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**Location Networking in the German Food Sector, using new
Logistical Systems to Integrate Production and Distribution**

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Summary

This paper looks at influences on the reorganisation of locations and locational networks, caused by concerns among producers and distributors in the food sector to improve flexibility. Two factors are identified:

- 1) An increased number of business specialising in logistical services, and a related adoption of innovative logistics. In part this is a strategic response to market pressure for greater flexibility.
- 2) Co-operation between manufacturing and distribution companies to improve transport flexibility by sharing processes and information.

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1. Introduction

Much has been said in recent years about the crisis of mass-production, and about market-oriented companies' need for flexibility. Market-orientation has significant strategic consequences for businesses. Ultimately it means aligning production to sales requirements, decreasing vertical integration and, closely connected to this, optimising workflow. Hence companies today no longer think only inside the firm, but are starting dialogues with up-stream and down-stream business partners about market-focussed flexibility.

The interface points between companies are acquiring a new significance: on the one hand they are being shifted, recast even, by the decrease in vertical integration; on the other hand, the pressure to rationalise at the inter-company level means that any reorganisation at the existing interface can influence the whole relationship between the two companies.

Issues of logistics are often central to such restructurings, because the potential for rationalisation in this field is very high. The traditional segmentation of logistics into Procurement, Production and Distribution is becoming inadequate. Companies are actively seeking sector-wide and inter-business logistics solutions which can integrate the supplier and customer.

This is true for the overlap between distribution logistics for food producers and procurement logistics for food retailers. Both producers and retailers want to align their logistics around inter-business concepts, which calls for changes at various levels.

- The first level to be affected is the inter-company interface. Given the often differing backgrounds of the businesses concerned, transaction-processing and decision-making difficulties can be expected.
- Each side's distribution channels are also affected. The reduced vertical integration caused by the need for more flexibility means more involvement for logistics service providers in the distribution process.
- Changes to these two levels have considerable knock-on effects on the physical division of labour within the individual firms.

2. Physical Changes

The advent of self-service shopping in the 1960s ushered in a phase of restructuring for food retailers characterised by concentration, closures and ballooning retail-space. The causes were numerous: more products; individual products needing more room for advertising and signs once sales advice was reduced; and new display technology which could prolong shelf-life. With fewer shop-staff thanks to the reduced service offer, a “strategy of substituting staff with floor-space” heralded new, large-scale retail formats such as hypermarkets.

These changes in shop-size and shop numbers were tied in with a wave of concentration across the sector. The large-format operators expanded at the expense of the traditional independents. Small-scale shop closures were matched by the extension of chain-store formats through takeovers of existing businesses and opening of large, newly-built premises. The process happened so fast that by 1996 the ten largest companies in the food retail sector in Germany accounted for 81.3% of total turnover.

2.1 Changes in Distribution Logistics

With the process of concentration, and the changes in shopping, came a revolution in the logistical organisation of retail companies. Traditionally, food markets were supplied direct from the producer. Today this transfer of goods has been heavily centralised. Fewer, larger distribution warehouses have been set up to supply the high numbers of individual retailers, and achieve bulk discounts for large customers. Producers deliver goods to these, and retail companies themselves organise the further distribution to the market. This simplifies distribution for the food producers, because they only need make large deliveries to a few central locations, rather than many small deliveries to numerous markets. However, at the same time it entails a transfer of activity to the retailer, and pushes the producer back up the distribution chain.

2.2 Changes in the Production Logistics of Food Manufacturers

Trends similar to the heavy concentration found in food retailing can be observed in food manufacturing, where the previously dense network of production locations has thinned out (Nuhn 1993). This process has seen the expansion and fusion of traditional delivery regions leading to nationwide and even pan-european shipment. Such changes call for changes in the producers' distribution systems.

There is a tendency towards central distribution networks. Traditionally, decentralised warehouse networks were used, where goods from production sites were assembled and prepared in several regional depots. From there they were distributed as required to the markets in the respective distribution areas. Today 80% of producers are using central warehouse systems. In this case goods are assembled in central warehouses or factory warehouses near the production site, and transported to the customer on demand nationwide, sometimes using trans-shipment terminals. The introduction of central warehouse systems derives primarily from the changes in clients' profiles. As shown above, most retailers now collect from the central warehouse. Well-assembled ("bundled") cargoes can be delivered direct from there, making it unnecessary for producers to transfer goods through their own decentralised warehouses.

We observe an organisational change between producer and retailer – the retailer takes over responsibility for the regional warehousing operation. This bundling permits optimal delivery to individual markets. It is not a physical restructuring, except in a very limited sense, because although the decentralised warehousing by individual producers becomes a bundling of goods from all producers in the market area, the location in the vicinity of dense population centres is normally maintained.

3 The Service-Provider's Role in the Supply Chain

The restructuring processes discussed here have been taking place for thirty years and are today largely complete. Nevertheless, development has not stopped, and today entirely new and progressive ideas are being pursued. These are at two levels. One is the question of who should undertake logistics functions, in other words the out-sourcing of logistical services. Another is the interest of trading partners in taking on more logistical

services themselves, or at least controlling them. Both tendencies are closely connected and indeed to some extent mutually define each other.

3.1 The evolving operating environment: deregulation and market forces

New business ideas are frequently initiated by political changes. This can be seen clearly in the tendency of companies to outsource previously mostly internal logistical functions to third parties. The decades-old regulation of the German transport industry, such as the fixing of road haulage tariffs, the regulation of market access, the allocation of long-distance goods haulage licences to the highest bidder, and the ban on “Kabotage”, meant that free-market economics could not develop in the transport and haulage sectors. The result was price-distortions, including the subsidising of the in-house transport fleet, in other words the execution of transportation by the sender themselves.

With the deregulation of the transport sector due to the European Single Market, this restrictive framework was substantially lifted. The Tariff Abolition Law took effect of 1st January 1994, lifting all previous tariffs on road haulage. There followed a phased increase in road haulage licensing, and on 1st July 1998 complete freedom of Kabotage across the EU. This changed to legal framework of the road haulage sector substantially, leading on the one hand to heavy price competition and consolidation trend within the sector, but on the other hand opened up competition, which started to bring new levels of performance and better service for clients sending goods (Lammich 1994).

With companies starting to focus on a flexible, market-oriented approach, the demands of the customer sending the goods take priority. Logistics come to be seen as a toll of marketing, and variables such as punctuality, reliability and flexibility start to acquire value. At the same time logistics plays a large role because there seems to be some slack which could be taken up to improve productivity. First and foremost from the viewpoint of inter-business ideas, logistical services are gaining in importance, because a close networking of the companies can be achieved by increasing the integration of the service-provider in the whole process.

Hence the service companies are facing entirely new qualitative demands. In today’s market, marked by intense competition, a flexible, comprehensive service offer is expected. That implies, alongside the technical networking using information and

communications technology, above all an increased flexibility, and willingness to take over functional control. Alongside the traditional middle-man's job, for example transportation, now more and more supplementary services are demanded, such as taking on warehousing and consignment work, right back to processing the goods (Aden 1991, Bieber/Sauer 1992).

3.2 Outsourcing logistical services

The trend towards outsourcing logistical functions can clearly be seen in the research¹ sample of food producers. 45% of companies surveyed had changed their use of outside service companies in the last five years. At the time of the survey, 87% of companies operating with outside service companies had completely outsourced their distribution. There was little difference here between sectors, with the figures standing at 90% of bakers and 85% for dairy product producers. The adoption of logistical outsourcing is very varied and can be separated into various stages ("steps"), with the lowest step being a simple delegation of trucking services, and the upper step encompassing a complete outsourcing of distribution.

Step 1

The first and second steps involve handing over delivery services to logistics companies. They can vary quantitatively and qualitatively so much that we have divided them into two groups. In the simplest form outsourcing is adopted for once specialised niche, long-distance deliveries to a single client, for example, as an extension of the company's own deliveries. This requires considerable flexibility on the part of the service provider, while retaining complete control over his services. 15% of companies used this type of outsourcing.

Step 2

A second stage of outsourcing is reached when outside transport services are used not just as an ad hoc addition to the in-house fleet, but become an extensive and

¹ The results are based on data from a study undertaken as part of a dissertation project. In all, 60 companies from the dairy and baking industries were surveyed verbally and by written questionnaire. A comprehensive presentation of this research is found in Neiberger (1998)

permanently outsourced element of it. This can apply to a specific area (initiating services for a specific region), sector (for a specific group of goods, which for example have specific transport needs, such as refrigeration), or type of delivery (part-load or full-load). Frequently the service-provider's own transit depots will be used. This form of outsourcing gives the sender increased flexibility with reduced risk, because costs can be controlled by using several competing service providers, and rapid switches from one provider to another are possible.

With this second step comes the possibility of eliminating ones own transport fleet altogether. The disadvantage is that direct control over service quality and delivery costs is lost, one reason why some producers retain a few vehicles. 31% of dairy companies and 62% of bakeries have completely outsourced their transport operations. The big difference between the product groups is can be traced back to the differing client bases. In the dairy industry the proportion of direct delivery is higher than in the bakery business. Short shelf-life milk products also make bigger demands on distribution, requiring refrigerated transport and an unbroken chain of refrigeration.

Step 3

A further stage up the curve towards a fully out-sourced solution adds the outsourcing of logistical services, warehousing and consignment. The stock control ware house will be financed and/or owned by the haulage contractor. As a rule these premises will be segregated for the use of one client, requiring a long-term connection between the service-provider and the supplier. Organisational control of the distribution flow at this stage remains primarily with the producer. Only 23% of dairy supplier, but 62% of bakery suppliers have such an agreement with a freight carrier. All these companies also fulfil the stage 2 criteria (transportation services) of outsourcing.

Step 4

The outsourcing of scheduling and order-processing represents a next stage of development. With this the distribution operation is entrusted entirely to the service-provider. Goods are transported from the production site to a warehouse financed by the service provider and become his responsibility. The goods are passed on via the service-provider's distribution network, at which stage they have a high propensity for bundling, so that produce from several manufacturers can be distributed together. Such

a high degree of outsourcing means for the producer a considerable loss of direct control over the distribution process, and with it direct influence over the delivery service. Many producers pull back from this step, afraid to lose direct contact to their clients. Among the survey group, 12% had given up their entire logistical operation to a service provider. Possibly they would have preferred to avoid full surrender of control over the distribution process. One observes that most family-controlled suppliers prefer to work with similar family-controlled distributors, in other words smaller sized business partners. A tendency to award contracts to more than one service provider also suggests there is a conscious decision to retain as much control as possible over the distribution process. Contracting with only one provider would hold down costs, but increase dependency by ruling out rapid switching.

Overall there has been a strong tendency to outsource logistical services. Nevertheless, the picture presented here is only a snap-shot in an ongoing process. 45% of companies say that they have only started this outsourcing in the last five years. This has shown itself mainly in the use of sub-contracted transportation, with some additional outsourcing of the warehousing operation. 43% of companies have concrete plans for such outsourcing in the future. Among these 50% of companies are considering making extensive use of outsourcing, with 20% considering using outsourced warehousing and consignment.

The decision to outsource takes several dimensions. One is cost, also dependent on quality and frequency, as described by transaction cost theory. The question of which operations should be outsourced is connected to strategic questions about the importance of the function in question to the company, and considerations about the need for influence over the distribution process. The decision about whom to outsource to seems to be strongly influenced by power-politics.

3.3 Physical implications of a Service-Oriented Approach

Logistical service providers have felt compelled by the drastic increase in demand to extend and improve their distribution networks, as well improving their service offer and introducing information and communication technology. Until now, medium-sized family owned companies in particular normally did not have national networks and international subsidiaries. Such steps will be necessary to satisfy the broadening

demands of suppliers and withstand competition. On the one hand one sees medium-sized family concerns extending their networks through start-up and acquisitions, and on the other, an increased number of co-operative freight networks being formed by smaller companies. These are legally independent companies, mainly operating in different regions, presenting themselves to the market with a unified information system and standardised product. Alongside these, particularly in the food sector, a series of specialists have set up in business, who cover particular regions with a niche service, for example refrigerated transport and storage.

The branch depots function both as dispatch and receiving stations. The goods from the supplier are brought to the regional warehouse where they are sorted by destination region and shipped by regular delivery to the relevant regional warehouse. Here they are consigned for the individual client and delivered. In this way a regional focal point is achieved both for the supplier and the client. The branch operations thus act both as the central depot for the producer and the trans-shipment warehouse for distribution into the target region². This is the system used under Stage 4, when the supplier entrusts his entire distribution process to a service-provider.

Alongside the transport-specific infrastructure, all service providers also provide special warehouses for individual producers in the vicinity of the production location. Goods can be delivered from there direct, or stored within the network. Existing production-based warehouses can be used by service providers. Additionally, many suppliers expect a tailor-made service, including an independent accounting system, that gives them the assurance that they will be dealt with individually. As before, one notes the supplier's inclination to retain as much control as possible over distribution (Step 3).

As mentioned, considering the large proportion of companies already using out-sourced transportation (Step 2), one can conclude that although producer-owned warehouses still remain important (in the production locality), distribution of goods will tend to move further onto the service-providers' own systems, achieving higher bundling benefits than can be achieved by any one producer.

In all, we can be clear that outsourcing of logistical services will continue to expand, to the benefit of the service provider network. This is evident from the high bundling capability than service-providers enjoy. Even so, their all-encompassing networks are

² Most recently hub and spoke (HUB) transport systems have been introduced which direct goods via a physically central collecting point. In this model, direct, task-specific connections are made with the hub, reducing warehouse, handling and transport costs (O'Kelly/Miller, 1994).

often only used for deliveries outside the production region, with the producer continuing to operate a warehouse in the vicinity of his own location, whether under his own or third-party management. In such cases, suppliers are concerned to retain some control over the distribution process,. There are eventualities which would be considerably more difficult to control if logistics had been completely outsourced (e.g. chasing up lost consignments etc.). This explains the limited adoption of what would otherwise be a more effective approach – the full outsourcing of delivery logistics.

4. Concepts of Producer and Distributor

Both food manufacturing and food retailing companies have tapped into a rich vein of potential for logistical rationalisation in recent years. The cause was partly the restructuring their physical networks, but above all the introduction of new data-processing and communications technology (e.g. **stock control** systems). Such opportunities for internal rationalisation are now largely exhausted, lending impetus to ideas that a further round of cost cutting might be achieved by improving flows between producer and retailer.

Other models for organising the process are needed if optimisation is to catch on within the organisation. Alongside the introduction of new rationalisation techniques, new organisational structures are needed to gain control of business-wide processes. This led to considerable interest being shown in recent year in the ECR³ management concept. ECR (Efficient Consumer Response) promises a firm-wide optimisation of processes, and with it an elimination of the potential for conflict in the areas of pricing policy, terms and conditions, product range and logistics.

4.1 Efficient Consumer Response

The ECR concept looks at two basic dimensions, Marketing and Logistics. In the field of logistics, three areas of efficiency are assessed

- Administration (order systems, delivery systems and payment systems)

³ A US concept brought to Germany in 1994 by a study by the Coca-Cola Retailing Research Group (CCRRGR 1994)

- Logistics (rational flow of goods)
- Provision of warehouse services and warehouse financing.

Achieving all three areas of efficiency may require a radical shake-up of the whole process. The concept calls for the producer to finance the inventory in the warehouse, not the retailer. The data about the sale of goods in the shop should be transmitted via the central depot to the producer, who can organise production accordingly, and at the same time decide for himself how much such be delivered to the retailer. This reduces the retailer's central depot to the role of trans-shipment warehouse, where goods are consigned for delivery to shops (CCRRGR 1994, Lintner 1996, Zentes 1996).

To be successful, this method of distribution needs logistical service providers who have the networking and data-processing connections to the manufacturers which are necessary for this complex task. An increased number of individual deliveries can be expected, in order to replenish stocks when they run low in the retail warehouse. Distribution in the locality would continue to be managed by the retailer, but to avoid high warehouse stock levels this requires close co-operation with the service provider.

ECR offers significant rationalisation effects for both sides, although considerably more savings are expected for the retail side. Nevertheless large producers are currently interested in introducing the concept. Their motives for supporting ECR, apart from pure cost savings, seem to serve another purpose. There is apparently a desire to develop core skills relative to the retailer and the competition. With the producer taking on numerous logistical operations, and the related IT networking, the quality of the service is improved and the retailer's ability to switch producer is reduced. Thus the competitive position of the producer is improved.

A further motive for the producer to introduce ECR seems to lie in the possibility of initiating discussions about new structures in other internal departments, using a technology-driven increase in flexibility as the excuse. This raises the issue of terms and conditions, which is a general source of conflict between producer and retailer. So producers are also seeking to use ECR to achieve changes in the balance of power.

4.2 Procurement logistics

However, not only producers are considering how to extend their logistical links beyond the confines of their own firm. Once the first step to outsourcing has been taken,

through the adoption of central distribution depots, retailers too look for ways to extend the integration of services. This involves taking over distribution services from production warehouse to retail warehouse, previously done by the producers. Such procurement involves collecting the goods of various producers in a particular region and then delivering a bundle of these into the destination region's central warehouse. The job can be done by regional freight companies which have the necessary IT connections and branches to do the bundling in the vicinity of the retail warehouse.

In this way the retailer can offer to cut costs in the retail warehouse, by sub-contracting, and so achieving better utilisation, with fewer trucks, whose departure and arrival can be better controlled. The transfer of this service from producer to retailer should be paid for by some form of logistical rebate.

The retailer cannot implement procurement logistics without heavy investment, to the extent that it becomes attractive to delegate the work to a logistical service provider. Comparing the locational networks of retail companies and service providers shows that the retail warehouses could be integrated into the service provider's distribution network without difficulty. In other words, the retail warehouse can be treated by the service-provider's warehouse as a destination warehouse, after which the vehicles would drive to the nearest service-provider warehouse to reload.

4.3 Consequences for the Physical System

Such ideas about manufacturer and retailer, ECR and procurement logistics, are essentially contradictory. Business partners are trying to gain influence over the distribution process, and the steps in the function of warehousing are being redefined: with the ECR concept a retail warehouse becomes a trans-shipment warehouse, which according to procurement logistics is a new, regional warehouse in the vicinity of the retail warehouse.

Although these concepts may be very different, they still have a common theme: both heavily involve the service-provider in the logistical process. Apart from signalling the rise of this segment of the market, it shows the increased importance of location for service providers, and the interconnection of these. As shown above, German service-provider networks generally consist of 20-25 branches evenly spread across the country, located in the vicinity of densely populated centres. These locations can be argued to

provide optimal physical coverage. At the same time, a degree of bundling can be achieved by such service providers which is not possible either for individual producers or retail companies.

5. Conclusions

This paper has investigated recent changes and trends affecting logistics between food manufacturers and food retailers in Germany. Two notable processes of organisational change are identified, influencing the future location of logistical operations in Germany.

On the one hand, we see a strong tendency to outsource among producers, a trend which is already well-advanced and expected to progress further.

On the other hand, both producers and retailers are considering two new, inter-business logistics systems. These have been discussed and tested only recently. Which of the two concepts will establish itself cannot be stated definitively today. Possibly individual business or sector-specific solutions will be found which allow both concepts to exist side-by-side. The result will depend less on the efficiency of the concepts than on the market power which they give individual companies.

One fact is decisive to the physical consequences of such logistical systems: logistical service providers will increase their share of the process. That will entail a growing importance for service-provider systems which have optimal locations and linkages capable of goods-bundling.

Literature

- Aden, D. (1991): Service-Logistik im europäischen Binnenmarkt: Herausforderungen an die Dienstleister. In: J. Zentes (Hrsg.), *Moderne Distributionskonzepte in der Konsumgüterwirtschaft*, S. 199-212, Stuttgart.
- Bieber, D./D. Sauer (1992): Das Speditions- und Transportgewerbe im Umbruch - auf dem Weg zu einer „modernen“ Logistikbranche. In: ISF (Hrsg.), *Jahrbuch Sozialwissenschaftliche Technikberichterstattung 1992, Schwerpunkt: Dienstleistungsarbeit*, S. 103-129, Berlin.

- CCRRGE (Coca-Cola Retailing Research Group) (1994): *Kooperation zwischen Industrie und Handel im Supply Chain Management*, o.O.
- Lammich, K. (1994): Deutschland nach dem Tarifaufhebungsgesetz. Was bleibt übrig von der kontrollierten Verkehrsmarktordnung? In: *Internationales Verkehrswesen*, Bd. 46, S. 20-24.
- Lintner, A. (1996): ECR Europa ergreift Initiative. In: *Lebensmittel-Zeitung*, Nr. 2, S. 41-42.
- Neiberger, C. (1998): *Standortvernetzung durch neue Logistiksysteme. Hersteller und Händler im Wettbewerb: Beispiele aus der deutschen Nahrungsmittelwirtschaft*. Wirtschaftsgeographie 15. Münster.
- Nuhn, H. (1993): Auflösung regionaler Marktsysteme und Konzentrationsprozesse in der Milchwirtschaft der BRD. In: *Zeitschrift für Wirtschaftsgeographie*, Bd. 37, S. 143-150.
- O'Kelly, M.E./H.J. Miller (1994): The hub network design problem. A review and synthesis. In: *Journal of Transport Geography*, Bd. 2, S. 31-40.
- Zentes, J. (1996): Verbraucher bestimmen Produktion. Ausschöpfungspotentiale liegen zwischen Handel und Industrie. In: *Lebensmittel-Zeitung* Nr. 29, S. 43.