

The Diversity of Logistics Centre Concepts in Europe

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The article discusses logistic centres in Europe, legal changes and directions for their development in the European Union that has led to an increased cross-border flow of goods and the need to continue the process. The article identifies major features of logistics centres and presents the comparison of various types of conceptual objectives for logistics centres in Europe. The analysis has been used to develop a list of features collated with the variety of concepts and current market requirements in relation to such issues as sustainable development and corporate social responsibility.

Keywords: logistics centers, typology, logistics services.

1. INTRODUCTION

The progressing globalization and EU enlargement have set new challenges for Europe. Those challenges are related to the need to counterbalance disparities between regions, as well as solving multi-cultural issues and social stratification. They also create the need for a new production and trade policy, which in turn has major influence on transport (incl. [29], [7], [24]). Due to the growing transport demand in the EU, efficient solutions have been sought to support logistics, [‘rtf;p[5rt./ and relations with immediate and further business environment and the rest of the world [24]. Thus, the EU transport policy focuses on creating the single European transport area. The area is designed to ensure conditions supporting the efficiency of transport systems, meeting the growing demand, and facilitating transport infrastructure networks [24]. Those steps led to the adoption of new transport legislation to facilitate the development of new logistics infrastructure (TEN-T transport corridors) and more appropriate and efficient use of infrastructure. One of the major factors influencing the efficiency of logistics systems is the transport infrastructure. Its utilisation is decisive regarding the efficiency and competitiveness of the economy [24]. In parallel, the increase in traffic conveyed by

the transport system created the need to develop more facilities for the transshipment of goods on the first and last miles [16], [27]. EU member states are required to invest in transport using funding from the following sources [24]:

- fees for the use of infrastructure, and
- fees to cover external cost,

into specific projects that are crucial for the TEN-T. Additionally, the funds should be designated to promote sustainable development [28], [25], [31].

Considering that cargo flows through logistics networks, in the EU as well as on all continents, it is particularly important to support trade by developing transport infrastructure, including hubs and logistics centres. The latter are locations where specific components of the logistics process are concentrated [32]. Those include, inter alia, linking and separating of cargo flows, exchanging transport modes, and providing storage, stock management, and distribution [32]. From the point of view of logistics capacity, the efficiency of logistics centres seems particularly important [24]. For this reason, new logistics centres should resort to modern technological and IT solutions, as well as to have highly developed infrastructure connections suitable to handle multimodal transport [24].

This article focuses on logistics centres. The authors made references to the classification of logistics centres depending on their conceptual setup. Additionally, based on the diversity of solutions, the authors identified features that can help to develop new competitive logistics centres.

2. THE IDEA OF LOGISTICS CENTRES

Logistics centres are facilities furnished with specific functionalities and established to occupy carefully selected space [6]. They have their specific infrastructure and operate within a defined organizational structure. The structure helps them to implement logistics services related to the reception of cargo, storage, division and dispatch of goods, as well as to provide a number of auxiliary services for dispatching and receiving parties [6]. A logistics centre involves at least two carriers operating according to the same principles as regards building and using of transport facilities, and combining of short and long distance transport [18]. The equipment of the centre comprises the site, internal infrastructure and suprastructure [5]. Internal infrastructure includes all basic technical equipment of the logistics centre [5], whereas suprastructure consists of buildings and other equipment [5]. Components of internal infrastructure and suprastructure are presented in table 1.

Table 1. Equipment of logistics centres.

Type	Description
Internal infrastructure	<ul style="list-style-type: none"> • line infrastructure: roads, railway track, inland waterways, water basins, • Point infrastructure: terminals, transshipment points, unloading quays, parking quays for ships and barges, power lines, water and sewage systems, telecom lines, IT network.
Suprastructure	<ul style="list-style-type: none"> • Office buildings, warehouses, production halls, workshops, hotel buildings, restaurant facilities, • Transshipment and other equipment.

Source: own materials based on [5]

Since logistics centres provide various services, they are capable of performing several functions. The concentration of logistics and transport services facilitates the provision of auxiliary services which contributes to a comprehensive cargo handling at a given site. Therefore, apart from their basic functions, logistics centres may include customs service, banks, insurance companies, post offices etc. [19]. Different

researchers distinguish various logistics centre functions. The most popular ones include [5], [14], [18]:

- I. Basic: logistics, forwarding, short-distance transport, long-distance transport, storage,
- II. Auxiliary first tier services: customs, insurance, marketing,
- III. Auxiliary second tier services: hotel, restaurant, property security.

We should remember that logistics centres play an important role in transport by providing two major effects: cargo shift and reduction of transport work needed [11]. Effects related to cargo shift encompass spatial and modal categories. Once logistics centres are established in relevant locations, such as outskirts of cities and urban areas, it is possible to change transport routes and reduce heavy road traffic in city centres [11]. Moreover, logistics centres enable shifting cargo from one mode to another, e.g. from road transport to rail [11]. The other effect is the reduction of transport itself. Since logistics centres are located close to TSL companies, it is possible to reduce cargo transport distances or possible eliminate the need for transport [11].

Thus, we may conclude that the operation of logistics centres takes place in four main areas and may translate into measurable benefits [4]. Areas of operation and effects produced by logistics centres are presented in table 2.

Table 2. Areas of logistics centre operation and benefits.

Area	Description
Economic	<ul style="list-style-type: none"> • Reduction of cost, • Improved efficiency of companies, • Increase in local employment.
Social	<ul style="list-style-type: none"> • Promotion and implementation of corporate social responsibility, • Support for local communities.
TSL sector	<ul style="list-style-type: none"> • Improved quality of logistics services and their provision to customers, • Creation of innovation in logistics.
Environment	<ul style="list-style-type: none"> • Application of standards and certification to reduce harmful effects for the natural environment.

Source: own materials based on [4], [17], [13], [12].

While discussing logistics centres we should remember about the differences in the range of their operations. The breakdown of logistics centre operations and impact areas are presented in table 3.

Table 3. Areas of logistics centre operation and impact.

Logistics centre type	Feature
International	<ul style="list-style-type: none"> • Cooperation range: 500-800 km • Site: 100-150 ha, • Full infrastructure • Full IT system • Full logistics services
Regional	<ul style="list-style-type: none"> • Cooperation range: 50-80 km • Site: 20-50 ha, • Developed infrastructure • IT system • Selected logistics services
Sectoral	<ul style="list-style-type: none"> • Range depends on sector • Site depends on objectives • Typical selected infrastructure • Standardised sector-oriented logistics services • User IT system
Local	<ul style="list-style-type: none"> • Cooperation range: 5-8 km • Site: 2-10 ha • Limited infrastructure • Limited logistics services.

Source: own materials based on [18].

3. VARIOUS LOGISTICS CENTRE CONCEPTS

Logistics centres in Western Europe are an important economic growth factor in their respective countries. They help to improve distribution of goods and increase the throughput of transport corridors. To a large extent, international logistics centres simplify and fine tune the distribution structure and provide a choice of the most convenient and cost effective mode of transport [20]. Such logistics centres started operating in 1970s and during thirty years which followed they developed in Italy, Germany, Denmark, France, Greece, Spain, Portugal, Luxembourg, Hungary, Poland, Austria, Finland, Czech Republic, Lithuania, Russia, Estonia and Ukraine [9]. Currently, German logistics centres account for 14.6% of the total number of logistics centres in the European Union. Among all countries, German logistics centres are ranked first before Spain, France and Italy [4].

In Europe, we can distinguish several basic logistics centre concepts. They include [10]:

- Freight Villages, the UK
- Guterverkehrszentrum, Germany
- Plate Forme Logistique and Plate Forma multimodales, France
- Interporto, Italy
- Rail Service Centre, the Netherlands
- Transport Center, Denmark

Particular concepts differ not only by their names, but primarily by their operational modes [2].

British Freight Villages are defined as areas where transport, logistics and distribution of goods, including domestic and international transit, are provided by different operators. The operators can own buildings and other facilities or lease them (e.g. warehouses, storage centres, offices, car parks etc.). Additionally, to follow principles of free competition, a Freight Village must provide access to any company running a similar business. A Freight Village needs to have equipment for the above mentioned operation, including equipment supporting intermodal transport [4]. The British concept has been designed to facilitate the flow of innovation, technology and professional skills in logistics [2]. Currently, Great Britain has nine main logistics hubs and several smaller centres all over the country. The average size of a UK logistics centre is 95.3 ha [4]. Information flow is particularly important, e.g. London Heathrow Logistics Centre. The process of centre-client communication is chiefly based on the Internet and EDI FACT system [21]. Additionally, the Handling Control System and Aircraft Logistics Electronic Resource Tracking System – ALERTS [21] are used for the internal management and to track cargo and vehicles. The System enables to determine the origin and destination of a shipment and then select the immediately available truck to transport cargo beyond the terminal or deliver it to the main terminal [21].

The German Guterverkehrszentrum concept is based on creating logistics centres that use space efficiently and support functional programme of urban agglomerations [2]. A good example is the Dresden-Friedrichstadt terminal. Appropriate land development and support for intermodal transport and deliveries to the city have secured the implementation of important transport objective of Dresden, namely reduction and avoidance of congestion and reduction of pollution [21].

At the moment, Germany has more than 36 logistics centres, such as Leipzig, Bremen, Dresden-Friedrichstadt, Nurnberg, Augsburg, Berlin and Frankfurt on Oder [20]. Apart from selling land, German logistics centres offer lease or rental of plots as well as specialist advice giving [20]. The average size of a German logistics centre is 175.2 ha [4].

Other concepts include the French Plate Forme Logistique and Plate Forma multimodales. Currently in France we have 26 logistics

centres [4]. The average size of a French logistics centre is 106 ha [4]. French logistics centre concepts facilitate the transfer of technologies and innovation, and to a large extent focus on IT and telecommunication capacity, as well as logistics skills among employees [2]. The best example of the above is Le Havre logistics centre. The Centre operates modern infrastructure, and enjoys excellent location and high reliability, which makes it the lead logistics platform in Europe [22]. Moreover, the logistics sector employees 17 thousand skilled and trained specialists, and together with the port and seafarers the employment of the centre 26 thousand [15]. The Le Havre centre is supported by an efficient and modern telecommunication system and cooperation with the French Customs system for data transmission. The latter enables to exchange data between the port, Customs Authority and clients, which translates into time savings [22]. Additionally, the centre uses electronic document exchange [22].

Another concept is the Italian Interporto Centre. Italy operates 21 logistics centres, and the average size of a logistics centre is 164.8 ha [4]. Italian concepts are linked with the postal service liberalization [2]. The Interporto concept is based on using geographic location that supports the development of sea ports [23]. Examples include the logistics centre in Padova, which has a connection with the Adriatic Sea through the Padova-Venezia Canal, and the logistics centre in Marcianise. The latter is situated in a convenient distance to ferry ports providing shipping services between the continent and Sicilia and Sardinia. Moreover, due to the ownership structure, it is possible to apply various solutions, including state-owned and private centres [23].

Finally, there are the Dutch and Danish concepts. The Dutch idea is the Rail Service Centre. At the moment, the Netherlands operates 15 logistics centres, and the average size of the Dutch centre is 66.6 ha [4]. The Rail Service Centre in Rotterdam handles 153,883 vehicles annually [26]. Stacking capacity is 1968 TEU [26]. The Dutch concept involves alternative modes of transport. Therefore, new railway lines are built and substantial funding is channelled to inland shipping [3]. Deeper inland, Dutch logistics centres focus on good road transportation and the development of the air transport [3].

Last but not least is the Danish Transport Centre concept. Currently, Denmark operates 7 logistics centres, and the average size of a centre is

170.7 ha [4]. Danish centres combine sea and air transport, and invest much in road infrastructure both within the centre and beyond. Danish logistics centres focus very much on sustainable development. Moreover, employee skills and qualifications are considered particularly important [8].

4. MAJOR FEATURES TO IDENTIFY A LOGISTICS CENTRE

Based on the analysis of logistics centres, we may distinguish several features that can be useful for investors while establishing new facilities. It is important to locate the centre close to a city. However, the distance should be adjusted in such a way that the centre, instead of producing additional traffic pressure, can functionally support the agglomeration. The logistics centre should be developed close to the origin of demand for its services [18].

Additionally, whenever possible, the centre should maximise the intermodal division of transport. Thus, it is advisable to develop terminals close to water canals, water basins, seaports, and railway lines.

Considering the current technological advancement, another important feature is the provision of an IT system to support the management of the centre, a system which will be tuned to the needs of the end user (client). It is especially true since the rising complexity of supply chains and logistics services requires precise data and efficient management of information [14]. It is also important to train personnel as regards specialist services and logistics. Considering environmental challenges, it is also worth remembering that, apart from business-oriented services, logistics centres need to follow sustainable development principles. In this particular area, it is important to develop a relevant approach to the corporate social responsibility. The best practices include the following: eco-office, eco-building, eco-efficiency, environmental programmes, relevant recycling and sustainable transport practices [30]. The purpose is to monitor the impact on the natural environment and the society from the very moment of creating the logistics centre [1], [18].

5. SUMMARY

For a logistics centre to operate efficiently we need not only a location close to the transport network, but also special operational technologies,

including transshipment, as well as integrated IT systems. While analysing the possibility of establishing and operating a logistics centre we need to remember about its impact on its environment, i.e. traffic involving various modes of transport and contribution to urbanization of a given area.

Summarising, we can say that examples of logistics centres presented in the article highlight the multitude of concepts. Those can be turned into good practices and contribute to further development. We should remember, however, that the final decision about the shape of a logistics centre and its operation mode depends on a number of factors referred to in the article.

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