

## **17. NEW MODEL OF COOPERATION BETWEEN LOGISTICS CENTER AND MARITIME CONTAINER TERMINAL**

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### **Abstract:**

The following article presents the innovative concept of logistics centers called “port-centric logistics”, which finds close co-operation with maritime container port. This concept can reduce the costs of logistics operations. In the first part the author focuses on describing the specifics of logistics centers. The following parts include characteristic of “port-centric logistics” concept. The last part of the paper contains information about Pomeranian Logistics Center which is an example of functioning “port-centric logistics” concept in business environment.

**Key words:** Logistics centers, port-centric logistics, containerization, container industry

### **1. Introduction**

Global containerization has been developing for several decades, placing very high demands on offshore transshipment terminals that act as a buffer in international supply chains. The complex needs of other participants in international trade also influence the functioning of modern transshipment terminals. It is here where the greatest added value is expected for the entire process. Through the changing distribution systems of many products, there are a number of arguments confirming the need to disassemble the already cooperated cargoes at the destination seaport to avoid unnecessary land transport of empty containers.

The White Paper in its reflections from 2011 "The plan to create a unified European transport area - striving for a competitive and resource efficient transport system." Draws attention to the contemporary location of production and directions of freight in the context of deep sea freight. This document emphasizes the extraordinary importance of increasing the number of efficient places of transshipment and handling of cargo arriving from overseas relations on the European continent. The document also mentions the essence of reducing unnecessary transport across European territory [European Commission, 2011]. In this context, sea ports play a strategic role as broadly understood logistics service centers, having convenient and efficient connections to inland areas. The concept of "Port-Centric Logistics" has become the answer to new challenges posed to seaports, which in practice may take various forms. The main idea is to create from the port a logistic space for handling large volumes of cargo, mainly containerized.

The aim of this scientific article is to show the importance and operation of logistics centers located in close proximity to seaports, which together form the concept of "Port-Centric Logistics". As a research method, the analysis of professional literature related to the described business area and the study of scientific articles describing the subject under study were used.

## 2. Characteristics of logistics centers

The concept of logistics centers has been very popular in the last few years due to the rapid development of the logistics industry. There are currently many definitions describing the logistics center. Fechner defines a logistics center as a spatially functional object with infrastructure and organization in which logistics services related to the receipt, storage, distribution and issuing of goods as well as accompanying services provided by economic entities independent of the sender or recipient are implemented [Fechner, 2003].

It should be noted that in their most developed form, logistics centers take the form of very complex objects, and most importantly they require significant expenditure and coordination of works on their construction. Over the years, their role has been transformed from basic warehouse functions to modern solutions supported by various types of IT systems and additional services for clients. The essence of logistic centers is important because it is a link between various entities in the supply chain, such as suppliers, customers or final consumers. They are therefore an important integration function in the supply chain. The dynamic development of logistics centers is the result of many changes on the market and brings many benefits. According to Fechner, we can include them [Fechner, 2003]:

- increase in the intermodality of freight transport,
- organizing business operations and better opportunities for shaping spatial order,
- business development around logistic centers and inflow of investments,
- regional development,
- recovery of inner city areas previously occupied by industry,
- development of logistics services in the area of urban logistics.

Logistics centers are nodes in logistic networks in which the flow of products takes place. They include the concentration of such elements of the logistics process as connecting and disconnecting streams of cargo, services related to storage, changing the means of transport and services related to inventory management and distribution [Kamińska, 2014].

In the literature, apart from many different definitions, you can meet with a different division of logistic centers, depending on individual criteria, including [Rydzkowski, 2011]:

- 1) Due to the range of impact:
  - international (radius of impact approx. 500 km),
  - regional (radius of impact 50 - 80 km),
  - local (impact radius 5 - 8 km).
- 2) Due to the type of loads handled:
  - universal,
  - specialist,
  - industry.
- 3) Due to the types of ownership:
  - public-private.

The individual logistics centers are different and therefore there is no universal set of logistic tasks that could be implemented by each of them. Requirements for logistic centers currently diverge far from the basic functions of storage, handling and transport. Localization and modern technologies that improve these processes along with IT solutions have become a priority. In addition to the standard requirements related to transport and reloading, the



development of logistics centers must go in the direction of providing additional value, such as: creating favorable conditions for cooperation of enterprises from various industries, shaping platforms integrating its participants: industrial and commercial companies and logistics and transport operators, further creating macroeconomic benefits for the development of regions and microeconomic for participants of logistics chains [Paprocki, 2003]. In logistics centers, operations for supply, producers and distribution are performed. At the same time, the distribution area is one of the most important processes carried out in logistic centers, which include storage, packaging, material flows [Straka, 2013]. In logistics centers processes of integration of these activities take place in order to improve the flow of goods and increase their efficiency and flexibility.

### **3. The concept of "Port-Centric Logistics"**

The term "Port-Centric Logistics" is defined as the provision of distribution services and other value-added logistical services by the seaport [Mangan, Lalwani, Fynes, 2008]. There are two solutions to expand the offer of logistics services at the seaport. The first method is the location of modern logistics facilities in the immediate vicinity of marine container terminals. The second way is the location of logistics facilities in the back of the port, while ensuring efficient transport connections from the sea port to warehouses. If certain conditions are met, in particular intermodal connections will be created, the resulting logistic complex can be described as so-called "Extended gates" [Rodrigue, Notteboom, 2009].

The subject literature defines the "extended gate" as a land-based intermodal terminal, connected directly to the sea terminal by very efficient transport connections. From these types of places, single-unit loads can be taken or delivered over which the seaport may take control. The idea behind this concept is related to the approximation of the load collection to the shipper within the transport corridor. The logistic terminal located in this way and connected with it is at the same time a specific gate of the seaport. Under such conditions, a range of logistic services can be offered, and even some customs procedures can be operated [Veenstra, Zuidwijk, Asperen, 2012].

It should also be noted that the terminals acting as the so-called "Extended gates" are also referred to in the literature on the subject of "dry ports" or "inland ports" [Klopott, 2011]. In Western Europe, such logistic complexes also have access to inland waterways.

The development of new trends in the area of logistics services has led to the creation of many advanced logistics, terminal and warehouse facilities inland. The largest of them, in size, resemble specific "logistic towns" having access to the infrastructure of various branches of transport and meeting a number of complex requirements. Such developed centers are called logistic centers. Some of them constitute a kind of competition for maritime terminals, whereas there are also centers closely cooperating with sea ports [Rodrigue, Notteboom, 2009].

### **4. Pomeranian logistics center as an example of the "port centric logistics" concept**

Discussing the reasons for the creation and role of the Pomeranian Logistics Center, one can not fail to mention the history of DCT Gdansk. The container terminal, whose majority shareholder is the Australian Macquarie fund, commenced operations in 2007. Since 2010, thanks to the deep waterfront, the terminal handles deep sea container vessels from the

Far East with a capacity exceeding 8.000 TEU (unit corresponding to the dimensions of a 20-foot container). Direct connection with Asian countries has given impulse for further, dynamic development. DCT Gdansk has become the transshipment hub of the Baltic Sea Region, serving container ships carrying cargo in sea transit for key ports in the Baltic Sea. The customers of the Gdansk terminal are the largest players on the container transport market, such as Maersk Line, MSC, CMA CGM [DCT Gdańsk, 2013].

The key change that took place in 2011 and significantly affected the dynamics of the development of the Gdansk terminal was the commencement of service for the container shippers of the largest shipowner in the world - Maersk Line, with a capacity of 15.500 TEU. This milestone allowed the company to join the elite group of European deepwater container terminals. In 2013 over 1 150.000 TEU were handled, for the first time in the history of Polish ports, exceeding the limit of one million TEU [Gospodarka Morska, 2011].

The successes associated with the market expansion went hand in hand with ambitious development investments. In addition to smaller investments, such as the launch of new storage yards (the so-called triangle), the expansion of the railway siding and the systematic retrofitting of the terminal with handling equipment, DCT completed the construction of a new, key infrastructure investment. T2 was launched for use - a new terminal with a deepwater shore and new reloading equipment. The project has doubled the annual capacity from 1.500.000 TEUs to 3.000.000 TEU. Two deepwater shores enable the simultaneous service of two transoceanic vessels [DCT Gdańsk, 2013].

Gdańsk has become a hub for serving not only Polish facilities, but also other Baltic ports. The launch of a direct Asian service resulted in a larger container turnover also for smaller ships. Feeder connections to Russian and Scandinavian ports serve both Maersk and Unifeeder containers. The event, which took place on May 11, 2011, was not only one of the most important steps in the development of DCT Gdansk, but also one of the most important events in the Polish economy. Thanks to these changes, the role of Polish ports has increased significantly.

In the face of such changes, it seems justified to implement the investment commenced on 1 October 2012, the construction of the Pomeranian Logistics Center (PLC) located at the back office of DCT in the area of 110 ha of land. It is anticipated that a complex of multifunctional facilities will be created on the adjacent areas of DCT, consisting of warehouses and production halls with a total target area of up to 500.000 m<sup>2</sup> and 40.000 m<sup>2</sup> of offices and social facilities. At PLC, the investor offers the possibility to build a flexible warehouse space with integrated offices. Depending on the operational needs, customers can take advantage of the offer of ready space for rent or tailor-made solutions (BTS) ("build-to-suit") [Goodman, 2017]. The logistics center is the first in the country to operate according to an innovative distribution concept. Its purpose is to avoid doubling the container travel (directed with the cargo to the distribution center located in the interior of the country and its vain return to the port). The project assumes the relocation of unloading containers from Asia to DCT in Gdansk to the direct port facilities, to the Pomeranian Logistics Center, and then the distribution of picked goods from warehouses located in PCL directly to the recipients. Clearly, non-containerized goods will be transported by road. The model assumes increasing the effectiveness of supply chain management by eliminating unnecessary container reloading inland and carrying out only the goods themselves to the recipients. This is the opposition to

the traditional model of the organization of the distribution of containerized cargo, assuming the transport of a container from the sea port to the distribution center located inland, and then goods in it transported further to the recipients.

The concept of port-centric-logistics in Gdansk means access to, among others, shipping lines and cargo owners. for depots and container repair workshops, light industrial production, warehousing and distribution as well as border and control services. For the cargo transport system in this area to be operational, road and rail access should be improved. Advanced steps have also been taken in this area. Investments such as the Sucharskiego Route (connection to the S7 and A1 roads), the Southern Gdańsk bypass (S7 road), the Tri-City beltway (S6 road), the A1 motorway, Słowackiego street and the Martwa Wisła tunnel have been completed. Railway infrastructure initiatives were also implemented, such as the bridge over the Martwa Wisła along with the railway line No. 226, which will increase the capacity from 84 to 240 trains a day. In addition, work is underway on the E65 and C-E65 railway corridor (main modernization) and the expansion of the Northern Port by-pass station [DCT Gdańsk, 2015].

The investor fully commercialized the Pomeranian Logistics Center in June 2016 and at the same time commenced the construction of the second A-class building. 21.000 m<sup>2</sup> was leased by five Polish companies from the TSL sector (transport-forwarding-logistics). These companies will occupy modules with an area between 3.500 m<sup>2</sup> and 5.200 m<sup>2</sup>. After completing the construction of the new building, the total area of the PLC increased to over 88.000 m<sup>2</sup>. High interest in PLC storage space proves its excellent location, which allows companies to use the facilities associated with handling and customs procedures. After completion, it will be the largest logistics center in Poland, which will be able to offer up to 500.000 m<sup>2</sup> of warehouse and production space with integrated office space [Goodman, 2017].

Pomeranian Logistics Center, in addition to basic storage and handling services, can also be used for re-export. Currently, many companies import parts and components for production from Asia to Poland and install them in the depths of Poland (eg LG Electronics TV factory in Mława), and then transport them back to Gdańsk, to export complete TV products via feeders, eg to Russia. Meanwhile, the plan to set up a Special Economic Zone and a Free Customs Area at PCL will allow potential investors to locate their own production at the back of DCT and eliminate the need to transport parts and subassemblies in one direction and finished goods in the opposite direction. The Pomeranian Logistics Center will also be able to reload and top-up containers. PCL surfaces were designated for large importers of the FMCG (fast moving goods) and forwarding agents [Rydzkowski, Matuszewicz, 2013]. Another interesting project implemented in the "Port-Centric Logistics" concept is the London Gateway currently being implemented in Great Britain. The deepwater container terminal will be integrated with the largest logistic park in Europe, supported by intermodal solutions, located approximately 40 km east of central London. The project is to provide faster, cheaper and more ecological transport of goods directly to their recipients. London Gateway integrates all links of the supply chain around the port. It connects the so-called entry port with warehouses, distribution center and producers, and simultaneously with various modes of transport. The port can be reached by truck and rail. London Gateway is to become the main hub and "entry port" for goods arriving in Great Britain and continental Europe of those

companies for which a cost-effective and sustainable global supply chain is important [Matuszewicz, Foltyński, 2012].

## 5. Conclusions

Logistics centers are a very important factor in the development of cities. Their scope increasingly goes beyond the distribution itself. Logistic operations for supply and producers are carried out, combining and integrating these two areas in the supply chain. Logistics centers, due to the fact that they constitute places of cumulation of logistic activities, may contribute to the implementation of the "port-centric logistic" concept. Although they may potentially be competing with seaports, their appropriate location, in the immediate proximity of the seaport or its back office, while guaranteeing constant transport links between the logistics center and the port, ensures the broadening of the logistics services offered by the port. Such a solution, as shown by many examples from business practice, turns out to be beneficial both for the logistics center and the port. However, success usually depends on the cooperation of various groups of entities.

## Bibliography

1. European Commission (2001). Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system, Brussels, p.8.
2. Fechner I. (2003). Wielkopolski park logistyczny – potrzeby i możliwości realizacji. In: Materiały Konferencji Naukowo – Technicznej „Centra logistyczne w Wielkopolsce”, Poznań, p. 55.
3. Rydzkowski W. (2011). Usługi Logistyczne. Teoria i praktyka. Biblioteka Logistyka, Poznań, pp. 179-180.
4. Paprocki W. (2003). Rozwój centrów logistycznych w Polsce. In: Eurologistics, no 5/2003, Warszawa, pp. 52-57.
5. Straka M. (2013). Distribution logistics as component part of firm micrologistics model. Technical University of Ostrava, Ostrava, pp. 6-18.
6. Rodrigue J.P., Notteboom T. (2009). The terminalization of supply chains: reassessing the role of terminals in port/hinterland logistical relationships, Maritime Policy & Management, Vol. 36, No 2/2009, Stockholm, pp. 165-169.
7. Asperen E., Veenstra A., Zuidwijk R. (2012). The extended gate concept for container terminals: Expanding the notion of dry ports, Maritime Economics & Logistics, Vol. 14, No 1/2012, Stockholm, p. 21.
8. Klopott M. (2011). Terminale intermodalne na zapleczu portów morskich – koncepcje i doświadczenia. In: Funkcjonowanie łańcuchów dostaw: aspekty logistyczne, przykłady branżowe. Zeszyty Naukowe no 31, Warszawa, pp. 211-222.
9. Fynes B., Mangan J., Lalwani Ch. (2008). Port-centric logistics, The International Journal of Logistics Management, Vol. 19, No. 1/2008, Bingley, p. 36
10. Matuszewicz M., Foltyński M. (2012). Pomorskie Centrum Logistyczne –nowatorska koncepcja dystrybucji. Czasopismo Logistyka, 2012, Poznań, p. 29.
11. Matuszewicz M., Rydzkowski W. (2013) Koncepcja Pomorskiego Centrum Logistycznego jako czynnik rozwoju przeładunków kontenerowych w DCT Gdańsk. Zeszyty Naukowe Uniwersytetu Szczecińskiego, Szczecin, p. 178.

12. Gospodarka Morska, <http://www.gospodarkamorska.pl/wydarzenia/najwieksze-kontenerowce-swiata-zawina-do-dct-gdansk.html> (Największe kontenerowce świata zawiną do DCT Gdańsk, 01.09.2018).
13. DCT Gdańsk, <https://dctgdansk.pl/en/about-dct/history/> (History, 01.09.2018)
14. Goodman, <https://pl.goodman.com/who-we-are/media-centre/najswiezsze-wiadomosci/20170126-goodman-pomeranian-logistics-centre-expansion-continues> (Pomorskie Centrum Logistyczne powiększy się o 36 700 m2 i pięciu nowych klientów, 01.09.2018).
15. Kamińska, <http://biznes.newsweek.pl/co-nowego-w-centrach-logistycznych-artykuly,344069,1.html> (Co nowego w centrach logistycznych?, 01.09.2018).