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## CRITERIA OF CATEGORIZING LOGISTICS AND DISTRIBUTION CENTRES

### ABSTRACT

*Logistics and distribution centres represent very significant infrastructure elements of the macro-logistic system. The creation of the logistics and distribution centres and their connection into a wide (global) network have resulted in the creation of conditions for an adequate distribution of labour and significant increase in the productivity of all the logistics elements and processes, noting that the logistics and distribution centres in this concept have a superregional significance.*

*This paper represents the summary (results) of the research that was carried out on a large number of logistics and distribution centres with the aim of considering the complexity and the issues related to the logistics and distribution centres and the distribution network, their elements and action of the subsystems according to the following criteria: spatial, technical, technological, and organizational, with the aim of defining the categorisation model of the logistics and distribution centres.*

*The analysis of the selected data collected during the research has resulted in defining of the categorisation model of the logistics and distribution centres which foresees six categories. Each of the foreseen categories has been defined according to the set model by the mentioned traffic, technical and technological, and organisational characteristics and the level of service. This is precisely where the application of the categorisation model of the logistics and distribution centres can be found, which will define the relevant categories of the centres applicable in the creation of effective distribution networks.*

### KEY WORDS

*logistics and distribution centers, categorization, model, logistics*

### 1. INTRODUCTION

The globalisation processes and the introduction of the logistics and distribution system into the sphere

of production, exchange and delivery to the end user, have caused sudden development of logistics. The logistic activities are increasingly present in the functioning of many distribution companies, with the tendency of expansion to the companies of a wide business scope.

The cargo flows are cause-effect factor of constant increase of space, time and quantity transformations in a continuous sequence of activities of packaging, loading, transport, storage, transshipment, transport, unloading, delivery, etc. All the activities of space, time, qualitative, quantitative, and other cargo flow transformations incur substantial costs of labour, materials, energy, tied up capital, etc. Those involved in the realisation of cargo flows are the logistic chains and logistic systems, and therefore the most significant place in the logistics chain belongs to the logistics and distribution centre. The logistics and distribution centres have existed for many years already. However, their founders, functions, structure and objectives of development have over time experienced different forms, received different names and functions, both in the terminological and the technological sense. By establishing the logistics and distribution centres and their connection into the global network the conditions have been formed for adequate labour distribution and significant increase in the productivity of all the logistics elements and processes.

This paper represents a summary (the results) of research which was carried out on a large number of logistics and distribution centres in order to consider the complexity and the problems of the logistics and distribution centres and the distribution network, their elements and action of the subsystem according to the following criteria: spatial, technical, technological and organisational, in order to define the categorisation model of the logistics and distribution centres.

The objective of the research was to set the categorisation model of the logistics and distribution centres that will enable their classification at the international, national, regional and local levels in order to create efficient distribution network solutions for optimal realisation of the cargo flows, as precondition of increasing rationalisation, accelerating cargo flows, increasing efficiency of logistics systems, harmonising of logistics processes and cooperation of the supply chain participants.

During this research, foreign literature and foreign research on this subject have been examined (there are studies from Germany [1], Czech Republic [2], Hungary [3]...) which are primarily oriented to a particular classification of logistics and distribution centres in each state and with few criteria (usually the size, quantity of goods, transport connections). Those are the main reasons why the results of those studies are inadequate to be taken as relevant sources for this type of research. Presented categorization is unique and is the result of research carried out independently of previous results and research.

## 2. THEORETICAL ASSUMPTIONS OF LOGISTIC PROCESSES

Most generally, the logistic systems can be defined as systems of space-time transformation of goods, and the processes that flow within them as logistic processes.

The basic function of the logistic systems is the space-time transformation of goods. Its fulfilment is related to the functions of change in quality and type of goods and the functions of facilitating the transformation of goods.

Thus, these functions are performed in the processes of<sup>1</sup>:

- transport, regrouping and storage, with focus on the cargo flows processes,
- packaging and labelling, with focus on the processes assisting the cargo flows,
- delivery and processing of orders, with focus on the information flows processes.

Seamless circulation of goods, between the point of the source of goods and the point of delivery, assumes adequate information exchange between the logistic system participants. The logistics complex is characterised by the interconnections of the movement process (transport) and holding process (storage). This can be graphically presented by means of a network in which all the links are interconnected. Apart from cargo, people and information also travel along this network. At single links of the network, cargo is often held momentarily, and then continues to move to its destination, i.e. the point of delivery. Differently set links in the network represent also various possi-

bilities of cargo movement from the point of receiving to the point of delivery. At the point of taking over, the cargo is received from a producer and prepared for transport and distribution. After transport at the point of delivery it is delivered to the buyer (consumer). Depending on how the cargo moves along the network, there is also difference in the logistic system structure, and it can be<sup>2</sup>:

- single-phased – cargo that moves directly along the network without stopping and additional processes of storage, sorting, repackaging, etc.
- multi-phased – flow between the point of delivery and the point of receipt is interrupted at least in one point, the task of which is to regroup the cargo into smaller units of quantity or to concentrate the cargo into larger units for delivery.
- combined – characterized by the possibility of direct and indirect movement of cargo from the point of receipt from the producer to the point of delivery to customers.

The flow of cargo between the point of delivery and the point of receipt assumes also the exchange of information between both points. The information is exchanged before, during and after the completed cargo flow. The information causes the flow, follows and explains it, controls and accompanies it, and confirms or indicates the deviations. Therefore, the information flow processes are also logistic processes<sup>3</sup>. Thus, the logistic processes are tasks that are realized through flows of transformation of cargo and information. They refer to planning, management and control of these transformation flows.

## 3. LOGISTICS AND DISTRIBUTION CENTRES AS BASIC DISTRIBUTION FACTORS

Logistics and distribution centres represent a very significant infrastructural element of the macro-logistics system. As a transport node within a certain geographic area the centre represents an instrument of cargo concentration and cooperation of all elements of the logistics system<sup>4</sup>. It is well known that the transport is characterized by: lack of homogeneity, spatial and time separation, which resulted in the need for concentration as the basic measure of rationalization. The basic objective of concentration is to achieve as much as possible: the uniformity, durability i.e. continuity of cargo flows and best possible usage of traffic infrastructure and transport means. Good usage of traffic infrastructure and transport means is of vital significance for rational realization of logistics functions, since good usage per time and capacity is the basic assumption to reduce the fixed costs that are, as well known, extremely high in transport<sup>5</sup>.

The establishment of the logistics and distribution centres and their connection into a wide-spread (glob-

al) network have created the conditions for adequate division of labour and significant increase of productivity of all the logistics elements and processes, noting that the logistics and distribution centres in this concept have supra-regional significance. The network effect is reflected in the fact that between individual logistics and distribution centres, i.e. on single network sections the application of high capacity transport means with good usage is now possible, as well as higher traffic density i.e. more frequent delivery, simpler change of transport means of different transport modes (multimodality) i.e. optimal division of labour, reduction of empty rides and adequate directing of transport means in the catchment area of the centres, as well as realisation of positive effects even in the very logistics and distribution centres through realisation of an entire series of the accompanying functions (multifunctionality) reloading, storage, commissioning, packaging, additional processing, maintaining, etc., with achieving high flexibility.

In the development concept evolution, the logistics and distribution centre is not treated only as a place at which the connection between the distance and local transport is realized in an adequate manner, but rather also as an element which should ensure a whole series of economic and other objectives: improvement of regional economic structure, disburdening of traffic routes, improvement of environmental conditions, etc.

Owing to high rationalization potential in the reduction of costs, improving of the marketing position of all the related economic subjects, improvement of the economic structure of the subjects from their environment, the logistics and distribution centres act very motivationally in the economic sense. Their planning and exploitation is a very complex task due to their complex structure and ambivalent system of objectives. The subjects that participate in the realisation of the objectives are heterogeneous: logistics service providers (logistics operators), employees, industrial and commercial companies, citizens and local government. Some subjects, as their primary objective, have different sub-objectives such as improvement of the economic structure, traffic mitigation, improvement of environmental conditions, etc. which clearly indicates the conflicting issues in the mentioned objectives.

Continuously increasing traffic requires the introduction of innovative as well as often interactive concepts. The logistics and distribution centres are centres that represent the basis for solving the problems in the logistics industry. They successfully connect the cargo flows of global, regional, national and local significance, different transport service providers, reduce transport and environmental impact, and have significant influence in overcoming the market resistance. The planning of logistics and distribution centres is

a complex task since it is not an isolated segment of the system but rather a component of a very complex network, so that the design methods of logistics and distribution centres are also subject to continuous research and improvement.

The aforementioned reasons have led to the research with the objective of defining the multiply applicable model of categorization of the logistics and distribution centres that will be able to influence the change in the structure and organisation of the existing logistics and distribution centres, and which will be used as guidelines for the construction planning of the future logistics and distribution centres. At the same time, it will be possible to represent the set categorization model in the function of designing the distribution networks.

#### 4. DEFINING CRITERIA FOR CATEGORIZATION OF LOGISTICS AND DISTRIBUTION CENTRES

As previously mentioned, the operation of logistics and distribution centres is experiencing constant and significant changes. The logistics activities are increasingly present in everyday life, whereas the companies involved in such activities, with optimal planning of distribution networks, realize higher profit by creating add-value on cargo and achieve their more stable position on the globalisation market.

Starting from the actual situation of the logistics and distribution centres there is need for research and definition of criteria to set the models of their categorization which, as already mentioned, will define the categories of the logistics and distribution centres, minimal conditions that define single categories, minimal technical and technological conditions for a certain category, and levels of service that they have to provide in the individual category.

Categorization represents the creation of the models for ranking and comparing of logistics and distribution centres on a certain scale ranging from those best equipped to those worst equipped ones.

This was achieved by setting certain conditions of the technical level of equipment and the functioning method of the logistics and distribution centres, i.e. by defining the criteria for the categorization of the logistics and distribution centres, in the form of a questionnaire. The questionnaire consists of four sections, 17 sub-sections and contains a total of 135 questions<sup>3</sup>. The basic selected sections are:

- general data, cargo flows and connections,
- terminals,
- logistic services,
- other.

Figure 1 shows the overall schematic presentation of the questionnaire structure, basic questionnaire

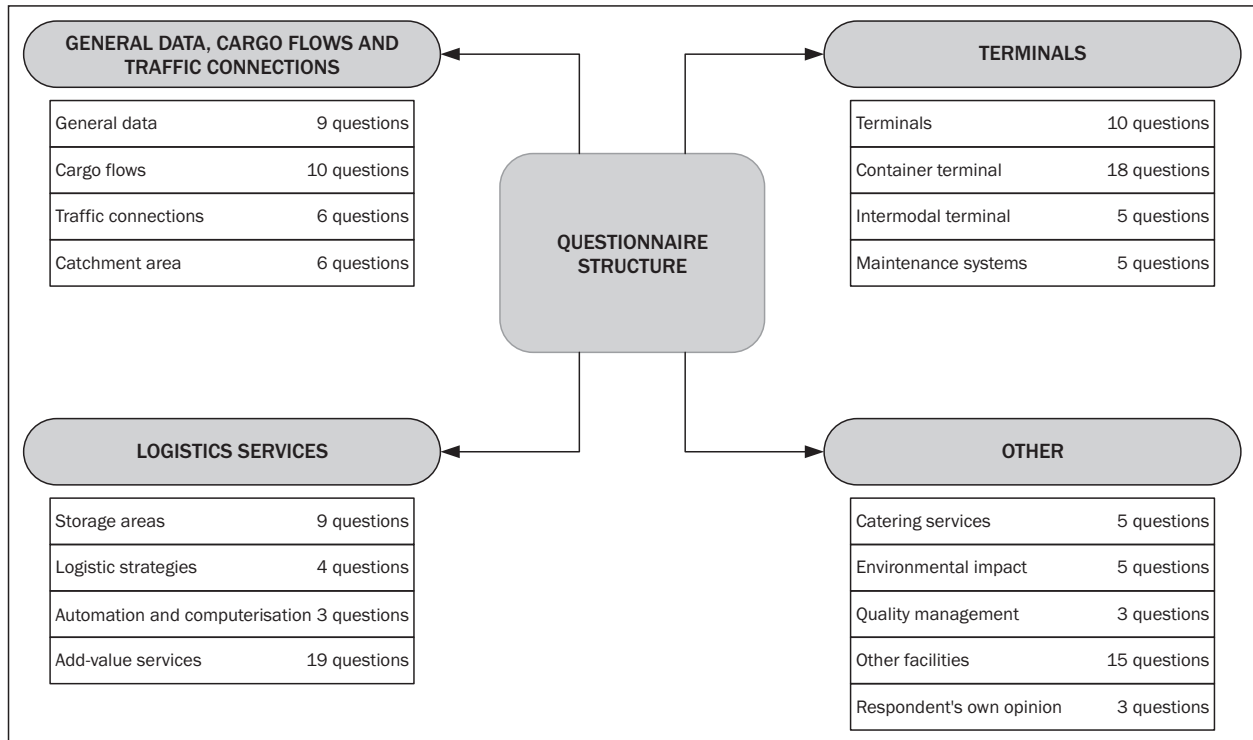


Figure 1 – Research methodology

sections with respective sub-sections, and the number of questions in each of them.

The selection of the criteria for the categorization of the logistics and distribution centres was based on the complexity of the system of the logistics and distribution centres i.e. on the fact that it is necessary to encompass as many infrastructural, functional, technical, technological and organisational data and services as possible, so that the proposed categorization can define clear categories with relevant characteristics.

The research was carried out on more than 70 logistics and distribution centres, located mainly in Europe, with a few, mainly global, world logistics and distribution centres located as parts of seaports worldwide. The research encompassed almost all forms and types of the logistics and distribution centres in order to obtain maximally true data, which are then used to develop the categorization model of the logistics and distribution centres. The answers obtained through this questionnaire are of quantitative (numerical) and qualitative (textual) nature and have been therefore processed manually, without computer processing.

As one may note, the definition of the criteria for the categorization of the logistics and distribution centres is not a documentation but rather a research instrument, and as the measuring instrument of the condition implemented in the phase of evaluating the logistics and distribution centres, which resulted in the development of the model of categorizing the logistics and distribution centres.

## 5. CATEGORIZATION MODEL OF LOGISTICS AND DISTRIBUTION CENTRES

The method of logistics service provision is very important in achieving the set goals of a logistics and distribution centre. The users' requirements have to be fully met in order to "motivate" them to use the services of the logistics and distribution centres, to deliver the excess capacities in their own organization, and to focus on their core activity – production or sales, and by using the services of the logistics and distribution centres to contribute to the improvement of operation efficiency and increase in the demand for the respective products<sup>6</sup>.

Optimal functioning of the transport chains and the entire system of macro- and micro-logistics means adequate level of development, organisation and functionality of the logistics and distribution centres<sup>7</sup>.

The development of the logistics and distribution centres over the recent twenty years has been very intensive, and certain technical, technological, organisational and structural differences have appeared between certain types of logistics and distribution centres. For instance, if one compares the centres as part of seaports and ports on inland waterways with the inland centres (no water traffic) and with available intermodal transport, or without it, one may see big differences. One may say that the development of logistics infrastructure which accompanies the trends of logistics industry, has led to establishing of certain

standards for infrastructure facilities (distribution warehouses, terminals...) and their locations, applicable in the majority of cases, which have to be met in order to provide efficient and effective performance of the logistics operations. The logistics operators today require bigger infrastructural units so that they may use them to consolidate the cargo flows of several local distribution networks. They prefer selecting the locations outside the urban zones, with lower land and utility prices, but with available traffic infrastructure (access to highway and rail, vicinity of ports....), usually 20 to 40km from the major urban centres.

These are precisely the reasons why the purpose of the research was to consider the complexities and the problems of the logistics and distribution centres and the distribution network, their elements and the operation of subsystems according to the following criteria: space, technical, technological and organizational criteria, all with the aim of defining the categorization model of the logistics and distribution centres.

In order to develop the categorization model of the logistics and distribution centres, a Questionnaire was made and sent to a large number of centres. The logistics and distribution centres that were addressed by the Questionnaire were of different sizes, located at different locations and playing different roles in the distribution networks, and representing a good sample for the development of the categorization model.

It should be noted that the logistics and distribution centres were considered as network nodes and considering only their role in the distribution networks; they were not classified according to the concepts of ownership, financing and organization. If one considers, namely, the example of the Port of Rotterdam, it may be noticed that there are three distinctly logistic areas which are called "Distriparks"; there are e.g. Distriparks Eemhaven, Botlek and Maasvlakte (currently being constructed is also Maasvlakte 2). Each of the Distriparks operates practically separately but in this research were analysed jointly. There are several similar examples, especially at big ports, so that the same principle was applied equally to all. Some examples may also be highlighted in which different owners appear, i.e. there is a certain number of logistics and distribution centres owned by a company or consortium, with container terminal for instance within the centre being owned by another company. Such examples were also considered as a whole, i.e. common data presented the characteristics of the mentioned node on the network [3].

The analysed logistics and distribution centres are located in 17 countries, mainly from Europe, and some from Asia and USA. *Figure 2* provides an overview of the distribution of the included logistics and distribution centres per states in which they are located. Since the greatest number of the considered logistics and distribution centres is located in Europe, it is only logical

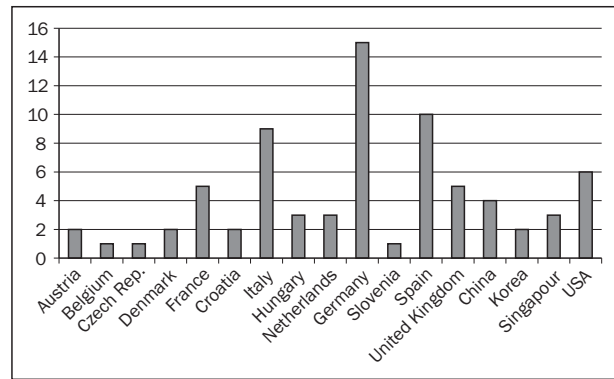


Figure 2 – Distribution of included logistics and distribution centres per countries of their location

that Germany, Spain, Italy and France lead regarding the number of the analysed centres.

The obtained research results can be graphically presented in several relations, depending on the criteria that are taken as reference. Thus, as example *Figure 3* shows the distribution of included logistics and distribution centres according to the availability of transport modes. The first criterion is the availability of four and more transport modes (road, rail, maritime, and inland waterway traffic or air traffic), the second criterion are three transport modes (road, rail, and maritime or inland waterway traffic), the third criterion are two transport modes (road and rail traffic) and the fourth criterion is only one transport mode, road transport. The obtained results show that the majority of the included logistics and distribution centres provide availability of two transport modes (road and rail traffic), followed by three transport modes, and there are almost similar results for four and more transport modes and a single transport mode, which could also have been expected regarding the profile of the included logistics and distribution centres.

After having carried out the research, useful data have been collected for the mentioned logistics and distribution centres, and in order to simplify the system of categorization criteria, certain criteria were regrouped or combined into new criteria. The collected

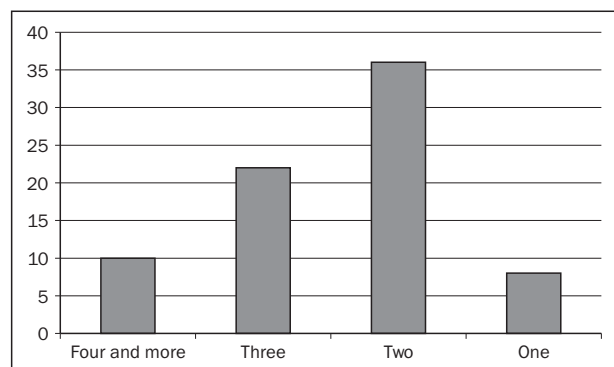


Figure 3 – Distribution of included logistics and distribution centres according to availability of the transport modes

data were processed manually, because the data were numerical and textual, and in the form of yes/no questions, which would complicate their computer processing. Data processing was performed by selecting data and grouping them according to the results and values, which resulted in the definition of a categorization model of the logistics and distribution centres which plans six categories, as follows:

- *Category 0* – Global logistics and distribution centres
- *Category I* – International logistics and distribution centres
- *Category II* – National/international logistics and distribution centres
- *Category III* – Logistics and distribution centres for intermodal transport
- *Category IV* – Logistics and distribution centres for logistics industry
- *Category V* – Logistics and distribution centres for urban logistics.

Each of the planned categories has been defined according to the set model by the mentioned traffic, technical and technological, and organizational characteristics and service level.

The categorization model of the logistics and distribution centres is presented in Tables 1 and 2, and to understand it, it is necessary to explain the used symbols. The categories are characterised by the following values:

*Numerical value* – means that the mentioned category has to satisfy the criterion in the sense of satisfying the mentioned numerical value or to be within the limits that satisfy it;

*Symbol "X"* – means that the mentioned category has to satisfy the respective criterion;

*Symbol „opt“* – means that for the mentioned category this criterion is optional, i.e. not mandatory;

*Symbol „/“* – means that the mentioned category need not satisfy the mentioned criterion.

The categorization of the logistics and distribution centres is presented in two tables since the first three categories (category 0, category I and category II) of global and international logistics and distribution centres, are primarily ports and big land nodes. Other three categories (category III, category IV and category V) are mainly national, regional and local centres, primarily land and of minor global significance. Because of the mentioned reasons and for simpler presentation of categories, the model categorization has been divided into two tables.

If the obtained research results are considered through the set categories of logistics and distribution centres the following results are obtained:

- *Category 0* – met by ten logistics and distribution centres,
- *Category I* – met by fourteen logistics and distribution centres,

- *Category II* – met by fourteen logistics and distribution centres,
- *Category III* – met by nineteen logistics and distribution centres,
- *Category IV* – met by eleven logistics and distribution centres,
- *Category V* – met by eight logistics and distribution centres.

The obtained results are presented graphically in Figure 4.

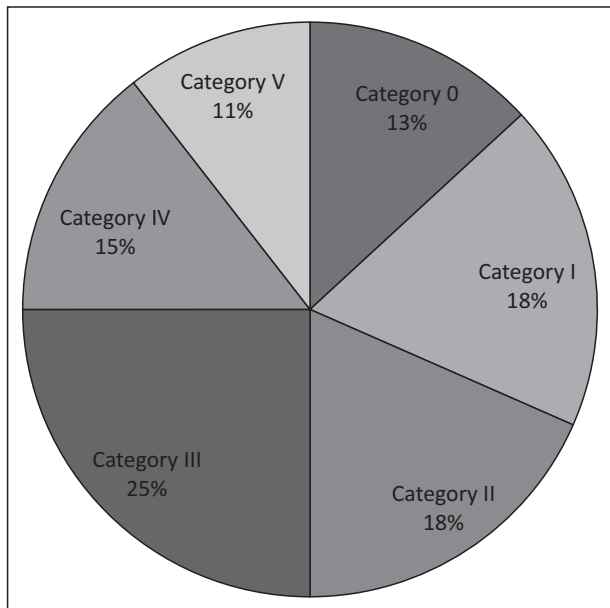


Figure 4 – Distribution of the included logistics and distribution centres according to the defined categorization model (according to defined categories of the logistics and distribution centres)

Table 3 presents a more detailed description of individual categories of logistics and distribution centres with typical users and areas covered by the operation of the centre from each category.

According to its structure the proposed categorization model of logistics and distribution centres is applicable to all the centres that appear today, independent of the area or country in which they are located. Of course, there are differences in the organization and functioning of the logistics and distribution centres from country to country that could be noticed while collecting data related to the research; however, the categorization model is structured in such a way that even the differences have no impact on the determination of the centre category. The biggest differences are related to the organization, management, and ownership of the logistics and distribution centres; but, as earlier mentioned, the given criteria have not been included in the proposed categorization model.

It could be said that the research results above all provide more transparency in the segment of the market of international logistics and distribution centres.

Table 1 – Categorization model of logistics and distribution centres (categories 0, I and II)

GENERAL DATA		CATEGORY 0	CATEGORY I	CATEGORY II
total area	ha	> 800	300 - 800	100 - 400
number of annually handled containers	pcs.	> 2,000,000	400,000 - 2,000,000	100,000 - 500,000
quantity of annually handled tonnes of cargo	t	> 50 mil.	15 mil. – 50 mil.	5mil. – 20 mil.
CONNECTIVITY - DIRECT CONNECTION				
highway		X	X	X
railway		X	X	X
maritime traffic		X	opt.	opt.
inland waterway traffic		opt.	opt.	opt.
air traffic		opt.	opt.	opt.
TERMINALS				
container terminal		X	X	X
terminal for general cargo		X	X	X
terminal for liquid, bulk and dangerous cargo		X	X	opt.
terminal for live animals, fruit and vegetables, perishable cargo		X	X	opt.
terminal for new automobiles		X	X	opt.
INTERMODAL TERMINAL				
road-rail terminal		X	X	X
road-river terminal		opt.	opt.	opt.
road-rail-river terminal		opt.	opt.	opt.
maritime-road-rail terminal		X	opt.	opt.
maritime-road-rail-river terminal		opt.	opt.	opt.
POSSIBILITIES OF LOGISTIC STRATEGIES				
JIT, crossdocking, QR, ECR		X	X	X
ADD-VALUE SERVICES				
low-value services (assembling, labelling, packaging ...)		X	X	X
high-value services (quality control, repairs, renovation...)		X	X	X
ENVIRONMENTAL IMPACT				
drainage systems of rainfall and sewage waters		X	X	X
system for filtering rainfall and sewage waters		X	X	X
alternative energy systems		X	X	opt.
waste disposal within the centre (recycling yard)		X	X	opt.
MAINTENANCE SYSTEMS				
maintenance systems of containers, waggons and heavy-duty vehicles		X	X	X
maintenance systems of vessels		X	opt.	opt.
maintenance systems of cargo handling machinery		X	X	X
CATERING SERVICES AND OTHER FACILITIES				
accommodation, catering		X	X	opt.
services - post, bank, medical clinic		X	X	opt.
commercial activities and entertaining facilities		X	opt.	opt.
duty-free zone, customs service and insurance companies		X	X	X
representations of transport, forwarding and log. companies		X	X	X
representations of commercial companies		X	X	X
leasing companies for vehicles, containers, palettes		X	X	X
parking for heavy-duty vehicles and passenger cars		X	X	X
firefighting service		X	X	X
fuel supply for all types of vehicles		X	X	X
veterinary and sanitary services		X	X	opt.
utilities services		X	X	opt.

Table 2 - Model of categorizing logistic-distribution centres (categories III, IV and V)

GENERAL DATA		CATEGORY III	CATEGORY IV	CATEGORY V
total area	ha	30 - 120	10 - 50	< 15
number of annually handled containers	pcs.	20,000 - 150,000	< 20,000	/
quantity of annually handled tonnes of cargo	t	1 mil, - 7 mil,	300,000 - 1,500,000	< 300,000
CONNECTIVITY - DIRECT CONNECTION				
highway		X	X	X
railway		X	opt.	/
maritime traffic		opt.	/	/
inland waterway traffic		opt.	/	/
air traffic		/	/	/
TERMINALS				
container terminal		X	X	/
terminal for general cargo		X	opt.	opt.
terminal for liquid, bulk and dangerous cargo		opt.	/	/
terminal for live animals, fruit and vegetables, perishable goods		opt.	/	/
terminal for new automobiles		opt.	/	/
INTERMODAL TERMINAL				
road-rail terminal		X	opt.	/
road-river terminal		opt.	/	/
road-rail-river terminal		opt.	/	/
maritime-road-rail terminal		opt.	/	/
maritime-road-rail-river terminal		/	/	/
POSSIBILITIES OF LOGISTIC STRATEGIES				
JIT, crossdocking, QR, ECR		X	X	X
ADD-VALUE SERVICES				
low-value services (assembling, labelling, packaging ...)		X	X	X
high-value services (quality control, repairs, renovation...)		X	opt.	opt.
ENVIRONMENTAL IMPACT				
drainage systems of rainfall and sewage waters		X	X	X
system for filtering rainfall and sewage waters		X	X	X
alternative energy systems		opt.	/	/
waste disposal within the centre (recycling yard)		opt.	/	/
MAINTENANCE SYSTEMS				
maintenance systems of containers, waggons and heavy-duty vehicles		opt.	/	/
maintenance systems of vessels		opt.	/	/
maintenance systems of cargo handling machinery		X	opt.	/
CATERING SERVICES AND OTHER FACILITIES				
accommodation, catering		opt.	/	/
services - post, bank, medical clinic		opt.	/	/
commercial activities and entertaining facilities		opt.	/	/
duty-free zone, customs service and insurance companies		X	opt.	/
representations of transport, forwarding and log. companies		opt.	opt.	/
representations of commercial companies		opt.	opt.	/
leasing companies for vehicles, containers, palettes		opt.	/	/
parking for heavy-duty vehicles and passenger cars		X	X	X
firefighting service		X	X	X
fuel supply for all types of vehicles		X	opt.	/
veterinary and sanitary services		opt.	/	/
utilities services		opt.	/	/



Table 3 – Descriptive layout of the categories of logistics and distribution centres

Category	Category description	Typical users
Category 0 Global logistics and distribution centres	These are primarily the leading world and European ports, that represent global logistics and distribution centres, with minimum three traffic modes (usually road, rail and maritime traffic), and with all facilities and services provided today.	Global logistics operators Producers and industry Global companies Global lessors
Category I International logistics and distribution centres	Represent also world and European ports (sea or on inland waterways) and land centres, that can be in the function of some industries (automobile, food, electronics), and they have international role (e.g. of European significance)	Global logistics operators Producers and industry Global companies Global lessors
Category II National/International logistics and distribution centres	These are primarily national logistics and distribution centres with certain international influence (primarily in case of ports). In case of those on land they have high level of intermodality and are specialized for container manipulation.	International and national logistics operators Light industry Carriers
Category III Logistics and distribution centres in the function of intermodal transport	As a rule, these are logistics and distribution centres that operate as intermodal nodes on the transport network. Along with the basic function of intermodality they represent strong logistics centres (with numerous logistics facilities) equipped with highly developed logistics industry.	International and national logistics operators Light industry Carriers
Category IV Logistics and distribution centres in the function of logistics industry	These are logistics and distribution centres oriented to logistics activities e.g. to add-value services on cargo (add-value services), and they are in the function of distribution of the mentioned cargo to distributors, wholesalers, or retailers.	Minor logistics operators Wholesalers Companies specialized for distribution of certain types of cargo (e.g. clothing, footwear)
Category V Logistics and distribution centres in the function of urban logistics	They represent local (urban) logistics and distribution centres whose basic function is the distribution of cargo on a certain area, as a rule in the urban area, towards wholesalers and retailers.	Wholesalers Retailers

tres and are oriented as positive incentive for further successful development of sustainable logistics and distribution centres. One of the phenomena that accompany the research and that may be emphasised is the fact that the comparisons among the logistics and distribution centres will provide their better networking (especially in Europe), since they will be supported by better information availability about the significant market positions and strategies at individual locations.

## 6. CONCLUSION

Categorization represents the creation of a model for ranking and comparing the logistics and distribution centres on a scale ranging from the best equipped ones to those worst equipped ones.

The criteria selection for the categorization of logistics and distribution centres was based on the complexity of the system of logistics and distribution centres i.e. on the fact that it is necessary to encompass the maximum number of infrastructural, functional, technical, technological, and organizational data and services so that the proposed categorization could define clear categories with relevant characteristics.

The processing of the selected data has resulted in defining of the categorization model of the logistics and distribution centres which plans six categories.

Each of the planned categories has been determined according to the set model by the mentioned traffic, technical and technological, and organizational characteristics and the level of service. It is precisely here that the implementation of the categorization model of the logistics and distribution centres can be found, and this will define the relevant categories of the centres applicable in the creation of effective distribution networks. Past practice in planning and creating the distribution networks relied on the services of the existing logistics and distribution centres, whereas the planning of new networks with planning of the construction of new centres was understood only at lower levels, i.e. usually at local or regional levels. By using the categorization model of the logistics and distribution centres it will be possible to plan and to realize the effective distribution networks even at higher levels, since each of the centre categories will be defined by a set of criteria that will have to be met. This allows insight into the current condition of each centre, its location and role in the network, and the possibilities of expanding in the technical and technological, organisational and servicing aspect with the aim of upgrading the category of the centre itself. Such approach certainly gives a wider view on the entire network by assigning to all centres (nodes) on the network a category, as well as a role in the mentioned network. Then the planning of optimal distribution net-

works can be carried out by selecting adequate logistics and distribution centres that may remain in the assigned category, or infrastructural or organisational improvements may be defined in order to upgrade the category, if necessary. Of course, even when the construction of a new logistics and distribution centre is planned, its planning can be facilitated by considering the category in which it would be classified and accordingly from the categorization model the criteria can be defined that the planned category has to meet.

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## SAŽETAK

### KRITERIJI KATEGORIZACIJE LOGISTIČKO-DISTRIBUCIJSKIH CENTARA

Logističko-distribucijski centri predstavljaju vrlo značajan infrastrukturni element makrologističkog sustava. Centar kao prometno čvorište u okviru određenog geografskog područja predstavlja instrument koncentracije robe i kooperacije svih elemenata logističkih sustava. Stvaranjem logističko-distribucijskih centara i njihovim povezivanjem u rasprostranjenu (globalnu) mrežu stvoreni su uvjeti za adekvatnu podjelu rada i značajno povećanje produktivnosti svih logističkih elemenata i procesa, uz napomenu da logističko-distribucijski centri u ovoj koncepciji imaju nadregionalni značaj.

Ovaj rad predstavlja sažetak (rezultate) istraživanja koje je provedeno na velikom broju logističko-distribucijskih centara u svrhu sagledavanja složenosti i problematike logističko-distribucijskih centara i distribucijske mreže, njihovih elemenata i djelovanja podsustava po sljedećim kriterijima: prostorni, tehnički, tehnološki i organizacijski, a u svrhu definiranja modela kategorizacije logističko-distribucijskih centara.

Obrada selektiranih podataka, prikupljenih u istraživanju, rezultirala je definiranjem modela kategorizacije logističko-distribucijskih centara koji predviđa 6 kategorija. Svaka od predviđenih kategorija prema postavljenom modelu određena je navedenim prometnim, tehničko-tehnološkim i organizacijskim karakteristikama te razinom usluge. Upravo se u tome može naći primjena modela kategorizacije logističko-distribucijskih centara koji će definirati relevantne kategorije centara primjenjive u stvaranju efektivnih distribucijskih mreža.

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logističko-distribucijski centri, kategorizacija, model, logistika

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