

# The new face of food logistics

A developing technology, new business environments and an understanding of logistics as one competitive factor are revolutionizing logistics in the food industry. The move is away from the optimizing of individual warehouses, distribution centers and transportation routes towards ever wider development projects, which involve production, transportation, distribution, wholesale and retail outlets, writes Professor Petri Helo.



Nowadays, the logistics chain is being scrutinized more often from the product's angle and performance is analyzed according to the route of the product. What is the order-delivery time of the product? How much is the total storage time of the chain if the demand peak is 20% higher than normal? And is there sufficient stock in the chain if demand for a new product rises 200 % a week? And so on.

Freshness requirements<sup>1</sup> and the need to incorporate consumer behaviour into the management of logistic processes also put pressure on logistics in the food industry. Changes in the business environment are currently driving many simultaneous processes:

- Retail chains. Products are sold via different channels and packed in different ways depending on whether the product is sold under the chain's own brand or the traditional brand names of the industry. Different consumers buy different kinds of products and also chains are run under different principles.
- Increasing product variation<sup>2</sup>. For logistics, product development in the food industry means that the introduction of products onto the market occurs swiftly. Some products or packaging options are only part of the range for a short season.
- Fast order-driven chains. The order-delivery time demanded by a store is short, nowadays more often a matter of hours rather than days. Speed and the growth of the product palette

are moving order handling from a stock-driven system to order-driven chain control.

- Transparent chain control. Data from the checkout registers can be transferred to transport control or industrial production planning. Thanks to the continuous updating of material requirement calculations, control can extend to semi-finished products and raw materials. On the other hand, as automation increases, it becomes harder to cope with the customer's ordering behaviour.

The challenges are therefore mainly horizontal. Supply chain methods, such as collaborative supply chain management or various performance measures (Supply Chain Operations Reference Model – SCOR), aim at the financial evaluation of the change potential of development projects being implemented in logistics as well as the management of change<sup>3</sup>.

### Customer-driven supply chains

Delivery time requirements have become tougher in many fields. This development is particularly highlighted in food logistics. Researchers at the University of Cardiff, Mason-Jones and Towill<sup>4</sup>, investigated the changes in order-delivery times over the period 1987–1997 and noticed that whereas the average order-delivery time in 1987 was five days, in 1997 it was down to three days. In many supply chains in the food industry, the majority of delivery

BRANCH	1987	1992	1997
Food	5	4	3
Perishables	9	6	4
Petrochemicals	16	11	6
Automotive	28	20	12
Building materials	42	18	4

*Delivery time requirements get tougher (Mason-Jones, Towill 1999)<sup>4</sup>.*

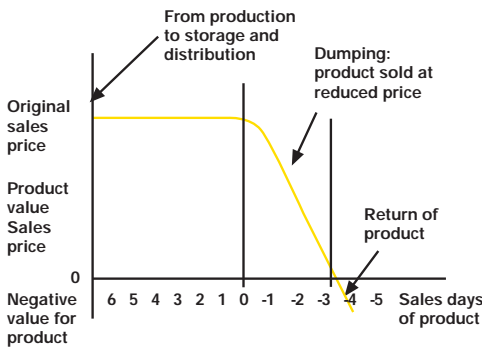
times are measured in hours.

The delivery time of fresh products in the transport chain is of special value: even one extra sales day reduces losses and increases sales. The graph overleaf presents the evolution of the sales price (product value) of fresh goods in relation to sales days. The product value remains the same from manufacture to the last sell-by date (day 0), but after this its price has to be reduced dramatically, in order for the retailer and customers still to accept it. At this stage the product will make a loss i.e. the value is negative. When the value of the product behaves in this way, it is easy to imagine how challenging inventory level management is, particularly in situations of uncertain demand.

If we assume that the sales margin for a retail product is 5–15% and normally there are seven sales days, what would be the value of one extra day? With effective chains, these extra days can be created for at least some of the desired volume. With order-driven chains, the order-delivery time may grow, but the extra ►

sales days will compensate for this loss<sup>5</sup>.

Shortened delivery times, freshness requirements, and swift changes in demand also present new challenges to distribution centre operations. Distribution centres have to be able to cope with the highest rates of restocking and emptying, even when the product variation is huge. At the same time the unit cost of order picking and handling has to be kept low, even though the amount to be handled varies according to the day of the week or season.



The value of a fresh product in relation to sales days.

## E-business

Many fresh foodstuff deliveries have moved to automatic ordering. Automatic ordering, driven by consumer demand, has simultaneously increased the number of order rows. This has brought new challenges to the industry since small orders increase the work in the supply chain and this is mainly manual work. Additionally, large variations in demand throughout the week make picking capacity management more difficult.

In many business areas product variation has grown considerably. The time requirements for fresh products have however stayed the same as before. In practice this means that production batches are getting smaller. The order frequency of small shops has also increased due to ordering over the Internet. All these factors are driving the need for development in food logistics.

Distribution centre operations in many fields are still based on manual procedures in order picking and data management. The technological development experienced in logistic

systems, robotics and data control would enable the development today of a fully automated distribution centre concept for order-driven fields of business. Internet-based order systems will also nudge development in exactly this direction.

## Automation

The automation of logistical information flow combined with automatic monitoring of product flow offers suppliers real-time data on the logistics chain. The technical keys to development will be various RFIDs, e.g. smart labels. At the same time, IT systems are being integrated: shop checkout systems, transport control and production planning software are being combined for effective management of customer orders. Supply chain level control systems will be joined to factory-level systems such as production lines, distribution centres and transport units.

Material flow management is also being automated more than ever. The picking systems of the future will be based on even more flexible



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robots and grippers. Distribution centre systems will cover the whole chain from the production units to warehouse management, packing, pricing, palletizing and loading into trucks.

It can already be seen that warehouse and distribution centre systems with their low operating costs are changing the nature of food logistics, since new systems can offer the players many new opportunities:

- Order monitoring and control on the terminal premises enable the improvement of picking and an increase in the degree of automation. The terminal therefore becomes the operational backroom of the shop.
- There is an enormous amount of packing lists and dispatch notes connected with each delivery batch. In future, these can be replaced with e-systems.
- Order monitoring extranet for shops and transport companies. The automatic approval of transport invoices could be based on transport units received. If the transportation crate has been registered, the delivery and transport invoice are approved. The IT systems will communicate directly with the distribution centre automation systems.

## Difficulty of forecasting

So, foodstuff logistics is well on the way to its future. Increased automation is the general trend in both material and information handling, and there is no reason to doubt the continuation of this trend.

The speed of change is considerably more difficult to predict. Many new solutions initially raise expectations far too high. Almost without exception this leads to disappointment, when the change achieved is not as fast or effective as expected. Examples of this development include business use of the Internet or remote-read RFID smart labels.

On the other hand, changes sometimes happen so slowly that their significance is scarcely noticed. Undervaluing is more likely in sectors of technology that are not in the public eye. The move to order-driven chains is a good example of this kind of long-term change that can take decades.

The food industry, the shops and even our consumer behaviour will continue to change, whether we are aware of it or not.

TEXT | PETRI HELO PHOTOS | HARRI PÄLVIRANTA

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## WORD FOR WORD

# Logistics automation

Logistics automation is the application of computer software and/or automated machinery to improve the efficiency of logistics operations. Usually the term is used to refer to operations within a warehouse or distribution centre, because broader tasks are undertaken by Supply Chain Management systems and Enterprise Resource Management systems.

Logistics automation systems are designed to complement the facilities provided by these higher level computer systems. Focusing on the individual nodes within a wider logistics network enables systems to be highly tailored to the requirements of each node.