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TYPOLOGY OF BASIC ACADEMIC NOTIONS RELATED TO THE TRANSPORT SYSTEM

Abstract:

The article presents a typology of basic academic notions related to basic academic notions connected with the transport system in a broad sense. It covers a wide spectrum of analyses of such transport issues as: transport, transport system, transport infrastructure, transport line, transport route or transport network. It discusses multi-aspect and multi-criteria approach to their interpretation from the perspective of various authors, with particular emphasis on relations between these notions.

Key words: transport system, transport, transport infrastructure and transport policy.

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INTRODUCTION

A transport system has a significant influence on the social and economic growth and development of every country. It is true that lack of a proper transport system or its inappropriate functioning or a wrong needs analysis related to its further development, have an immediate negative effect on the economic, social and political and even military situation of the whole region. It is a consequence of the fact that it is an important element stimulating the right functioning of a given state, through, among other things, effective and economical flow of material means (raw materials and products), transport of people participating in manufacturing and tourism processes. It also ensures overall performance of tasks related to needs of people employed in manufacturing processes such as: education, science, healthcare, culture or satisfying various material and non-material needs of the society. It is also an important determinant related to the military security of a given state. All these factors generate traffic flows of both goods (delivery traffic) and passengers, which at the same time are components of the *transport system*. Thus, it plays an important role in stimulation of effective operation of various branches of national economy and is a factor contributing to their growth. Lack of cohesion between transport activity and other branches of the economy directly weakens development opportunities

of a given region², because there are close dependencies between these entities. These dependencies became also the subject of interest for various scientific and academic environments, because they have significant influence on generation of important phenomena and processes, which have impact on social and economic development³.

It may seem that such notions as *transport system*, *transport* or *transport policy* are not specially interesting for academic researchers. However, a more profound analysis shows that these notions are becoming an interesting analytical spectrum, because they are characterised by a multi-aspect approach to their definition, and their interpretation, depending on the author, can be presented in various ways. In connection with these issues, the authors of this article undertook the task of familiarisation with the most important typology of these notions in the perspective of various academic considerations, because such issues are usually discussed in system and multi-criteria categories.

² J. Neider, *Transport międzynarodowy*, Wyd. PWE, Warszawa 2008, p. 11.

³ Social and economic development – process of positive quantitative and qualitative changes, thanks to which already existing phenomena in all areas of economic, cultural and social activity as well as social and manufacturing, political and system-wide relations are increase or improved and apart from this new phenomena are created and developed. These changes take place in time and space dimensions; www.pl.wikipedia.org (27.09.2012).

1. THE NOTION AND TYPOLOGY OF TRANSPORT

The notion of *transport* has historical and geopolitical background. In an analysis of this issue, one cannot overlook that it is an issue permanently attached to overcoming distance, i.e. it is inseparably connected with one of the basic human needs on Earth, namely the need to relocate. The issue can also be analysed from the perspective of transport of people only and transport of goods by offering transport services. Although these are two different subject areas, one can notice a certain dependence they have in common, namely human need to relocate. Hence one should try to answer the question: what is *transport* and present a typology of this notion.

In available scientific and academic analyses, there are numerous definitions of this notion, because it is an interdisciplinary issue. The notion of *transport*, in its widest etymological meaning comes from a Latin word "*transportare*", i.e. "carry", "cross". The most general definition of this notion can be found in the encyclopaedia published by PWN, which states that it is a branch of economy which provides services related to relocation of people and goods⁴. It is a rather general definition which allows for any interpretation. Thus if one would like to discuss this notion in detail, the issue would have to be analysed from the perspective of various semantic criteria, such as:

⁴ *Encyklopedia PWN*, www.pwn.pl; *Encyklopedia Świat i Polska*, Wyd. PWN, Warszawa 2007.

activities, phenomena, logistics concepts, technological or economic processes, which characterise this notion.

Being understood as a group of activities, according to the PWN Encyclopaedia definition, the notion of *transport* is related to relocation of people and material goods using appropriate means of transport infrastructure, it encompasses both relocation from one place to another as well as all other activities necessary to reach this goal, i.e. loading activities (loading up, unloading, reloading) and any other activities (e.g. handling and other charges)⁵. A similar interpretation of this notion is used in a studies by Karbowski (2009)⁶. However, according to Dworecki (1999), it is a separate group of activities necessary for physical relocation of goods from the forwarding place to the reception place⁷. The same author considers transport also in the categories of the logistics concept, i.e. as phases of real movement in the supply chain. These phases in connection with a manufacturing process and turnover of goods are its integral part⁸. A similar interpretation is presented by Towpik (2004), who states that it is relocation of people, goods or energy in space depending on human needs in this respect⁹. It should also be

⁵ Ibidem.

⁶ H. Karbowski, *Podstawy infrastruktury transportu*, Wyd. WSH-E, Łódź 2009, p. 7.

⁷ S. E. Dworecki, *Zarządzanie logistyczne*, Wyd. WSP, Pułtusk 1999, p. 243.

⁸ Ibidem, p. 243.

⁹ K. Towpik, *Infrastruktura transportu kolejowego*, Wyd. Oficyna Wydawnicza PW, Warszawa 2004, p. 7.

reminded that, as Karbowski (2009) has already mentioned, speaking of transport one should remember about three basic and inseparable elements of this system, namely: a road, means of transport and a transport process¹⁰.

Looking at this notion from the perspective of technological processes, one should present the issue like Tarski (1973), as a particular type of transfer, relocation or forwarding various elements, i.e. transfer of people, goods or energy¹¹. Using the criteria of the state economic system, the notion may be defined as a complex sector of the national economy from the technical, economic and organisational point of view which belongs to the materials manufacturing sector, Mindur (2002)¹². Transport may also be defined as an element of social and economic infrastructure, Gołemska (1999), as a separate part of the social and economic encompassing both elements of social and economic infrastructure¹³. From the perspective of physical phenomena, it is presented as conscious transfer of matter and energy for the purpose of moving objects or goods,

¹⁰ H. Karbowski, op. cit., p. 7.

¹¹ I. Tarski, *Ekonomika i organizacja transportu międzynarodowego*, Wyd. PWE, Warszawa 1973, p. 11.

¹² L. Mindur, (ed.), *Współczesne technologie transportowe*, Wyd. WKiŁ, Warszawa 2002, p. 21.

¹³ E. Gołemska, *Kompendium wiedzy o logistyce*, Wyd. PWN, Warszawa - Poznań 1999, p. 105.

being matter or energy particles, to another place than before, Hołowiński (1961)¹⁴.

Transport is also defined as an economic notion and then it is interpreted as a process resulting from human needs, taking place in time and space and consisting in payable services resulting relocation of people and loads, Rydzkowski and Wojewódzka - Król (2008)¹⁵, it also involves creation of auxiliary services directly related to this process¹⁶. However, in accordance with and economic analysis based economic activity, including a manufacturing process, Szczepaniak (2002) defines transport as a way in which people overcome space to relocate themselves or deliver results of their work to places where there is demand for them which can be in this way satisfied. This definition can only be complemented with a statement that transport is manufacturing process in which people, having limited resources, perform relocation of people, goods and energy in space for the purpose of satisfying their various needs and desires¹⁷. Going further in this analysis of an economic aspect of this notion, one should notice that a result of transport as a manufacturing process is a product in

¹⁴ J. T. Hołowiński, *Ekonomika transportu morskiego*, Wyd. WSzM, Gdynia 1961, p. 7.

¹⁵ Auxiliary needs encompass shipping, freight brokers' services, etc. (see T. Szczepaniak, (ed.), *Transport i spedycja międzynarodowa*, Wyd. PWE, Warszawa 1985, p. 14).

¹⁶ *Transport*, ed. W. Rydzkowski and K. Wojewódzka - Król, 4th edition amended, Wyd. PWN, Warszawa 2008, p. 1.

¹⁷ T. Szczepaniak (ed.), *Transport i spedycja w handlu zagranicznym*, Wyd. PWE, Warszawa 2002, p. 16.

the form of a carriage service (transport), which is paid for, so it is strictly related to the national economy.

To sum up these consideration on the typology of the notion of *transport*, one may unequivocally state that it is a set of activities involving relocation of various material goods in time and space using auxiliary services (logistics, shipping, control and customs), finally resulting in carriage services including loading, unloading and storage. Thus it is possible to attribute three basic functions to transport in the national economy, which prove its complementarity¹⁸ in relation to other sectors of the national economy. These functions include¹⁹:

- *consumption*, through transport services one can satisfy carriage needs; most often this sector is served by passenger transport, which in turn satisfy transport related needs of people, most often connected with their personal needs;
- *manufacturing*, satisfying manufacturing needs by rendering transport services, i.e. ensuring exchange of goods in transport of raw materials, prefabricated elements, materials, etc., for further production and shipment of finished results of manufacturing activity, ready for individual consumption;

¹⁸ In this case it means lack of possibility of replacing it with other activity.

¹⁹ *Transport*, ed. W. Rydzkowski and K. Wojewódzka - Król, op. cit., p. 2.

- *integration*, uniting society by making it possible to relocate people and goods from one place to another.

In this characteristics of *transport* it is not possible to omit its division into particular categories, (Fig. 1). The first division of transport types van take into account the environment in which people or loads are relocated²⁰:

- *land transport*, it can be further divided into transport on land, underground (e.g. underground systems) and above over land (e.g. cable lines), rail transport (railway) and railless (vehicle transport);
- *water transport* (sea and inland waterway);
- *air transport* (aviation);
- *transmission transport* (pipeline, wire, conveyor).

With regard to the type of carried load, or the subject of shipment, transport can be divided into *transport of goods and passengers*. It may have *universal* character (shipment of various loads or any people) or *specialised* (shipment of one or a few types of loads, e.g. in refrigerated vehicles, or a group of people, e.g. in ambulances or military vehicles). Specialisation in transport may result striving for mechanisation of loading operations (e.g. containers, palettes, loading packages, etc.), especially in the case of a need to use various means of transport. Moreover depending on the way of relocating a load, it is

²⁰ *Encyklopedia PWN*, op. cit.

possible to divide transport into *continuous transport* (e.g. pipeline) *discontinuous* (vehicle, rail, air, etc.). With regard to its availability for users, *transport* can be divided into *public, economic* (e.g. own transport or company transport of companies having their own fleets) or *individual transport*, to satisfy transport needs of individuals or groups of people (e.g. the closest relatives). With regard to organisation, transport may be divided into *regular and irregular*, while if one takes into account the use of loading units, it is divided into *conventional and multimodal transport*²¹. Moreover, transport can be divided with regard to the type of transaction into *domestic and international*.

²¹ *Multimodal transport* – shipment of goods using at least two transport types. There is only one shipment agreement, one contractor is responsible for the whole shipment. In scientific literature it is frequently mistaken with *combined* or *intermodal*. *Intermodal* transport is shipment of goods in one unit using at least two subsequent transport branches, while *combined transport* is intermodal shipment in which the main part of transport is rail, water inland or sea and only a short section at the beginning or at the end is vehicle transport (See: *Terminology on combined transport*, Economic Commission for Europe, European Conference of Ministers of Transport, European Commission, New York - Geneva 2001).

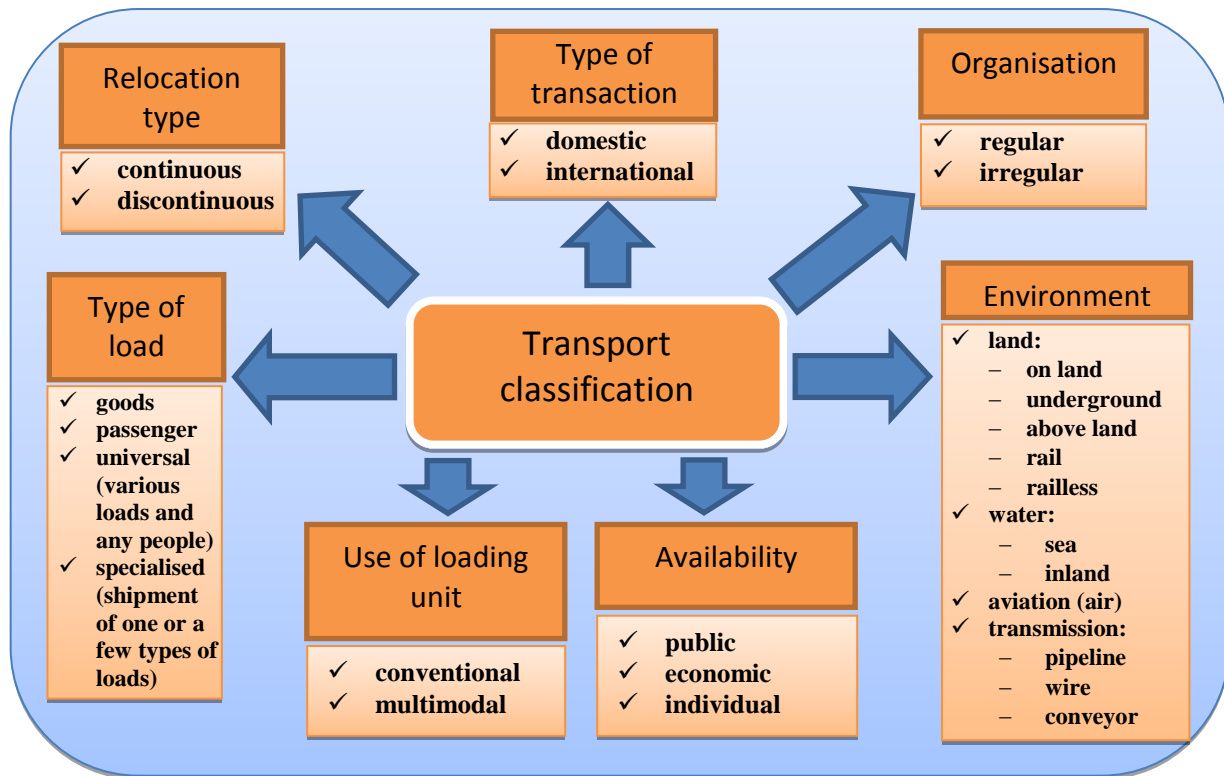


Fig. 1. Transport typology with regard to its categories

Source: Own research.

A condition necessary for transport to function is the so called *transport line*, i.e. a road²² connecting two *transport points*²³. Most often it has a functional character, which means that it is inseparable from traffic, shipment or transmission of goods and people or a

²² Road – an appropriately separated strip of land prepared for vehicle and pedestrian traffic.

²³ Transport points – they set the beginning, course and end of transport lines and routes, i.e. places for loading, unloading and reloading or the starting and finishing points of a passenger journey.

particular means of transport (e.g., a train, vehicle, ship or aeroplane) on a strictly defined section, using an appropriate road²⁴.

A group of transport lines connecting points, nodes²⁵ or towns is called a *transport route*, while a group of roads and transport lines as well as points and nodes makes a *transport network*. There are many transport networks (e.g. road, rail, tram), which complement and replace one another. Thus, a *transport network* can be defined, following Ratajczak (1999), as a system of road, rail or other connections, occurring in a given area whose shape is strictly related to the distribution of population centres and geographical characteristics²⁶, it is one of the main elements of a *transport system*.

2. ESSENCE OF A TRANSPORT SYSTEM

For the purpose of a deeper analysis of the notion of a *transport system*, it is necessary to start with a definition of its meaning. According to the encyclopaedia published by PWN, it is a notion comprising a group of elements, relations and processes, which process a stream of loads and passengers, often defined as a demand

²⁴ M. Potrykowski, Z. Taylor, *Geografia transportu. Zarys problemów, modeli i metod badawczych*, Wyd. PWN, Warszawa 1982, p. 12.

²⁵ *Nodes* – they are a special type of transport points in which at least three roads or transport lines intersect. Usually in a given area there are more transport points than nodes because nearly each of them is a forwarding point, a reception or reloading point, however, only some of them have the function of nodes.

²⁶ W. Ratajczak, *Modelowanie sieci transportowych*, Wyd. UAM, Poznań 1999, p. 15.

for transport services in an output stream from this system²⁷. It is quite a complex and rather unclear definition, hence it requires an in-depth interpretation of its meaning. In defining this notion, it is worth referring to Neider (2008), who presents this issue as a correlation between the activity of all transport branches²⁸ and uniting them both internally (*horizontal and vertical coordination*) and externally (*domestic and international coordination*)²⁹, so he describes this notion as an integrated set of means related to all transport branches occurring in a given area. According to the same author, *horizontal, internal coordination* is based on a division of transport tasks into particular transport types, i.e. it shapes the transport market in regular way in a given country by working on appropriate transport policy contributing to its development. Certainly, the state may direct its activity through various incentives and allowances to further development of selected transport types. This may result from certain political aspects, such as: the financial situation of the state, capital intensity of infrastructural investments³⁰, demand for transport

²⁷ *Encyklopedia PWN*, op. cit.

²⁸ Road, rail, sea, water inland, air and pipeline transport.

²⁹ J. Neider, op. cit., p. 14.

³⁰ Capital intensity of investment – collecting sufficiently large financial means, preferably originating from various sources, for activity related to infrastructure development. Production of transport services is highly capital intensive activity because nowadays shipment is related availability of a sufficient number of modern means of transport, whose purchase often means expenses of about hundreds of millions or even milliards of euros or dollars. Moreover, services necessary for passengers and goods between transport points requires investments in infrastructure, equipment and other facilities.

services, social issues or the geopolitical location³¹. According to the same author, the *internal vertical coordination* encompasses all activities related to the state transport politics, first of all creating appropriate conditions for the complementary character of particular transport types used to deliver goods to their destinations and ensuring appropriate competition in the market of transport services. Thus the potential of particular transport branches must be complementary to one another, to limit creating small throughput places (the so called bottlenecks³²) and it should ensure substitution opportunities³³, which means that there should not be single-branch systems.

According to the same author *domestic external coordination* is directly connected with the state transport policy and involves striving for situations in which transport and its development meet the expectations of other economy sectors. Thus transport services should be available in all places where there are economic entities which need this type of services and so they need access to various transport networks. The need for such services should be balanced with

³¹ Ibidem, p. 26.

³² The term denotes an element or a place where throughput is limited, which leads to slowing down and interferences in traffic continuity. As a result external costs increase, e.g.: natural environment pollution growth, fuel consumption, machines and vehicles wear and tear, etc., in consequence overall transport costs grow. Most often such "bottlenecks" are: bridges, railway crossings, roads ingoing to cities, compact development, crossroads or wrong traffic organisation.

³³ Ibidem, p. 28.

appropriate volume of supply, i.e. sufficient quantity of available transport services. According to the author, this will be related to ensuring appropriate throughput in transport networks and, in the case of entities offering transport services, preparation of a significant number of differentiated means of transport and types of transport equipment, as well as ensuring appropriate quality of these services. The *international, external coordination* consists in adjusting domestic transport policy to transport systems in the European Union member states, i.e. it is strictly connected with the European Transport Corridors and should ensure fluent international traffic service for other states thanks to allowing transit³⁴ across its territory.

The issue is presented from another perspective by Potrykowski and Taylor (1982), who treat a *transport system* in a very general way, namely they claim that it encompasses various types of technical equipment, economic issues and organisations. The determinants mentioned here, according to these authors, must be interrelated with one another to allow feedback between them. This in turn should be used to organise and conduct the whole transport process, served by one or more transport branches³⁵, i.e. it should be strictly connected with the economics and organisation of transport activity. Yet another characteristics of a *transport system* is presented by

³⁴ Ibidem, p. 27.

³⁵ M. Potrykowski, Z. Taylor, op. cit., p. 12.

Karbowiak (2009), who states that it is a set of elements related to one another and the surroundings in such a way that relocation of people and loads is possible³⁶.

Thus a *transport system*, according to Jacyna (2009), can be defined as a system of technical, organisational and human elements connected with one another in a way which enables effective relocation of people and loads in time and space³⁷. This means that a transport system comprises such elements as: road, rail, air, water inland, sea or pipeline networks (*transport infrastructure*), fleets of vehicles and ships (*suprastructure*), service stations, railway stations, ports and stops and all equipment used to manage and control transport including human resources to serve them³⁸. Thus it has to be defined by the following elements³⁹:

- *activity purpose*, i.e. passenger mobility and loads relocation;
- *input determinants*, i.e. materials, power, machines and equipment necessary for the system to function, workforce, material resources, etc.;

³⁶ H. Karbowiak, op. cit., p. 7.

³⁷ M. Jacyna, *Modelowanie i ocena systemów transportowych*, Wyd. Oficyna Wydawnicza PW, Warszawa 2009, p. 25.

³⁸ Ibidem, p. 26.

³⁹ M. Mrozicka, *Materiały pomocnicze do nauczania przedmiotu „Systemy i środki transportu”*, www.wysockisw.ovh.org (27.03.2012).

- *equipment condition*, i.e. transport infrastructure and equipment⁴⁰;
- *operating system*, i.e. activities necessary to conduct a relocation process;
- *human resources*, i.e. resources of professional knowledge, skills and experience;
- *output determinants*, i.e. mass of relocated loads and the number of transported passengers;
- *environment*, i.e. other national economy sectors, e.g. industry, civil engineering, agriculture, commerce, etc.;
- *interrelations* between particular elements of the system.

Therefore the transport system contributes to the creation of development incentives in the national economy, it may trigger the economy if it can meet certain goals, namely if it can ensure increased availability of transport services in time and space to allow to reduce costs of transport services and its time with simultaneous, steady improvement energy efficiency and reduction of individual emission indices, and also to contribute to the development of multimodality, safety increase for traffic participants and meeting basic needs and

⁴⁰ *Transport equipment* – all types of vehicles used for various purposes (e.g. passenger and commodity transport, coaches and rolling stock). In inland water and sea transport it is called a *fleet* (e.g. passenger or commercial fleet).

expectation in the society⁴¹. All this leads to the conclusion that the system is an essential factor in building a cohesive and effective transport system integrated with the domestic, European and global systems. It is also a natural step in the direction of a better use of the economic potential of the state. Without an efficient and well operating transport, it is not possible to increase the economic growth or improve development in international trade.

3. TRANSPORT INFRASTRUCTURE AND TRANSPORT POLICY

An important element in the *transport system*, without which the system cannot operate is *transport infrastructure*, it is a part of economic infrastructure⁴². With reference to a transport system, infrastructure encompasses all basic, transport related elements of technical equipment, they are man made and have fixed location. Transport infrastructure is usually identified with social capital which is apart of both roads and other transport facilities⁴³. Transport infrastructure encompasses roads of all transport branches (roads, railways, airways, seaways, water inland routes and pipelines), transport points and other auxiliary equipment, used for road and transport points service. It is divided into *linear* (natural and manmade

⁴¹ *Transport Development Strategy until 2020 (with a perspective until 2030)*, Ministry of Transport, Civil Engineering and Maritime Economy, Warsaw, 22 January, 2013, p. 5.

⁴² Infrastructure is generally divided into economic and social.

⁴³ Transport facilities comprise, except for roads, also bridges, railway bridges, tunnels, overpasses, culverts, underground lines, railway lines, tramways, ports, airports, etc.

roads) and *point* transport infrastructure (transport points, seaports, airports, railway stations and logistics centres)⁴⁴. Natural roads are mainly water inland routes and sea routes⁴⁵ as well as air corridors, while manmade roads are all roads vehicle transport (motorways, express roads, national and local roads), busbars and local railways as well as pipelines for transport of liquids and gas, electric power transmission lines. Therefore it can be said that transport infrastructure is nothing else but all road, rail, water inland networks, sea motorways, sea and river ports, airports and other internal connection points between existing modal networks⁴⁶. It is extremely important in the economic policy of every country, because it triggers the economy as it increases investment attractiveness of particular regions. It can be said that the quality of the economy in a given country and its competitiveness largely depends of its infrastructure development⁴⁷. All this must be appropriately correlated thanks to well managed *transport policy* of the state, i.e. another issue which requires detailed characteristics of its meaning.

⁴⁴ www.skladowanie.info/slownik-pojec (21.09.2012).

⁴⁵ In inland water and sea transport there are also some typical elements of manmade routes, such as canals with water gates and other hydrotechnical structures. Apart from this, in the case of navigable rivers there is constant human intervention to maintain their navigability (canalised, regulated and deepened rivers, etc.).

⁴⁶ *Decision No. 884/2004/EC of the European Parliament and Council of 29 April 2004*, Art. 3, item 2; *natural modal networks* are connections between a few transport branches, frequently they are conventionally called combined connections.

⁴⁷ J. Neider, op. cit., pp. 24 ÷ 25.

In primary sources *transport policy* is not explicitly defined, so it is necessary to present a typology of selected definitions. Generally it may be assumed that this policy is part of general state economic policy of the state. A general understanding of this word is presented by Predhöl (1958), as “shaping” transport through activity of certain public and legal organisations and institutions. According to the same author, the main goal of transport policy is finding right proportions between transport development and needs resulting from general assumptions for national economy growth, it has to create incentives for economic growth in a particular direction⁴⁸. On the other hand, Bissing (1956) defines transport policy as “all state activity and ways of influencing the relocation process undertaken to maintain transport unity”⁴⁹. This unity, according to this author, is maintained when shipment tasks are shared among transport branches in such a way that there is a guarantee that transport needs will be met, and at the same time technical and economic requirements of carriers are met. Pirath (1949) presents yet another version of the definition of this notion, it is “care for maintaining the state and strengthening its economy by supporting its development and modernisation of transport facilities”⁵⁰. Therefore, he expresses an opinion that this policy is carried out by every state to maintain order in transport

⁴⁸ A. Predhöl, *Verkehrspolitik*, Göttingen 1958, p. 7.

⁴⁹ F. Bissing, *Verkehrspolitik. Einige Einführung*, Berlin 1956, p. 1.

⁵⁰ C. Pirath, *Die Grundlagen Verkehrswirtschaft*, Berlin 1949, p. 3.

related issues being a part of the whole economy from the perspective of the whole society. This politics may also be viewed in the same way as Tarski (1970) did, namely as “state activity leading to achievement of particular economic benefits or even non-economic goals thanks to measures and means related to transport”⁵¹, so he identifies transport policy with the internal and international politics of the state. On the other hand Piskozub (1975) claims that “transport policy is an activity which shapes the economic reality on the basis of general theories”⁵², the basis of which the author attempts to find in transport economics. According to the same author, the basic role of this policy is developing a uniform transport system through, e.g. coordination of transport development with selected other sectors of the national economy, coordination within particular sectors and coordination of connections between branches⁵³. The issue is interpreted in a similar way by Morawski (1978), who also defines this policy as state policy⁵⁴, however, its goal is ensuring proper availability of transport services for the society and the national economy⁵⁵, so in his considerations he refers to the basic task of this policy, namely ensuring throughput of

⁵¹ I. Tarski, *Prognozowanie polityki transportowej*, (w) Międzynarodowy Rocznik Transportu, Wyd. Kił, Warszawa 1970, pp. 2 ÷ 4.

⁵² A. Piskozub, *Ekonomika transportu - podstawy metodologiczne*, Wyd. Kił, Warszawa 1975, p. 206.

⁵³ A. Piskozub, *Funkcjonowanie systemów transportowych*, Wyd. WKiŁ, Warszawa 1973, p. 189.

⁵⁴ Uwzględnia również występujące w jej strukturach organy państwowe.

⁵⁵ W. Morawski, *Polityka transportowa*, Wyd. SGPiS, Warszawa 1978, p. 8.

transport networks. This state can be achieved only if balance between transport demand and supply is guaranteed. According to the same author, transport policy can be defined as “a process of social choice between certain undertakings related to the development and operation of transport taking into account various assessment criteria”⁵⁶. These criteria may be, e.g. energy saving, social preferences, natural environment pollution, bottlenecks, availability of job markets or potential customers. Finally the definition of this notion developed by Grzywacz (1991), should be mentioned as well, in his interpretation, it is “programming the development of the transport system and impact on its efficient operation with regard for the requirements of theories and economic laws”⁵⁷, so he refers in his considerations to using models and research methods existing in transport economics⁵⁸.

SUMMARY

To summarize this analysis of notion related to the *transport system* one cannot remain immune to the claim that it is multi-criteria notion, as on one hand it describes points, lines, transport routes, so it characterises a transport network and presents dependencies

⁵⁶ Ibidem, p. 8.

⁵⁷ W. Grzywacz, *Polityka transportowa*, Wyd. WNUS, Szczecin 1991, pp. 20 ÷ 21.

⁵⁸ *Transport economics* – sector of economy dealing with issues related to economic activity in the transport sector.

between them, on the other hand it indicates development directions for the state transport policy in terms of coordinated activities aiming at ensuring social and economic development. In the above mentioned definitions one can clearly see certain differences between authors who characterise this notion taking into account various dimensions and thus give it more extensive meaning. Therefore, the presented analysis unambiguously shows that speaking about the transport system, means a wide comparative spectrum of characteristics of various determinants and academic notions.

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