

CHAPTER 4

ROLE OF WAREHOUSE SPACE IN THE SUPPLY CHAIN

Karolina Kolinska¹

¹ Institute of Logistics and Warehousing, Estkowskiego 6, 61-755 Poznan, Poland
karolina.kolinska@ilim.poznan.pl

Abstract

Market globalization of economic activities will focus on customer service level, which has become a key factor in the competitiveness of enterprises. Lead times force the continuous improvement of material flow throughout the logistics supply chain. For this reason, constantly searched and improved are service logistics concepts of the target customer. One of the essential elements of the supply chain is a logistics center offering services to support manufacturing operations and distribution. The activities of logistics centers are aimed at increasing the efficiency of material flow service in the entire supply chain. This chapter presents the role of logistics centers in the supply chain and discusses the warehouse space market in Poland.

Keywords: warehouse space, outsourcing, supply chain

4.1. Introduction

In the era of globalization and rapidly changing market conditions, a key factor for improving competitive position is to focus on customer service. Customer service is perceived as the ability or capacity to satisfy the requirements and expectations of customers, mainly to the time and place of the ordered supplies, using all available forms of logistics activity, including transportation, warehousing, inventory management, information flow and packaging.

Lead time is, therefore, one of fundamental factors determining customer satisfaction. For this reason, the continuity of material flow should be ensured not only within companies, but also the entire logistics supply chain. The continuity of

material flow in the logistics process affects both supply and distribution, as well as production processes, which causes the multiplicity of the ways of its achievements. Figure 4.1 shows the basic factors affecting the level of customer service in the supply chain.

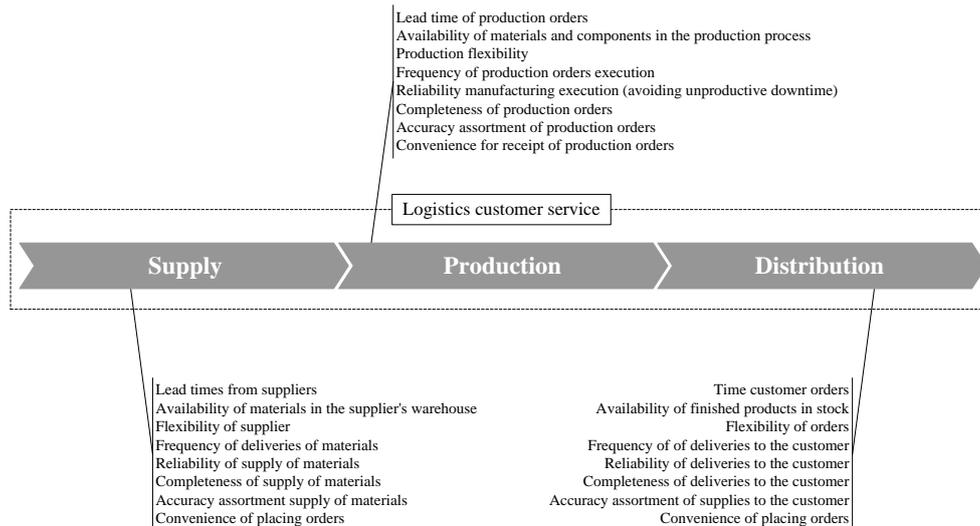


Fig. 4.1. Basic factors affecting the level of customer service in the supply chain

Source: own study

Research, conducted by the author, concerned the analysis of the use of management methods and techniques to minimize the effects of the economic crisis only confirms the key role of customer service in the logistics process. To improve the competitive position in the market and avoid the consequences of the economic crisis, the companies decide to (Koliński, Trojanowska, Kolińska, 2011, p. 12):

- attracting new markets (28%),
- inventory optimization (16%),
- transferring certain processes to outsourcing (9%),
- widening portfolio (9%),
- changing the logistics processes realization (5%),
- changing the products and services (4%).

To maximize the competitiveness of the logistics services market, a very important aspect of the decision is not only the location of the warehouse in the supply chain, but also the decision of a possible outsourcing of warehouse space. Analysis of supply chain efficiency in terms of warehousing allows for the optimal location of warehouses, which has a direct impact on delivery times and customer

service level. In the scientific studies of the logistics management, can be found a lot of factors - the processes and resources that affect the whole warehouse process. It is therefore clear that the warehouse management should focus on ways to improve the efficiency of processes, both internal and external supply chain and continuous monitoring and evaluation of the results (Kolinski, Sliwczynski, 2015). Simultaneous consideration of the use of warehouse space outsourcing, may also affect:

- logistics cost savings, as well as attractive pricing services offered by the entire supply chain,
- increase the flexibility of the entire supply chain, due to the possibility of manipulation of warehouse infrastructure available.

4.2. Warehouse space outsourcing in terms of the supply chain

Outsourcing means the process of having suppliers provide goods and services that were previously provided internally (APICS, 2004). Outsourcing means more than just the purchase of raw materials and standardized intermediate goods. It means finding a partner with which a firm can establish a bilateral relationship and having the partner undertake relationship-specific investments so that it becomes able to produce goods or services that fit the firm's particular needs (Grossman, Helpman, 2005, p. 136). On the other hand, for enterprises receiving orders for performing certain tasks or services, outsourcing is an opportunity for entering into new markets and to gain competitive advantage in the region. Figure 4.2 shows the development of outsourcing in the enterprises.

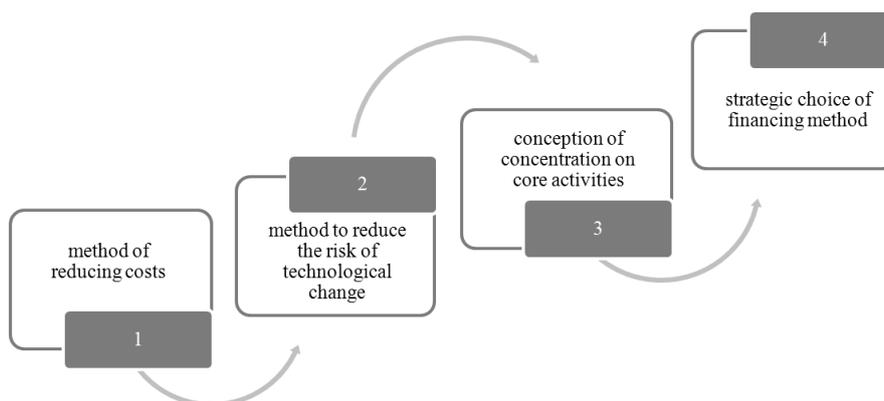


Fig. 4.2. Development of outsourcing domain

Source: own study (Koliński, Kolińska, Trojanowska, 2014, p. 145)

Research conducted by the author concerns the analysis of transferring degree of processes to outside companies (Koliński, Kolińska, Trojanowska, 2014, p. 147). The first issue of the research was to analyse the role of outsourcing in enterprises, which are partners in the supply chain. Results are shown in Figure 4.3.

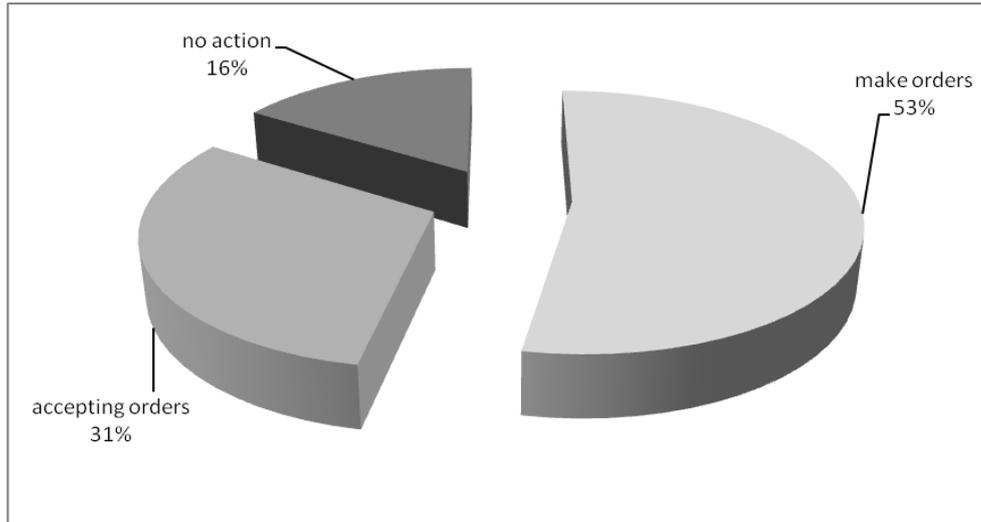


Fig. 4.3. Role of outsourcing in enterprise and supply chain
Source: own research (Koliński, Kolińska, Trojanowska, 2014, p. 147)

The largest number of companies provides certain tasks to be carried out externally (53% of companies). A large percentage of companies reporting tasks into outsourcing is a result of characteristic features for the small and medium enterprises to which outsourcing may be the only chance of cost. It is interesting that there is a big part of companies (16%) which did not take any outsourcing action, neither depute tasks into outsource nor render tasks for other companies.

Situation, when two or more enterprises outsource to a same vendor, MCO (one vendor vs multiple clients) is observed (Sharma, Yetton, 1996), which is sometimes referred to as co-sourcing (e.g. Gallivan, Oh, 1999). MCO is widely observed in this era of increasingly competitive and globalizing economies (Ni, Li, Tang, 2009, p. 130). For example, firms in different industries turn their information systems over to relatively few computer companies such as IBM (Dibbern et al., 2004), and more and more firms now outsource their logistics needs, resulting in the rapid growth of the third-party logistics business (Berglund et al., 1999; Stefansson, 2002).

Research confirms that there are some companies, which in past used the services of outsourcing companies, and now resigned from the services to perform

certain processes on its own infrastructure capacity. Currently, business executives often decide to use insourcing (Tomkowiak, Kolinski, 2013). On the other hand, there are also companies which during their business never use outsourcing services. Companies which attended in research and which does not apply outsourcing showed following arguments of making decision of abandonment of outsourcing:

- costs of implementing all the activities (services) on their own are lower in comparison to external companies (64%),
- within a company there are not any companies interested in taking certain actions (services) performed by the company (36%).

It should be noted, that the warehouse processes are increasingly a part of outsourcing. This is due to the specific exigencies of logistics centers in the entire supply chain. In business practice, there are numerous possibilities for use of warehouse space in the logistics processes. The complexity and the possibility to perform additional logistics services that are beyond the scope of warehousing and storage of goods, causing creation of buildings of different functionality. It is therefore necessary to distinguish both warehouse buildings, warehousing centers, as well as logistics centers. Developers involved in the expansion of warehouse space, incorrectly define logistics centers, and therefore fundamental functional differences between the logistics center and other buildings should be clarified. Table 4.1 shows the evolution of defining the scope of the logistics center over the years.

They are a few of authors who put different names of facilities for transport, logistics, storage and distribution operations in one line. The main criteria to correspond are operations performed and services offered. A number of previous studies have addressed the issue of the importance of service attributes of distribution centers or warehouses. Some authors conclude that distribution center is virtually synonymous with the warehouse because it is also where most goods from different suppliers are collected for delivery to customers' temporary holding areas and is in somebody's distribution system (Rimienė, Grundey, 2007, p. 89-90). Table 4.2 summarizes different interpretations of a logistics center in the literature.

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Tab. 4.1. Evolution of logistics centres definition

1960s - 1970s	1980s – early 1990s	Mid 1990s – present
		Materials management Distribution services (national/global)
	Bonding	Import clearance Bonding Inbound transportation
Receiving	Receiving	Receiving
	Cross-docking	Cross-docking
Storage	Storage	Storage Inventory management and control Shipment scheduling
Order processing Reporting Picking	Order processing EDI* Reporting Picking	Order processing EDI* Reporting Picking
Order assembly (Re) packaging	Order assembly (Re) packaging Stretch-shrinkwrapping	(Product) subassembly Order assembly (Re) packaging Stretch-shrink-wrapping
Palletizing/unitizing Label/mark/stencil	Palletizing/unitizing Label/mark/stencil	Palletizing/unitizing Label/mark/stencil
Shipping Documentation	Shipping Documentation Outbound Transportation	Shipping Documentation Outbound Transportation Export documentation FTZ* operation JIT/ECR/QR* services Freight rate negotiation Carriers/route selection Freight claims handling Freight audit/payment Safety audits/reviews Regulatory compliance review Performance measurement Returns from customers Customer invoicing
Abbreviations*: EDI – electronic data interchange, FTZ – free trade zone, JIT – just-In-time ECR – efficient customer response, QR – quick-response		

Source: (Bolten, 1997, p. 19)

Tab. 4.2. Definitions of Logistics Centre

Definition	Emphasis on
Logistics centre as Freight village or Logistics node	transport, logistics and goods distribution functionality freight transport modes change geographic coverage facilities include warehouses, distribution centres, storage areas, offices, truck services, etc public services, full territory access management and ownership issues
Freight terminal as Distribution centre	freight transport modes change handling operations value-added services
Distribution centre as Logistics centre	consignments grouped or splited transport organization centre freight transport modes change located at nodal points in the system
Distribution centre as Warehouse	product flow in contrast to storage value-added services rapid delivery
Warehouse	place for inventory Storage connecting link between producer and customer

Source: (Rimienė, Grundey, 2007, p. 93)

In the polish literature one should pay attention to the fundamental difference between the definition of a logistics center and warehousing center. Factor distinguishing the logistics center between the warehousing center, is to provide, by the first-mentioned additional services to users of supply chain. Figure 4.4 shows the difference between the logistics center and warehousing center.

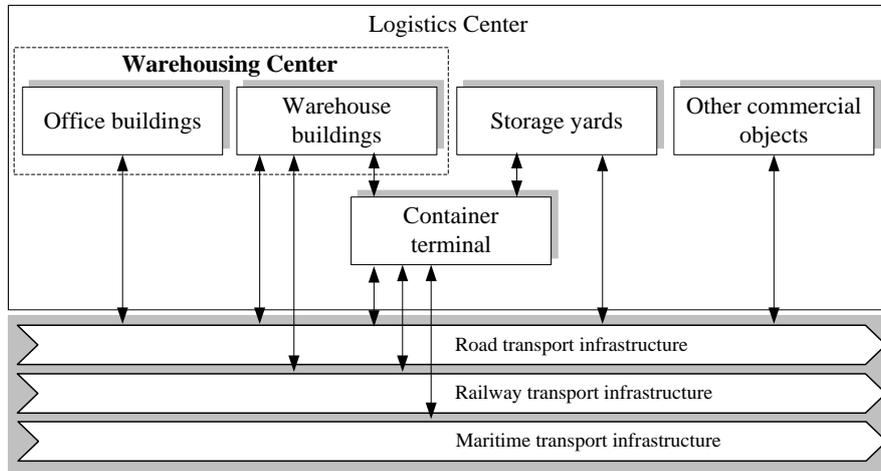


Fig. 4.4. Difference between the logistics center and warehousing center
 Source: own study (Kolińska, Koliński, 2009, p. 3)

The characteristic feature of the logistics center is the intermodal terminal object. But this is not the only feature that distinguishes logistics centers (LC), warehousing centers (WC) and warehouse buildings (WB). The comparison of individual functionality of logistics infrastructure objects, is presented in table 4.3.

Tab. 4.3. Comparison of individual functionality of logistics infrastructure objects

Performed functions	LC	WC	WB
Storage	X	X	X
Cross-docking	X	X	X
Sorting packages	X	X	X
intermodal transshipment	X		
Shipping	X	X	X
Customs Services	X	X	X
IT services	X	X	
Financial services	X		
Rent of transport packaging	X		
Cleaning and repair of transport packaging	X		
Refuelling of vehicles	X		
Maintenance of vehicles	X		
Food & beverage	X		
Hotel services	X		

Source: own study based on (Fechner, 2009, p. 3)

Moreover, it should be noted that the right choice of warehouse location is an important factor in the subsequent occupancy rate of available warehouse space, as well as the level of profit that is possible to achieve in connection with the rent charged for the rental.

Consequently the location selection should be considered and analyzed for more criteria, which may primarily include the following elements (Kolińska, 2012, s. 34):

- infrastructure terms - both warehouse space, as well as the conditions of their allocation,
- availability of large properties suitable for the construction of buildings and warehouse structures,
- legal regulations related to obtaining the actual developers conditions and building permits,
- the quality of transport infrastructure in a given region,
- regional labor market, including the availability of potential warehouse workers.

Collecting and analysing all of the above problems is not simple, however, to make the correct choice of the area where building a warehouse is planned, it is necessary to conduct a multifaceted analysis taking into account the above factors. Through a comprehensive approach to the analysis of warehouse space market, the risk associated with incorrect choice is smaller (Kolińska, 2014).

In connection with the development of e-commerce market and continuously increasing trade is also a growing demand for warehouse spaces and logistic services. This is the signal for developers to dedicate their services also in support of this market (BNP Paribas Real Estate, 2015). Unlike the traditional stores, where demand for warehouse space is quite predictable, industry e-commerce requires a lot more flexibility. Assortment, number of customers and the place of delivery for the online shop are diverse, therefore it is essential that the warehouse space was adapted to changing demands, and the owners of warehouses will enable increased of warehouse space used during peak periods of the sale, for instance, during the holiday season.

4.3. Analysis of the warehouse space market in years 2010-2015

Based on research conducted by Institute of Logistics and Warehousing in terms of warehouse space market in Poland, the analysis of this market was carried out in 2010-2015. The obtained results are presented in this chapter.

In recent years (2010-2015) it can be seen that the number of warehouse space from year to year was increasing (Fig. 4.5). However, in the last two years (2014-2015) there was a slight slowdown in the development of new warehouse spaces.

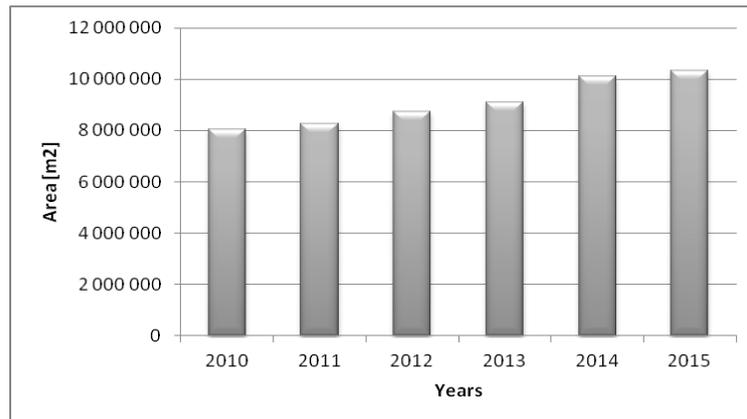


Fig. 4.5. The existing warehouse space in 2010-2015

Source: own study based on the research of Institute of Logistics and Warehousing

Analysing warehouse space in individual provinces in details (Tab. 4.4), can be noted that the analyzed years, the first five places occupy the same provinces. It should be noted that the participation of the Mazowieckie province decreased by about 7% over 6 years. The positive aspect is the appearance of warehouse space in all provinces in Poland².

The share of developers in the warehouse space market has been significant for years (Fig. 4.6). However, it may be noted that during the last two years logistics operators and owners significantly increased their market shares. The main reason for this situation is the interest from companies of build-to-suit (BTS) warehouses type. A build-to-suit is a building specifically constructed to meet the design, location and physical specifications of one major user. A building may be developed based on a build-to-suit requirement of one user. Excess space in the building could be leased to additional tenants or set aside for the planned expansion of the original tenant (Larsen, 2016). By means of such solution built warehouses from the beginning will be adapted to customer requirements and do not need any changes and facilities.

² In the Warmińsko-mazurskie province are only 2000 m².

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Tab. 4.4. Percentage share of individual provinces in the existing warehouse spaces

Province	2010	2011	2012	2013	2014	2015
mazowieckie	40,4%	39,6%	39,1%	37,4%	32,8%	33,3%
śląskie	16,7%	17,1%	16,7%	16,3%	18,9%	18,9%
łódzkie	13,4%	12,5%	13,7%	14,0%	14,3%	13,9%
wielkopolskie	12,5%	13,0%	12,6%	13,1%	13,2%	13,2%
dolnośląskie	8,3%	8,2%	9,0%	8,7%	10,1%	10,1%
małopolskie	2,3%	2,4%	3,0%	2,8%	2,7%	2,8%
pomorskie	1,8%	2,3%	2,7%	2,7%	2,0%	2,0%
podkarpackie	0,6%	1,0%	0,9%	1,7%	1,5%	1,5%
kujawsko-pomorskie	1,3%	1,2%	1,2%	1,5%	1,5%	1,4%
opolskie	0,0%	0,0%	0,3%	0,7%	1,2%	1,1%
zachodniopomorskie	2,3%	2,2%	0,5%	0,6%	0,9%	0,9%
lubelskie	0,0%	0,0%	0,0%	0,0%	0,4%	0,4%
lubuskie	0,1%	0,1%	0,1%	0,4%	0,4%	0,4%
świętokrzyskie	0,2%	0,2%	0,2%	0,2%	0,1%	0,1%
warmińsko-mazurskie	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Total	100%	100%	100%	100%	100%	100%

Source: own study based on the research of Institute of Logistics and Warehousing

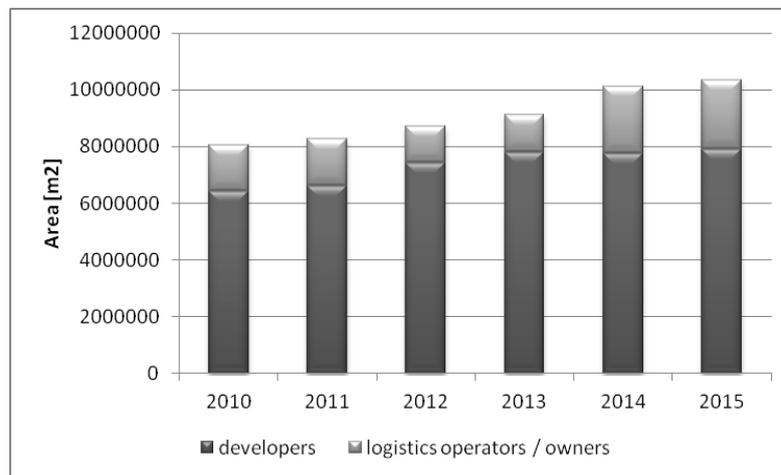


Fig. 4.6. The existing warehouse space by types of owners in 2010-2015

Source: own study based on the research of Institute of Logistics and Warehousing

Looking for the significant share of warehouse space that belong to the developers, it was necessary to analyze in details the developers who have the largest market shares.

The analysis (Fig. 4.7) shows, that on the Polish market there are three major developers: Prologis, Panattoni and Sergo. Over the 6 years, it can be noted that the share of these three developers is growing steadily and is now 64% of all warehouse space belonging to the developers.

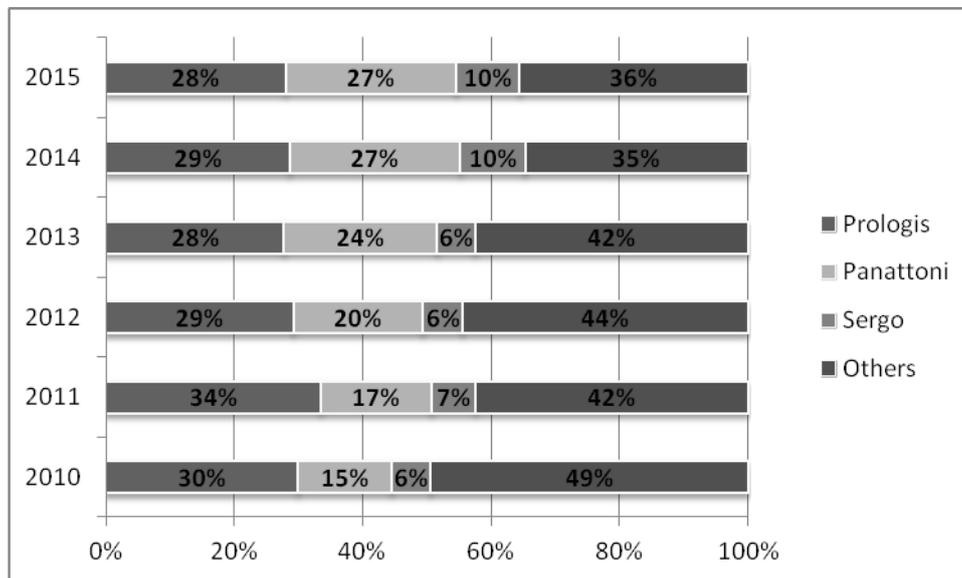


Fig. 4.7. The existing warehouse space belonging to the developers in 2010-2015
Source: own study based on the research of Institute of Logistics and Warehousing

It should also be noted that a detailed analysis of warehouse space in Poland allows to conclude that more and more popular solutions are the BTS types, in connection with the possibility of fitting the building to the individual needs of the client. The main features of the warehouse buildings for BTS type, are (Kolińska, 2012, s. 34-35):

- location - objects can be built on plots located within the developer's owned bank of land or on the client's real estate,
- the size of industrial space - depends on the client's needs,
- the size of the office space - standard for the job for one employee dedicating a minimum of 2 m² of floor space and 13 m³ of cubature,
- the kind of cooperation - lease transaction or sale of the investment to the customer,

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- functions of industrial building - according to customer requirements is prepared technological and technical infrastructure assistance to operational processes.

The specificity of this technological solution determines some advantages and disadvantages. The main advantages of warehouse buildings for BTS type, may include:

- the possibility of adjusting the technical requirements of the warehouse building to individual customer needs,
- realization of warehouse space construction process by experienced company,
- the possibility to choose the location according to individual customer needs,
- no impact for the change the level of rental costs.

In contrast, the main disadvantage of buildings for BTS type, in case of decrease in sales and the need to abandon the warehouse use, there is a problem with the sale or rental this building, especially if the warehouse has a very specific technical characteristics and location (Kolińska, 2014).

During the research conducted by the Institute of Logistics and Warehousing for each warehouse space the type of investor is defined, ie. developer, owner and BTS. Figure 4.8 resetting the share of individual investors, who built warehouses for BTS type, in the analyzed period. The largest market share in this field has Panattoni, which should be at the moment more than 60% of the market.

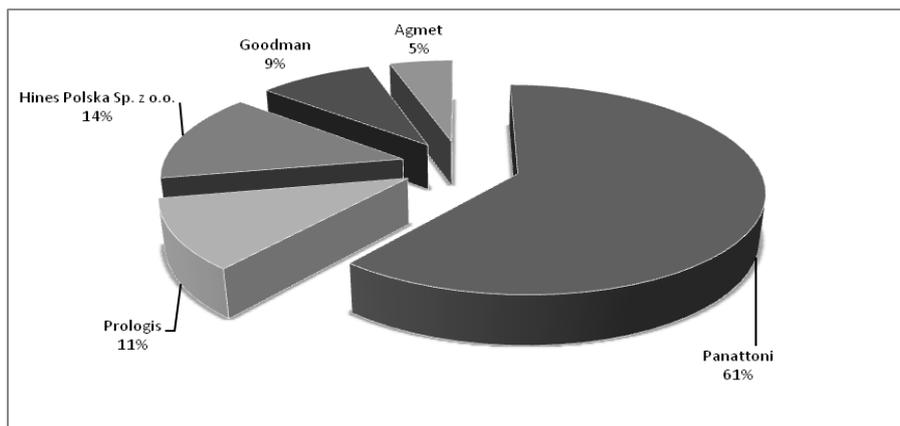


Fig. 4.8. Warehouse space for BTS type (in 2015)

Source: own study based on the research of Institute of Logistics and Warehousing

Based on the above analysis, a forecast of development of the warehouse space market can be defined. Polish market research also allows for the generalization of conclusions and presents trends in the warehouse space market in the European Union.

4.4. The development perspective of warehouse spaces

The analysis conducted by the Institute of Logistics and Warehousing, and by consulting firms operating in the area of real estate (Jartom, 2016; Coliers, 2016) shows, that the warehouse space market will develop in the following directions:

- among warehouse developers will strengthen the trend of implementing the multi-tenant objects, and thus speculative objects,
- standard able to use robotics, advanced IT solutions, automated high bay storage and Internet of Things,
- the warehouses and production objects will appear, which will use communication M2M (machine-to-machine),
- next to the BTS contracts, on the market transactions BTO (Build to order, also known as fee development) will appear, where the customer orders the developer to build a warehouse object on his property. BTO is the oldest style of order fulfillment and is the most appropriate approach used for highly customized or low volume products and objects. This approach is considered good for highly configured branch, e.g. automotive or IT (Holweg, Pil, 2004),
- the development of smaller companies in the e-commerce sector will affect the interest of objects of Small Business Units (SBU),
- expected to develop the smaller warehouse space markets (Toruń/Bydgoszcz, Lublin, Rzeszów, Szczecin).

4.5. Conclusions

Analyzing the current situation on the warehouse space market, the emergence of a small number of new warehouses can be seen, which mainly results in the procurement of buildings for BTS type. The big advantage of this type of building is the perfect fit to the requirements of each customer, which eliminates the risk associated with the subsequent lack of renting warehouse space.

The warehouse space market in Poland continues to grow in existing spaces. The determining factor in the further development of this sector is not only the need for continuous concentration on strategies of logistics cost reduction in enterprises, through the outsource of warehouse processes, but also need to adapt

their offer to the technological and organizational changes that have an impact on the level of customer service and competitive position in the market.

Still, such as the province: mazowieckie, śląskie, łódzkie, dolnośląskie and wielkopolskie have the largest share of warehouse space in relation to the whole country, but in connection with the development of road infrastructure, there is a chance for the emergence of new warehouse space in other regions. However, this decision depends mainly on the strategic decisions of developers, which include a significant portion of warehouse space in the country, as well as the business commissioning the construction of the BTS type. Build-to-suits represent one of the alternatives available to companies in today's complex commercial warehouse real estate environment. Many executives in charge of procuring warehouse space for their companies find the build-to-suit option advantageous, while others prefer more traditional approaches to meet warehouse space needs. Build-to-suits make the most sense when the company can make a long-term commitment to a property, can handle the initial costs, and when the firm is seeking to maximize warehouse efficiency and possible expansion potential (Larsen, 2016). It should also be noted that the choice of the type of warehouse space will affect the evaluation of warehouse process efficiency (Kolinski, Sliwczynski, 2015) and the results that can be obtained from the analysis.

The share of developers in owning warehouse space does not change over the years warehouse space. Still the biggest developers are Prologis and Panattoni, and probably the market share will remain unchanged.

Proper selection of the allocation of warehouse space is important for the functioning of supply chain, both for the cost of the rental / purchase of warehouse space, as well as due to the strategy of customer service, eg. servicing costs or delivery time to customer.

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