

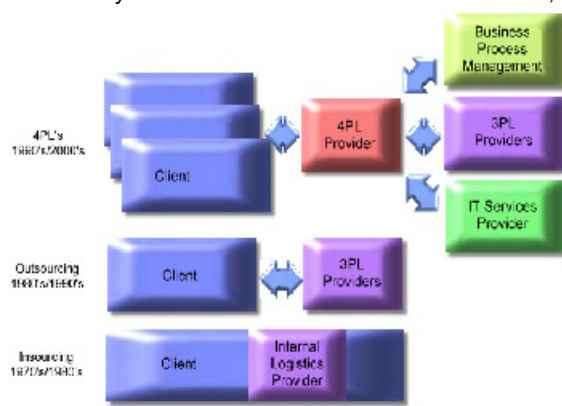
'Collaboration and Technology are key to Supply Chain Efficiency'

This paper discusses some of the current trends in the Supply Chain Industry and focuses on the move towards 'collaboration' and the use of technology as a means to drive down supply chain costs and improve efficiency.

Introduction

Europe is seen as having one of the most mature third party logistics (3PL) markets in the world, with 76% of European companies using third party logistics providers compared with 58% in the U.S.A. As the European third party logistics market has matured, it has had to embrace collaboration and technology in order to keep costs down and efficiency up. Not all of this change has been easy, some of it has been forced on the market by ever demanding customers, some of it has been developed by the players themselves and some of it has come about as a result of natural evolution, responding to the market needs.

It is not only the 3PL market that has been affected; the whole supply chain has been changed to a point



where the traditional boundaries are becoming blurred, suppliers taking on roles that used to be the customers (Vendor Managed Inventory), the customer taking on roles that used to be the suppliers (Factory Gate Pricing) and a general broadening of the role of the supply chain service providers to include a lot more than just logistics services (4PL's).

The development of these current supply chain theories and practices has been mirrored by the increased availability and use of technology, in particular technology that allows quick and accurate dissemination of information. Collaboration is key to obtaining the efficiencies

implied and without information and the ability to pass this quickly to where it is needed, collaboration is not possible. The development of information technology and internet communications has been one of the key enablers to collaboration.

Vendor Managed Inventory

In a recent survey of European blue chip consumer manufacturers, over 90% of them either had adopted Vendor Managed Inventory (VMI) to some degree or would consider using it in the future. VMI is a process where the customer passes over control of stock levels and purchase order generation to the supplier. The supplier generates orders for the customer based on an agreed stock level profile, fill rate, cost and demand information sent by the customer. This obviously requires a high degree of collaboration and trust between the customer and the supplier, but the benefits of VMI are numerous for both parties:

Lower customer inventory is the benefit most people name first when they discuss VMI. Under VMI, the supplier is able to control the lead time component of order point better than a customer with thousands of suppliers can ever hope. Additionally, the supplier takes on a greater responsibility to have the product available when needed, thereby lowering the need for safety stock. Finally, the supplier reviews the information on a more frequent basis, lowering the safety stock component. These three factors combine to significantly lower inventories.

Lower supplier inventory from better forecasts are achievable, but there are two caveats. The first caveat is that better forecasts do not result from sharing information about normal business. Better forecasts result from having a more forecastable demand. Under VMI, the orders created for the customer more closely match the true demand in the marketplace. The demand is reflected in more frequent orders for the same parts and therefore lower variability of demand on normal turn business. At the same time, better communication of exceptional demand is required in a VMI relationship. This results in the supplier seeing the exceptional demand, such as project work or promotional demand, earlier than under the traditional relationship, improving their ability to forecast those bumps.

The second caveat is that better forecasts are only attainable if a substantial percentage of the business is handled via VMI. Most suppliers are not able to lower their inventories with VMI today because VMI represents too small a percentage of their overall business. However, the smoothing of demand brought by VMI is potentially the largest benefit for suppliers engaging in VMI with a significant portion of their business.

Lower administrative costs accrue to both parties. The benefit to the customer is easy to see. The customer spends less time ordering. In addition to this, both parties spend less time following up on bad order information correcting orders for non-shippable parts or quantities, and reconciling differences between orders and shipments. This benefit can be traced to a better, more frequent flow of information. If the supplier changes carton quantities, the next order created by the supplier will reflect those quantities. This allows the supplier time to correct the problem when it occurs instead of allowing it to build up costs. Lower administrative costs can be a substantial benefit for both parties.

Increased sales are the most exciting VMI benefit. Both suppliers and customers see their sales increase from VMI. The most obvious cause of increased sales is better inventory placement resulting in fewer out-of-stock situations. The supplier has information about the use of their products, the overall marketplace, as well as coming industry-wide events that allow them to direct the inventory investment to the right products. This knowledge, when combined with frequent communication about specific geographic marketplace issues communicated by the customer, results in higher sales per dollar of inventory investment.

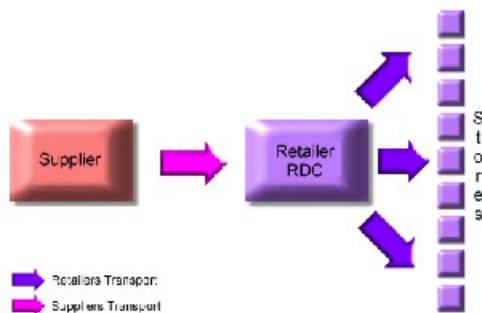
In addition to the sales increase from having the right part at the right place at the right time, many customers reinvest some of the savings from inventory reduction and administrative savings into building their business. This investment can fund lower end user prices or a broader selection of product. This investment increases business for both parties.

Trading partners who focus on the changing business relationship can maximize their benefits. Under VMI, suppliers and customers can both recognize and focus on the same issue: how to sell more product to the end user more efficiently. This changes the supplier's focus from how to get the customer to buy more to how to help the customer sell more. This change in relationship is the most exciting feature of VMI.

In conclusion, the benefits of VMI are due to the increased information flow between the customer and supplier. This information needs to be part of the day to day process for all parties in order to assure the quality and freshness of the data.

Factory Gate Pricing

Factory Gate Pricing (FGP) is another new trend that blurs the boundaries of the traditional relationships within the supply chain. One effect of network consolidation and stock rationalisation has been a rise in the transport costs on individual stock units. This along with the environmental impact of transport and the fact that on average 30% of all haulage vehicles in Europe currently run empty, this is one of the main drivers for reducing transport costs. Looking to the future, the European Working Time Directive will also have a significant impact on transport costs, particularly in the UK, where current driver shortages will magnify the effect of reducing the working week. FGP is one way that the impact of such changes can be minimised.

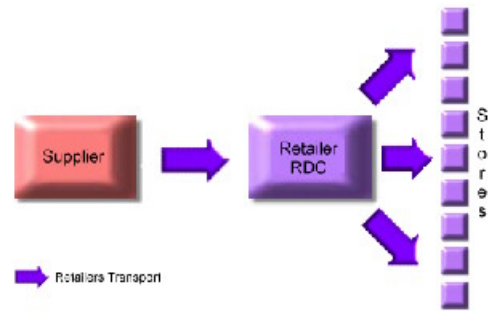


In the traditional model, the supplier is responsible for deliveries into the retailers Regional Distribution Centre (RDC), the price of the product delivered including the cost of the transportation. The retailer (or retailer's 3PL) is responsible for the delivery of goods from the RDC to the outlets (stores).

However, retailers now operate (either directly or sub-contracted) sizeable distribution fleets and warehouses of their own and have built up considerable expertise and economies of scale in the logistics market. The retailers have seen opportunities to further rationalise on transport costs, by utilising their own fleets to transport goods that previously would have been handed by their suppliers. It is not only the economies of scale that has attracted the retailer into FGP, but the fact that it could also offer an even better utilisation of the retailers existing transport fleet.

At its simplest level, FGP allows the retailer to undertake deliveries from the supplier into its own RDC. These deliveries can be executed using the retailer's own delivery fleet using backhaul arrangements. This obviously increases the utilisation (or running full) of the fleet, providing the retailer with significant cost savings. However, FGP could involve a lot more far reaching activities such as collection direct from

factory. No longer does the supplier hold stock at their "NDC", but product is held at the retailer's consolidation centre. This enables the retailer to manage a wider portfolio of product direct from the factory. The retailer's would carry out the transportation of the product direct from the factory into their own consolidation centres and onward to the RDC.



In the UK, the initiative towards FGP is being led by two of the larger retailers; Tesco and Sainsbury's, although the other major players in this market (Asda, Safeway, Waitrose) have also announced plans to move towards FGP. A recent study in the UK (July 2002) indicated that 75% of retailers and 100% of hauliers saw FGP as fully integrating into the supply chain strategy in the near future.

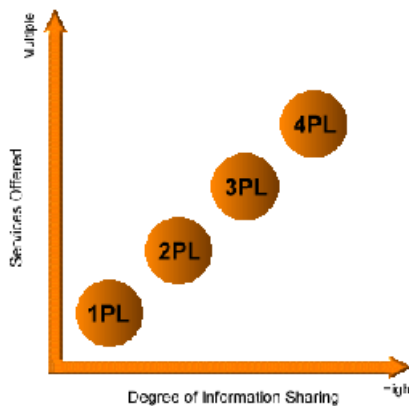
Why are the retailers doing this now? Tesco state that their reason is simply to reduce costs, in the spirit of supply-chain improvements. Manufacturers widely suspect the motive of commercial gain rather than supply chain collaboration. This impression was partly created by the abrupt way in which dialogue commenced, and has not been entirely dispersed by the more collaborative approach now being adopted. However, Tesco have a history of forcing through painful supply-chain initiatives, which in the long run have been good for the industry.

Not all suppliers are opposed to the change. Many are currently negotiating; a few are already beginning to implement change. Suppliers with less efficient logistics may benefit. Manufacturers of short-life products may be glad to see more of the logistical wastage risk transferred to the retailer. All manufacturers will be able to concentrate resources of capital and personnel on what they do best - which is manufacturing. But suppliers who currently enjoy a logistical advantage over their competitors will not wish to revert to a level playing field.

Factory gate pricing is also most definitely a commercial matter. Suppliers' pricing and discounting policies will be thrown into disarray. The new trading terms may suit the major retailers more than the suppliers. Smaller retailers have most to lose, if manufacturers' delivered prices rise.

4PL's

Since the 1970's the logistics market has been maturing. Today, Europe is considered to have one of the most mature logistics markets in the world, but even so it is still evolving. Fourth Party Logistics (4PL) is the latest form of service provision, which has evolved as a result of the requirement of manufacturers to outsource more of their business so that they can focus on core activities.



A 4PL service can, theoretically, include everything in the product cycle from design and development to manufacture, transaction processing and after-sales support, in addition to actually delivering the goods to the customer.

The concept of 4PL has grown out of a broader trend towards outsourcing enabled by information technology and internet communications. A growing number of companies - especially in the technology sector - have recognised the benefits of off-loading the administrative burden of building and distributing goods to concentrate on creating and marketing new products. Companies need a more agile and flexible supply chain to meet the demands of modern business. The focus has traditionally been on creating a lean supply chain with things like just-in-time (JIT) manufacturing laying the foundation for leanness. But

leanness does not necessarily give agility.

A pragmatic approach to restructuring the supply chain using 4PL services can bring the agility required and reduce potential risk - although the approach is not universal: The main candidates are products with a high value, a short life cycle and high price depreciation and high-tech goods are an obvious example. A mobile phone is a very sophisticated device - but within months it will be out of date. Manufacturers need to be able to move quickly on to the next product. Globalisation is also driving companies to consider a 4PL approach. In a global market, customers want more, far-reaching services.

There is a consensus however, that there is a need for further advances in technology before the full benefits of 4PL can be realised. There is a lot of complex software and other changes that need to take place. Mobile technology in particular has an important potential contribution to make. With good mobile

technology, for example, you can start tapping into the order process and get down to the stock keeping unit level.

Economics is also a key driver. The current problems of making profits from home delivery in the retail trade pushing the case for rationalisation. The large supermarkets are finding it hard to make money out of home shopping and one of the solutions is to develop a common user approach managed on a 4PL model. The joint venture between John Lewis and LMS in the UK is looking in this direction. It is based on home shopping from John Lewis's Waitrose supermarket - but they have left the market open so they can distribute other people's goods.

Despite their reluctance to co-operate, retailers could be forced to - or abandon home delivery altogether. There is clearly a risk that they will curtail the service if it is not making money. But if they can do it cost effectively through a 4PL, this gives them another option.

Reverse Logistics

With the increase in home shopping enabled by the use of internet technology, the issue of how to process and handle returns is becoming increasingly significant. Reverse Logistics is the process of moving goods, packaging, equipment and information back from the point of sale in the reverse direction to the normal supply chain flow.

The issues encountered with reverse logistics are very different to normal logistics, primarily because it typically deals with a relatively low number of items spread across a wide geographical area. In a study of one major retailer, the cost of handling a single return was as high as £24 and overall, only 60% of the returned goods were being credited by the manufacturer.

There are a number of issues associated with reverse logistics:

- The cost of transportation
- Ownership of the returned products
- Quality of the returned product
- Warranty periods
- Returns agreements

Traditional forward supply chain processes, IT systems, KPI's, management information and accounting practices do not work for reverse logistics and it is only sensible to treat it as a separate beast.

Voice Directed Systems

One of the more innovative technologies now being used in the logistics/supply chain market is voice recognition. This, linked to sophisticated Warehouse Management Systems (WMS), is providing a significant increase in accuracy and efficiency for warehouse operations where the technology has been adopted. Use of this technology is now becoming more common in the UK. The infrastructure technology required is now readily available, and is reliable and cost effective enough to make voice direction an attractive proposition to an ever-widening audience in the warehousing/logistics market.



The hardware required consists of a spread spectrum RF network (802.11b) and voice terminals. These devices are programmed with specific voice tasks and communicate with host system via the RF network. The voice unit typically, on request, gets sent a batch of work. This work can be completed independently of the host, allowing for areas without RF coverage, the transactions being stored on-board until RF coverage is regained. In this way, real-time updates are achieved when possible, but without slowing the operative down.

Using this technology, the list of potential benefits is impressive:

- Increased accuracy – 99.9% plus
- Increased productivity – 10% to 20% plus
- Removes trips back to operations office for work assignment
- Removes cost of printing and distributing warehouse documents
- Removes cost of re-keying order amendments, picking confirmations and catch weights
- Hands free & Eyes free – makes tasks easier
- Real-time feedback for proactive management

- Real time stock updating
- Improved safety – hands free & eyes free
- Reduced training – verbal prompts easier

The biggest benefits are obtained in low margin, high volume, labour intensive operations, and because of this, the Foodservice Industry and Grocery Retailers and Wholesalers are leading the way in adopting the technology. Accuracy and productivity are critical in these low margin, labour intensive operations, and the use of voice technology delivers this by freeing both the hands and the eyes for the warehouse task. The hands free operation is also particularly suitable for Frozen Foods and Chilled Foods, where gloves hamper the handling of paper or radio data terminals. Catchweights are easily captured, and the subsequent re-keying of information removed. Furthermore, the improved accuracy usually eliminates the need for costly order checking altogether.

Accuracy

The biggest cost benefit is increased accuracy, and this is frequently used on its own to cost justify the adoption of voice technology. However, the cost of a picking error is frequently underestimated, and of course differs for wholesalers and for retailers distributing to their own stores. The cost of a picking error also differs for short picks, over picks and mis-picks. It can also be argued, that picking accuracy can be significantly affected by accuracy of other movements within the warehouse and it follows logically that accuracy throughout the warehouse; receipts, putaway, replenishment, stock adjustment, etc. as well as picking is the key to maximising the benefits and voice direction can deliver in all these areas.

For the wholesaler, the costs of picking errors can be quantified as follows:

Short pick – The costs are the clerical effort of handling the credit claim and the margin on the lost sale.

Over pick – If reported, the costs are the transport costs of returning the item, labour costs in handling the return, and in some cases the cost of writing off stock if outside acceptable shelf life or QA parameters. If not reported, the cost is the stock loss incurred, perhaps an average of £10 per case.

Mis-pick – If the error is correctly identified and reported, the costs are the clerical effort of handling the credit claim, the margin on the lost sale, the transport costs of returning the item, the labour costs in handling the return, and in some cases the cost of writing off stock if the returned item is outside acceptable shelf life or QA parameters. If the error is incorrectly identified as a short pick (i.e. the item sent is not returned, but also not paid for), then the costs are the clerical effort of handling the credit claim and the cost of the stock loss incurred – a very costly error!

The average cost per picking error for most wholesalers is in the range of £5 to £25 per error, with £5 being a significant underestimate in most cases. For the retailer, the costs of picking errors can be quantified as follows:

Short pick – The costs are the clerical effort of recording an adjustment in the stock and accounts system and the margin on the lost retail sales if the short delivery results in a stock out in the store (typically 20% of short picks might result in stock outs)

Over pick – The costs are the clerical effort of recording an adjustment in the stock and accounts system, and if the overstocking is great enough to justify a return, the transport costs of returning the item and the labour costs in handling the return. The overstock situation may in some cases result in writing off short shelf life stock.

Mis-pick – The costs are the clerical effort of recording an adjustment in the stock and accounts system, and the margin on the lost retail sales if the short delivery results in a stock out in the store. If the overstocking of the incorrect item is great enough to justify a return, the costs include the transport costs of returning the item, the labour costs in handling the return. The overstock situation of the incorrect item may in some cases result in writing off short shelf life stock.

For retailers, the greatest cost arising from picking errors is often the cost of checking orders on delivery to stores. In most cases, the improved accuracy arising from the use of voice technology is such that there is no longer any need to perform this check at all.

The reduction in picking errors resulting from voice picking can vary considerably (in some environments 99.9% accuracy is exceptionally good, while in others it is exceptionally bad), but some recorded examples are error rates of:

- 3 per thousand reducing to 0.3 per thousand (accuracy of 99.7% improving to 99.97%)
- 8 per thousand reducing to 1 per thousand (accuracy of 99.2% improving to 99.9%)
- 1.1 per thousand reducing to 0.1 per thousand (accuracy of 99.89% improving to 99.99%).

These represent reductions in picking errors of between 80% and 90%.

As an indication of the magnitude of the possible savings, a wholesaler picking 500,000 cases per week with an error rate of 2 per thousand (99.8% accuracy) is experiencing 50,000 errors per year. An 80% reduction to 0.4 per thousand (99.96% accuracy) will reduce errors by 40,000 per year, which at a cost of £10 per error represents savings of £400,000 per year.

Picking Productivity

Typical productivity improvements are between 10 and 20%, arising from:

- Hands free – no paper or bar code scanner to handle. The benefit is even greater for frozen and chilled foods.
- Eyes free – no stopping to read picking instructions, pickers listen & speak while moving.
- No return to operations office to collect next picking list.
- Voice direction “pushes” pickers harder – workers respond well to verbal instructions.
- Faster recording of catch weights – spoken rather than written or keyed. The benefit is even greater for frozen and chilled foods.
- Fewer re-picks due to fewer empty picking slots because real time stock updating triggers replenishment instructions

As an indication of the magnitude of the possible savings, a distribution centre employing 50 pickers might have a total labour cost of £1 million, and maybe significantly more if overtime payments are substantial. A 15% saving on £1 million is £150,000 per year.

Administration Productivity

Improvements in administrative efficiency arise from:

- Elimination of the tasks of printing and distributing warehouse documents (e.g. pick notes)
- Elimination the re-keying of confirmations, order adjustments for out of stocks, and catch weights for variable weight items.

These cost savings are significant, and for a large wholesaler there may be several administrative staff no longer needed for those tasks.

Savings In Stationery Costs

Eliminating paper movement lists (e.g. pick lists) or picking labels brings a significant cost saving in the cost of the paper alone. Many distribution centres spend in excess of £50,000 per year on purchasing stationery.

Also, due to the fact that the requirement for paper is reduced, the cost of running and maintaining the printers through which movement notes are produced also need to be taken into account. Again for a large distribution centre, this may be in excess of £15,000 per year.

Real Time Stock Updating

Real time stock updating allows:

- Triggering of letdowns to replenish picking faces, optimising the use of fork lift trucks and preventing re-picks or waiting time due to empty picking faces
- Cycle counting can built in to the replenishment (letdown) task, improving the efficiency of the stock checking process.
- Immediate action to be taken on stock discrepancies if picking face is empty or from cycle counting, allowing picking face replenishment to take place and improving accuracy of stock recording.
- In turn, the improved accuracy of stock recording leads to improved service level and less time spent investigating stock discrepancies

Improved Safety

The hands free and eyes free operation leads to fewer accidents. Eliminating paper leads to less waste paper or label backing sheets, resulting in a cleaner, tidier and safer warehouse.

Improves Worker Health and Comfort

The wearable design of the voice units reduces repetitive stress injuries associated with other forms of recording movements.

Reduced Training

The training time for new warehouse staff is reduced by the use of voice, as a voice directed task is easier to learn, more intuitive and more natural than interpreting a paper task. Training time can often be reduced by as much as half.

Expected Return On Investment (ROI)

The expected ROI from voice directed warehouse movements will, of course, vary significantly from one company to another, depending on:

- The current level of picking accuracy and the potential for improvement
- The current method of picking – paper based or radio data terminal
- Whether orders are checked before despatch
- How many picking shifts are in operation
- What infrastructure is already in place – e.g. RF Network
- Whether the existing Warehouse Management software (if any) supports voice technology

One of the biggest factors is the number of picking shifts in operation. If there is more than one picking shift per day, then equipment can be shared between pickers on different shifts. Typically each picker would have their own headset (and microphone), but would share the wearable computer or terminal, as their voice profile can be downloaded to the terminal when they log on. For a company with more than one picking shift moving from paper based picking to voice directed picking, the cost of installing voice technology is now such that payback can often be achieved within 6 months. For a company with a single picking shift per day, payback within one year would be a more realistic target, which makes it a very attractive proposition to a larger number of logistics/supply chain companies.

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