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Increasing the competitiveness of rail transport in Poland by revitalizing railway stations and sidings

Abstract: The main subject of the study is to present the negative impact of the degradation and underdevelopment of point infrastructure on the functioning of the freight transport system in Poland. The author proves that the revitalization of railway stations and sidings can contribute to increasing the competitiveness of rail transport, especially in the area of competing with road freight carriers for transport orders as part of dispersed transport, as well as securing the transport system in Poland against the effects of increasing congestion in road transport. Unfortunately, in the Third Republic of Poland, the number of railway sidings has been systematically decreasing, and the problems of transporting goods by rail are exacerbated by the optimization of railway infrastructure in terms of fast passenger trains. The plans for renovation and expansion of the railway network take into account the needs of passenger traffic rather than freight, which is manifested, for example, in the elimination of the so-called train passing loops.

Keywords: Rail freight transport; Railway sidings; Railway stations; Transport infrastructure; Railway competitiveness

Introduction

The subject of the study is to present the negative impact of degradation and underdevelopment of point infrastructure on the functioning of the freight transport system in Poland. The author proves that the revitalization of railway stations and sidings can contribute to increasing the competitiveness of rail transport, especially in the area of competing with road carriers for transport orders within dispersed transport, and also protect the transport system in our country against the effects of increasing congestion in road transport.

When developing the research topic, the analysis of generally available professional literature, statistical data of the Central Statistical Office and the Office of Rail Transport, as well as internal materials of PKP SA were used. The author also made his observations, mainly at the Przysucha railway station, located on the Radom-Tomaszów Mazowiecki railway route, in the summer months of 2019-2021. An important source of information was in-depth individual interviews conducted in 2019-2021 with three employees of the management board of PKP SA and a representative of the Office of Rail Transport. A valuable source of information and opinions were five conferences and scientific seminars devoted to rail transport, during which the author had the opportunity to listen to lectures and participate in group and individual discussions (behind the scenes).

The essence of competitiveness in the transport of goods

There is no unequivocal, generally accepted definition of competitiveness in the literature. For this study, the author had to make a selection to highlight those elements in the scientific discussion on the competitiveness of enterprises and industries that best match the reality of the transport market in the cargo transport segment.

Since it is quite obvious that one of the basic competitive advantages of road carriers over railway carriers is a much higher density of road than railway infrastructure - both linear and point, the so-called factor and operational competitiveness. And so, it can be said - after D. Bastowska - that factor competitiveness "emphasizes what determines the capabilities of companies to activities that create the basis for their effective competition, such as quick response to changes in the environment, skillful use of own resources, the ability to use favorable configurations of the environment, the rationality of decision-making processes and other non-accidental factors, but building the competitiveness of companies in the long term." [Bastowska, 2014, p. 5121]. In our case, the "skillful use of resources" and "the ability to use favorable configurations of the environment" should be "emphasized". In other words, the factor competitiveness of railway carriers (or railway as a mode of transport) will increase if they can use railway stations and sidings to serve shippers (transport users), multiplying the benefits of the convenient location of these elements of transport infrastructure on the road connecting shipment senders railways with their recipients.

The above approach to the competitiveness of rail transport in the context of these considerations may be supplemented by operational competitiveness, meaning "technical skills that are important from the point of view of functioning on a specific market" [Bastowska, 2014, p. 5121].

It is worth noting that various authors describing competitiveness use an additional criterion constituting this concept, namely "competitive advantage". It can be presumed that, according to these authors, a company is only competitive when it has a competitive advantage over its competitors. This is zero-one thinking: either you're a winner because you're the best, or you're second, which means you're neither competitive nor efficient, and you should disappear from the market. Such thinking about competitiveness often does not fully reflect the much more complex reality of market relations. It excludes "win-win" situations in advance, and above all, it does not take into account the possibility of simultaneous competition and cooperation – the so-called coopetition. Unfortunately, in the public debate on the problems of rail transport in Poland and the international forum of the EU, such an approach is promoted too often. This leads to misleading conclusions in the sense that although in absolute numbers rail transport has maintained its market position for a quarter of a century (e.g. in Poland since 1995, between 200 and 250 million tons of cargo per year has been transported by rail), it is claimed that railway carriers are not competitive, as their market share, calculated as a percentage of total freight transport, is decreasing. On this basis, the European Commission in White Papers sets out ex-cathedra, partly abstract (detached from the material, geographical, and qualitative structure of transport needs) strategic goals of transport policy, defining, for example, very specifically for several dozen years in advance the desired branch structure of modal split transport, in which the role of car transport is clearly smaller than it is today.

It should therefore be clearly emphasized that high-factor competitiveness does not necessarily have to be interpreted only as an attribute of entities with the largest market shares. In this way, factor competitiveness (i.e. competitive ability) would be confused with result competitiveness (i.e. competitive position). The fact that road transport has been showing an increase in its share in the transport market for years does not necessarily result from its higher factor competitiveness. This is contradicted by a large number of bankruptcies of road transport companies, which are the result of fierce price competition in this market segment, which in turn is the result of an oversupply of road freight transport services. And the oversupply of services is conditioned by lower market entry barriers than in the case of rail transport.

In addition, it must be remembered that each branch of transport plays a role in the transport system that in a given market situation results from the demand for its services. In

the last three decades, the share of loads that are inherently more burdensome for road transport than rail transport has been increasing. It concerns heterogeneous general cargo, the supply of which is dispersed in time and space. In this context, there is talk of dispersed general cargo transport. The railway is technologically much more predestined for the transport of bulk cargo in a block train than single wagons or groups of wagons with general cargo coming from relatively many senders and intended for various recipients. Therefore, car and rail carriers provide services for various transport needs. The size and occurrence of these needs are dependent on structural transformations and the economic situation on the part of transport users (industry and trade), and not on the competitive ability of individual modes of transport.

Taking into account the segmentation of the transport market according to different transport needs, it should be noted that the market relations of rail and road carriers are not limited only to competition. Both branches also complement and interact in transport chains. For example, road transport plays the role of transport from and to railway terminals. Both branches support sea transport in the same way, delivering cargo to seaports and collecting cargo arriving from overseas. In relations between various branches, we are dealing not only with competition for the same groups of loads but also with cooperation. This phenomenon, as already mentioned, is called coopetition.

Referring the above considerations to the realities of the freight transport market in Poland, it must be said that the railway cannot transport much more cargo than it has done on average annually in the last two decades. A significant increase in the market share of railways at the expense of road transport by transferring loads from roads to railways (*modal shift*) cannot be achieved only by administratively disfavouring the latter branch. Assuming a similar quality level of services, services offered by rail carriers would not only have to be cheaper than services provided by car carriers (which could be achieved by imposing additional charges on car carriers, e.g. road fees), but they would also have to be physically available. However, for this to take place, it is necessary to expand the railway network and facilitate access to it for both shippers and cargo carriers, as mentioned below.

The impact of transport infrastructure on the functioning of rail freight transport

As noted above, factor competitiveness depends on the skillful use of the company's own resources. In the case of rail transport, these resources traditionally included e.g. transport infrastructure. However, due to Poland's accession to the EU, the railway infrastructure was separated from the national railway carrier, PKP. Our country had to implement the Community Directive 91/440/EEC of 29 July 1991 on the development of Community railways, imposing on the Member States the obligation to separate the railway infrastructure from the assets of the existing national railway carriers and handing it over to separate entities (vertical separation) [Wojewódzka- Król, Załoga, 2016, p. 102]. In connection with the liberalization of access to the railway transport market, the traditional monopoly of national railway carriers was broken in this way. In Poland, the railway infrastructure was separated from the assets of the national railway carrier PKP and transferred to the PKP Polskie Linie Kolejowe SA (abbreviated PKP PLK) company established especially for this purpose. Although this company remains in a capital relationship with the parent company PKP SA, which is also the parent company for other state-owned transport companies, such as PKP Cargo SA, by law PKP PLK is obliged to grant non-discriminatory and transparent access to the Polish railway network to all licensed the EU to rail freight operators.

As can be seen, as a result of institutional transformations in the rail transport market in Poland, as in other EU Member States, the traditional structure of the railways was broken up at the beginning of the 21st century. Although an in-depth assessment of this process goes beyond the scope of this study, it should at least be said that the separation of the operational

sphere from the infrastructural sphere and the introduction of intra-industry competition in rail transport have much more far-reaching effects than in the case of road transport. In rail transport, we are dealing with the so-called technical or natural monopoly. This is due to the exceptionally strong nature of technical and organizational links between individual elements of the rail transport system. The breakdown of these links led not only to benefits, at least from the point of view of the essence of the free market economy, in the form of introducing competition to rail transport, but also caused significant negative effects, collectively referred to as disintegration disadvantages. They are the emergence of numerous competing entities operating in various spheres of rail transport. Since rail transport by its very nature still requires a systemic approach and internal coordination, the fragmentation of a state-owned railway company results in a state of permanent organizational chaos. In the sphere of infrastructure, the situation is additionally complicated by the fact that, for example, railway sidings are owned by individual shippers, and often also by local governments in the area where they run.

As a result, divergences of interests on the part of users of transport services are often detrimental to the efficiency of the rail transport system and the competitiveness of rail carriers. Over time, it turns out that not all of them are interested in continuing cooperation with railway carriers. Entities that cease to use the railway infrastructure allow the physical degradation of railway stations and sidings, and even their liquidation, associated with the sale of assets and railway infrastructure. When the decline in interest in rail transport services in a given region reaches a sufficiently large scale, railway carriers may no longer pay to collect loads from other shippers who, although they would like to continue transporting their goods by rail, do not generate such a mass of loads in total that would allow them to create compact trainsets and achieve appropriate from the point of view of railway undertakings, benefits from the scale of transport.

The reasons for this phenomenon are manifold. The first one to be mentioned is the collapse of large state-owned industrial enterprises that had previously used rail transport services. In Poland, this phenomenon was quite common in the 1990s in connection with economic transformations and the crisis of the existing state economic structures. The second reason is the change in the functioning of logistics supply and distribution systems from the push-type, i.e. make-to-stock production, to the pull-type, i.e. make-to-order production. In the case of production to order, companies try to adjust the production volume to the current demand, which often results in the use of the Just in Time delivery system - frequent deliveries of small batches of goods. As we know, such a method of delivering deliveries is more conducive to the use of road transport than rail transport, focused on the transport of large batches of homogeneous loads in compact train sets.

Sometimes resignation from rail transport services by even just one shipper leads to the "breaking of the weakest link" principle, leading to the disappearance of the possibility of rail transport operating in a given area. This is the case, for example, when the functioning or even the existence of a railway siding will depend on the will of all its co-users. It is enough, for example, that one of the users of the siding and at the same time its owners (the owner of the land on which the railway road forming the siding runs) decides to dismantle the track or block the passage through his plot, and the other users of the siding located behind it will be deprived of access to the public railway road, or looking the other way around - access from a public railway road to its part of a private railway siding. An example of the above is the situation that occurred in 2018 on the railway siding located in Gdańsk at the Kokoszki estate. After the city of Gdańsk sold a fragment of the land through which the railway siding ran, the new owner dismantled the tracks located on his part of the siding. He did not inform his neighbors - users of the siding, or the railway operator PKP Cargo, the Office of Rail Transport, or the Ministry of Infrastructure of his intentions, which was his duty. With its

actions, it deprived several large business entities of access to rail transport, including Arcelor Mittal Distribution Solutions Poland, which distributes steel products. In addition, it cut off a traction vehicle and a group of wagons belonging to PKP Cargo from the publicly accessible railway network. It is worth noting that the described situation would not have happened if the local government of Gdańsk had not decided to sell the plot on which the railway siding has been running for 50 years. Currently, steel products, which have so far left the Arcelor Mittal plant in large quantities by rail, will have to be transported by trucks, which will cause additional problems for the residents and business entities of Gdańsk related to the increase in road congestion.

Another reason, not so much preventing as it is hindering the effective use of rail transport to service shippers' business activities, is too long and unpredictable (making it difficult to plan transport and supply chains) travel time to loading points located at transshipment stations and railway sidings. The intermodal competitiveness of railways in cargo transport is influenced not only by the efficiency of shunting and reloading works at loading points but also by the time of travel to these points. Unfortunately, in recent years there has been a tendency to deteriorate the operational parameters of the public railway network in relation to freight trains. Although investments in railway infrastructure made after Poland acceded to the EU, mainly thanks to EU funds, are significant, "paradoxically" in some cases they worsen the competitiveness of rail freight carriers. Plans for the renovation and expansion of the railway network take into account the need for passenger transport (traffic) rather than freight transport (traffic). For example, the introduction of additional passenger transport on the Kraków-Warsaw-Tri-City route by trains of the highest category "Express InterCity Premium" resulted in the partial displacement of slower freight trains from the timetables (mainly daily) and hindered the transport service of the Tri-City seaports, especially during holiday peaks [cf. Piotrowski, 2016, p. 26].

This is related to the specificity of railway traffic, in which various types and categories of trains participate, characterized by high diversity in terms of speeds, braking distances, length of the train and its total weight, as well as the number of stops [Piotrowski, 2016, p. 37]. Therefore, it should be noted in this context that rail traffic is based on the principle of maintaining appropriate safety distances between successive trains. The length of the intervals depends on the braking distance of the train and on the length of the track sections, which are determined by the follow-up posts located along the route. These checkpoints determine the release of subsequent trains on the route to unoccupied sections of the railway route; there can be only one train on a given section, i.e. a safety clearance. As passenger trains have right-of-way over freight trains, with relatively long safety clearances and ever-faster passenger trains, such as the above-mentioned state-of-the-art Express InterCity Premium trains, there is less and less time left for slow heavy freight trains. "jumping from one passing pass to another passing pass". The situation of rail cargo carriers is additionally aggravated by the process of reducing the number of passing points during the modernization of the railway network (due to savings), as a result of which freight trains are forced to stop more and more often and for longer to give way to passenger trains. More on this topic in Piotrowski [2016]. The general principle in the creation of timetables has become the transfer of freight traffic on the railway to night hours.

In this aspect, the railway has therefore lost its competitive advantage over car carriers, who, due to the increasing road congestion, had already been forced to use the nighttime to carry out cargo deliveries. Hence, the saying that "logistics takes place at night" has already become established in the TSL industry.

The importance of railway stations and sidings for increasing the competitiveness of railways in dispersed transport

By rail dispersed transport, also known as a wagon or single-wagon transport [cf. Engelhardt, 2018, p. 227] should be understood as the transport of cargo by rail in single wagons or small groups of wagons. They are usually carried out between the points of dispatch and collection (e.g. sidings, railway stations), in the case of which a small amount of cargo sent for transport does not justify - from the economic point of view - the formation of block trains transported in compact trainsets [Drewnowski, 2012, p. 74].

Consolidation of wagon consignments (not full trains) into compact block trains is not unpracticed. With more shippers of wagon consignments, the threshold of profitability of consolidating these consignments into block train consignments may decrease measurably. However, the degree of complexity of organizational and maneuvering works also increases significantly. Wagon consignments and groups of wagons are too small to form a compact block train because they have to pass through shunting and marshaling stations where they are combined into larger trainsets [Zielaskiewicz, Górnikiewicz, 2010]. Between loading points and shunting and marshaling stations, delivery or collective trains are launched [Zielaskiewicz, Górnikiewicz, 2010].

Consolidation of individual wagons and groups of wagons into block trains is so complex that in the face of a drastic decrease in the number of sidings and railway stations, and thus de facto even greater dispersion of wagon shipment consignors, freight railways not only in Poland but also in many other EU countries, including Germany, resigned from servicing this segment of the transport market in favor of cheaper and organizationally more flexible road carriers.

However, in the face of the constantly growing demand for car transport services, growing road congestion, an increasingly noticeable shortage of professional drivers, and the intensification of climate and environmental policy in the EU, it can be expected that without a technological revolution in road transport (see e.g. platooning, autonomous trucks, trucks, etc.) within a dozen or so years this branch will exhaust its development potential. Then the railway may face the task of supporting road transport in the transport service of the constantly growing supply of cargo. However, to cope with this, loading points located at railway stations and sidings will be needed, which currently seem redundant or too expensive to maintain.

Conclusions

A freight railway can function without railway stations and sidings, but then it would have no chance of remaining a generally accessible mode of transport unless the network of railway and intermodal terminals would be many times denser than the current one. Without a dense network of loading points, rail transport would be "relegated" to the role of inter-hub transport, or even international transport, transporting full-train loads over long distances in compact trains, and its ability to relieve road roads would be lost, especially in the field of domestic dispersed transport.

Therefore, the stagnation in the volume of rail transport and the decreasing share of this branch in total cargo transport in Poland seem not accidental, with the simultaneous systematic decrease in the number of railway sidings and the accompanying strong increase in road transport - both in terms of cargo weight and transport performance.

The decrease in the number of sidings used by Polish railway carriers is well illustrated by the situation of the largest Polish rail freight carrier. In 2000, PKP Cargo SA operated 1,930 sidings [Zielaskiewicz, 2021]. In 2019, this number decreased by 48.7% to 990 [Zielaskiewicz, 2021]. As rightly stated by M. Antonowicz [Association of Experts and Managers of Rail Transport, 2017], the liquidation of sidings was influenced by modern economic trends, such as the liquidation of companies operating sidings as a result of the restructuring of heavy industry and agriculture, or technological changes in industrial

production. Among other reasons, he also mentions high administrative and operational costs related to the use of sidings, as well as the need to deal with a large number of formalities.

Following M. Antonowicz, the problem of the so-called last mile, i.e. the need to transport cargo to and from railway sidings in relations with senders and recipients of railway shipments who do not have direct access to the railway infrastructure. This is an important issue, although - for the sake of accuracy - it should be noted that this problem is more related to intermodal terminals and railway stations owned by rail and intermodal operators, and not to sidings that directly connect production plants to the public railway network; the essence of the functioning of sidings is to minimize or even eliminate the need to include transport modes other than rail in the transport chain.

Although - as was emphasized earlier - rail transport could function without sidings and rail transshipment stations, the question remains whether the same can be said about the transport system. The share of road transport in the transport of cargo and passengers is increasing year by year, which is followed by an increase in road traffic and congestion on roads. Road transport - as it seems - becomes a victim of its own market success. A highly probable scenario is therefore a serious loss by this branch of transport of those features that determined its current market strength - relatively high commercial speed, punctuality, and reliability. Therefore, it can be assumed that in the future there will be a tendency to return shippers and forwarders to rail transport. This seems to be confirmed by e.g. the experience of the United States, where some local railway carriers recorded a significant increase in the transport of wagon consignments, even for shorter distances [Drewnowski, 2012, p. 75]. As noted by A. Drewnowski, the reasons for this state of affairs should be sought in the increase in the cost of road transport, the increasing congestion on the roads, and the improvement of the transport offer by railways [Drewnowski, 2012, p. 75].

If a similar situation were to occur in our country, it would be necessary to revive loading and reloading points at sidings and railway stations. However, for this to be possible, they cannot currently be subjected to technical degradation, and the land belonging to them cannot be sold. After getting rid of the ownership of land on which sidings and railway stations are currently located, it may be impossible to regain them in the future without a costly and legally complicated expropriation process.

It should be noted that part of the land currently owned by PKP companies is located in very favorable locations from the point of view of the possibility of developing them for the needs of distribution centers serving the supply of consumer goods to cities. Considering that these are usually places with a connection to the generally accessible railway network, their usability as part of the structures of logistics services for cities is potentially very high. The construction of logistics facilities in such areas would make it possible to transport consumer goods directly to the centers of crowded cities by rail, avoiding the increasingly long-lasting road congestion. An example of such an area is the plot under the former Warszawa Główna railway station. Unfortunately, interest in such areas is openly manifested by numerous developers who, by no means disguised, are trying to buy land located in the most attractive places in Polish cities and develop it as soon as possible.

From the point of view of the future possibilities of efficient and ecologically sustainable supply of cities, it is worth protecting such areas against the greed of some decision-makers and city authorities, because in a dozen or so years it may turn out that in Poland we will not only have to deal with the problem of smog or municipal waste disposal but primarily with the chronic state of congestion of large urban agglomerations with road freight and passenger traffic.

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