The next stage for Rank Xerox will be to integrate the supply chain back into manufacturing.

Philips

Philips is one of the worlds leaders in the manufacture of electrical goods selling of the order of 200,000 different products. The need to be more responsive to market needs in bringing new products to the market more quickly and having product available to meet demand while at the same time reducing operational costs has acted as an impetus for the improved management of the supply networks.

The Supply Networks

Philips supply networks are very complex for the company as a whole and the old matrix organisational structure tended to focus attention on the performance of the functions at the expense of the flow of material through to the customers. Recent organisational changes into divisions with global responsibility has encouraged in a limited number of instances to date the creation of end to end responsibility for groups of products which is the first stage in breaking traditional barriers to material and information flow. In making changes of this type Philips are creating at a sub unit level manageable structures which equate more to the simpler supply networks in companies like Rank Xerox.

Problems Hindering the Process to Integrated Supply Networks

There are a number of problems identified in the complexity of Philips which hinder moves to gain the benefits of integrated supply networks:

* Long and intricate supply chains for some products moving material between Europe and the Far East several times in the course of manufacture

* Different languages and cultures in the different functions along the supply chains impedes the establishment of common goals.

* Incompatible information systems and a preponderance of paperwork which lengthens the supply chain in time.

Indications of Change

While progress may be slow overall there are indications of progress being made to shorten and control supply chains. Among the initiatives are:

* End to end responsibility by one person for some domestic appliances with the authority to act to break barriers and remove bottle-necks.

* Delayed finishing of some products to decrease uncertainty of demand and hence the need for finished goods inventory.

* The creation of a Logistics Support Unit to assist at the divisional level.

* Use of EDI integration with some suppliers and JIT delivery.

ICL

ICL have broken their supply chain into two parts like Rank Xerox. The Manufacturing Operations Division is responsible for the supply chain up to manufacturing. The Logistics Operations Division is responsible for the rest of the supply chain as far as the individual country organisations. The degree of integration of the final part of the supply chain to the end customer varies from country to country.

Performance Measures

Key service level measures at ICL are

- ability to ship to the date requested by the customer, currently 75%
- ability to ship to the date promised to the customer, currently 95%+
- value of backlog arrears
- product leadtimes, 24 hours for PCs in UK

The only end-to-end measure which ICL uses is total inventory relative to turnover. Inventory turns have been increased from 4 to 6 with a target of 8 by 1993. All other cost measures relate to individual elements in the supply chain.

Planning

Forecasts from all the countries plus knowledge of available capacity is used to produce a manufacturing commitment programme which is revised monthly. This then links up with the MRPII system used by manufacturing. Total manufacturing leadtime is 6-7 months.

As declared leadtime vary from 1 month for mainframes to 24 hours for PCs, order processing has to be extremely rapid. Any order from anywhere in the world is put on a single order database system which triggers allocation and shipment of the item ordered. ICL are currently developing an EDI link so that each country system will be able to access this system directly.

Key Priorities

Current priorities for ICL in this area are

- rationalisation of spares storage points

- development of a logistics measurement system
- development of a more global logistics team

General Motors

General Motors Europe is only 3 years old and is currently implementing a 4 year programme in place to provide common systems across the 15 national companies in Europe. The key priorities are increased responsiveness and shorter cycle times. The aim is that when a dealer enters an order for a car he is immediately given a firm delivery date.

At the moment, delivery promises are made by looking at the order bank and production schedule for the coming month and seeing where each new order can be fitted in. The main emphasis at the moment is on achieving close to 100% delivery reliability. Once this is being achieved attention will switch to shortening leadtimes.

EDI links with suppliers are currently being implemented. 35% of outside suppliers are already on the system and the target for full coverage is 1992. JIT delivery is used for a few things like car seats. 90% of material is delivered daily against a weekly schedule.

Conclusions

None of the companies surveyed claim to have a fully integrated supply chain although most see this as the eventual aim. Most are pursuing integration by starting with the end customer and integrating backwards stage by stage. Indications of progress include the following,

- * Greater emphasis on end-to-end performance measures
- * Shortened supply chains
- * Greater integration of material schedules used along the chain
- * Changing organisational structures giving greater end-to-end responsibility
- * Improvements in customer service levels, inventory turnover and costs

There are two major factors inhibiting progress. First there are the difficulties of developing a management structure which matches the information and material flows from a traditional, functional management structure. Then there is the lack of common systems and a lack of understanding of the different functions exacerbated by different 'languages'.

What does all of this imply for the Operations Manager's role. It is likely to be much more a general management role than a purely manufacturing management role. There will be greater emphasis on shared responsibilities for the achievement of corporate targets rather than departmental performance measures. Finally, adherence to the 'Schedule' will become even more important at every stage in the supply chain with emphasis being placed on developing the flexibility to respond rapidly and in a coordinated way to required schedule changes.

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