

THE SYSTEM OF FLOWS AND THE RESTRUCTURING OF SPACE
ELEMENTS OF A GEOGRAPHY OF DISTRIBUTION

With 3 figures and 1 table

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Verdichtungsräume, Peripherregionen, Deutschland, Logistik, Standortkonzepte, räumliche Dispersion

Zusammenfassung: Das System der Ströme und die Re-Strukturierung des Raumes. Elemente einer Geographie der Distribution
Gütertransport und Logistik haben in Geographie und Raumwissenschaft lange Zeit wenig Beachtung gefunden. Dies verwundert, da wesentliche Raumwirtschaftstheorien auf den Kosten der Raumüberwindung und damit implizit auf den Eigenschaften des Distributionssystems basierten. Durch den Rückgang der Transportkosten und die Revolutionierung der Kommunikation wurde dieses Feld als selbstverständlich vorausgesetzt: Es verschwand, paradoxerweise, aus dem Blickfeld der Forschung. Veränderte Rahmenbedingungen wie die Ausweitung des Welthandels oder die zunehmende Vernetzung der Produktionssysteme haben diesem Teilgebiet zu Recht wieder mehr Aufmerksamkeit verschafft, auch in der Geographie. Durch die Re-Strukturierung der Wertschöpfungsketten wandeln sich Raumansprüche, Raumabhängigkeit und -wirksamkeit der Logistik. Es entsteht eine neue „Geographie der Distribution“ als Ausdruck der Interaktion von Warenströmen, Standortsystemen und Institutionen. Die wachsende Mobilität von Waren und, in jüngster Zeit, auch von Standortsystemen wirft die Frage auf, inwiefern die Logistik an der Aufhebung räumlicher Bindung arbeitet und welche Konsequenzen daraus resultieren.

Summary: Freight transport and logistics have long been neglected by geography and regional studies. This is surprising since several major spatial theories are based on the costs of overcoming space and thus, implicitly, on the characteristics of the distribution system. Falling transport costs and the communications revolution caused researchers to take this field for granted and, paradoxically, let it slip from focus. Changing global factors such as the expansion of world trade and the widening network of production systems have rightly rekindled interest in logistics and transport, also on the part of geographers. Restructuring of value-added chains has transformed the spatial needs, spatial dependence and spatial effectiveness of logistics. A new “geography of distribution” is evolving, expressing the interaction between commodity flows, location systems, and institutions. The growing mobility of goods and – recently – of location systems raises the question of how far logistics is working to loosen spatial ties and what the outcome will be.

1 Introduction

In the course of history, logistics and freight transport have played a key role in spatial development, in mercantile economies and in the age of industrialisation (BRAUDEL 1982). For a long time they were even more important than passenger transportation. Yet this field has long been under-represented in geographical discourse. Geography’s neglect of freight transport is surprising in view of the fact that major theories were formulated with particular regard to transport costs as a locational criterion (industrial location theory, central places, market networks, land rents). In the past, geographical analysis of freight transport primarily focused on two themes: first, the historical and geographical development of freight traffic and its infrastructural networks (cf. INSTITUT FÜR LÄNDERKUNDE 2001), second, the growth of seaports and inland ports and the restructuring of port cities and waterfronts (e.g. NUHN 1999; HOYLE a. PINDER 1992). Impressed by the globalisation of trade and transport, authors have re-

cently focused on the development of the main ports (DEECKE a. LÄPPEL 1996; DREWE a. JANSSEN 1998; SLACK 1998; VAN KLINK a. VAN DEN BERG 1998; HALL 2004) and on the trends towards containerisation and developing intermodal gateways (cf. SLACK 1999; GOETZ a. RODRIGUE 1999). Economic geographers have analysed distribution restructuring in the context of production reorganisation (BERTRAM a. SCHAMP 1989; LEMPA 1990; NEIBERGER 1997, 1999; NUHN et al. 1999). The boom in freight transport finally led to a discussion about planning and policy problems and possible solutions (DEITERS 2002).

However, the logic of spatial structures on which the location systems of the carriers are based has been considered only in part (HÖLTGEN 1995; HESSE 1999). In this respect, geographical analyses of the freight transport system tended to remain selective and descriptive. De facto, distribution is a kind of “missing link” between industrial geography and its well-advanced research on *production* and retail geography which tends to start at the other end of the commodity chain, supply

to consumers. Against this background, WRIGLEY (2000, 292) asked: “Whatever happened to distribution in the globalization debates?” The fact that DICKEN (2003, 471ff.) included a chapter on the development of distribution in the 4th edition of “Global Shift” may be considered evidence of rekindling interest in the topic, just as logistics as a whole is gaining importance in the Anglo-American context (HESSE a. RODRIGUE 2004b; HALL et al. 2006).

A further reason for a stronger research focus on logistic systems, logistic networks and spatial development is that it complements research on global production networks (COE et al. 2004; NEIBERGER a. BERTRAM 2005) and thus adds to a comprehensive analysis of the entire value-added chain. In addition, it can make use of the scientific community’s heightened awareness of mobility and transport, networks, flows and nodes (CASTELLS 1996; CRANG 2002). In this context, this paper aims to conceptualise elements of a geography of distribution, consisting of material flows, logistic locations and institutions. It explores the importance of logistics and distribution for the restructuring of systems of spatial relations and spotlights relevant topics and avenues of research.

2 Logistics and distribution in the context of changing spatial economics

Logistics designates the organisation and regulation of information, material and traffic flows involved in transportation. By contrast, distribution – also known as “physical distribution” in Anglo-American contexts (MCKINNON 1988; BREWER et al. 2001) – describes all activities included in the distribution of goods from the place of production to the place of consumption, but excluding production logistics. The logistics system comprises all important elements involved in organising and performing the tasks described above: freight forwarders and carriers, infrastructure and locations (including areas), modes of transport und transport containers, communication systems and technologies, etc.

When analysing the logistics system we should distinguish its internal developments from external processes and influencing factors. The *internal* system logic of logistics results from the company organisation, especially the materials management of individual enterprises in the context of the division of labour both within the company and at higher levels. Companies are increasingly faced with the challenge of controlling complex commodity flows under precarious conditions of cost and competition (BIEBER 2000; NEHER 2005). At the same time the logistics system is no longer

merely a derivative of industry and commerce. It is becoming more independent, more “structural” (HESSE a. RODRIGUE 2004a). The *external* form of logistics is physical distribution, under specific boundary conditions of time and space (DEECKE et al. 1999). Freight transports require transportation systems and gateways; they take up space, use power and pollute the environment. Transportation ensures accessibility and influences the competitiveness of commercial and industrial locations. It follows that the technical and functional perspectives of business administration or the transportation and traffic sciences cannot suffice for scientific analysis: a *contextual* approach is needed. Consequently, the perspective offered by the spatial sciences and geography could be appropriate.

Another reason for a more intensive study of logistics and freight transport is that both are prototypes of current structural change. SUAREZ-VILLA (2003) termed this change “technocapitalism”. It is characterised by the constant evolution of *information and communication*. Technological change is the key determinant of logistic change. Decades ago this was true of containers; today it applies to technologies such as bar coding, materials management systems, tracking and, most recently, radio frequency identification devices (RFIDs). They have transformed materials management over the past 15 years. The interim effect is to make the logistics system more important – no longer only (or primarily) as a service branch, but as a key link in a networked economy, within which added value is created more and more fragmentarily. In spatial terms, *internationalisation and globalisation* set the pace. The real-time networked global system of economic exchange is a key factor determining logistics and distribution (MCCALLA et al. 2004). To an increasing extent, the technology-driven economy is also a global economy: for decades the volume of global trade has been growing more quickly than worldwide output (DICKEN 2003, 35). There are many signs that this trend will continue in the future.

The driving forces behind this trend are, first, the change from the traditional delivery chain to the modern supply chain – characterised by the integration of all segments, a reverse, upstream-orientated distribution, as well as a marked reduction of stocks and inventory (see Fig. 1; also LÄPPLE 1995a). This corresponds to an increasing degree of integration in logistics development (Table 1). On the one hand, the structure and topology of logistical networks are changing: they are becoming increasingly hierarchical and large-scale, changing from the local or regional to the supra-regional level (ALICKE 2003; NEHER 2005). This change is transforming the flux of commodity flows and also the outreach and localisation of location systems. This

finds expression in a general rise in goods exchange and freight transport, a changing importance of scale levels in the freight transport system (local => regional => large-scale), in a centralised distribution function, linked with a decentralised location system, and in the change of location-related centrality (HESSE 2007). These changes should be examined more closely in relation to location issues and location logics: they are the focus of investigating a “geography of distribution”.

3 *The location of logistics – spatial effectiveness and spatial dependence*

3.1 *Continuously changing traditional location logics*

Traditionally the locations of freight distributors depended on industry: distribution sites were located at both ends of the production-orientated transport chains, at the place of production (manufacturing location) and at the place of either consumption or transport to the end consumer (retail trade). These were generally urban agglomerations from which the distribution areas were supplied. Depending on the focus of the functionally segmented transport chains, they chose proximity to either the production site or to the market. On the whole, the distribution system had a strong affinity with the central place system of settlement and market areas.

Decentralisation of industrial production and the parallel expansion of transit routes logically led to dif-

ferent choices of location for handling and storing freight (PRED 1977). This was demonstrated by CHINITZ (1960) for New York City/New Jersey, VANCE (1970) in his geography of wholesaling, and MCKINNON (1983, 1988) with reference to warehousing and logistics services in England. Recently, technical and organisational changes in distribution have transformed location systems further (GLASMEIER a. KIBLER 1996). The crucial factors here are, first, the transition from a single plant or site to networked production (SCHAMP 2000) and, second, the continuous improvement of transport and communications technologies (BARRY a. SLATER 2001). It would otherwise have been impossible to streamline materials management. The key elements of this strategy are new logistics networks. Their inherent rationalisation logic is based on a high degree of centralisation. As a result of the coarsely meshed configuration of logistics networks and parallel to the internationalisation of commodity flows, the distribution areas are expanding (DE LIGHT a. WEVER 1998) and the number of facilities for handling goods is decreasing.

Logistics networks are materialising as the new Distribution Centres (DCs), which are facilities to optimise supply flows rather than conventional warehouses (HESSE 2004). DCs enable economies of scale to be exploited and stocks to be replaced by commodity flows, in order to reduce inventory and costs. Their size and traffic frequency create special locational and infrastructural requirements, and they can no longer be located at traditional transshipment sites (POSCHET et al. 2000). In consequence, distribution companies move to

Table 1: *Phases in the development of logistics*

Phasen der Logistik		
Phases of logistics development	Subject	Aims
1970s	Traditional logistics <i>Supply – storage – manufacturing – storage – distribution</i>	Optimisation of separate functions
1980s	Logistics as cross-section function <i>Supply – logistics – manufacturing – logistics – distribution – customer</i> Phase of functional integration Logistics integrates functions into process chains: <i>Customer – development – supply – order management – distribution – re-cycling – customer</i>	Optimisation of processes Establishment and optimisation of process chains
1990s	Phase of comprehensive, inter-firm integration Logistics integrates firms into value-added chains: <i>Customer – distributor – logistics provider – manufacturer – retail – logistics provider – customer</i>	Establishment and optimisation of value-added chains
2000s	Phase of worldwide integration of value-added chains Logistics integrates value-added chains into global networks	Establishment and optimisation of global networks

Source: own after BAUMGARTEN a. THOMS 2002, 2

strategically favourable sites outside the city; by contrast, urban ports and traditional wholesaling districts are becoming increasingly gentrified. The outcomes are new locational logics which will be considered here in relation to three elements:

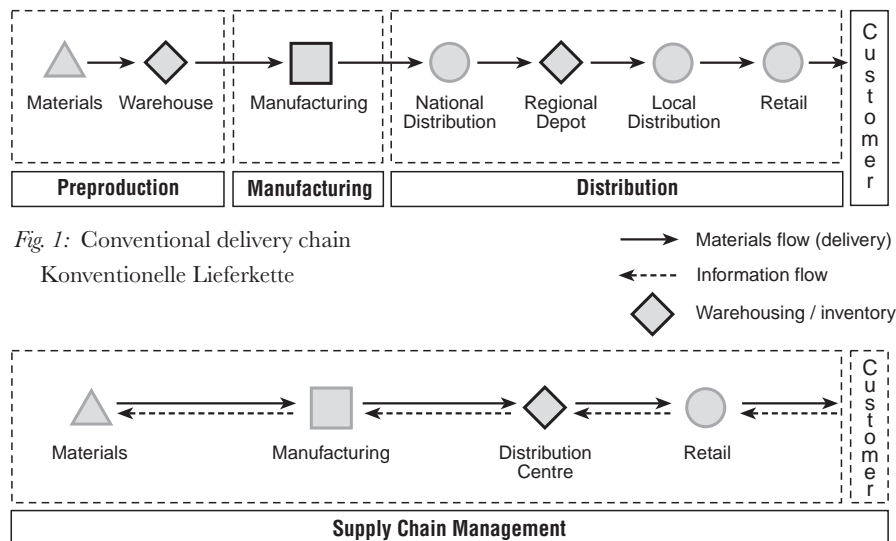
- global gateways and intersections,
- regional distribution complexes,
- new centres in the old periphery.

3.2 Global gateways and interfaces

Among the location complexes most affected by changes in the logistic requirements of enterprises are the traditional gateways of freight traffic – especially seaports, container ports, and large freight airports in industrialised countries, but also increasingly in areas of neo-industrialisation where globalised transports are concentrated. Port locations are now confronted with pressures arising from the restructuring of the value-added chains. As nodes of long-distance transport they no longer act as traditional gateways for supplies to their hinterlands (NUHN 1999, 88); rather, they serve the organisation of the physical freight flow in a larger spatial-organisational context. In this way they are integrated in the space/time organisation of complex transport and production systems. Increasingly value is being added on the high seas or inland, i.e. away from the ports. Hence individual locations are becoming less important. New transport and container technologies, automatisisation of many work processes, and flow

orientation in the logistic creation of added value mean that these activities are no longer necessarily tied to port locations (LÄPPLE 1995b).

All big seaports are now keenly competing to operate as international hubs for logistics services (VAN KLING a. VAN DEN BERG 1998). This applies to the big ports such as Rotterdam, Antwerp and Hamburg on the North Sea coast (HESSE 2006), New York/New Jersey on the east coast and Los Angeles/Long Beach, Oakland and Seattle-Tacoma on the west coast of the USA (MCCALLA et al. 2004). Since significant proportions of industrial production have been relocated to the Far East, new competition has also arisen in the Asia-Pacific Region: the new hubs of international freight flows have evolved in Hong Kong, Singapore, Shanghai, Pusan or Kaohsiung (COMTOIS a. RIMMER 1997). Faced with keener competition, all locations are committed to expanding their infrastructure (enlarging port or transshipment areas, dredging rivers). Like the distribution networks of the transportation economy, these strategies are governed by the economies of scale that favour the concentration of the largest possible volume of freight (SLACK et al. 2002). However, these efforts come up against constraints almost everywhere: space is scarce and expensive in the traditional port locations. Scope for expansion in the densely built core cities is either rare or politically controversial. In addition, traffic density has increased as a result of higher volumes of freight transport. Hence, various alternative concepts are being developed at these locations, as well as the



Source: own, modified from HESSE / RODRIGUE 2004a

Fig. 2: Integrated supply chain
 Integrierte Versorgungskette

classical expansion strategies (space, navigation channels, etc.). These include reclaiming land from the sea (e.g. the Maasvlakte in Rotterdam), building sea-based ports off-shore (WEISBROD 2004), or creating brand-new coastal ports like the planned deep-sea Jade Weser Port in Wilhelmshaven. For quite a long time distribution and logistic facilities have been expanding into the hinterland. ALLAERT termed this process “sub-harbourisation”, by analogy with the suburbanisation of distribution (1999, 3). NOTTEBOOM and RODRIGUE (2005) also speak of “port regionalization”, the displacement of port functions into the region. NOTTEBOOM and WINKELMANS (2004) described these spatial polarisation and expansion movements with reference to the Benelux seaport system (cf. Fig. 3).

All big ports are developing transportation corridors towards the hinterland in the effort to cope with the heralded growth of transport volumes and to shorten transport times. For example, the Betuwelinie will provide a rail link between Rotterdam Port and the Ruhr area, possibly also the further hinterland. The A73 motorway between Venlo and Nijmegen has proved a successful logistical corridor for relocating firms (“de logistieke snelweg”). The Betuwelinie is

intended to alleviate some of the A73’s congestion. A similar target is envisaged for the planned rail corridor between Antwerp and the Ruhr area (“Iron Rhine”). In the USA, the Alameda Corridor was built in Los Angeles/Long Beach to improve their links with the hinterland. An alternative way of coping with bottlenecks is for companies to relocate farther into the hinterland. This applies especially to the inland hubs that are located in accessible locations in mid-continental macroregions (e.g. the Midwest of the USA). These inland hubs are “DC clusters”, i.e. agglomerations of distribution centres that gather together warehousing, transshipment, as well as transport, trucking, and air freight. They are conveniently close to the motorway network and often also have access to airport infrastructure (URBAN LAND INSTITUTE 2004).

In the context of institutional change, particularly the deregulation of the transport markets and the creation of globally operating logistic concerns, both logistical networks and nodal functions are also changing (NOTTEBOOM 2004). Pressure of competition is increasingly threatening the traditional hubs too: their infrastructures are no longer run by local port companies but increasingly by multinational service corporations

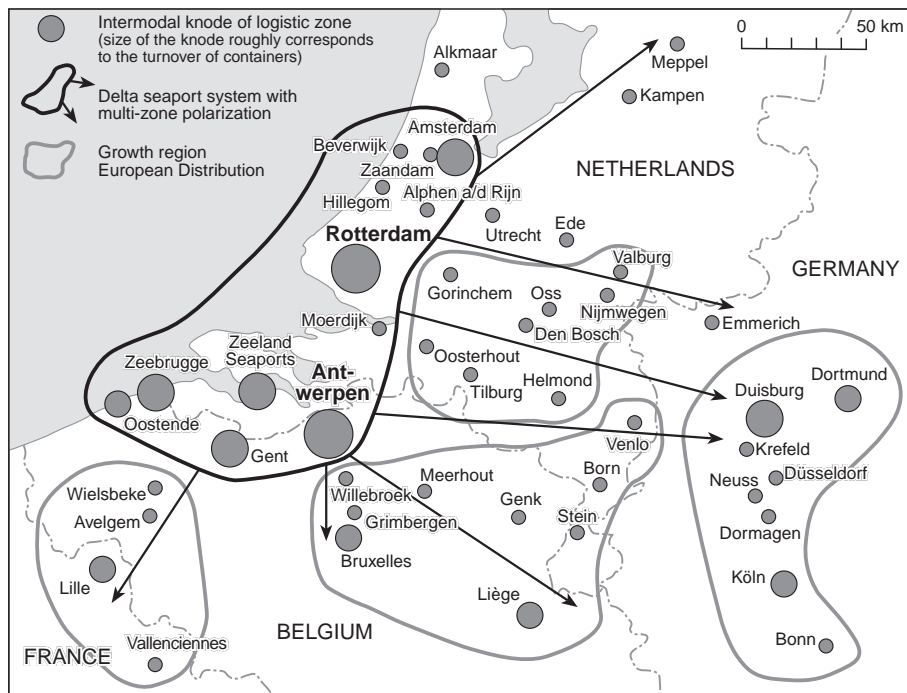


Fig. 3: Spatial polarization and expansion of the “Seaport-System Benelux”
 Räumliche Polarisierung und Expansion des „Seehafen-Systems Benelux”
 (Source: own data (after NOTTEBOOM a. WINKELMANS 2004))

with a global infrastructure network (NUHN 2005; SLACK a. FRÉMONT 2005). Owing to the global activities of these service corporations, port functions are losing their traditional locational ties, and infrastructures and locational systems are becoming increasingly mobile. Marginal locations can suddenly achieve great importance merely because of the individual strategies of globally operating services. One example is the container port of Gioia Tauro in Calabria (Italy) that became one of the major European terminal complexes within a ten year period. This is where part of the container freight coming through the Mediterranean from the Suez Canal is reloaded on to the railway and transported to northern and central Europe. The volume of goods handled at Gioia Tauro already almost totals 50% of that at Hamburg Port (NOTTEBOOM 2004, 99). On the Arabian Peninsula, Dubai is now a boom location; as a global node, it is evidently positioned ideally in time and space. A *Logistics City* is emerging, in the immediate vicinity of Dubai's existing container port and a free-trade zone; ultimately it will cover 25 times the area of *Cargo City Süd* in Frankfurt/Main. There are also plans for a huge freight airport (HELMKE 2005). The case of Dubai demonstrates how the restructuring of global supply flows creates complex spatial arrangements at new locations.

3.3 Development of regional distribution complexes

The growing importance of the distribution and logistics sectors is also affecting agglomerations or densely populated areas. One reason for this is the tendency of value-adding and logistics chains to expand from the big intersection locations into their hinterlands; another is the proximity of agglomerations to customers. In the course of the economy's growing user-orientation, distribution locations are moving away from production and towards consumption, i.e. partly towards the agglomerations (again) (MUELLER a. LAPOSA 1994). This is where clusters of distribution centres (DCs) form, sometimes at single, more or less unconnected locations, sometimes planned as freight transport centres (HESSE 2004). The locational advantage of agglomerations is less their position at an important infrastructure intersection, but rather their combination of short- and long-distance accessibility and *also* access to major distribution areas. Decisions on the location of new DCs are primarily based on the criteria of size and accessibility. In the past few decades, this combination of factors has brought a greater proportion of distribution uses to the areas surrounding agglomerations, as industry already did before. Under the present conditions of flow-orientated economy this

movement out of the cities has become stronger because the core cities and their traffic congestion create more and more obstacles to flow-oriented distribution.

GLASMEIER and KIBLER (1996) also attribute this development to new technologies and their application in transport and transshipment; a different arrangement of the supply chain and a different power structure in the logistic channel always trigger changes in the spatial organisation of distribution too. However, this does not apply equally to all branches of logistics: GLASMEIER and KIBLER (1996) think that wholesaling will still remain in core or even central city locations, as VANCE (1970, 130ff.) already stated, but they assume that the decentralisation of logistics will continue. Empirical studies on the extent of this trend are rare, however. MCKINNON (1983) studied the development of warehousing in England and traced its spatial distribution in industry and distribution services. He revealed a spatial pattern of sub-areas around conurbations and along major motorway corridors with above-average growth rates (MCKINNON 1983, 392). This applies especially to the northern part of Greater London (M1-A1), whose growth is attributed to the fact that local distribution moved out of the core city. These locations are also attractive for regionally scattered supply networks.

RIEMERS (1998) employed a similar approach in his study of the Dutch wholesale sector with reference to the changing spatial distribution of the working population between 1973 and 1993. Employment in the wholesaling sector declined in the three biggest Randstad cities (Amsterdam, Rotterdam, The Hague), whereas four regions in the southern Netherlands (Brabant) recorded higher figures (RIEMERS 1998, 90). These regions are favourably located in the heart of the Benelux region, with ideal connections to the motorway network. Locations in the surrounding areas profit from the fact that local and regional planning actively supports the relocation of enterprises by designating "city distribution centres" on the outskirts of cities and, at the same time, restricting truck traffic in city centres (ibid.). By contrast, peripheral parts in the northern and eastern Netherlands, for example, have lost out: "The general tendency seems to be that wholesale businesses look for more central locations in the open space within the Randstad or to the eastern and southern fringes of the Randstad" (RIEMERS 1998, 90).

The locational structures of logistic services show a similar spatial logic in Flanders (Belgium), to the north of Paris (JONES LANG LASALLE 2001), around London (MCKINNON 1983) and Milan (DEBERNARDI a. GUALINI 1999). In Germany, too, terminals, depots, and new distribution centres are increasingly being built at the periphery of urban regions. In eastern Germany there are

the corridors along BAB 14 (Halle-Leipzig), around Hermsdorfer Kreuz in Thuringia (A 4/A 9), or along the Berlin Ring (A 10). Typical examples in western Germany include Hanover (cf. HANNOVER REGION 2000), the eastern Ruhr area, the Lower Rhine, eastern Munich, and the region around Frankfurt/Main airport. Employment statistics in Germany's transport sector reflect this trend: in the late 1990s such jobs were concentrated (in absolute values) in agglomerations and in the port districts of Hamburg and Bremen. However, districts such as Groß-Gerau (near Frankfurt/M.), Saalkreis (near Halle/Saale) and Unna (North Rhine-Westphalia) had the highest density or the highest relative proportions of this sector in employment figures as a whole (BERTRAM 2001).

3.4 New centres at the old periphery

The arrival of national or even European transport networks means that places outside the agglomerations have become interesting as potential locations for logistical functions. There are two reasons for this: first, their traditional disadvantages of poor accessibility have been offset by extensive motorway construction during the past few decades; travel time to these markets has dropped considerably, despite their peripheral situation. This makes such locations attractive, especially for supraregional networks. Second, these regions possess space and labour-market reserves; at least the former factor offers an advantage over agglomerations. Hence, previously near-border areas are well represented in this logistical logic of location: since the demise of national borders they enjoy new locational advantages, they are easily accessible by motorway and have huge reserves of space. The prototype of this is northern and central Hesse, whose central location since 1990 has made it a suitable node for national transportation networks (KREMER 2000). Especially Bad Hersfeld now counts as a kind of hub for nationally-orientated distribution centres (GUDEHUS 2000), as the main terminals for many parcel services, the German headquarters of an internet dealer, and the distribution centres of retail and wholesale companies are based here.

In western Europe the region around Venlo in the Netherlands is increasingly filling the earlier vacant space between Randstad and the Ruhr area. It is gaining a reputation as a hub providing logistics services for the agglomerations and throughout Europe. On the whole the Benelux countries are on a development streak owing to their easy-to-reach location (DE LIGT a. WEVER 1998); the same is true of the Nord-Pas de Calais region in northern France, which has acted as

a bridgehead between Great Britain and continental Europe since the Channel Tunnel was built. CABUS and VANHAVERBEKE (2003) have studied similar trends in western Flanders (Belgium). Its rural areas are under strong suburbanisation pressure from the core area of Belgium and are experiencing a highly dynamic development. Business services show the highest job growth rates, for instance in the transportation and logistics sectors: "[...] there are specific niche economic activities performing very well in the countryside. This is the case for business services, transportation and catering. It is obvious that the excellent growth figures for transportation and logistics are linked to the proximity of world harbours, a favourable situation regarding traffic congestion, and the availability of cheaper space – an important requirement for the logistic handling of goods. [...] As a result, new logistics developments such as European distribution platforms (EDP), become more important and play a crucial role in the functioning of production systems." (CABUS a. VANHAVERBEKE 2003, 241)

The peripheral regions are showing signs of the cost/benefit ambivalence of logistical modernisation. On the one hand, rural regions have lost economic substance through the breakdown of regional production chains (NUHN et al. 1999). Moves towards centralising production and distribution have caused large-scale collapse of the traditional industrial pattern of peripheral regions, e.g. the processing of agricultural products. At the same time, rural regions are attractive sites for relocations from the agglomerations (BADE a. NIEBUHR 1999). In this respect, the regions can also benefit when logistics and distribution move to the periphery. It is sometimes assumed that logistic nodes and locations are attractive sites for production facilities because of their transport connexions; however, there is as yet no empirical evidence for such links, not least because almost all these locations are equally accessible. In the case of certain (rural) areas it is true that logistic projects are increasingly receiving active economic support because these regions are often not traditional industrial locations.

4 From transport networks and location factors to the geography of distribution

4.1 Spatial logics: embedded or footloose, leader or follower?

Restructuring of the value-adding chains has brought changes in the spatial needs, spatial dependence and spatial effectiveness of logistics: the breaking-up and flexibilisation of value chains, on the one hand, and the

spatial expansion of production systems, on the other, generate a much greater exchange of goods. An additional factor is the keener competition among enterprises in the deregulated market, as a result of which transport costs have dropped further. These trends have triggered new imperatives to mobilise the value-adding situation. They are shown by the increased speed and fluidity of information, goods and transport flows and in the expansion of distribution channels. Recently these mobilisation processes have also affected location systems: dislocation and localisation trends are revealing a new geography of distribution that is characterised by changed location calculations and new spatial organisation patterns.

Inasmuch as this shift is directed away from the core city and towards the periphery of the urban region, it may – at first glance – be interpreted within the historical continuum of recent urban and regional development. Starting with proximity to the places of production and consumption and to the interfaces of the transport networks, areas with more space and better operational conditions were then chosen as distribution locations – but generally still within the catchment of the urban region. If the spatial distribution of employment in the respective branches is taken as the yardstick (cf. again BERTRAM 2001), its spatial logic still fits in with the central place system. But if we consider the development dynamics of the large interfaces and global nodes, we recognise a break: here, logistics increasingly functions as a driver of spatial economic development by freeing itself from traditional local and regional integration structures or by dynamically transforming them. This trend is not limited to a few global hubs. The growing choice of locations in former border regions or peripheral vacant spaces reflects a decline in the locational ties of enterprises and a new spatial logic. The decisive factors for this are the rationality of the network and a relational understanding of situation and distance. As a result there is a change in the meaning of situation and location. In addition to “space”, “place” and “network”, SHEPPARD (2002) suggested using the term “positionality”: this means that the strategic positioning of location in the network space becomes much more important than situation in physical space or in the transport network (cf. also BATHELT a. GLÜCKLER 2002, 33ff.).

At the same time, the high pressure exerted by cost and competition forces companies to manage transport volumes and commodity stocks as rationally as possible. Previously, economies of scale through spatial concentration and lean management had been the strategy of choice to control growing transport quantities with concomitant pressure to rationalise. However, these

strategies do not go far enough, for companies have got caught in a practically immanent dilemma of spatial dependence: due to growth constraints, bottlenecks at the interfaces and high costs. Because of various frictions (infrastructure capacities and bottlenecks, settlement density, coordination of the chains), the flowing logic of logistics is unable to proceed without disruption. The case of the ports demonstrates that distribution locations no longer function as a “spatial fix” (cf. SCHOENBERGER 2004), as a spatial anchor in the network of flows. When KREUKELS (2003, 26) talks about the anchoring of the ports in space, he means the systematic networking of the big terminals – no longer primarily with region and hinterland, i.e. in spatial proximity, but increasingly in organisational proximity, via corresponding networks (ibid.). Networks no longer form primarily or exclusively via infrastructures and interfaces, but increasingly via information and organisation.

In these changed circumstances, the location choice of distribution companies cannot be interpreted as simply the response to the presence of specific factors such as infrastructures or access to markets. Rather, it is based on the interactions among an individual company’s decision (and power), the company’s position within complex value-adding relations, and the spatial and infrastructural configurations of competing locations. We see this, for example, in the strategies of the leading global freight companies which decide on the choice of gateways (ports), or the private terminal operators who can control part of the global goods flow in time and space by means of their infrastructures (e.g. DHL’s decision to create a new air cargo hub at Leipzig). The new regional distribution centres have a similar message. They show that companies are able to create their own location conditions and infrastructural facilities. Only this active company role – already described by STORPER and WALKER (1989) in the “industrial dispersion” approach – explains how the system of flows reproduces itself and diverges from the traditional local and regional location conditions.

Hence, the “geography of distribution” is manifested on the one hand in the new location patterns and strategies of logistics companies, which materialise in each case in a specific tension between spatial dispersion and re-concentration. Various patterns are recognisable at the different scale levels and functional fields. On the other hand, logistic arrangements affect accessibility in space and time, as well as its general importance. Thus they contribute to the extensive restructuring of conditions of value creation in terms of space (and time). However, this field of interaction has received only fragmentary research attention up to now.

4.2 *Research avenues*

The analysis presented above supports the view that logistics deserves more attention in the context of spatial economic networks. In his institutional analysis SCHAMP (2000, 203) called on industrial geography not just to analyse how production regions develop, but to pay more attention to the links between production and consumption and its organisation in nodes and logistic systems. In particular, the recently much-discussed global production networks (COE et al. 2004; DICKEN et al. 2001) are closely related to this viewpoint, for the networks observed there cannot be represented without communication and transport or logistics and distribution. Only the physical nets enable regions to be integrated into the multi-scalar network of the globalised economy. So there are good reasons for formulating research avenues related to the geography of distribution.

Such a research programme should address at least three aspects of the topic: how the distribution system emerged, its costs, benefits and externalities, and finally how it is regulated. The severance of some of the traditional location ties of the logistics and distribution system signals radical changes regarding function and character – distribution no longer appears to derive primarily from production (RODRIGUE 2006). But it is still unclear how far a flow-orientated economy actually represents an independent sector that creates its own functional logics and spatial relations. The tendency towards organisational and spatial separation from the requirements of the shippers in trade and industry is probably not general but selective, focused on specific sections and branches. It is harder to identify clear functional allocations and dependences because outsourcing and the high profile of specialised service providers within the logistics system have blurred the conventional boundaries between manufacturing and marketing, between the logistics of production and of distribution (VISSER a. LAMBOOY 2004).

In so far as geography and the spatial sciences dealt with the field of traffic and transportation in the past, their work was strongly coloured by the paradigm of lower – if not completely eliminated – transport costs. In the future, however, energy prices are likely to rise, leading to higher transportation costs. What impact would this have? Would economic activity become focused again, would the chains even be re-integrated, and would regional conditions of value creation emerge again? Or would this be offset in the companies' internal calculations, by trade-offs between transport and other costs? From the company perspective the cost dimensions are extremely complex to say the least: they require analysis not only of transport

costs but also of logistics costs and transaction costs. In addition, physical transport generates external costs that can reach very high levels (INFRAS a. IWW 2004). Finally, the cost factor is also related to location: on balance, do regions such as Bad Hersfeld, Hanover, the eastern Ruhr or other areas profit from wanting to become transit areas and hubs, from advertising themselves as “logistic regions”? Obviously not all regions can be equally successful, being differently endowed in this respect. Apart from that, such a strategy also has its risks and follow-up costs.

With an eye to the follow-up costs of freight transport, problem-orientated research has long attempted to find solutions for the future, such as intermodality in long-distance transport, or innovation in urban logistics (DEITERS 2002). But the difficulties involved show that the problems are fundamental and systemic in character: the classical method of regulation via infrastructure offers is increasingly unproductive; the companies have a much greater choice of carriers, terminals, space and time optimisations. To solve problems it is thus necessary to have knowledge of internal dynamics and conflicts within the logistic system, for instance of power structures within the logistic and value-added chains. “Logistic regimes”, i.e. forms of logistic coordination, control and power, drive the transport chains (COX 1999). Power distribution in the logistic channel is strongly hierarchical – it is concentrated in the hands of big retail chains, shippers or freight forwarders. They make the strategic decisions about the routes of the transport flows or the choice of transport nodes and carriers. Knowledge of their specific interests is essential if operational strategies are to be more than rudimentary.

Logistics systems and physical distribution are presently experiencing highly dynamic change, and they make a considerable contribution to the restructuring of systems of spatial relations and locations. This factor has been widely underestimated up to now. However, because of its development dynamics, complexity, and structural importance, logistics deserves a legitimate place in research. Judging from the scientific attention it has received as yet, which was highly economic and technical by orientation, this place could appropriately be positioned within geography.

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