

Role of Rail in Passenger Border Traffic between Poland and Ukraine — a Dynamic Approach

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Abstract

Changes in the functions of Polish borders at the turn of the 20th and 21st century resulted in a reorientation of transport connections with countries of the former Soviet Union. One of the consequences of the phenomenon are considerable transformations in the scope of degree of use of rail transport in cross-border passenger traffic. The objective of the article is the dynamic assessment of the importance of railways in passenger traffic between Poland and Ukraine in the years 1990–2016 (including limited data for 2018), with consideration of the infrastructural and organizational factors. The analyses employed data on traffic of persons and vehicles on railway and road border crossings. They provided the basis for the determination of changes in the position of rail towards other modes of cross-border transport. The second source is Network Train Timetable (in Polish: Sieciowy Rozkład Jazdy Pociągów), used for the preparation of maps of connections functioning in selected time intervals. The analyzed period was characterized by a continuous decrease in the importance of rail in bilateral passenger traffic. It proved completely inflexible towards systemic and geopolitical transformations and intermodal competition of bus transport, and from 2013 also air transport. The spatial layout of rail connections suggested initial de-concentration involving several border crossings, and then concentration on two main lines. The vast general increase in traffic that occurred in recent years in the Ukrainian direction constitutes a chance for increasing the role of rail transport in a situation of overload of road border crossings.

Keywords: rail transport, passenger border traffic, intermodal competition, border infrastructure

JEL: R4, R41, R42

Introduction

Changes in the function of borders that occurred at the turn of the 20th and 21st century as a result of the economic-political transformation, and then Poland's accession to the European Union and Schengen Zone, considerably transformed transport connections of Poland with countries of the former Soviet Union. In spite of the initial liberalization of procedures in the 1990's, the integration of Poland with the EU eventually contributed to a decrease in the permeability of borders with Russia, Belarus, and Ukraine. In the case of Ukraine, the changes were partially balanced with unilateral maintenance of a visa-free travel regime for Polish citizens, introduction in 2009 of the agreement on minor border traffic, and finally a visa waiver for Ukrainian citizens (in the entire Schengen Zone) in 2017.

Simultaneously with those processes, changes in the structure of transport freight performance occurred in Poland. Mass motorization took place. The accompanying de-concentration of the

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labor force caused an increase in the contribution of road transport, particularly at the cost of rail transport. The contraction of the rail infrastructure lasted continuously until the moment of accession to the European Union. The length of lines providing passenger transport decreased. Opposite tendencies were only observed as a result of the inflow of European funds and modernization of a part of routes, mainly motorways and expressways. In countries of the former Soviet Union neighboring Poland, the processes occurred with a certain delay, and the loss of position of rail was not that drastic. This was one of the reasons for the relatively long maintenance of Polish-Ukrainian cross-border rail connections. Their role was also determined by economic factors, including a good near-border economic situation encouraging provision of minor commercial activity, or alternatively trafficking.

The objective of the article is the dynamic assessment of the importance of rail transport in passenger border traffic between Poland and Ukraine in the years 1990–2016 (including limited data for 2018). The analyzed section of the Polish eastern border seems particularly interesting, because Ukraine was the only one of the three countries that did not introduce visa traffic for Polish citizens. In the study period on the Polish-Ukrainian border, the highest number of rail border crossings also functioned. Their role in particular years was subject to substantial changes.

Transformations in the scope of passenger cross-border transport by rail had a complex character and were determined by a number of infrastructural and organizational factors. Railway transport has features that from the point of view of the carrier limit the possibilities of its use in cross-border transport. Unlike road transport, crossing the border by a train requires the adjustment of the rolling stock to the infrastructure existing on both sides of the border. It is often of a different character (differences in the scope of rail gauge, power supply systems, signalization, or safety standards). The process of admitting new vehicles to traffic is time-consuming and related to obtaining formal permits issued by relevant authorities of a given country (in Poland—Office of Rail Transport). In the aspect of passenger transport, the development of international timetables and tariff integration also constitute a great challenge. Therefore, the organization of rail cross-border transport is a more difficult undertaking than provision of activity in the sector of international bus transport.

In spite of the aforementioned technical and organizational limitations, for a number of years, until the moment of entering economic and political transformations by the countries of East-Central Europe, crossing the Polish border by railway was more convenient for passengers than using means of road transport. Due to the development of individual transport, public transport, including rail, gradually lost its leading role in border traffic. However, still in the 1990's an important factor maintaining railway transport was near-border trade which partly collapsed after 2004. The first decade of the 21st century also brought the restructuring of the Polish State Railways (PKP)¹ enterprise, characterized by a nation-wide contraction of rail passenger network, also in the case of cross-border connections. In the case of the eastern border, the reduction of available crossings and number of connections seems to correspond with the decreasing permeability of the border.

1 Literature review

The issue of the effect of borders on the functioning of new international connections is not frequently encountered in the scientific literature. It was discussed by Dunstone (2013) based on selected historical examples from Europe in the 19th and 20th century. The author shows that the problem of the border effect already occurred in the first decades of the functioning of rail on the Old Continent. The limiting role of rail border crossings in the context of modern rail cargo transit through the territory of Estonia was discussed by Hilmola and Henttu (2015).

Among Polish papers discussing rail connections of Poland with other countries in infrastructural and organizational terms, attention should be paid to papers by Lijewski (1993, 1996)—on Polish-Ukrainian borderland, Więckowski (2003)—on Polish-Slovakian borderland, and Taczanowski (2012)—on Polish-Czech-Slovakian borderland, as well as Rusak et al. (2003)—on Polish-

1. In Polish: Polskie Koleje Państwowe.

German-Czech borderland. In a broader geopolitical context and with consideration of many modes of transport, the problem of cross-border connections was investigated by those including: Komornicki (1995, 1999, 2005)—on all borders of Poland, and Anisiewicz (2007)—on border with the Kaliningrad Oblast. In reference to the Polish-Ukrainian borderland, the most extensive monograph study covering infrastructural issues and dynamics of border traffic is the publication by Pastuszek, Adamczyk, and Kowerski (1997, 57–103) in the series Euroregion Bug.

In the majority of cases, the cited publications concern a situation that took place before Poland's accession to the European Union. Similar studies covering the post-accession period are scarce. It is time related to the intensification of investments in transport infrastructure, financed from EU resources, partially translating into the improvement of the state of the existing infrastructure. A gradual increase in the permeability of the Polish-Ukrainian border simultaneously occurred, in recent years accompanied by the launch of new rail connections between both countries. One of such scarce publications from the period is the article by Fedan (2008) concerning Polish-Ukrainian transport infrastructure as a condition of effective cooperation of both countries.

Several Ukrainian authors discussed the issue of the current situation of cross-border transport and border infrastructure. In the first period after obtaining independence by Ukraine, they were particularly studies providing inventories of the possibilities of the infrastructure (among others: Posac'kyj 1994; Rowenczak 1995). In later years, the importance of the factor of technical infrastructure for the functioning of the Polish-Ukrainian border was emphasized by Papish (2013). Kashuba (2014) as well as Erfan and Korol (2017) who analyzed the modern condition of Ukrainian infrastructure at the border with the European Union, with particular consideration of road connections. No papers strictly regarding rail traffic are available.

The analysis of the issue of changes in the provision of connections between Poland and other countries by rail transport also requires citing monographs by (among others) Koziarski (1995), Taylor (2007), and Komusiński (2010), discussing transformations of the Polish rail network, including the contraction of the near-border sections. The aspect of rail was also indirectly mentioned in the context of works on proposals of new transport corridors (among others) Rościszewski (1995), role of transit (among others) Wendt (1999), development of the transport network of Polish near-border voivodships (among others) Komornicki et al. (2015), and technical aspects of differences in rail infrastructure of both countries (Szkoda 2014).

The complexity and dynamics of processes determining international rail passenger transport provides an opportunity for the expansion and continuation of research initiated by the aforementioned authors. A dynamic analysis was performed for all rail points (crossings) on the border with Ukraine, and selected time periods from the years 1990–2016 (including limited data for 2018). Moreover, data on cross-border rail traffic from 1980 (i.e., from a period of a still normally functioning centrally-planned economy, was used as a reference). The year is a good reference point, because it precedes restrictions countries of the eastern bloc introduced as a prevention for the inflow of Polish citizens (already in 1981, the total number of visits to the former Soviet Union decreased by 68%) (Stola 2010). Spatial transformations of rail passenger transport on cross-border connections have not been fully investigated and determined in such a broad time scale.

2 Data and methodology

The dynamic analyses presented in the article employed data on passenger and vehicle traffic on rail and road border crossings with Ukraine in the years 1990–2016 (and partly for 1980) provided by the Polish Border Guard Headquarters. They permitted the determination of changes in the position of rail towards other modes of cross-border traffic. Passenger traffic was analyzed with a division into Polish citizens and foreigners, and with a detailed division into citizens of selected countries, also considering the air border.

The second source of information on passenger traffic between the analyzed countries is Network Train Timetable² in the form of an electronic application HAFAS (for periods: May 2000 – May

2. In Polish: Sieciowy Rozkład Jazdy Pociągów.

2001, Dec 2004 – Dec 2005, Dec 2009 – Dec 2010, Dec 2014 – Dec 2015, Dec 2017 – Dec 2018) and in the printed version (for periods: May 1990 – May 1992, May 1995 – May 1996). In the case of use of the application, the date of reference adopted by the authors was a working day in the middle of October of a given year, as an optimum term not in the vacation or holiday season. The timetables were used for the preparation of maps of the network of cross-border connections functioning in particular time periods. This permitted obtaining an image of changes in the availability of rail in direct connections between Poland and Ukraine.

In the infrastructural aspect, cartographic materials in the form of atlases of railway lines of both countries were helpful (Kopylova and Khil'chevs'ka 2008; Stankiewicz and Stiasny 2014). They provided technical characteristics, including the number and gauge of tracks, state of electrification, and sections excluded from operation.

3 Rail cross-border infrastructure 1990–2018

In different phases of the analyzed period, a total of seven border crossings functioned between Poland and Ukraine, including six providing passenger transport (fig. 1). The number of simultaneously operating points was subject to changes. Initially it increased—from 3 at the beginning of the 1990's to 5 in the second half of the decade. After 2000, the number gradually decreased. In the years 2001–2007, 4 crossings functioned, and between 2008 and 2010—3. In the second decade of the 21st century, only 2 border crossings were available, namely Przemyśl–Mostyska and Dorohusk–Jahodyn. They remained in operation throughout the analysed period. The earliest, in 1991, train traffic was withheld on crossings Malhowice–Nyzhankovychi (Khyriv) and Krościenko–Khyriv, together with the liquidation of transit connections from Przemyśl to Zagórz through the territory of the Soviet Union. In 1994, traffic was only restored on the latter crossing, and it was in operation until 2010. Between 1996 and 2007, passenger rail traffic also occurred on the border crossing Hrebenne – Rava Rus'ka. Throughout the 1990's through 2000, periodic passenger traffic also occurred by the cargo Broad Gauge Metallurgy Line (LHS) through border crossing Hrubieszów–Izov (Volodymyr Volyns'kyi).

From the point of view of the state of infrastructure, the highest technical parameters are characteristic of border crossings in Dorohusk and Przemyśl, connected on the Polish side with dual-track electrified lines (No. 7 and 91—belonging to corridor E 30). Stations Dorohusk and Jahodyn are connected by a non-electrified section composed of parallel normal and broad gauge track, further leading towards the Kovel station. The terminal for exchanging bogies in passenger coaches is located on the Ukrainian side. A three-track electrified section including one broad gauge track is located between Przemyśl, Medyka, and Mostyska. Facilities used for changing gauge are available on both sides of the border.

Due to its continuous use in cargo traffic on line LHS, the border crossing in Hrubieszów still shows high technical parameters. It is connected with stations Izov and further Volodymyr Volyns'kyi by a single track broad gauge section. The state of infrastructure of the remaining crossings formerly operated in passenger transport was subject to gradual decapitalization (overgrowing of tracks by bushes, devastation of facilities) along with the liquidation of subsequent connections. Stations Hrebenne and Rava Rus'ka are connected by a single track normal gauge line, and section Krościenko–Khyriv–Malhowice features a dual gauge track (mixed 1 435 and 1 520 mm track with three rails), constituting the only technical solution of the type on the Polish–Ukrainian border. Potential revival of traffic on those crossings would require considerable investments for the purpose of restoring the original parameters.

4 Dynamics of passenger border traffic between Poland and Ukraine

In 1980, in the period of very strongly formalized contacts between the Polish People's Republic and the contemporary Soviet Union, 55% of cases of crossing of the border with Ukraine occurred in rail transport (fig. 2). This resulted from a number of formal and organizational facts. The Soviet authorities were reluctant to agree to the entrance to their territory by private cars. Passenger



Fig. 1. Linear and point rail infrastructure on the Polish-Ukrainian borderland

Source: Own elaboration based on Kopylova and Khil'chevs'ka (2008), and Stankiewicz and Stiasny (2014)

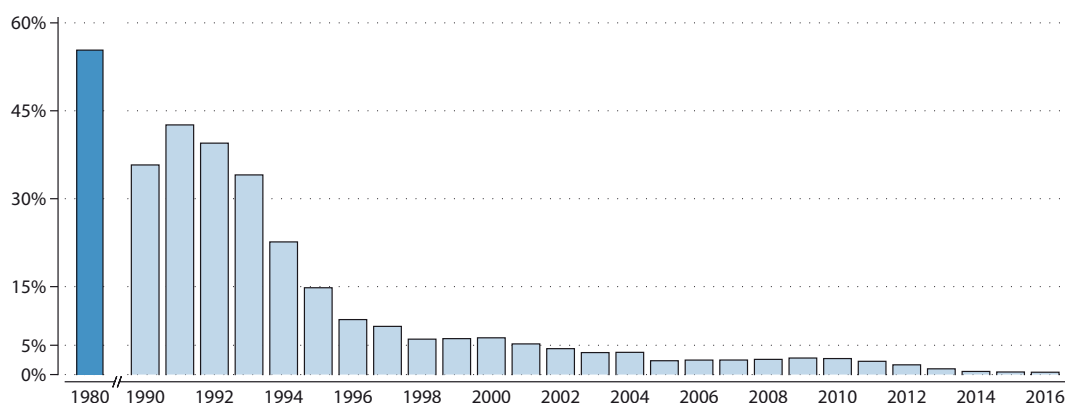


Fig. 2. Regress of the role of railway in passenger traffic on the border section with Ukraine (share in road-railway passport traffic)

Source: Own elaboration based on data of the Polish Border Guard Headquarters

trains connecting Poland with Romania and Bulgaria regularly ran (particularly in the summer season) through the territory of Ukraine. In the 1980's, the scale of holiday trips in that direction drastically decreased (political restrictions). This translated into a decrease in the contribution of railway in passenger traffic. Therefore, at the beginning of the transformations (but still before the fall of the Soviet Union), the share amounted to only 35%.

Subsequent years, however, brought fast liberalization of passport provisions in the Soviet Union, and then the breakout of the country and far reaching simplifications in travelling (already between Poland and independent Ukraine). Passenger traffic in both directions rapidly grew, increasingly powered by minor near-border trade (fig. 3). The number of road crossings was insufficient (in 1990, still only one crossing of the type functioned in Medyka), and new local cross-border

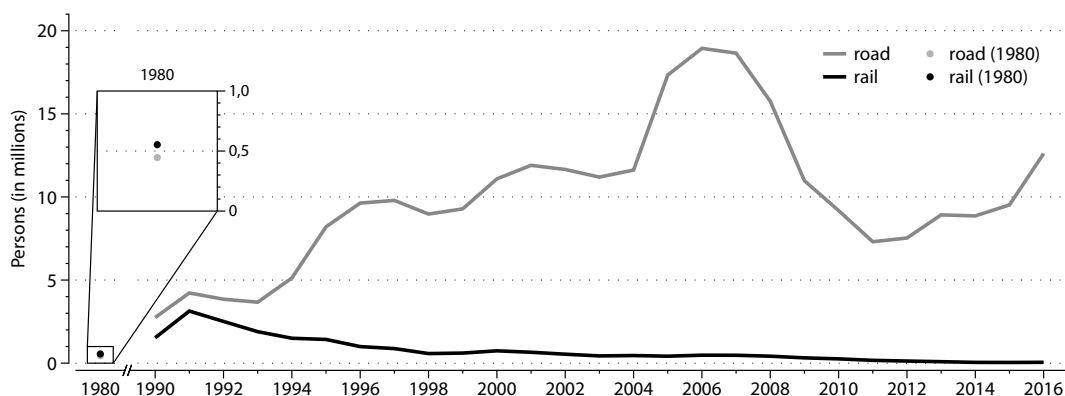


Fig. 3. Changes of border passport traffic of persons on road and rail border crossings with Ukraine

Source: Own elaboration based on data of the Polish Border Guard Headquarters

rail connections were launched for the purpose of support of the growing number of passengers. The contribution of rail in traffic periodically increased again (to a level of approximately 43% in 1991, fig. 2), and then rapidly decreased until 1998, when it stabilized at a level of only approximately 6% for several years. The decrease was a result of a very fast increase in the number of persons crossing the border by roads, and a systematic although not so fast decrease in the number of passengers of cross-border trains (fig. 3).

Factors responsible for such spectacular changes included:

- construction of further new road border crossings
- dynamic development of cross-border bus connections (already in 1993, Poland and Ukraine were connected by 61 direct lines with 416 return travels per week (Komornicki 1996))
- gradual development of private car ownership in Ukraine
- concentration of minor trade by mini-wholesale distributors who usually used individual, and more seldom public transport
- weakly competitive and inflexible offer of railway carriers
- lack of competitiveness of timetables resulting from the necessity to exchange coach bogies at the contact of infrastructure with different track gauge (travel time approximately 2 hours longer)

It is characteristic that the described modal changes in passenger traffic through the Polish-Ukrainian border concerned particularly foreigners (in majority citizens of Ukraine). The number of Polish people travelling in those years was relatively stable (fig. 4). This can be associated with concerns related to driving cars to countries of the former Soviet Union.

In the years 2000–2004, another wave of decrease in the importance of rail in two-way traffic occurred. It was not as spectacular as before. In 2004 (i.e., at the turn of Poland's membership

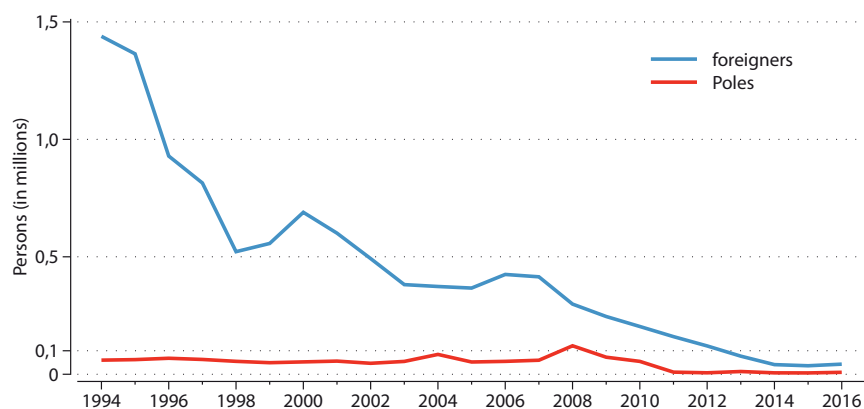


Fig. 4. Changes of border passport traffic of persons by origin on railway border crossings with Ukraine

Source: Own elaboration based on data of the Polish Border Guard Headquarters

in the EU) the Polish-Ukrainian border was crossed by rail by only 3,8% of the total number of persons crossing the border (both directions). In that period, the total amount of the two-way traffic was reduced as a result of the so-called “Russian crisis” at the end of the 1990’s (a decrease in the profitability of near-border trade). A substantial change was brought about in 2005, when total traffic began to increase again, but this time owing to Polish citizens who overtook part of the minor trade in the conditions of the visa traffic for Ukrainians (from October 2003). Many of them travelled by their own vehicles (also for the purpose of tanking cheaper gasoline). This contributed to a decrease in the contribution of rail to a level of 2,4%.³ The absolute value of rail traffic, however, was relatively stable throughout the period from 2000 to 2008. Its role was determined by rapid changes in the level of road traffic. After 2005, the contribution of rail was maintained at a level of 2,5%–2,8%. The final reduction of the share occurred at the beginning of the following decade (after 2011), to a level of only 0,4% of total traffic in 2016. In that period, causes of the phenomenon included:

- closing of many railway connections, particularly local, partially caused by pressure of customs authorities (difficulties in effective control of luggage of passengers)
- signing and coming into life (2009) of the agreement on minor border traffic, mainly implemented in road traffic
- increasing number of Ukrainian citizens working in Poland (dispersed workplaces and a large group of persons dealing with unofficial transport of employees by car directly to workplaces in Poland)
- increase in the number of cases of crossing the border on foot on the only border crossing admitting such a form of travel (Medyka-Shehyni)
- appearance of low-cost air connections between Poland and Ukraine

From 2014, Polish-Ukrainian passenger traffic increased very rapidly. One of the accelerating factors was the armed conflict in East Ukraine, and another was the increasing importance of Ukrainian citizens in the Polish labor market. The increase, however, did not translate into the renaissance of railway connections. Only after 2016, rail began to inconsiderably make up for the losses due to new connections through the crossing Przemyśl-Mostyska. Moreover, in 2017, the visa obligation was revoked for Ukrainian citizens travelling to the Schengen Zone. Effects of the changes are still not evident in the statistics of border traffic. It can be assumed, however, that they also do not substantially affect the modal structure of two-way passenger transport. After 2010, the absolute number of Polish citizens travelling to Ukraine decreased to a level of 5–10 thousand annually (in comparison to 1,3–2,1 million in road traffic). Passengers using this mode of transport still include more foreigners. From the time of the geopolitical crisis in 2014, almost all foreigners crossing the two-way border are Ukrainian (Komornicki and Wiśniewski 2017) (see also tab. 1).

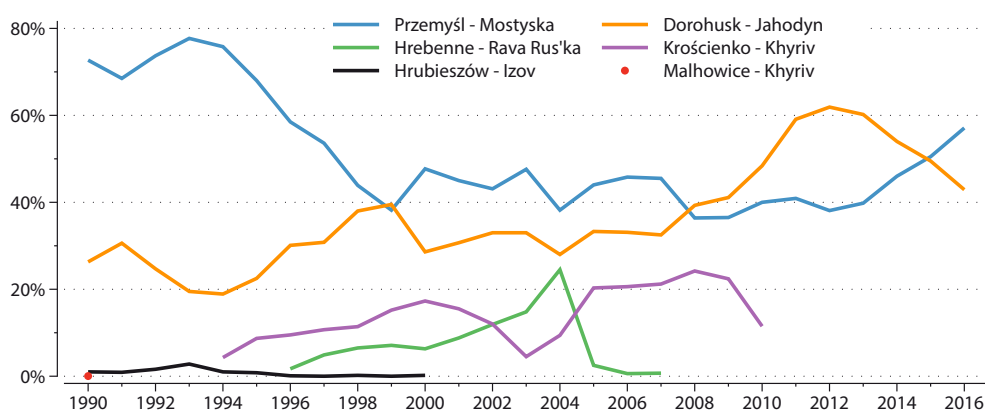


Fig. 5. Contribution of border crossings in passenger border passport rail traffic

Source: Own elaboration based on data of the Polish Border Guard Headquarters

3. [In the journal European practice of number notation is followed—for example, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style).—Ed.]

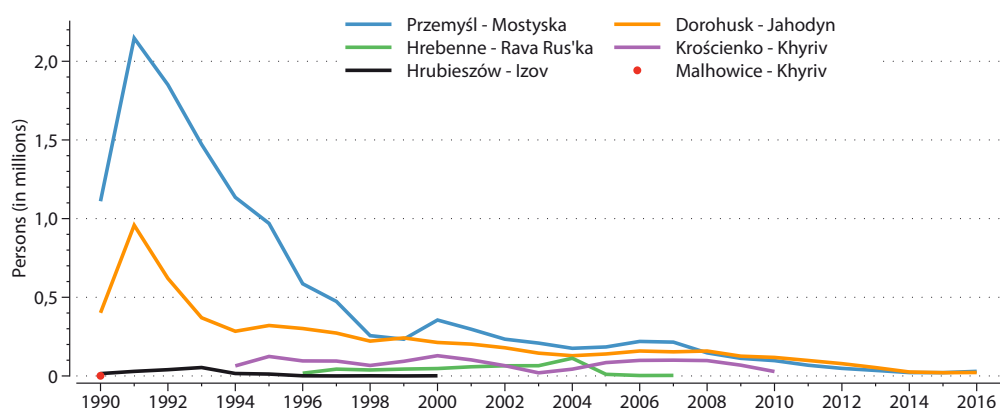


Fig. 6. Changes of the number of persons in passport traffic on rail border crossings

Source: Own elaboration based on data of the Polish Border Guard Headquarters

Tab. 1. Changes of the share of citizens of selected countries in entry of foreigners to Poland through the section bordering with Ukraine—road and rail crossings together (in %)

Year	Ukrainians	Romanians	Russians	Moldavians	Germans
1994	92,02	2,86	1,51	1,00	0,74
1995	93,00	1,58	1,25	2,46	0,49
1996	93,60	0,67	1,30	2,67	0,49
1997	94,80	0,41	1,05	2,07	0,51
1998	95,89	0,31	0,57	1,51	0,63
1999	96,88	0,19	0,37	1,07	0,63
2000	97,10	0,17	0,32	1,15	0,59
2001	97,47	0,18	0,38	0,65	0,61
2002	97,00	0,32	0,44	0,57	0,78
2003	95,79	0,51	0,58	0,73	1,20
2004	94,96	0,46	0,63	0,75	1,59
2005	94,49	0,41	0,57	0,70	1,91
2006	94,06	0,43	0,58	0,63	1,96
2007	94,20	0,19	0,57	0,69	1,84
2008	89,53	0,51	0,88	1,24	3,51
2009	92,84	0,31	0,64	0,75	2,45
2010	94,83	0,21	0,52	0,40	1,70
2011	95,49	0,24	0,51	0,34	1,34
2012	95,43	0,31	0,54	0,26	1,32
2013	96,34	0,29	0,55	0,21	0,93
2014	97,84	0,28	0,13	0,21	0,53
2015	97,70	0,30	0,09	0,27	0,53
2016	97,03	0,42	0,11	0,50	0,58

Source: Own elaboration based on data of the Polish Border Guard Headquarters

The contribution of particular border crossings in the total number of persons crossing the Polish-Ukrainian border by rail was subject to considerable fluctuations (fig. 5 and 6). They were related to the launch and later closing of passenger traffic on several local points and competition in long-distance traffic between points Przemyśl–Mościska (line Kraków–L'viv) and Dorohusk–Jahodyn (line Warszawa–Lublin–Kiev). In 1990, regular passenger lines ran through three points. The crossing in Przemyśl was dominant (more than 70% of traffic), as well as the newly opened crossing in Dorohusk (almost the entire remaining traffic).

Trains running on the broad gauge line through the point in Hrubieszów – Volodymyr Volyns'kyi were also of marginal importance. In subsequent years, new local crossings were launched, namely Hrebenne – Rava Rus'ka and Krościenko–Khyriv. In the first period, they competed for passengers with Dorohusk. The role of the crossing Przemyśl–Mostyska was maintained on an unchanged level of 60%–70%. Later, however, it decreased to approximately 40%. After 2007, the importance of the line Warszawa–Kiev increased. Due to this, Dorohusk became the leader in the scope of number of persons crossing the border with Ukraine in rail traffic. From 2011, passenger trains have only been using two crossings, and from 2014, Przemyśl–Mostyska has been the leader again. This can be associated with the launch of the connection Przemyśl–Kiev, implemented by Ukrainian rolling stock with increased standard (electric multiple units: HRCS2 Hyundai Rotem made in Korea and EKr1 Tarpan made in Ukraine).

In the study period (in the case of structure of citizenship passenger data are available from 1994), the total number of entrances of foreigners to Poland through the border with Ukraine is dominated by citizens of Ukraine (tab. 1). The dominance was lower in the 1990's due to the functioning of transit from Russia and Romania. From 2002, the second group of foreigners following Ukrainians began to be Germans. Their share was highest (approximately 3,5%) in 2008 (i.e., at the moment of Polish access to the Schengen Zone). From the moment of the geopolitical crisis in 2014, more than 97% of travelling foreigners have been Ukrainians. The most abundant groups from third countries at the time were Germans (less than 0,6%) and Moldavians (0,5%).

The analysis of the size of traffic of Ukrainian citizens by mode of transport is presented in figures 7 and 8. The entire period 1994–2016 is characterized by a systematic decrease in rail traffic, with simultaneous (described above) fluctuations of road traffic. The actual competition of aviation transport appeared after 2008, and from 2013, the number of Ukrainians entering Poland

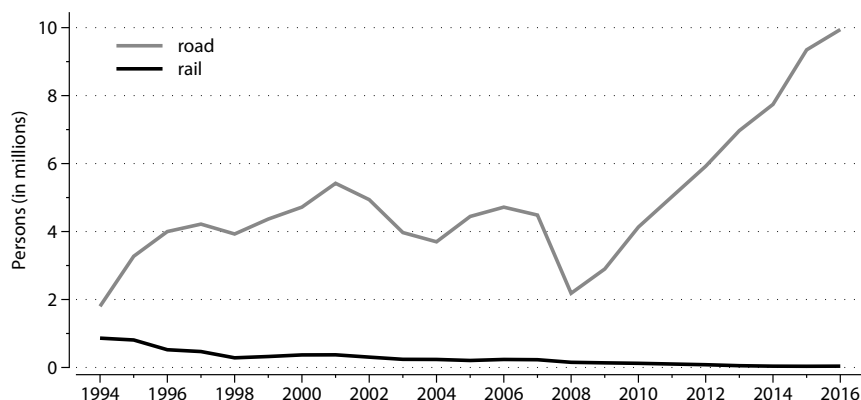


Fig. 7. Changes of the number of Ukrainians entering Poland by rail and road transport

Source: Own elaboration based on data of the Polish Border Guard Headquarters

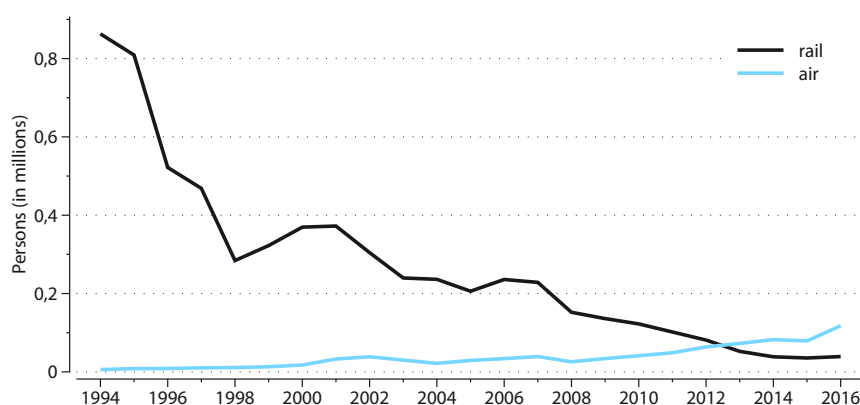


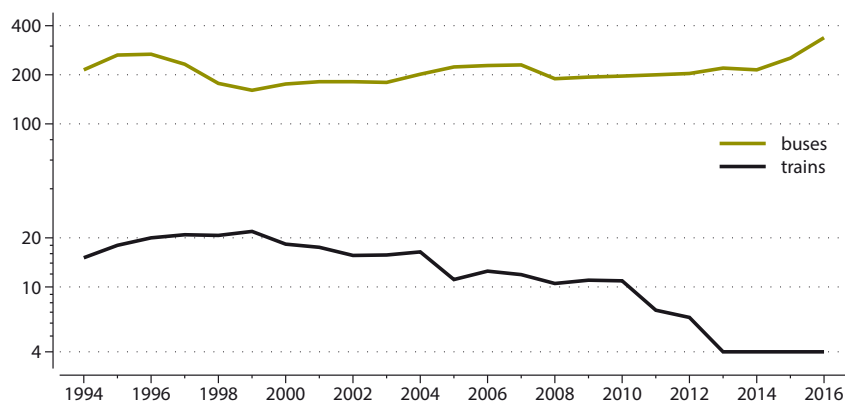
Fig. 8. Changes of the number of Ukrainians entering Poland by rail and aviation transport

Source: Own elaboration based on data of the Polish Border Guard Headquarters

Tab. 2. Directions of direct flight connections between Poland and Ukraine in 2018

Polish airport	Ukrainian airport
Warszawa-Okęcie (WAW)	Kiev-Boryspil (KBP) Kiev-Zhuliany (IEV) L'viv (LWO) Odessa (ODS) Kharkiv (HRK) Zaporizhia (OZH)
Kraków-Balice (KRK)	Kiev-Boryspil (KBP) Odessa (ODS)
Katowice-Pyrzowice (KTW)	Kiev-Zhuliany (IEV) Kharkiv (HRK) L'viv (LWO)
Wrocław-Strachowice (WRO)	Kiev-Boryspil (KBP) L'viv (LWO)
Poznań-Ławica (POZ)	Kiev-Boryspil (KBP) L'viv (LWO)
Bydgoszcz-Szwederowo (BZG)	Kiev-Zhuliany (IEV) L'viv (LWO)
Gdańsk Rębiechowo (GDN)	Kiev-Zhuliany (IEV) L'viv (LWO)
Lublin (LUZ)	Kiev-Zhuliany (IEV)
Olsztyn-Mazury (SZY)	L'viv (LWO)

Source: Own elaboration based on Google Flights website (<https://www.google.pl/flights/>)

**Fig. 9.** Changes of the mean daily number of trains and buses on the border with Ukraine

Source: Own elaboration based on data of the Polish Border Guard Headquarters

Note: Logarithmic scale on vertical axis

through airports has been higher than in rail traffic. Year 2016 brought about intensification of the dynamics of two-way air traffic. Currently (2018), as many as nine Polish airports offer direct connections with Ukraine. They are usually flights to airports Kiev-Boryspil, Kiev-Zhuliany, and L'viv. The most comprehensive offer concerns airport Warszawa-Okęcie with 6 connections (tab. 2). Simultaneously, from 2015, an increase in border traffic of buses has been observed again (fig. 9). This suggests the involvement of bus carriers in transporting Ukrainian citizens travelling to Poland for work, or alternatively travelling by transit through Poland to West Europe.

Until 2013, the number of passenger trains crossing the Polish-Ukrainian border continuously decreased (fig. 10). Later, until 2016, it was subject to no further changes. The number of buses (bus lines and occasional trips) crossing the border, however, increased, and flight connections intensified. This resulted in the loss of the market by rail to other modes of transport.

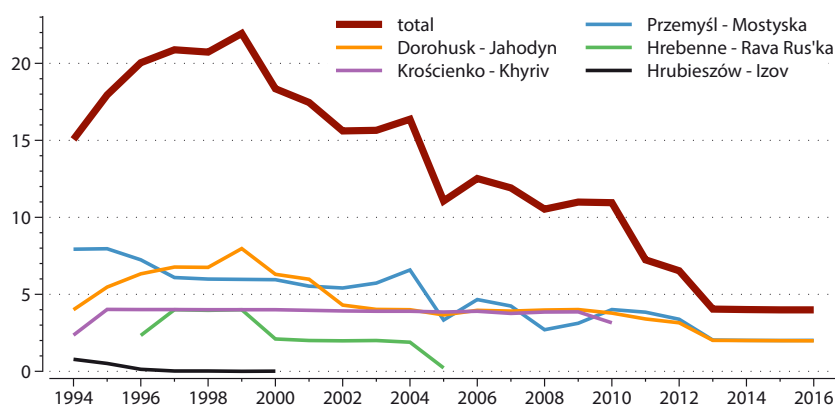


Fig. 10. Changes of the mean daily number of trains on rail border crossings with Ukraine

Source: Own elaboration based on data of the Polish Border Guard Headquarters

5 Changes of passenger cross-border rail connections

At the beginning of the 1990's, in the last phase of functioning of the Soviet Union and the first stage of existence of independent Ukraine, directions of passenger transport between Poland and the territory of Ukraine became highly concentrated, with the leading role of the border crossing in Przemyśl–Mostyska. Relatively permanent night-time connections existed on route Warszawa/Kraków – L'viv/Kiev/Odessa. Moreover, a number of periodical (or even running based on announcement) connections appeared. Until 1991, transit on normal gauge tracks through the territory of Ukraine, between Przemyśl and Zagórz through Khyriv functioned, without the possibility of leaving the train outside the territory of Poland. The connection considerably reduced travel time to the Bieszczady Mountains. Another interesting example from the 1990's is the use of the Broad Gauge Metallurgy Line for transport of passengers from the former Soviet Union to Olkusz, with stops in Hrubieszów, Zamość Północny, and Sędziszów, where special platforms for the connection were set up. The main directions on the Ukrainian side was Kiev and Kharkiv. Single trains on directions L'viv, Moskva, or Magnitogorsk also appeared. This type of traffic occurred in a very limited scope until 2000 (fig. 11).

Until the end of the 1990's, gradual de-concentration of the network of connections occurred, along with the involvement of a higher number of border crossings. Connections to other cities in Ukraine also appeared, particularly using direct coaches, transported from Poland and connected to local trains. Their availability, however, was very limited due to their operation only on particular days. In 1994, traffic on route Zagórz–Krościenko–Khyriv was restored, this time with a possibility of leaving the train on the Ukrainian side. The section Przemyśl–Malhowiec–Nyzhankovychi was not reactivated. In 1996, a direct connection Warszawa – Rava Rus'ka was launched, on normal gauge track through the crossing in Hrebennie. This provided the possibility to change trains to route Rava Rus'ka – L'viv (the connection existed until 2007, at the end of the period only on selected days).

Until the mid-2000's, further de-concentration of the network of connections occurred, with continuously decreasing total traffic and a decrease in the role of rail in border traffic. On the Polish side, the number of stations with the possibility of commencing travel by an international train (or a direct coach) also decreased, whereas the situation was the opposite in Ukraine (fig. 12). In 2000, it was possible to travel among others to stations: L'viv, Kiev Pass., Kharkiv Pass., Odessa Holovna, Dnipropetrovsk and Simferopol' (Crimea). A coach also periodically ran through Ukraine on route Warszawa–Kishinev (Moldavia) and from Kraków to Astany in Kazakhstan (fig. 13). Both in 2000 and 2005, a permanent connection Przemyśl–Chernivci existed. Trains ran on the route Warszawa – Rava Rus'ka. International trains from the station Berlin Lichtenberg through Warszawa and Praha hl.n. (direct coach) through Kraków towards stations L'viv, Kiev Pass., and Odessa Holovna also appeared in the period.

After 2005, together with restrictions resulting from the presence of Poland in the EU and then in the Schengen Zone, a considerable reduction of the cross-border transport offer commenced.



Fig. 11. Routes of periodical connections between Poland and Ukraine through the border crossing in Hrubieszów in the 1990's, and crossings in Malhowice/Krościenko until 1990 (the map does not include the remaining permanent connections)

Source: Own elaboration based on Network Train Timetable

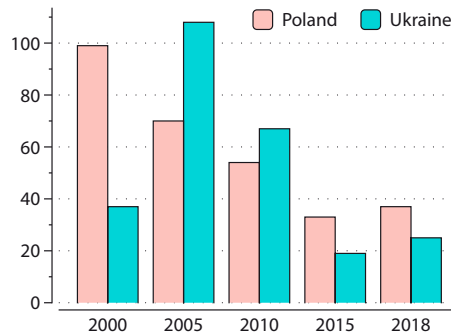


Fig. 12. Change in the number of points of access to direct rail connections Poland-Ukraine

Source: Own elaboration based on Network Train Timetable

Three crossings remained in operation (from 2011 only 2, after closing traffic on the section Krościenko-Khyriv). It was also possible to travel to a lower number of municipalities in Ukraine. Periodically open connections include only Doneck (direct coach from Berlin, launched due to the preparations for the Euro 2012). An additional factor contributing to the liquidation of a large part of rail connections between Poland and Ukraine was trafficking activity, causing considerable devastation of passenger trains. The necessity of continuous repairs discouraged carriers from providing their services (Graff 2007).

In the second decade of the 21st century, a further decrease in the availability of rail on cross-border routes was determined by the geopolitical crisis in the eastern oblasts of Ukraine. Connections towards Berlin and Prague were abandoned. Only two night trains remained on routes: Warszawa–Kiev and Wrocław–L'viv. In 2015, no attached direct coaches to stations available in previous years were in operation.

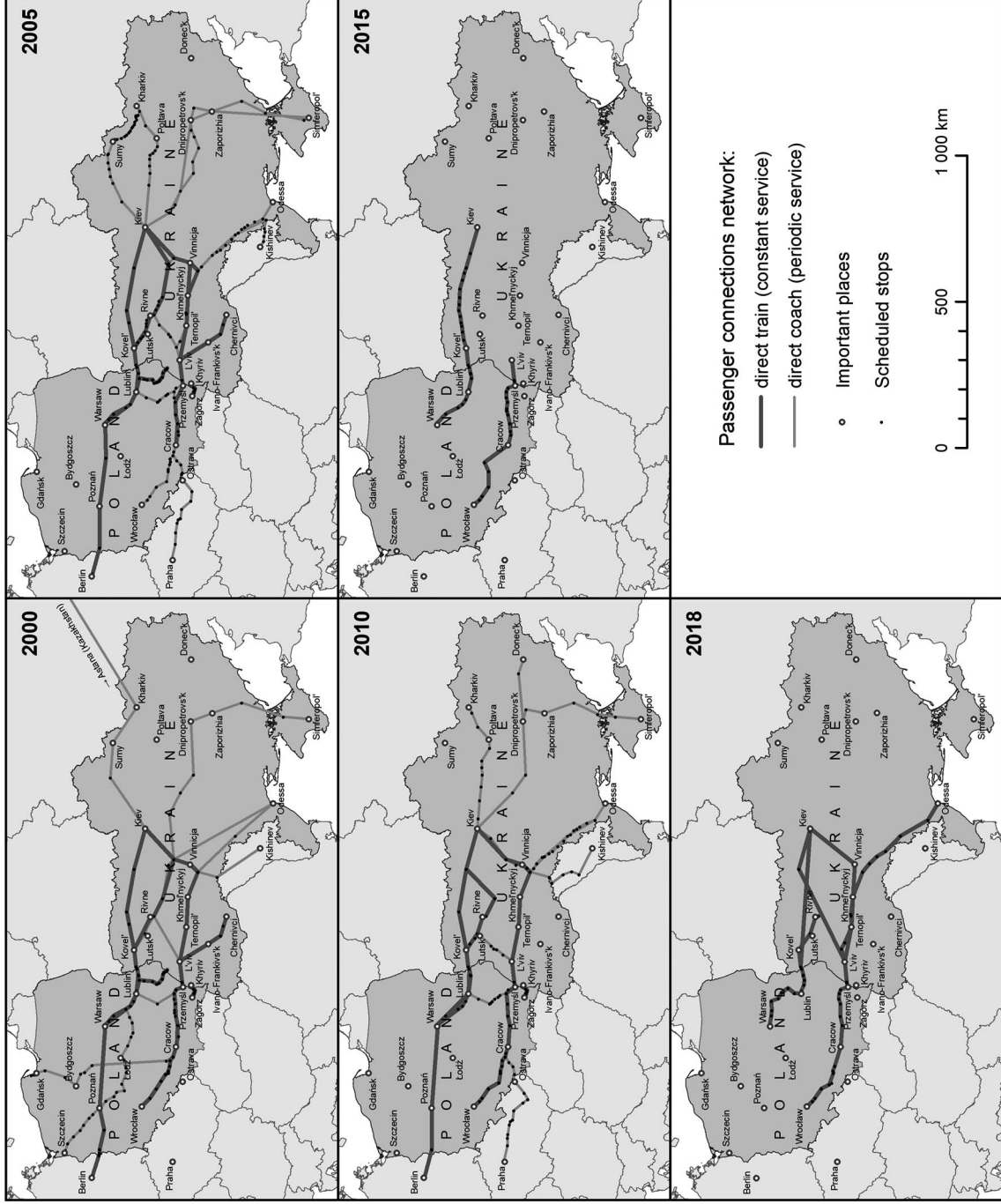


Fig. 13. Spatial changes in passenger networks of direct rail connections between Poland and Ukraine
Source: Own elaboration based on Network Train Timetable

A certain breakthrough in cross-border connections between Poland and Ukraine can be associated with appointing a Polish manager Wojciech Balczun (former President of PKP Cargo) as President of the Ukrainian Railways. His term of office was Jun 2016 – Aug 2017. He initiated the launch of daily express connections on broad gauge tracks on the route Przemyśl–L’viv–Kiev, and fast connections for Chełm–Kovel’–Zdolbuniv. A modern rolling stock was applied, purchased in the scope of organization of Euro 2012. The connections became very popular. In 2018, also night-time trains appeared on the route Przemyśl–Odessa, offering hope for reverting the negative tendencies and an increase in the involvement of rail.

Conclusions

The study period showed a continuous decrease in the importance of rail in two-way passenger traffic between Poland and Ukraine. Cross-border rail traffic proved completely inflexible towards systemic (transformation), geopolitical (visa and customs regulations), and sectoral transformations (competition of other modes of transport). In this context, it is possible to designate several periods of loss of importance of rail with different dominant determining factors:

- decade of the 1990’s, when the situation was caused by the implementation of the economic situation (the previous position of the rail was maintained through the regulation of the centrally planned economy), in the boom of near-border trade, competition of bus transport, and mass motorization in Poland, and later also in Ukraine
- decade 2000–2011, when the situation was caused by general regress of rail (closing unprofitable connections, including cross-border connections), Poland’s accession to the EU and the Schengen Zone, and customs conditions
- current decade (2012–2016), when the basic factor seems to be the unattractive offer of carriers and lost competition not only with individual transport (which already occurred before), but also with public bus and air transport

Whereas the former two periods are related to objective economic and political processes (to a certain degree, the regress of cross-border rail traffic probably could not be avoided), the current period is strongly determined by the actual transport policy of both countries and activities of carriers. A vast increase in traffic from Ukraine offers a chance for an increase in the role of rail transport. Only the Ukrainian Railways showed initiative so far, launching daily connections on routes Przemyśl–L’viv–Kiev and Chełm–Kovel’–Zdolbuniv. Further development in the scope of local crossings will require greater involvement of the Polish side which has been lacking so far.

The spatial distribution of rail traffic, analyzed in the dynamic approach, points to the initial deconcentration followed by concentration of two-way connections. Initially, an attempt was taken to maintain the role of rail transport in rapidly growing (in the 1990’s) Polish-Ukrainian traffic. It involved the reactivation of previously inactive lines, including fragments of normal gauge track infrastructure in Ukraine (among others, routes Malhowice–Khyriv–Krościenko and Hrebene – Rava Rus’ka), as well as broad gauge infrastructure in Poland (LHS line through Hrubieszów). The attempt was unsuccessful. Local lines were not attractive for passengers, due aspects such as low speeds of the trains, and competitive bus connections. The current process of concentration of traffic on two main lines is quite natural in such conditions. It is also a consequence of the modernization of the routes in Poland and Ukraine, offering a chance for competitive travel times.

As a result of the current geopolitical situation, Polish-Ukrainian rail connections are useful almost exclusively to citizens of Ukraine, and Poland to a lesser degree. Historical data confirm, however, that transport of citizens of third countries is also possible.

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