A RETAIL DISTRIBUTION SOLUTION FOR THE FUTURE
A Personal View

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ABSTRACT

Its almost impossible to open a newspaper these days without seeing at least one article reporting on, or speculating over changes in the UK retail industry. Regardless of who owns whom in the future we are likely to see far greater degrees of change in the retail supply chain than any experienced to date. This paper describes those issues the author believes will be critical to the retail supply chain over the next five years, specifically as they apply to the major grocery chains.

By also looking at the various supply chain solutions and the emerging technologies, and then by matching solutions and issues it is possible to create a vision of how tomorrow’s retail supply chain might look. This is just one personal view of the future and whether or not this represents how products will be distributed to the major retailers, it is certain that the individual aspects described will become fact.

Even if you are not directly involved in this industry there are aspects of the vision that could become a part of almost any industrial supply chain.

EXPECTATIONS AND PRESSURES

What will be the primary drivers for change?

Replenishment Ordering – ie. matching purchase orders placed on suppliers to the rate of sale within the retail store.

With retailers holding in the region of two to three weeks inventory within their warehouses the potential to reduce this to two days or less will not only release many millions of pounds of capital, but also reduce the need for large and numerous distributions warehouses.

7 Day – 24 Hour Ordering and Supply – the larger supermarkets are already open 24 hours, with deliveries from the distribution centres throughout the night. To smooth out product movement through the distribution centres it is only a matter of time before the suppliers are expected to also take orders and deliver throughout the night with order to delivery lead times of 24 hours.

Cross-Docking – developing the concept of stockless warehouses, with multi-product orders delivered to the warehouse’s receiving dock, which are then split into each store’s requirement and loaded on to vehicles on the despatch docks.

Product Tracking - as the volume of stock within the supply chain is reduced, it becomes critical to identify exactly where that stock is at any point in time.

Improved Vehicle Utilisation and Reduced Vehicle Movements –over 50% of the goods vehicles travelling on Britain’s roads are empty or less than fully loaded (Heriot-Watt University 1996). Motorways that are becoming increasingly congested, leading to increased journey times along with rising fuel prices.

Add to this the fact that the retailers will be demanding more frequent deliveries and smaller order sizes.
Regardless of the demands of the industry, greatly improved efficiencies will be necessary to meet both ecological and political pressures.

THE EMERGING TECHNIQUES AND TECHNOLOGIES

Any manufacturer supplying the major grocery retailers will already be familiar with the use of Electronic Data Interchange (EDI) as a means of electronically communicating orders to the supplier. Of these retailers, Tesco, J.Sainsbury and Safeway have extended the concept of e-commerce by also providing sales and inventory data to their suppliers over the Internet. This provides consolidated information on stocks held in the distribution centres and retail sales, this sales data being available within around four hours of the sale taking place. The expectation is that this information is used for joint demand and promotion planning.

In an attempt to foresee how the retail supply chain could operate I have considered a toolbox made up of six developing concepts and tools and then applied these to the expectations and pressures described above.

The Use of Shared Data via the Internet – already starting to be used, as indicated above, but this is only the tip of the iceberg and we are yet to see the true potential of this method of communication for business to business trade.

The ECRate (Returnable Transit Packaging) – the development of an industry standard plastic crate for transporting product throughout the retail supply chain. These crates, similar to those already in use for fresh vegetables, will be shared between all the retailers and controlled through a central pool operator, in the same way as current pallet pools operate. The ECRate has been developed by a cross industry team within the ECR (Efficient Consumer Response) initiative. The crate was launched to the trade in October of last year and is expected to be in use within the next two years.

RFID (Radio Frequency Identification) – the use of small data storage and transmission devices capable of being attached to products or outer packaging, these devices can be interrogated through a scanner. This technology is expected to replace the bar code over the coming years offering improved read rates without the ‘line of sight’ requirement of bar codes.

‘Mr Tag’ – the Combination of the ECRate and RFID to Create Intelligent Crates. Being developed by an industry team made up of representatives of the major retailers and a number of their larger suppliers. These intelligent crates will be capable of storing information on their contents, product manufacturing details, expiry date, plus a full history of all movements and any other required information.

Distribution Warehouse Sortation Systems - conveyor based systems that facilitate the automation of product movement from warehouse storage location to store order assembly point. In addition to this benefit these systems offer the possibility of stockless distribution centres operated on a true cross-docking principle.

Intermodal Transport – the combination of road and rail transport to reduce road traffic by using the rail network for long distance movements. In his forward to the European Commission ‘Task Force Transport Intermodality’ brochure (1996), Neil Kinnock lists a number of reasons why it is imperative to develop intermodality. These include:

- The reduction of carbon dioxide emissions – the 20 years between 1973 & 1993 saw an increase in 50%.
• Congestion – there is expected to be an increase in cars within the EU of 45% between 1993 – 2015. The cost of congestion is estimated at 2% of GDP.
• Industry – transport represents an integral part of production costs, therefore a reduction in these costs will increase the competitiveness of UK industry.

A SOLUTION

So, taking all of the above into consideration, what could the future of retail distribution look like?

Figure. 1

Details of each retail store’s requirements will be communicated to a central order processing point, usually based within the company’s regional or head office. Whilst currently this demand data is manipulated by various algorithms within an inventory management system, in future this demand will be left predominantly unchanged, amendments only being made to compensate for changes in the rate of demand created by promotional activity, new product launches or product withdrawal.

The only rounding of volumes will be to Traded Unit (TU) quantities. Currently this is a case quantity but increasingly this will be to align with the quantity held in the plastic returnable crate (ECRate). These requests for replenishment stocks will be raised daily for delivery the next day. (Orders 7 days a week with a lead-time of c.24 hours).

Other than the removal of these demand volume modifiers and the increase in order frequency, changes which have already been operational to a limited degree within some retailers. The first significant change comes in the way in which orders will be communicated to the supplier and subsequently how the supplier will then assemble the order.

The whole distribution system will be built around a central computer based Order Management and Tracking system.

This large and open database will record the status of all orders and stock movements throughout the distribution network. Access to information being selectively available to all parties through Internet links.

Orders placed onto the suppliers are currently for Distribution Centre (DC) inventory replenishment. In the proposed system individual store orders will be combined and passed into the system, details of the ordering store being retained. Hence, the system will be capable of identifying individual store requirements and deliveries at all stages of the supply chain.

Orders will be received and transmitted electronically, either using existing EDI protocols or new Business-to-Business Internet protocols.

Suppliers will no longer receive a discrete order for each DC to be supplied, but will receive a single order detailing the requirements of each retail store, whereever located.

The idea of picking product for individual stores will probably instill a feeling of dread into most suppliers as it generates an image of large warehouses with armies of warehouse operators.
This would not necessarily be the case. By attaching an RFID tag to each traded unit at the point of manufacture it will be possible to write the order number and the store delivery point to the tag when it is picked for despatch. This could be considered in the same way as attaching a postcode to identify the delivery point.

The ultimate solution will be to pack all products into intelligent ECRates (Mr Tag) during production, writing the product identity and manufacturing details at this point, then on picking, to update the crate tag with the customer details and destination directly from the sales order processing system. Whilst this facility will not be available for a number of years, a short term solution to allow pilot studies can be provided through the use of bar code labels. By presenting the picking list as a sheet of self-adhesive labels, one for each traded unit with the store and product details, these can be used to provide the store identity.

This would not necessarily entail significantly more work that the current process of picking product by pallet layer, which involves handling individual cases to build single layers.

Now, rather than picking numerous orders for the DC's of individual retailers, it will be possible it pick a single order for despatch to multiple retailers’ stores. The individual delivery details need only be kept to discrete customers within the supplier's sales order processing system.

These consolidated orders can now be delivered into a primary sortation unit, or be collected by a carrier acting for a group of suppliers. This approach will ensure far better vehicle utilisation than that experienced by despatching discrete customer orders.

**Sortation Units.** The best way to demonstrate how distribution will take place through the sortation units is to envisage a situation where this technique is already in everyday use. An airport baggage handling system. This takes our luggage from the check-in point, where the final destination is identified and coded to the bag on a bar coded label and then via a conveyer system delivers the bag to the aircraft. This demonstrates the purpose of the primary sortation unit where delivery loads are then made up for delivery to the secondary sortation unit. (as in Figure 3). These secondary units would be situated adjacent to the main centres of population for ease of delivery to the retail stores.
Whilst, distribution both into the primary and out of the secondary sortation units will use road transport, the journeys between primary and secondary sortation units will run to a regular timetable and over fixed routes. In other words, these could utilise rail rather than road transport, so reducing the number of road miles involved.

Within the secondary sortation units the mixed loads received from the primary unit will be sorted to make up deliveries for the individual stores. The products will then be stacked onto plastic dollies, (wheeled platforms) for delivery to the store.

On receipt into the store the products will be received into inventory automatically by passing the loaded dolly through an RFID aerial array which will read and check each TU.

**DATA FLOW**

So much for the physical distribution of the products, but with inventory only being held in an in-transit status it will be critical to identify exactly where the in-transit stock is.

Figure 4 details the data flows that will monitor and control the distribution process. The Data Channel will be the central control and data management system for the process from end to end.

Following the data flow from the point of ordering at the retail store (top left).
• Order placed electronically, either direct to the supplier or via an order office for authorisation, both route into a supplier’s ‘mailbox’ within the Data Channel.
• The supplier then pulls orders from the system against a predetermined timescale.
• The supplier’s sales order processing system checks stock availability and credit clearance and then produces multi-customer picking lists.
• Order picked and confirmed back to the Data Channel.
• Order transported to the Primary Sortation Unit and receipt confirmed to the Data Channel, plus pre-delivery notification sent to the Secondary Sortation Unit.
• Order split by delivery region and transported to the Secondary Sortation Unit where receipt is confirmed to the Data Channel.
• Pre-delivery notification sent to the retail store.
• Order received by the retail store, automatically received and proof of delivery communicated back to the Data Channel.
• Electronic Funds Transfer (EFT) triggered to make payment to the supplier.
• Order closed.

CONCLUSION

Whilst it is clear to see the benefits of such a distribution system, the scale and complexity of setting it up, specifically the co-operation that would be required between the major players in this industry, will make this a difficult concept to turn into practice.

The specific questions we need to ask are:

• Who would own such an operation?
  ➢ The retailers, 3rd Party Logistics providers, the supplier of the returnable packaging, database provider?
• Would the major retails be prepared to co-operate in such an operation?
  ➢ A difficult question to answer given that supply chains are being seen as an arena for competition. But, such a system could be set up for an individual retailer. It would not however, gain the optimum benefit.
• Are the suppliers’ levels of service high enough and do the retailers have sufficient confidence in the suppliers for a stockless system?
  ➢ Where problems are anticipated it may be necessary to retain some inventory within the supply chain. However, continuing low service levels are likely to result in products and even suppliers being ‘delisted’.
• Could it ever happen?
  ➢ I leave the reader to make up their own mind on this, but also ask them to consider the aspects of this model that could apply to their industry, and perhaps to think of how their supply chains could develop in the future.

About the author

David Aldridge, MIOM is employed by Cussons UK, where he has held various positions within Logistics, Supply Chain and Business Process development. Over the last 18 months he has been involved in the development of ECR (Efficient Consumer Response), the initiative led by the major grocery retailers to achieve ultimate consumer satisfaction, with specific responsibility for the development of the supply chain. His exposure, through this work, to the individual supply chain
tools and philosophies being developed has lead him to create this concept for the retail supply chain of the future.