Chapter 21

CHANGES IN GOODS DISTRIBUTION AND THE CITY: Physical Distribution as an Indicator of Urban And Regional Development

Markus Hesse
Institute of Geographical Sciences, Urban Studies
Freie Universität Berlin, Germany

Abstract

The paper is part of an ongoing research on the locational dynamics of physical distribution firms, in particular logistics, freight transportation and forwarding, warehousing and wholesale. The project was stimulated by the observation that the location of contemporary distribution facilities are increasingly being established in areas that are distant and independent from core cities. The hypothesis of the study is that a new set of locational dynamics is shaping the functions and the character of urban places. These changes have two main effects: first, they affect the traditional role of the city as a centre of goods merchandising; second, they are changing metropolitan structures, primarily due to the new preferences of physical distribution firms for suburban and, to a certain extent, exurban locations. Preliminary results of a case study of the East-Bay Central Valley of California illustrate some of these changes, which will be followed up by future studies in several areas such as Berlin-Brandenburg. The study also demonstrates how the logistics of goods movement can be investigated as an indicator of structural change in cities, and provides recommendations for the long-overdue integration of studies of goods movement as part of the future monitoring of cities.

Introduction

McKinnon (1988, 133) suggested that "physical distribution (PD) is the collective term for the range of activities involved in the movement of goods from point of production to final point of sale". It comprises all functions of movement and handling of goods, particularly transportation services (trucking, freight rail, air freight, inland waterways, marine shipping, and pipelines), logistics and warehousing service (e.g. consignment, storage, inventory management, packaging), wholesale activities, and, in principle, retail distribution also. Among the different transport modes, truck and air transportation have developed dynamically in the past twenty years, whereas railroads and waterways are losing a significant share of the market.

Traditionally, cities have always been among the most significant nodes for the exchange of goods. Trade, merchandising, and retail distribution have been closely connected with urban genesis and urban development, for cities have acted as 'central places' for their hinterland, and as 'gateways' for distant sources and markets for goods. The classical function of the city as a centre of goods trans-shipment was acknowledged

in traditional urban theory; for example, Max Weber (1921, 61) argued that the "regular exchange of goods" was one of the basic characteristics of cities. Theories on urban structure and land use also placed a lot of emphasis upon the importance of trade: first to the foundation of the city as a generic transport focus; second to the emergence of specific districts dedicated to the provision of freight transport, such as wholesaling and light manufacturing (Harris and Ullman 1945, 9-15). Also, since manufacturing was once concentrated in the urban core, a major reason for the location of industry, and thus distribution, was explained by the city's agglomeration advantages in terms of transportation and labour orientation (A. Weber, 1929, 41 ff., 95 ff). Thus, the provision of goods was important to the development of urban places. After the Industrial Revolution the railway system became the main mode of distribution, yet from the early twentieth century the motor truck has become more and more important.

Over the last 15 to 20 years, physical distribution facilities have been undergoing radical changes. Corporate logistics used to be divided into three functions: supply, production, and distribution. The new forces of 'flexibility' in production processes, and 'lean management' in organization, has meant that most firms have been subject to comprehensive rationalization. These changes are now starting to be implemented in the retail and wholesale trades, and in the new transport logistics as well, leading to almost revolutionary changes in physical distribution. These changes are the outcome of several features of the changing technological and economic framework of society.

First, it is a product of *sectoral* economic changes, in particular the rise of service economies and the increasing share of goods with high value and low weight, derived from the new and expanding high technology and knowledge-based activities. Secondly, a *power shift in market relation*s is apparent, from a supplier-dominated to a buyer-oriented market, associated with new landscapes of inter-firm competition. Thirdly, the new processes of *globalization* are shaping logistics by means of several key changes: the increasing spatial expansion of the economy; a more complex global economic integration; and the developing network of global flows and hubs. Fourth, politics of *deregulation and liberalization* also have to be considered, effective for the U.S.A. in the late 70s and early 80s and for Europe in 1992 (through the introduction of the Single European Market). Not only has this opened up new markets, but transportation has become cheaper and more competitive. Finally, but certainly not last in significance, has been the introduction of *new information and communication technologies* which have allow the development of more integrated management and control of information, finance, and goods flows.

The flow-oriented pattern of rationalization is now affecting almost every single activity within the production and marketing of goods, which involve many stages of the creation of value. The aggregate of this highly segmented picture is the *supply chain*, the time-related and space-related arrangement of the whole goods flow, between supply (of components and raw materials), core production (including manufacturing by suppliers and sub-contracters), distribution, and recycling. The chain also represents major actors in the interplay between producers, distributors (e.g. wholesalers, freight forwarders, carriers), retailers, and end-consumers. Both the structure and the major players in the architecture of the supply-chain are affiliated with cities in a different way, either with regard to the city as a distribution location, or as a place of consumption.

It would seem obvious that urban places, which are heavily connected to the function of goods distribution, must be affected by these structural changes. This is also indicated by the emerging notion of 'flow' in contemporary urban thinking and writing. Yet, there seems to be relatively little research in this field. Major questions in this context seem unanswered: How is the freight system working? Where is physical distribution located? What is the role of the city in these changes? Such issues seem to be out of academic favour, at least in urban and regional studies. Aside from the extensive literature on ports, recent research explicitly addressing the urban and geographical dimension of freight transportation is somewhat limited, and includes works by Chinitz (1960), Vance (1970), McKinnon (1983,1998), OTA (1995), Hesse (1995,1999), Meijer and Ten Velden (1996), Glasmeier and Kibler (1996), Riemers (1998), Debernardi and Gualini (1999), and Abbey, Twist and Koonmen (2001). Even in upcoming paradigms on technological and economic changes, such as the seminal concept of the Network Society (Castells 1985, 33; 1996, 378)—with its famous theoretical figures of the "space of flows and the space of places"—the dimension of physical distribution remains undeveloped.

Geographies of Distribution.

The structural changes taking place in goods distribution and logistics have important geographical dimensions, which can be initially expressed in terms of mobilities (freight transport) and immobilities (land use). They can be broadly characterized by two features. First, is the spatial enlargement and temporal flexibility of freight flows, which probably results in a higher amount of freight traffic. Second, is the concentration of logistics functions in certain facilities at strategic locations; these facilities are much larger than before, and the locations are characterized by a particular connection of local and long-distance relations.

Traditionally, goods distribution has been located at major places of production, for instance in the manufacturing belt of the North American East Coast and in the Midwest, or in old industrialized regions of England and Continental Europe. Today, large-scale goods flows are directed through major gateways and hubs, mainly large ports and major airports, and highway intersections that have good access to a majority of customers. The large-scale national and international distribution businesses favour locations that are either the gateways already mentioned, or transportation corridors with access to traditional gateways of trade (interfaces) as well as to large consumer markets (destinations). As one recent American research publication noted:

> Historically, industrial space was concentrated in manufacturing centres. Today, it is concentrated in six hub distribution markets (Los Angeles, New York-Northern New Jersey, San Francisco, Chicago, Dallas and Atlanta) which comprise 17% of the nation's employment but 44% of its industrial inventory.
> (Abbey, Twist, and Koonmen 2001, 1).

These changes mean that a certain shift from producer to consumer-oriented distribution seems to be evident.

There is a new, systematic, logic to goods movement and storage. People and businesses (both public and private) are the consumers of goods and the targets of the distribution system. Today, the place of origination may have less influence on goods storage needs than on the destination. Finished goods are best kept near the consumer for quick response delivery (Mueller and Laposa 1994, 44).

This new principle is certainly driving the contemporary locational behaviour of distribution firms. Owing to the increased competition between the main distribution locations, all major freight hubs (large ports, freight airports, inland hubs) are currently committed to expand their infrastructure. Several factors are of importance; the first is a consequence of the growth of trade and transport in general, supported by economic growth and the enlargement of the market areas (globalization); the second is a result of the high pressure on supply chains, caused by accelerated information transfers, changing consumer habits, and rising competition. *So paradoxically, at a time of quicker and cheaper communication, the world of goods flows is becoming more sensitive about proximity*. Following the changes from a producer- to a buyer-oriented market, the new logistics models are driving distribution facilities to strategic locations—locations that are often closer to customers.

These changes mean that freight transportation and logistics are powerful factors affecting, and indicators of, regional structural change and metropolitan land use. At this level, logistics changes are associated with an increasing demand for new transshipment points, particularly Distribution Centres (DCs) and warehouses. New facilities are needed in order to control the more complex, mass-customized, freight flows designed for an increasing market area without increased logistics costs. New patterns of demand and supply are turning the old warehouse areas into new DCs, or 'High Throughput Centres' (Abbey, Twist and Koonmen 2001). The facility is no longer needed (at least not primarily) for storage—the type of long-term storage of the past—but for the efficient consolidation of the materials flow.

> The act of warehousing exists because companies are unable to predict demand and prefer to provide a buffer for themselves that accommodates spikes and lulls in the sales process….Aggregate demand for traditional warehousing space should decline over time, as the enabling technology is widely adopted and implemented. Today's state-of-the-art warehouses feature high-cube space with clear heights of at least 30 feet. However, as the new technology enables continual movements of products in the supply chain, the need to stack inventory begins to diminish. Traditional storage space must start housing activities that involve more horizontal movement rather than vertical stacking.
> (Kirschbraun, Bomba 2000, 16).

The specific requirements of the new centres, such as size, transportation access, and operability, mean that they are increasingly constructed at new peripheral locations. Recent observations in many metropolitan regions has revealed that logistics spaces are moving out of the core city areas toward suburban or even exurban places. However, this

particular spatial drift of freight-handling is not entirely new. It was described in the New York Region forty years ago:

> Wholesale establishments, warehouses, and terminals for both water and land transport—all of which are characterized by continual in-and-out freight movements—have been increasing their employment fastest in places *outside* the congested heart of the Region. And in this respect they closely resemble manufacturing itself.
> (Chinitz 1960, 153).

More recently, what may be called *'freight sprawl'* might become significant for a majority of the metropolitan regions in industrialized countries. After all, the new communication and information technologies have accelerated the spatial distribution of the goods sector. As a consequence, the U.S. Congress Office of Technology Assessment (OTA) argued that activities are decentralizing away from older urban cores.

> Much of the goods production, transportation, and distribution jobs that core cities have depend upon will continue to decentralize to outer suburban und exurban areas and to lower-cost, smaller and middle-size metropolitan areas.
> (OTA 1995, 145)

Table 1 summarizes some of the key features of the locational preferences of various functions, providing examples of some of most significant trends. There are several reasons for the spatial preference of firms for suburban sites: they offer larger and cheaper land resources compared with the urban core; they have much better access to major transportation arterials due to the locational advantage of freeways and intersections, connecting local and long-distance flows; and they can accommodate the trade-offs between inventory and transport costs that are important for many location decisions, since mobilities (freight transport) and immobilities (land use) are closely intertwined. Since the deregulation of transportation markets, total costs can also be lowered by rationalizing location decisions at the expense of higher transportation costs. In order to find the optimal ratio between low land prices and short distances to the point of final distribution, firms move their DC location as far away as necessary from expensive land markets in city centres. At the same time, they need to stay as close to the customers as possible, in order to limit distribution costs. Not coincidentally, therefore, most recent construction of warehouses and distribution centres takes place at the urban fringe or beyond. Thus, the locational decisions of distribution firms follow a composite pattern, composed of both a traditional 'transportation and labour orientation', and the more contemporary criteria of 'customer orientation, market proximity, flexibility and reliability of services'.

Table 1:.
Function and Location of Urban Goods Distribution

	Function	Location	Examples
'The city as a market place'	• Traditional place of goods exchange. (City as a location for regional distribution)	• Historic urban centers; temporary use of areas for warehousing and transshipment	• Market places, traditional locations for urban retail, warehouses
Port cities, Inland-Port cities	• Traditional place of goods exchange. (The city as a location for long distance distribution)	• Traditionally at shorelines, at large inland waterways, at intersections of distant trade-routes	• Classic ports and port-infrastructures, storage buildings, warehouses, magazines
Rail freight terminals	• Main transshipment point in the process of industrial urbanization	• Around main stations and their neighbourhoods (close to urban core, e.g. in zones of transition)	• Until recently in all major cities with railroad access
Wholesale, Freight Forwarding	• First outward drift of distribution functions out of the core city (Suburbanization)	• Modern locations for commerce and industry at the urban periphery	• Transportation intensive land uses (commercial, industrial areas)
'New' centres of distribution at the urban periphery	• Spatial anchor or magnet of modern logistics- and distribution-networks (Second outward drift)	• Location at intersections, with cheap land and workforce, close to the customers' area (urban markets)	• Shopping malls,' big box' commercial areas, industrial warehouses
Large scale distribution of / for retail, wholesale, warehousing	• Decoupling of distribution from the urban market place (Counterurbanization)	• Location at inter-sections, with cheap land and workforce - increasingly in peripheral regions	• New freight centres and DCs; National HUBs • of distribution firms
Interregional 'Mainports'	• 'Gateways' of the global and international goods flow	• Selected marine and inland ports, large freight airports, national freeway intersections	• The Ports of LA-Long Beach, JFK-Airport-NY, Memphis-TN, Inland-Port Columbus-OH

Source: Compiled by author

.

Theoretical Framework

In many ways, the research project from which this paper is drawn has a hybrid nature since it aims to illuminate the interrelationship of three basic processes in an urban geography or urban planning approach:

1) the rationalization of logistics (by large retailers or wholesalers, by manufacturers, shippers or freight forwarders);
2) the determination of locational choices of companies according to logistical and freight transportation requirements;
3) urban development with respect to the distribution function and particularly the contribution of logistics to the dispersal of the urban region.

The theoretical framework of the empirical study is based on the combination of two parallel arguments and their respective foundations. First, *location theory* can be used to understand the *location choices* of distribution firms in city regions. To a much greater extent than in other industries, the decisions are still being made with respect to transport costs, functional requirements (accessibility, time) and specific trade-offs between urban land costs, labour, and transportation expenses—reflecting the traditional principles formulated by Alfred Weber (1929). This is particularly true for activities that are mainly metropolis-related. Although distribution firms are probably less sophisticated, and locally less embedded, than contemporary manufacturing firms, their locations have the potential of interconnectedness due to agglomeration benefits and positive externalities. The concept of 'geographical industrialization' proposed by Storper and Walker (1989) summarizes these linkages. Thus, the locations of distribution firms specifically contribute to industrial dispersal and commercial suburbanization. Second, concepts and principles from more contemporary theories need to be taken into account. Features such as the concept of flexibili*ty*, as in Post-Fordist approaches, focus on the effects of *changing organizations*, within firms and between firms, particularly with regard to transaction costs, and to the strategic question of whether to outsource or not. Consequently, new patterns of spatial division of labour have emerged in metropolitan regions. Freight flows and logistics businesses are directly related to this process. Since the distribution function is intermediately embedded within on-time adjusted production systems, trade, wholesale and retail activities, it appears as a 'hybrid'. It is neither only a transportation problem, nor one exclusively committed to retail or wholesale decisions, but increasingly it is a mixture of all of these. Under scarcity conditions, in conditions of congestion or high land prices, it tends to produce its own distinctive, functional logic. Table 2 summarizes some of the key traditional and contemporary research ideas that are involved in the process of location choices by firms engaged in physical distribution of goods. These sources led to the research hypothesis that underlies this study: Physical Distribution firms specifically contribute to commercial suburbanization.

Table 2.
Location Choices of Distribution Firms: Theoretical Framework of the Study

Location	**Organization**
(Neo-) Classical models of location choice *(A. Weber 1909, 1929)*	Flexibility, Technological restructuring, Lean management, Post-Fordism *(M. Piore/C. Sabel 1984, Harrison 1997)*
Dynamic spatial theory *(E.v. Böventer 1962, W. Isard 1956)*	Outsourcing, Externalization, Comprehensive cost reduction (of transportation, transaction costs) *(O.E. Williamson 1975)*
Geographical Industrialization, Industrial dispersal in metropolitan regions *(M. Storper, R. Walker 1989)*	Logistical restructuring, Supply chain management *(A. McKinnon 1998)*

Source: Compiled by author

Case Studies and Methodology.

Two case studies are being conducted in order to prove the main assumptions of the project. One case study consists of the *Berlin-Brandenburg Metropolitan Region* (Germany). This region, which was split into two parts by the post war partition of Germany, has been characterized by a fundamental political-economic transformation since 1990, associated with a certain spatial re-configuration between the core city of Berlin and in the newly emerging suburban areas. The new suburbs at the Berlin urban fringe consist of housing, retail, and commercial development. The latter is primarily related to different kinds of distribution. Although development had already taken place along the backbone highway (A 10/110) and the Berlin beltway autobahn in general, the process of change speeded up from the 1990s. Freight transportation, trucking and warehousing firms have been actively attracted to locate in new, dedicated freight centers, established at three strategic locations in the West, South, and East of the City of Berlin. The completion of the freight centres will alter the landscape of the physical distribution facilities around Berlin.

The second case study currently underway is the *East Bay-Central Valley* area of California, both having a close relationship to the San Francisco Bay Area. The Bay Area is one of the most dynamically growing regions of the U.S.A. Within this region, the East Bay, between the Cities of Richmond in the north and Fremont in the south, was once the region's main industrial corridor, providing the City of San Francisco with major industrial assets, including the Port of Oakland. Now the picture is likely to change. The strong growth of the Silicon Valley and the South Bay Area (San Jose), has meant that light manufacturing with a high technology orientation, Research and Development, and professional businesses are moving north, driving the much less competitive distribution and warehousing land uses out of the Bay Area and into the Central Valley. However, the intrusion of these freight-related land uses and transportation businesses are being increasingly questioned and criticized by local residents, due to their impact on urban areas.

The theoretical background of the study and the changes that have been experienced in the particular case study areas led to five major research questions.

1) Where do physical distribution firms currently locate? What are the major factors that determine the locational decisions of distribution firms in these areas?
2) Have there been changes in the locational pattern over the last few years, following the assumption that there is a certain movement of distribution facilities from core areas to the urban fringe?
3) Is there a particular contribution of logistics favouring suburbanization or exurbanization, such as by the initial movement of some firms out of town, thereby initiating land uses that may subsequently be followed by others?
4) How do political authorities incorporate the freight sector into their planning strategies and how do they cope with the competitive benefits and disadvantages of the logistics sector?
5) What do these questions mean for the contemporary city and its future role in physical distribution?

Two methods have been used in an attempt to answer these questions.

Statistical analysis is being carried out, primarily of employment data from census sources, at county and city level, for the goods distribution industry, but also of warehousing inventory data retrieved from real estate firms. Selected planning and economic development sources and documents provide an additional source of data. Location quotient analysis, at county and city level, is used to identify concentrations of the distribution industry, relative to, or different from, the changes in other economic sectors.

A *qualitative survey* is being conducted among relevant agents in the physical distribution industry. In Berlin-Brandenburg, 23 regional experts were interviewed in autumn 2000, to be followed by a corporate survey of a projected 50 firms in 2002. In the East Bay Area and the Central Valley, about 50 personal interviews have already been conducted between June and September 2001. Among the surveyed people were: first, city, county and state officials in the economic development, transportation, and land use sectors; secondly, corporate executives in distribution firms, such as transportation and warehousing, retail distributors, freight forwarders and carriers, container shippers, port and airport-related experts; thirdly, real estate agents who are active in industrial and commercial real estate transactions will be interviewed. In addition, 20 personal interviews have been conducted with researchers in the field of Geography, City and Regional Planning, Logistics, Transportation, and Architecture in order to cover a range of different disciplinary perspectives.

It is inevitable that in both case study areas there will be singular circumstances, or region-specific features of transformation. But it is expected that results will be produced that will go beyond the two case studies to identify general lessons or principles of change. This problem of separating the 'general' from the 'particular' is being answered in two ways. Transatlantic comparisons are being carried out from theory and empirical findings, regarding the similarities and differences between the case study regions and their socio-economic framework conditions. Yet the problem of providing generalizations from only two case study areas is recognized. Hence for comparative reasons, additional investigations are projected in other regions, such as Hamburg and the Ruhr Area in Germany ,and areas such as New York-New Jersey, Minnneapolis-St. Paul, Columbus (Ohio) and Greater Los Angeles in The United States. Preliminary findings to date, based on statistical evidence from the first three of these additional American case study areas and from personal interviews conducted in the Los Angeles Region in June 2001, has led to the conclusion that the locational dynamics of goods distribution firms do seem to follow a generic pattern.

Preliminary Findings: The Northern California Case Study

Where Does Physical Distribution Locate, and Why?

The spatial dynamics of goods distribution facilities and flows in the East Bay Area and the Central Valley, have led to three different types of location, with separate development patterns and different potentials for the future.

- First, there are main hubs, such as the The Port of Oakland and Oakland International Airport, which have undergone strong growth, especially over the last 12 years, a feature also characteristic of the San Francisco International Airport on the Peninsula, which serves parts of the East Bay as well.

- Secondly, there are traditional, more spacious, and less nodal goods distribution areas in the East Bay—that is, in the Cities of Oakland (e.g. West-Oakland), San Leandro, and Hayward. These places are partly related to the main hubs, but are locations that also contain businesses unrelated to goods distribution. In the East Bay area, these three municipalities contain more than 53 million sq. feet of warehousing space, estimated to be almost 60% of the building base of the entire sub-region (BT Commercial Real Estate 2001). Currently, the three cities are maintaining their high amount of warehousing space (building base), and have some minor additions, but most growth is taking place elsewhere. According to the county and city employment data, the growth rates in Standard Industrial Codes for the distribution industry (4200, 4400, 4500, 50-5200) are highest in the outer areas of the Bay (except for Alameda County, with Oakland Port and Airport) and the northern Central Valley.
- Third, many of the new warehousing and DC sites have been established in existing commercial areas of the Central Valley, which is now supplying the Bay Area with goods. In the two most dynamically growing locations, Stockton and Tracy, goods distribution firms account for about 80% of all firms in the new commercial areas. Interviews with real estate personnel revealed that they consider that 90% of these firms have moved there from the Bay Area.

These changes mean that goods distribution firms in the study area can be classified into 'movers' and 'stayers'. Each type has distinct reasons that underlie their decision to select a site, which is highly dependent upon the type of their business. At this stage in the research it is recognized that is difficult to make a general statement on the basis of a few dozens of interviews. However, the main trends in decision-making seem to be evident. Indeed, three different locational attitudes seem to characterize goods distribution firms.

1) The *pure cost minimiser* is mainly associated with forms involved in the physical transfer of goods between different places—firms that place a strong emphasis on economies of scale. These firms are often large freight-forwarders (or national 3PLs as their subcontractors) or large retail chains. This type of firm favours peripheral mega-DCs; it tends to choose locations dependant upon the mere cost-cutting potential. Consequently, this type of firm is increasingly moving out of the urban core toward strategic places, such as at major transportation corridors that are close to a significant number of customers and primary distribution markets or areas. A main characteristic of these firms is that they retain full control of the supply chain and hence can determine place, time, and mode of delivery.
2) The *fast and flexible respondent* type of goods distribution firm is more competition-related. It is deeply involved in service-dependent market transactions, and is committed to a high standard of delivery service and added value. This type of company relies on proximity to customers, who are often situated in core areas, and tries to keep those locations, at least as far as it is able to, given the cost perspective. To a certain extent, market presence can be performed for competitive reasons only. Examples are: wholesale distributors, parcel-services, or office suppliers. In many cases the process of goods delivery also involves actual market transactions (even cash payments). This makes these

firms highly sensitive to any constraints in velocity of trade or propinquity to customers.

3) The *inter-modal operator/customer* relies on quick access to large transport modal interfaces, particularly seaports, airports, and freight railyards. Such firms need to be located in the vicinity of such facilities in order to efficiently operate the movement and unloading of vessels or containers. Often, added-value activities are also included. Among these firms are: container shippers, import-export merchants, or major freight carriers. There is increasing pressure on ports to maximize loads and to cut costs by accelerated throughput, both often result in the need for existing port and arterial expansion. However, the sites of these terminals and the associated sites occupied by firms of this nature are often challenged by urban land use constraints, which means expansion is difficult. This can lead to congestion and perhaps less than efficient facilities, thereby limiting the competitiveness of firms.

Which are the Main Locational Motives of Distribution Firms?

The locational decisions made by firms about their goods distribution facilities are based on three main issues.

1) Land cost and land competition.
2) Strategic transportation access (long-distance/regional) and less congested places.
3) Affordability of the workforce, both in terms of low wages from the firm's perspective, and the low cost of living in an area for the employees.

These three factors cover most of the answers of the firms that were surveyed. Given the historical background and infrastructure development in the East Bay, the main location factors explaining the density of goods distribution facilities in the region are as follows: the presence of a major port and an airport, and the interchange of two major highways, namely the I-880 along the East Bay and the I-580 connecting the Bay with the Central Valley. Good access to the Peninsula, and to South San Francisco via the San Mateo Bridge also plays a role, crossing the I-880 in Hayward. The disadvantages of this location relate to the population and land use density of the region, the related transportation constraints, and the fact that the freight business is regarded as an undesirable land use. Municipal strategies will further restrict the goods distribution businesses, since those firms are low tax-payers, have relatively few employers, and—certainly of major concern—are important generators of truck transport, which often adds to local congestion.

The main interplay of *fixed costs* (land site), *variable costs* (transport, labour) and *political regulations* may explain a majority of the site-selection decisions. The research so far has found no evidence for the hypothesis of inter-linkages between the goods distribution sector and other commercial land uses, which could lead to a more intensive dispersal. Such connections might be true for manufacturing, but do not seem to be influential for logistics firms—at least not yet. However, it is probable that there are indirect connections between labour and the housing markets. A firm's movement to aperipheral location is eventually supported by cheaper housing supply, particularly for warehouse workers and truck drivers, who certainly cannot afford either the increasingly expensive housing in the core Bay Area, or the time and cost of long commutes.

What is the Nature of the Newly Established Distribution Businesses?

Goods distribution is supposedly becoming highly differentiated, dependent upon the particular customers and their requirements. The traditional general warehouse is losing significance; modern DCs and "High Throughput Centres" are dedicated to efficient goods flow and high inventory turnover. In terms of geography, the number of facilities needed for the consolidation of average freight flows is steadily declining. Two important consequences flow from these changes: first, the emergence of much larger facilities; second, an increase in the average distances between the points of transshipment and delivery.

How do Municipalities Cope with Distribution?

Cities and regions are often critical of freight transportation, at least those who can afford to select certain companies for investment in the area of their responsibility –cities and regions to an attractive location, where the demand of firms for investment and location is much higher than the supply of land or infrastructure. All municipalities surveyed in the Bay Area sought service activities, high technology and light manufacturing firms. Even the current winners of the outward drift of distribution into the Central Valley confirm, at least officially, that they would not deliberately seek additional goods distribution firms. (Yet, in the case of certain interest, it is reported that they agree and attract further companies to settle). The City of Tracy provided a good example. Although city officials claim to be interested in higher quality investments, the administration still promotes the area as an attractive place for goods distribution firms, via an information video that cleverly proclaims: 'All Roads Lead to Tracy'. Indeed, in general, the surveys showed that most cities do not actively discourage the addition of new goods distribution firms, even centres such as Fremont, with a strong demand for High Technology firms. Neither have they developed any strategy to cope with the growing freight traffic that is affecting the region, which seems an oversight, since even high technology sectors depend upon an efficiently working freight system. If any attention is paid to the freight transport sector, it is carried out by widening the infrastructure, and sometimes by promoting rail and water transport to make the system run more efficiently. Concerns about sustainability with respect to truck traffic, the effect of negative externalities, and attempts to provide better acceptability for freight transport, do not seem to be the subject of concern, or policy development in the region.

What is the Generic City's Role in Physical Distribution Facilities?

The city remains a major market place, according to the generic structural change toward increasingly buyer-driven markets. At the macro scale, there seems little doubt that distribution firms and facilities are moving closer to customers and markets. This means that the large agglomerations are still the major target-areas for goods distribution firms. This trend is likely to continue, or as long as a majority of the customers remains in the city regions, which is currently more realistic to expect than the opposite. Within the conurbations, the preference of goods distribution firms for the periphery is evident. To some degree, and with varying impacts, physical distribution still remains an urban function or is particularly affiliated with cities. Under the current competitive regime, only a few cities can retain, or gain the function as a major Hub or a Gateway. In the

U.S.A the dominant centres are Los Angeles (CA), Chicago(IL), New York (NY), Memphis(TN), the distributive Midwest. Most of the other goods distribution locations are satellites of these centres, subordinate to certain logistics functions, and have a role primarily as a distribution area for their local region.

Consequences for Monitoring Cities of Tomorrow

A major increase in freight traffic growth in the 1990s, and the emergence of logistics as a key organizational system for material flows and goods delivery, led urban economists, transportation planners, and the trade experts to share a rising interest in freight issues. Much of the research and commentary was devoted to economic and trade issues, particularly problems associated with the need to prepare the region for sustained growth and to cater for new traffic flows. But an additional reason for interest in urban freight policies was to ensure a sustainable distribution system. This included such issues as: the politics of integrating freight and logistics into urban development; the promotion of inter-modal freight transport; the attempt to make truck freight traffic more acceptable (safe, clean, quiet); and the reuse and recycling of former commercial or industrial sites for goods distribution purposes.

If we are to really understand the impact of the changes in the geography of goods distribution and their effects on cities, as part of our monitoring of changes in cities of the future we need better information. A major requirement for academic geographers, as well as for those interested in developing new planning policies to accommodate the changes, is a major improvement of our existing knowledge on the volume, composition, and dynamics of physical distribution in cities and agglomerations. This involves the identification of some new key parameters for a long-term monitoring of cities and urban regions. The following logistics- and freight-related indicators can be suggested as being useful measures to identify the impacts of physical distribution firms in individual cities and metropolitan areas:

- the number of establishments involved with goods distribution;
- employment figures for goods distribution firms and the calculation of location quotients to measure the degree of spatial concentrations;
- the amount of regional warehousing and DC floorspace;
- the development of goods distribution and logistics land markets;
- the calculation of land use figures to estimate the amount of current and future land consumption;
- evaluations of the environmental effects of the changes in goods distribution;
- regional breakdowns of freight flow data, such as the national commodity flow survey in the U.S.A, and additional corporate and site-related data;
- data on international trade flows.

Acknowledgements.

This project is part of a postdoctoral research study on ‘Freight Transport and Logistics: Driving Forces for Counterurbanization?’. Funded by the German Research Organization (DFG), the study involves major case studies in the Berlin-Brandenburg area of Germany and the East Bay Area-Central Valley in Northern California, U.S.A.

References

Boeventer, E. v. (1962): *Theorie des raeumlichen Gleichgewichts*. Tübingen

BT Commercial Real Estate (2001): *East Bay [I-80/I-880 Corridor] Warehouse Report*. Oakland/CA.

Cassinfo/ProLogis (eds. 2000): *State of the Logistic's 12th annual Report*. www.cassinfo.com/bob.html.

Castells, M. (1985): High Technology, Economic Restructuring and the Urban-Regional Process in the United States. In: Castells, M. (ed.): *High Technology, Space and Society.* Beverley Hills: Sage, 11-40.

Castells, M. (1996): *The Rise of the Network Society.* The Information Age: Economy, Society, and Culture, Vol. 1. Malden/MA, Oxford/UK: Blackwell.

Chatterjee, A. (1999): *Urban Goods Movement Planning in the USA: A Historical Perspective.* Invited Paper to the Urban Goods and Freight Forecasting Conference (Conference Two), 12-1 - 12-6.

Chinitz, B. (1960): *Freight and the Metropolis. The Impact of America's Transport Revolutions on the New York Region.* Cambridge/MA: Harvard University Press.

Cooper, J., Browne, M., Peters, M. (1991): *European Logistics. Markets, Management and Strategy.* Oxford: Blackwell.

Czerniak, R., Lahsene, J., Chatterjee, A. (1999): *Urban Freight Movement. What Form Will It Take?* Transportation Research Board Committee on Urban Goods Movement (A1B07). Millenium Paper. Washington D.C.

Debernardi, A., Gualini, E. (1999): Die Geographie der logistischen Dienstleistungen in der Stadtregion Mailand: Strukturwandel und aktuelle Planungsaufgaben. In: *Geographische Zeitschrift* 87 (3-4), 238-252.

Dicken, P. (1998): *Global Shift. Transforming the World Economy.* 3rd Edition. London: Guilford.

Fishman, R. (1990): Unbound Megalopolis. America's New City. In: *Wilson Quarterly*, Winter 1990, 25-48.

Gereffi, G., Korzeniewicz, R. (1994): *Commodity Chains and Global Capitalism.* Westport/CT: Praeger.

Gillespie, A., Healy, P., Robins, K. (1998): Movement and Mobility in the Post-Fordist City. In: D. Banister (ed.): *Transport Policy and the Environment.* London: E F Spon, 243-266.

Glasmeier, A., Kibler, J. (1996): Power Shift: The Rising Control of Distributors and Retailers in the Suppy Chain for Manufactured Goods. In: *Urban Geography* (17), 8, 740-757.

Hanson, S. (ed., 1995): *The Geography of Urban Transportation.* 2nd Edition, 81-99. New York: Guilford.

Harris, C.D., Ullmann, E.L. (1945): The Nature of Cities. *The Annals of The American Academy of Political and Social Science.* Philadelphia (Reprint).

Harrison, B. (1997): *Lean and Mean. The Changing Landscape of Corporate Power in the Age of Flexibility.* 2nd Edition, New York: Basic Books.

Harvey, D. (1989): *The Condition of Postmodernity.* Oxford: Blackwell.

Hesse, M. (1995): Urban space and logistics: on the road to sustainability? In: *World Transport Policy and Practice*, I, Vol. 4, 39-45.

Hesse, M. (1999): Die Bedeutung von Warenwirtschaft und Logistik für die Stadtentwicklung. In: *Geographische Zeitschrift* 87 (3-4), 223-237.

Isard, W. (1956): *Location and Space-Economy. A General Theory Relating to Industrial Location, Market Areas, Land Use, Trade, and Urban Structure.* New York/London: Wiley.

Kirschbraun, T., Bomba, T. (2000): The New Economy. Effects on corporate real estate strategies. In: Jones Lang LaSalle (ed.): *Property Futures. Occupier Strategies in the New Economy*, 10-19.

Laepple, D. (1995): Transport, Logistik und logistische Raum-Zeit-Konfigurationen. In: Laepple, D. (ed.): *Gueterverkehr, Logistik und Umwelt.* Analysen und Konzepte zum interregionalen und staedtischen Verkehr. Berlin: Edition Sigma.

Laepple, D. (1996): Thesen zum Verhaeltnis von Stadt und Handel. Entwicklungstendenzen, Problemfelder und Handlungsansätze. In: MSKS (Hg.): *Handel in der Stadt. Handeln in der Stadt.* Duesseldorf, 129-140.

Longstreth, R. (1997): *From City-Center to Regional Mall. Architecture, the Automobile, and Retailing in Los Angeles, 1920-1950.* Cambridge/MA: MIT-Press.

McKinnon, A. (1983): The Development of Warehousing in England. In: *Geoforum* (14), Nr. 4, 389-399.

McKinnon, A. (1988): Physical Distribution. In: Marshall, J.N. (ed.): *Services and uneven development.* Oxford/UK: Oxford University Press.

McKinnon, A. (1998): Logistical Restructuring, Freight Traffic Growth and the Environment. In: D. Banister (ed.): *Transport Policy and the Environment*. London, 97-109.

Meijer, M., Ten Velden, H. (1996): Spatial Aspects of Logistics Activity. *EUREG* 3/96, 49-54.

Mueller, G., Laposa, S. (1994): The Path of Goods Movement. In: *Real Estate Finance* 11, No. 2 (Summer 1994), 42-50.

Neiberger, C. (1997): Die Neuordnung der Logistikkette. Räumliche Auswirkungen unternehmensübergreifender Umstrukturierungsprozesse zwischen Industrie und Handel. Das Beispiel Molkereiprodukte. In: *Erdkunde* 51/2, 131-142.

Odgen, K.W. (1992): *Urban Goods Movement. A Guide To Policy And Planning.* Aldershot: Ashgate.

Ogden, K.W. (1999): *Urban Goods Movement and its Relation to Planning.* Keynote Address to the Urban Goods and Freight Forecasting Conference (Conference Two). o.O., 2-1 - 2-14.

Pawley, M. (1994): The Redundancy of Space. Die Redundanz des urbanen Raumes. In: Meurer, B. (Hg./ed.): *Die Zukunft des Raumes. The Future of Space.* Bd. 1 der Schriftenreihe des Laboratoriums der Zivilisation - Akademie Deutscher Werkbund, 37-57. Darmstadt.

Piore, M., Sabel, C. (1984): The second industrial divide: possibilities for prosperity. New York: Basic Books.

Rondinelli, D. (2001): Making Metropolitan Areas Competitive and Sustainable in the New Economy. In: *Journal of Urban Technology*, Volume 8, Number 1, 1-21.

Riemers, C. (1998): Functional Relations in Distribution Channels and Locational Patterns of the Dutch Wholesale Sector. In: *Geografiska Annaler B*, 80, 83-97.

Scott, A. (1997): The cultural Economy of Cities. *Intern. Journal of Urban and Regional*

Research, 21, 323-339.

Schoenberger, E. (1997): *The Cultural Crisis of the Firm.* Cambridge/MA, Oxford/UK: Blackwell.

Sivitanidou, R. (1996): Warehouse and distribution facilities and community attributes: an empirical study. In: *Environment and Planning A*, volume 28, 1261-1278.

Soja, E. (1995): Postmodern Urbanisation. The Six Restructurings of Los Angeles. In: Watson, S., Gibson, K. (eds.): *Postmodern Cities and Spaces*. Cambridge/Oxford: Blackwell, 125-137.

Storper, M., Walker, R. (1989): *The Capitalist imperative. Territory, technology and industrial growth*. New York/Oxford: Basil Blackwell

Strauss-Wieder, A. (2001): *Warehousing and Distribution Center Context.* NJPTA Brownfield Economic Redevelopment Project. Prepared for the New Jersey Institute of Technology and the North Jersey Transportation Planning Authority. February 2001.

U.S. Congress, Office of Technology Assessment (1995): *The Technological Reshaping of Metropolitan America*. OTA-ETI-643 (Washington, DC: U.S. Government Printing Office, September 1995).

Vance, J.E. (1970): *The Merchant's World. The Geography of Wholesaling.* Englewood Cliffs, N.J.: Prentice Hall.

Visser, J., van Binsbergen, A., Nemoto, T. (1999): Urban Freight Transport Policy and Planning. In: Taniguchi, E. Thompson, R.G.: *City Logistics I*, Kyoto (Institute for Systems Science Research).

Weber, A. (1929): *Theory of the Location of Industry.* English Edition. Chicago.

Weber, M. (1921): *Wirtschaft und Gesellschaft.* Max Weber Gesamtausgabe, Teilband 5: Die Stadt. Herausgegeben von W. Nippel. Tübingen 1999.

Williamson, O.E. (1975): *Markets and hierachies: Analysis and anti-trust implications.* New York: The Free Press.

Wrigley, N., Lowe, M. (eds. 1996): *Retailing, Consumption and Capital. Towards The New Retail Geography.* University of Southampton.

Published in:

Wayne K. D. Davis/Ivan J. Townshend (eds.): Monitoring Cities: International Perspectives. IGU/International Geographical Union, Urban Commission. Calgary and Berlin, December 2002, 357-372.