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## LOGISTICS APPROACHES TO STABILIZATION AND DEVELOPMENT OF TOURISM ACTIVITIES DURING THE PANDEMIC

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### ABSTRACT

The relevance of the problem under study is stipulated by the need to stabilize the market for tourist services in existing restrictions caused by the SARS-CoV-2 pandemic. The purpose of the research: The purpose of the article is to develop integrated measures for the formation of transport and logistics clusters to increase the synergetic effect of the proposed activities aimed at raising the mobility level of potential consumers of tourist services. Methods of the research: The main research methods include predicting and simulating; they make it possible to consider the problem of forming the package of tourist and transport services as a process of targeted monitoring and optimization of tourist routs. Results of the research: The article presents the concept of creation of the network of transport and tourist clusters in Poland and its functioning; large rail carriers are the core of the clusters. Practical significance: The proposed models for the formation of a package of tourist services are aimed at increasing the synergetic effect for all cluster participants, as well as at the development of tourist activities during the pandemic.

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### INTRODUCTION

Tourism is a complex and many-sided phenomenon relating to many aspects of human life. Based on Oxford English Dictionary (2005), tourism is not only travel for pleasure, but also a multifunctional and complex business of organizing tours, as well as attracting, accommodating and organizing leisure activities for tourists. From an economic point of view, tourism belongs to the service sector, which is considered to be the most dynamically developing sector of the economy. Based on Panasiuk (2004, tourist services have traditionally played an important role in organizing economic activity and had a significant share in the

economies of many countries. Before the outbreak of the SARS-CoV-2 pandemic, the global tourism sector generated about \$ 1.7 trillion annually. However, the tourism industry is currently undergoing severe crisis. Although similar phenomena, which are associated with the drops in the volume of tourist activity, based on UNWTO World Tourism (2010), were observed before (during the economic recession of 2008-2009, as well as due to the outbreak of the H1N1 influenza virus in 2009); the crisis of the late 2000s had the consequences for tourism, which are tens of times less negative than they are now. Since March 2020, the COVID-19 pandemic has actually led to the sharp drop in the

tourism business. Based on UNWTO World Tourism (2010), the number of international travels around the world fell by  $\frac{3}{4}$  in 2020, resulting in the global financial loss of \$ 1.3 trillion and the ruin of many business entities relating to tourism.

Poland is one of the countries affected by COVID-19. Based on Service of The Republic Of Poland (2021), the state is currently taking a lot of measures to stabilize the situation in the ongoing pandemic. But most of the activities have priorities of the epidemic nature, which relate a little to the maintenance of the tourism sector. In these conditions, representatives of the Polish tourism industry are actually left on their own and have to search for the ways of the survival by themselves. Based on Roman (2017), collective actions, rather than individual ones, can be used for the stabilization and development of tourism activities in such conditions. Due to the fact that there is a critical shortage of own resources of travel companies for solving the problems concerning the consequences of the pandemic, the support and capital from outside are needed. Fund-raising becomes possible and effective way in case there is a mutually beneficial cooperation of partners specialized in this field, complementing each other with resources. Therefore, to stabilize the negative impact of the pandemic, it was proposed to form tourist logistics clusters, which, based on Marshall (1979) and Porter (1980), are traditionally generated around the most powerful participants. The article presents the key principles for the formation of tourist logistics clusters; large carriers make the core (first of all, Polish railway transport companies, which are still inactive in this market segment).

Based on Hall (2008), four main roles are traditionally predetermined for the transport industry in tourism: integration of the points of departure (place of residence) and points of destination (place of travel); ensuring mobility within the region/country; ensuring mobility of access to tourist attractions, as well as the provision with the rare vehicles and infrastructure as the tourist sites. Prediction of the consequences of COVID-19 for the Polish transport industry, which is carried out in the article, emphasizes the need to diversify the activities of the railway transport companies (within the newly formed tourism cluster) by providing new types of logistics and digital services based on the Agile system (Aloshynskiy and Bilan, 2013).

The purpose of this work is to develop integrated measures for the formation of a new type of logistics services aimed at stabilizing tourism and transport activities during the pandemic. The main hypothesis of the article is in the following: to stabilize and develop tourism, the networks of tourism and logistics clusters should be performed around large carrier companies; it will expand the possibilities of attracting new customers (including individual ones) and increase the mobility of potential consumers of travel services (Aloshynskiy and Prymachenko, 2018).

In the course of the research, the following methods were used: theoretical (analysis; synthesis; specification; generalization, simulation); diagnostic (questionnaire; prediction); empirical (studying the experience of organizing the tourism activities and regulatory documentation); methods of mathematical statistics and graphical representation of the results (IT service for the tourism industry, 2021).

#### **Statistical data**

Before the outbreak of the SARS-CoV-2 pandemic, annual revenues, generated by the global tourism industry, reached \$ 1.7 trillion. However, due to the exacerbation of COVID-19 and the subsequent restrictions, the United Nations World Tourism Organization (UNWTO) recorded a 74% decline in the volume of tourist activity in its final reports for 2020. Globally, this has led to the consequences well beyond the most pessimistic predictions:

- decrease in the number of foreign tourists by 1.2 trillion (compared to 2019),
- global financial losses of the world tourism sector - \$ 1.3 trillion (11 times more than losses from the previous financial crisis in 2009),
- losses of employment - 120 million people,
- introduction of the border and transport restrictions.

At the beginning of 2021 (after tightening of the restrictions on internal and international travel) another decline in world tourism was recorded almost in all countries. The identification of new strains of the SARS-CoV-2 virus has led to the cancellation of alleviation of travel restrictions, especially in Asia, the Pacific region and Europe, according to UNWTO. In the first quarter of 2021, the crisis situation in the tourism industry worsened even more: UNWTO showed another 87% decrease in the activity of international tourism

compared to 2020 (Aloshynskiy *et al.*, 2012). In the second quarter of 2021 (after the partial vaccination and significant decrease in the incidence), the situation was improved, but not stabilized in many countries. Firstly, this happened due to the need either to have a vaccination passport, or to stay at least 10 days of home quarantine when traveling abroad, or to undergo paid tests.

However, the level of vaccination is still insufficient among tourists. For example, at the end of July 2021, 57.4% of people were vaccinated in Austria, 68% - in the UK, 64.6% - in Spain, 61.4% - in Italy, 60% - in Germany, 47.4% - in Poland, 59% - in France, etc. At the same time, vaccination rates are low in many countries (Belarus – 7.4%, Ukraine – 7.1%, etc.).

The second reason for instability relates to the constant virus mutations (for example, the Delta strain) and the emergence of new zones of epidemic. In addition, the limits for travelling abroad are caused by the instability of the financial situation of potential tourists (exacerbated in the summer of 2021 by the consequences of floods in China, Turkey, Germany, Belgium and other countries of the world) (UNWTO World Tourism Organization, 2009; 2010; 2020). Naturally, the drop of the tourism industry has

negatively affected the economies of many countries. Although across the EU, the impact of the pandemic on tourism led to only 0.7% drop in GDP in 2020; the differences among the certain countries are huge<sup>16-17</sup>. This relates to the European countries which are specialized in export (Germany, Great Britain, etc.) and tourism (Spain, Greece, Portugal, etc.). For example, in Spain, the growth of tourism income was 1.5 per cent for every 5 per cent of GDP growth until 2020; in other tourist countries it was from 2 to 4 per cent. Spain (11.8% of national GDP) and Portugal (8.0%) are the countries where the dependence of the economy on the tourism industry was the greatest (see Fig.1). The great economic significance of tourism is also noted in France, Greece, Hungary, Austria, Italy and even Germany. Thus, the crisis led to a significant decrease in GDP in the countries depending heavily on tourism: in France – by 1.3%, in Italy – by 1.9%, in Spain – by 8%, in Portugal – by 12%, in Greece – by 16 %<sup>16-17</sup>. The opposite situation is in the so-called exporting tourist countries, where the residents preferred to spend money traveling within their country in 2020-2021.

The largest beneficiaries of this situation are the following countries: Germany (GDP increased by 2.8%), Great Britain (by 1.2%) and Sweden (by 1.2%).

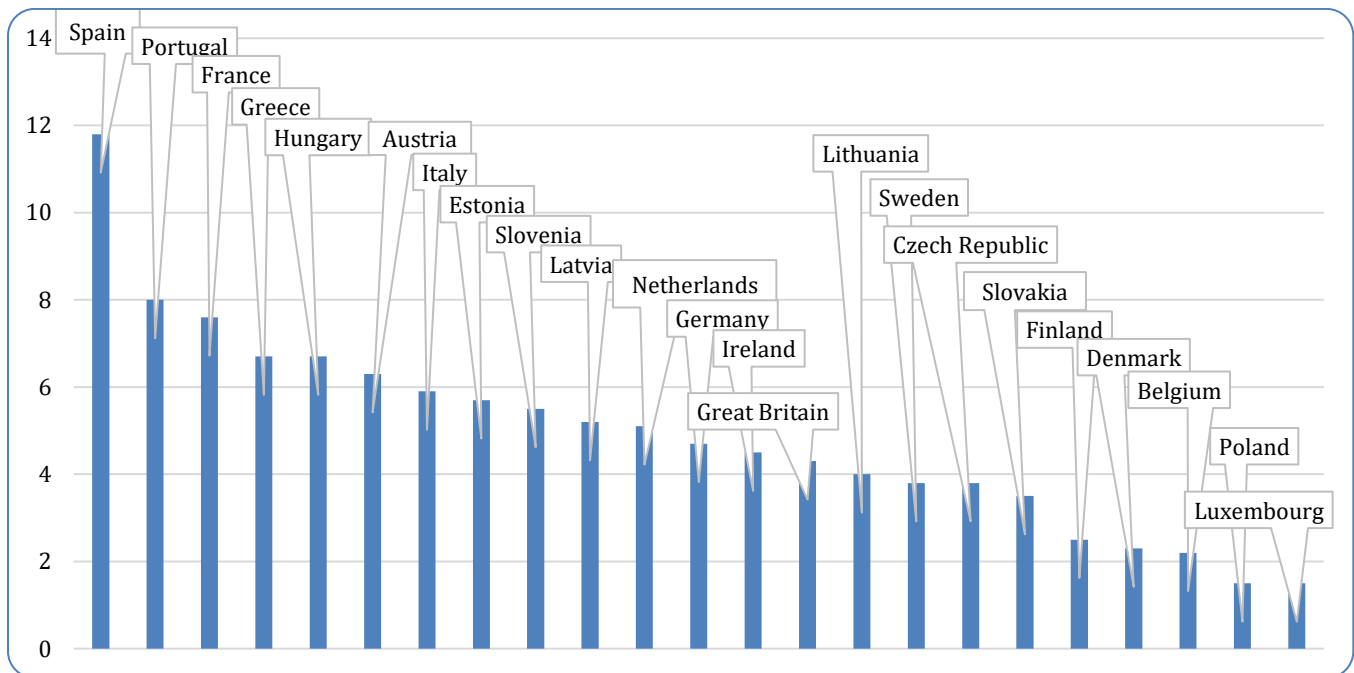


Figure 1. Percentage participation of the tourism industry in the economy of the EU countries. Source: Leszczyński, 2020.

Regarding the fact that the research, given in the article, is more concerned with the problems of stabilization and development of the tourist activity in Poland, the consequences of the epidemic for this state will be further analyzed in detail. Polish Economic Institute (Polski Instytut Ekonomiczny, PIE), found the Polish tourism industry generated in total 140.92 billion zloty (PLN) of the added value in 2018. The production effect was 5.3. This meant that each PLN 1 generated in the tourism industry, contributed to the creation of additional PLN 4.3 of added value. In 2019, Poland recorded a further increasing role of the tourism sector in forming the country's GDP to the level of 6.3%. In 2018, a number of foreign tourists staying overnight in Poland was about 7.1 million, and in 2019 it was already

7.5 million (5.6% more.). The number of the domestic tourists also increased annually by 5-6% - 26.8 million (in 2018) and 28.2 million (in 2019) respectively (Peeters *et al.*, 2007). However, only negative changes were observed in the development trend of Polish tourism in 2020 because of the SARS-CoV-2. Despite the fact that Poland, like Germany and Sweden, also specializes more in tourism to other countries, it did not become the beneficiary of the global tourism crisis and ended 2020 with a negative balance in the economy. Since the share of tourism in Poland's GDP was only about 1.3%, the impact of the sharp drop in the tourism industry on the decline in GDP in 2020 was insignificant (Figure 2). A decrease of 2.8% was recorded if compared to 2019 (as against an increase of 4.5% in 2019).

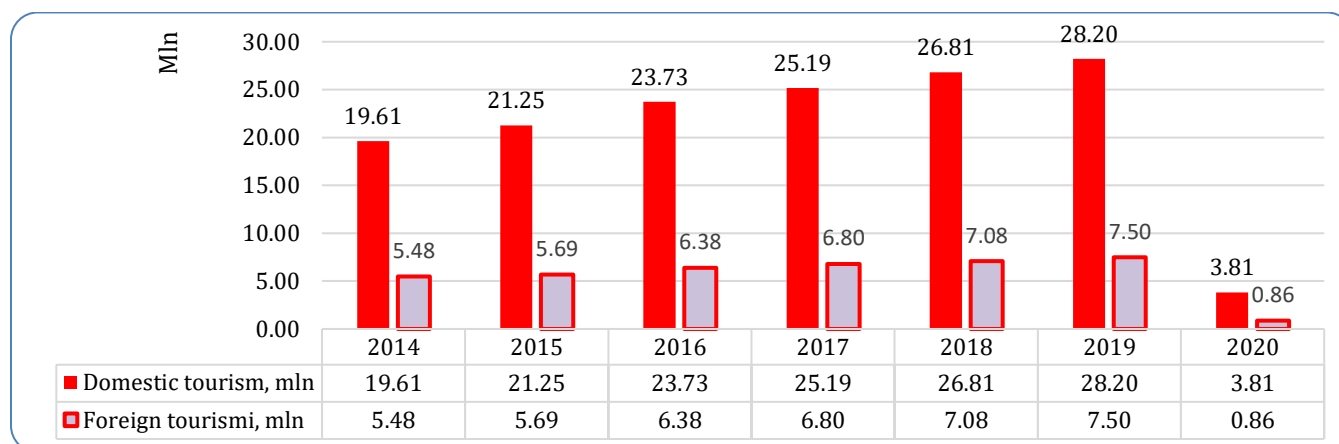


Figure 2. Tourism activities in Poland in 2014-2020.

In recent years, the Polish tourism industry, which was an important component of the labor market, has provided the support in total for about 1.36 million people. (Polish tourist organization, 2021). Most of them are currently at constant risk of losing their jobs (due to the closure of hotels, restaurants, reorganization of working conditions at sea and mountains resorts, etc.). For a detailed assessment, we have analyzed the studies of the impact of quarantine on related industries, which were carried out by the Gdansk Tourism Organization (pol. Gdańska Organizacja Turystyczna, GOT) and the Pomeranian Regional Tourist Organization (Pomorska Regionalna Organizacja Turystyczna, PROT). The study involved primarily:

- representatives of the hotels and accommodation facilities (52%, including 6% of short-term rent);

- guides and tour guides (14%);
- representatives of the catering industry (8%);
- representatives of the travel agencies (6%);
- representatives of the tourist sites/ museums, etc. (8%).

According to the study, the overwhelming majority (90%) of representatives of the Polish tourism industry estimated already in March that the situation had either a very large (72%) or large (18%) negative impact on the state of their companies. Based on the questionnaire, GOT made the predictive estimates, according to which the negative situation could be stabilized since June 2020. But in fact (after conducting similar studies in the spring of 2021), it was noted that the real epidemiological situation caused a more global problem that destroyed the traditional business created over the years. According to the results of 2020, restrictions

related to the quarantine had either a very large (93%) or large (7%) negative impact on the representatives of the Polish tourism industry.

**The situation in Poland**

The Polish government took certain steps to reduce a negative impact of the epidemiological situation. But it is quite predictable that the main focus was not so much on financial losses in the tourism industry, but on the possible consequences for the health and lives of citizens. It should be noted that effective actions at the state level during the first wave of the epidemic actually led to the stabilization of the epidemiological situation in Poland, where the percentage of infection of the population was on average 4.2 times lower than in other countries (Figure 3). According to a preliminary analysis of the previous tourist season, many tourists from countries such as Germany, Sweden, etc., due to the fear of coronavirus in 2020, preferred to travel to the sea coast to the safer neighboring Polish area instead of traveling abroad to southern Europe (Italy, Spain,

France, Portugal, etc.). Optimistic predictions for 2021, 2022 and later years concerning a possible change in the preferences of tourists from Germany, Sweden, England and others in favor of Polish tourism were strengthened in fact by the unchanged trends in early autumn 2020 (the percentage of the infected population in Poland remained around on average of 3.4 times less than in other countries). However, with the beginning of the second and third waves of the epidemic since mid-October 2020, a decrease in the tourism level in Poland to zero was recorded. In addition, from October 2020 to June 2021, there was a significant deterioration of the epidemiological situation. Of course, in such circumstances, it is already difficult for Poland to compete in the European tourism market. Although the agreed favorable conditions (see Figure 3) for the change in the previous year tourists' preferences from Germany, Sweden, Great Britain and others, have already led to an increase in the share of foreign tourists in Gdansk and other cities of the Baltic region since June 2020.

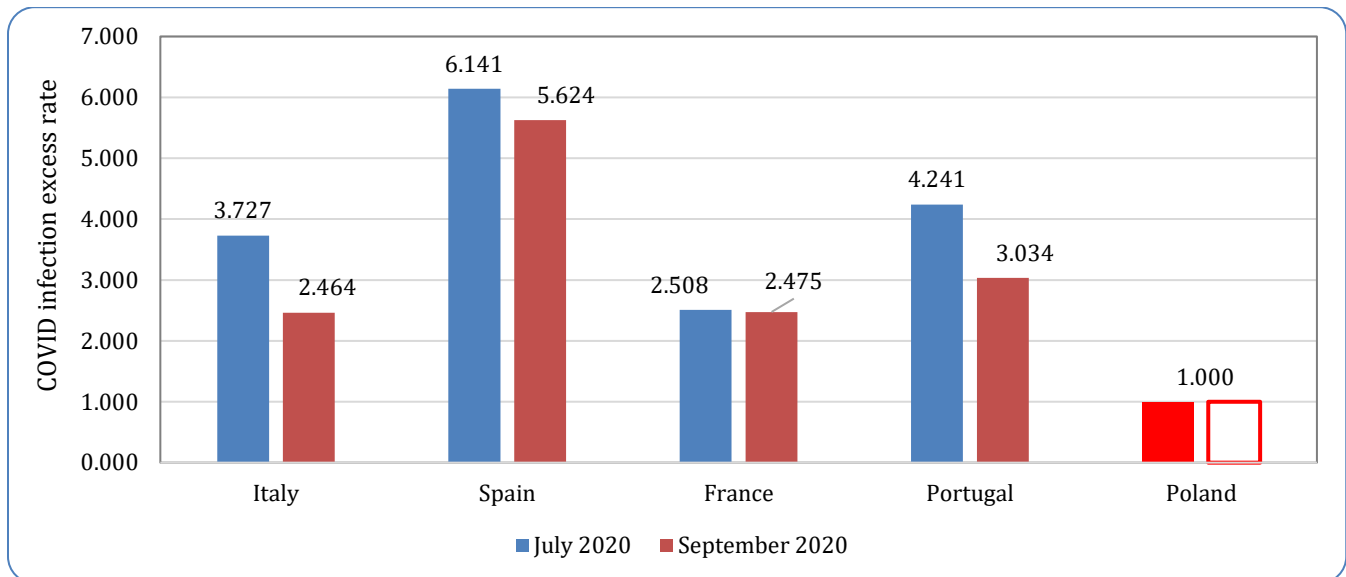


Figure 3. Poland COVID infection excess rate (2020).

In absolute terms it is possible to assume that there is a decline in indicators. 44% fewer tourists visited Gdansk in 2020 (in 2019 there were more than 3.5 million). A similar situation is observed in Warsaw (a drop in tourism by 60.8%), Krakow (by 43%, including foreign tourists - by 75%), Wroclaw (by 47.4%, including for foreign tourists - by 65.1%)<sup>21</sup> etc. In this situation, the turnover of companies in the tourism industry

decreased by 95% during the introduction of numerous restrictions; some entrepreneurs declared bankruptcy. According to the latest UNWTO report for July 2021, it could take three to four years for the tourism industry to return to 2019 levels. To solve the problem, organizational measures were proposed to accelerate the stabilization of the negative impact of the consequences of COVID-19 on the activities of small and

medium-sized businesses, as well as to turn Poland into a beneficiary of tourism in the near future.

To stabilize the activity and development of economic entities, including those which are related to tourism, as well as to maintain their competitiveness, both individual (independent functioning in the market) and collective actions (in cooperation) can be used <sup>8</sup>. It follows from the analysis given above that small and medium-sized businesses do not currently have enough own development opportunities (human, material, financial, informational) to solve the problem of the consequences of the pandemic. They need the outside support and capital. However, no one (it is understandable) is interested in financial or any other support from other companies. Fund-raising becomes possible and effective if there is only mutually beneficial cooperation of partners specialized in the given field, complementing each other with resources.

That is why, it is necessary to form a tourist complex of macro-regions and all of Poland, which will include all economic entities interested in such cooperation. In this regard, the concept of clusters is preferable. The key function of the clusters is to increase the level of logistic mobility of potential customers of the tourism services. To increase the competitiveness of Polish regions, it is necessary to form a network of mobile, interconnected macro-regional tourism and logistics clusters (Tourism and logistics cluster - TLC). Their total number can range from 5 (West, North, Central, South, East) to 7 (North - Western, South-Western, Northern, Central, Mazovian, Southern, Eastern) for Poland (Opińska, 2020).

According to the definition of the theory developers (A Marshall <sup>9</sup> and M. Porter <sup>10</sup>), a cluster is a geographic, spatially focused set of mutually dependent specialized enterprises, institutions, organizations, as well as consumers (including individuals), formally or informally connected in certain joint industries and complementing each other by a system of vertical and horizontal links. During the pandemic, the cluster approach should replace the traditional competitive approach, making it possible to benefit each of the entities of tourism activity, because the cluster policy is focused on a set of actions that link the industries.

The creation and operation of macro-regional TLCs can become an effective tool to support small and medium-sized representatives of the tourism business who are most affected by the consequences of COVID-19 (travel agencies and bureaus, hotels, museums, souvenir shops,

etc.). This will increase the overall (synergetic) efficiency of tourism organizations over time by reducing costs. Unlike the already existing clusters, TLC can join the companies that directly specialize in the tourists travel in addition to tourism companies. First of all, Polish rail carriers that are inactive in this market segment, which also had big problems during the pandemic. Despite the fact, that railway tourism was one of the first forms of modern travel in the middle of the 19th century (especially due to the possibility of simultaneous transportation of a large number of passengers between remote locations). This is the type of transportation in tourism which does not actually use its potential today. Traditionally, air and bus services have a greater weight in international tourism on the territory of Poland when organizing group travel. For example, in Europe the part of land transport in organized tourism was only 15–20% of passenger-kilometers before the pandemic (less than 10% was by railway); this is certainly less than in air transport. The railway as a means of transportation was used by a few Polish tour operators, mainly abroad and not in Poland. In addition, the role of railways in European tourism is most commonly limited to either the passengers flow servicing for tourists transfers at the airports, or providing car-carrying wagons. Based on the limited range of services offered by the railway transport, potential tourists and travel agencies formed their choice of mobile operators, which was not in favor of the railway.

However, passenger travel conditions have changed significantly during the pandemic. For example, the most popular bus carrier in Europe Flixbus (in 2019 it carried 62 million passengers, including 4.7 million in Poland) practically froze all its transportation in Poland in 2020, having left only 11 routes (4 of them are domestic ones). Even though, the trend indicated the opening of Flixbus 40 new routes in Poland annually before quarantine. A similar situation was observed in air traffic in 2020, when low-cost carriers, which were so popular among tourists (Wizzair, Ryanair, etc.), were actually forced to cancel (to postpone at best) most of their flights. At the same time, railway transport was the most reliable and stable (in terms of the minimum percentage of canceled flights) when servicing mass traffic in 2020 and 2021. This significantly changed the sympathies of the tourists who preferred to travel without using their own individual vehicle. In this regard, today the railway transport has a unique chance to diversify its activities

towards ensuring the logistics mobility of the population (including tourist trips organizing), that is, to become one of the key participants in tourist clusters.

Market diversification (including the tourism and transport industry) should be carried out in three stages: identification of potential TLC participants and formation of associative groups; integration of associative groups into joint-stock companies; organization of holding companies. The first step

towards the formation of holding companies is the creation of individual associative groups on the basis of the small voluntary associations of carriers, entities of tourism activities and other participants, provided that their independence in operational economic activities is remained. According to the authors, economic entities proposed in Fig. 4 can voluntarily join potential participants of macro-regional TLCs (Service of the Republic of Poland, 2021).

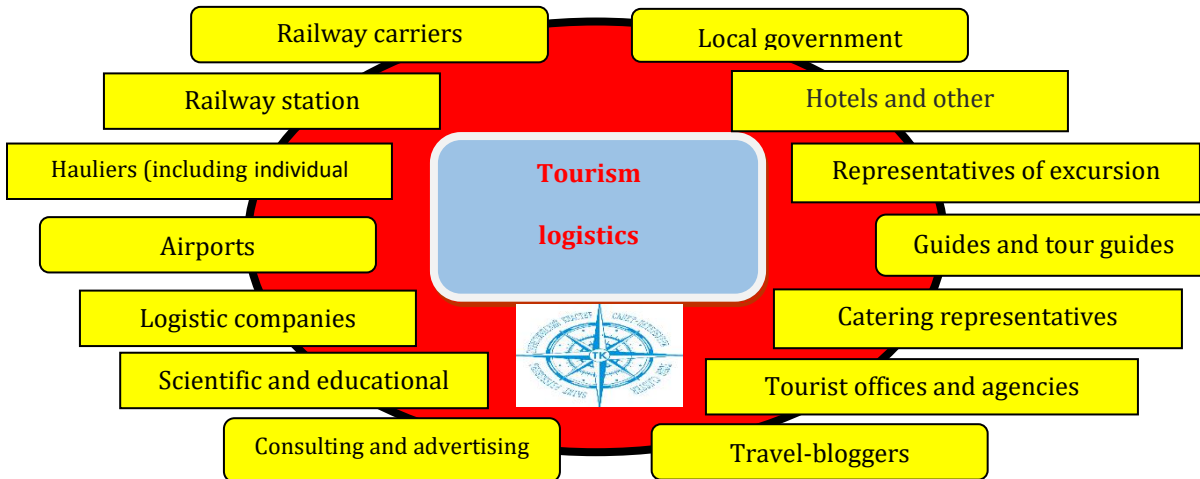


Figure 4. Main participants of the TLC region.

A number of questions arise. Does the railway need this diversification of activities and what will the potential participation in tourist clusters give it? First of all, expanding the range of activities will increase passenger traffic, and secondly, it will stabilize the train capacity rate. According to the studies carried out, the number of

passengers on the Polish railway network decreased by 37.73% (fig. 5), and transportation work (it is measured in passenger-kilometer) - by 42.65% in 2020. In 2021, which is considered to be more stable year, these indicators are also recorded at the level, which is significantly lower than before the quarantine.

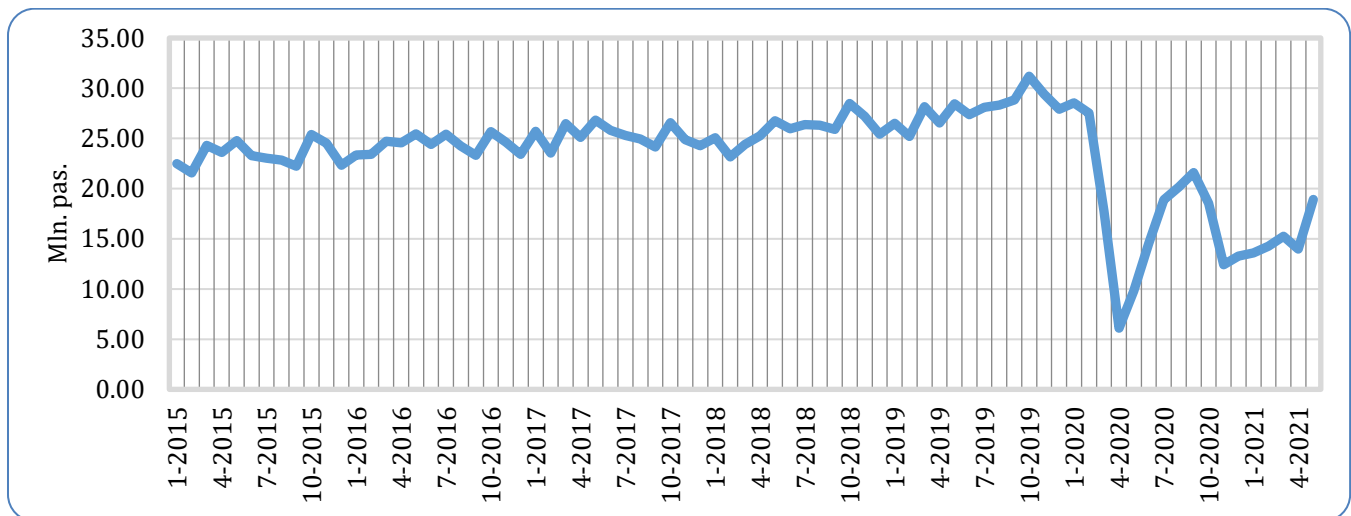


Figure 5. Number of passengers carried by Polish railways (2015-2021).

Figure 5 shows that all drops in traffic concur with three waves of exacerbation of the coronavirus in Poland: 1) March-May 2020; 2) October 2020 - January 2021, 3) April 2021). It can also be seen from the graphical dependencies that the growing trend of recent years has changed to the almost unpredictable since March 2020; its strong variability exceeds 100%. Based on the calculations, the coefficient of variability is the following:  $v = 19.503 / 16.039 = 1.216$ , that is, 121.6% (at the standard up to 10-25%).

**Analytical data**

Taking into account the unpredictability of the epidemic, as well as the traditional seasonal fluctuations in the passenger traffic, it is difficult to predict the return of rail passenger traffic to the level before the pandemic with this level of volatility. Based on Aloszynski (2021), the results of calculations, obtained by the author for traditional mathematical predicting models (time-series models and polynomial regression models), indicate an insufficient level of predicting adequacy. The coefficient of determination ( $R^2$ ) is within  $0.13 < R^2 < 0.59$  for most of the traditionally used models, even with the use of exponential smoothing. It corresponds to an unacceptable or weak level of predicting adequacy (at the same time, a sufficient level of forecast accuracy is characterized by  $R^2 > 0.60$ , and a very high level -  $R^2 > 0.90$ ). Therefore, a hybrid mathematical model was used, in which the parabola model and the Holt model were combined with the exponential smoothing to

increase the level of adequacy of predictive values (Figure 6). Based on the obtained parabolic model  $X_{(2)} = a_0 + a_1 \cdot t + a_2 \cdot t^2 = 20,0744 - 1,1173 \cdot t + 0,0642 \cdot t^2$  (red dashed line) which was put over the Holt's model (green dashed line), a predicted trend in the level of passenger traffic on Polish railways under the ongoing pandemic (brown solid line) was determined. The obtained coefficient of determination for the hybrid model ( $R^2 = 0.906$ ) indicates a very high level of prediction adequacy.

From the obtained dependencies (see Fig. 6), we can conclude that passenger traffic can reach the pre-quarantine trend level in the summer of 2022 provided the most optimistic forecast (dashed red line). However, this prediction is not ideal one due to the fact that it does not take into account the seasonality factor and is based on the shaky hypothesis of stabilization of the epidemic situation since the summer of 2021. So, taking into account possible new waves of the epidemic (autumn-winter 2021/2022 and winter 2022/2023), a return to the pre-quarantine level can be expected no earlier than since August 2023 (subject to the final stabilization of the sanitary and epidemiological situation since spring 2023). The brown line (see Figure 6) is a predictive trend of the obtained hybrid model, taking into account the unpredictability of the epidemic and traditional seasonal fluctuations in passenger traffic. This indicates that the prospect of leveling losses, caused by a 40% decrease in passenger traffic during the pandemic, may take several years for the Polish railways.

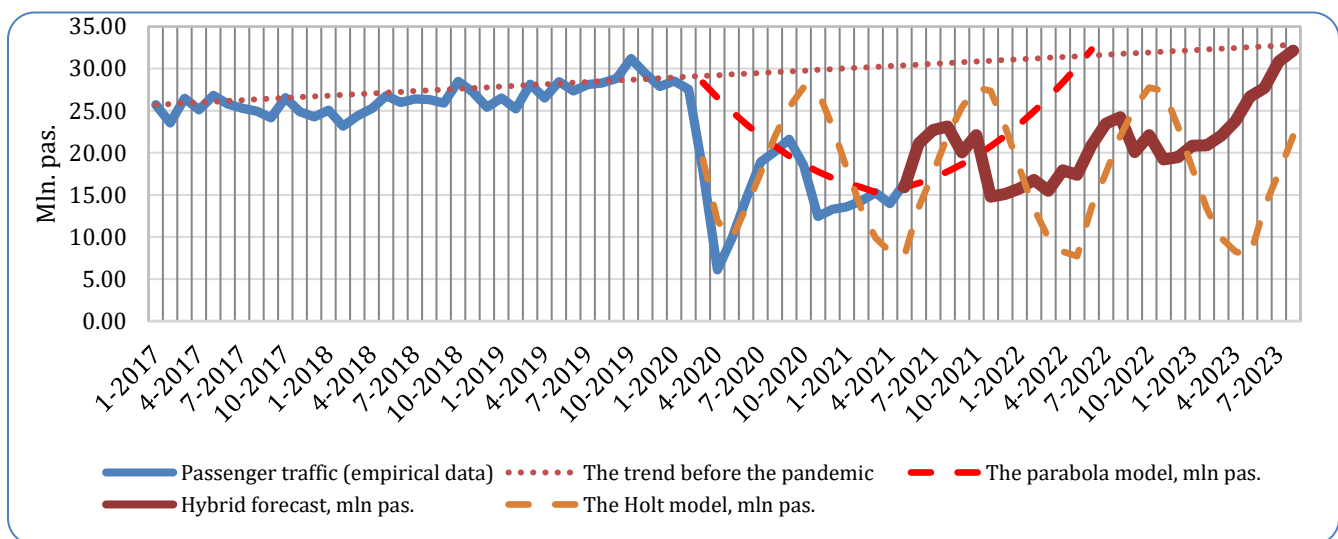


Figure 6. Predicting passenger traffic on Polish railways during the pandemic.



Due to the fact that both rail carriers and travel companies are now experiencing great problems, they are interested in cooperation with other business entities to search for potential passengers. This proves that companies that directly specialize in the tourists transportation (primarily railways) can join potential tourist clusters. Therefore, the creation of TLC can become a new stage in the development of not only the tourism, but also the transport industry. The main motivation for integration of tourism and transport entities is the fact that the higher the transport mobility of the population, the higher the total income of the state and all participants in the aggregate cluster (Alyoshinskiy *et al*, 2011).

A similar cluster approach was used by German specialists during the preparations for the 2006 FIFA World Cup (Irvine, 2016). It has been proven in Germany that tourists spent 40-50% more money for two days spent in different cities than for two days in one city. Therefore, the organizers created such conditions, when each national team played no more than one match in one city. For example, the Polish national team and, accordingly, its fans during 3 games specially moved to three different cities in Germany (Gelsenkirchen, Dortmund and Hannover). The national team of Ukraine (5 games) moved to five cities (Leipzig, Hamburg, Berlin, Cologne and again to Hamburg) etc.

To increase the mobility of tourists and simplify the system of movement around the country during the FIFA World Cup in Germany, special fares with discounts on rail travel were introduced for fans with tickets to any football match (even those that have already been played). It was proved during the World Cup that if a passenger has 30% discount for his/her travel, there is a great possibility for buying a ticket and, accordingly, moving to another city (where money will be spent again), has been 3 times increasing<sup>23</sup>. In so doing, the compensation for reduced incomes of carriers was directed not to the transport company but to the local governments, which evenly distributed the income received. The successful experience of Germany was used by Austria and Switzerland at the following major sporting events in 2008, and by Ukraine in 2012 (but not by Poland) (Central Statistical Office, 2021).

A similar cluster approach to cooperation between carriers and the tourism industry, for example, has recently been applied in the UK. Cheap flights (lowcost) are stimulated and this covers the losses of airline

companies due to the super profits received because of the significant increase in tourist traffic.

Due to the fact that the cluster must be created around the strongest participant, Polish State Railways (PKP) together with the detached companies (PR, SKM, PKP Intercity and others) can offer their services to become the core of the cluster. Leading railway companies from Germany, France, Spain, China, South Korea, etc. can serve as an example of the implementation of the cluster approach for Polish railways. For example, German Railways (Deutsche Bahn) or the National Society of French Railways (SNCF) currently not only organize rail transport, but also offer the road transport services, as well as comprehensive tourist tours with simultaneous hotel accommodation to their customers (Petukhova, 2020).

The realization of the process of diversification of the Polish tourism market from the railway carrier companies side requires a description of specific steps in the strategy implementation for promoting tourism services.

It is evident that traditionally organized travel groups, which will potentially generate the majority of TLC's revenue can be the potential clients of cluster services. But it is not necessary to limit the range of possibilities of cluster services so narrowly (Taylor and Ciechański, 2014).

According to the latest research of the founder of the modern marketing Philip Kotler<sup>28</sup>, the traditional group classification of service consumers (by gender, age, social status, place of residence, etc.) does not already work in the modern world. It is aggravated by the split and isolation of society because of the consequences of COVID-19 quarantine. So, when uniting potential clients into one organized tourist group, there is a very high probability that at least half of them will be dissatisfied due to the so-called conflict of interest (Wolska, 2021).

To interact optimally with the potential customers, it is necessary to think in terms of their categories and values. For example, Philip Kotler<sup>28</sup> distinguishes 5 such main categories today: 1) activists against the progress, 2) activists against the climate change, 3) vegetarians, 4) conservatives, 5) minimalists.

The 5th category of consumers, the so-called people who want to have a simple life, looks very promising for the development of the tourist services market. They are ready to earn less and consume less, needing only freedom of decision-making and movement. It is thanks

to this category of consumers that tourism, as well as services such as loans and rentals (which can also be offered by companies integrated into the cluster), will develop.

With this in mind, it is not surprising that recently the demand for independent (unorganized) domestic and international passenger and tourist transportation (most often by 2-4 people) has significantly increased among the Poles and residents of Europe (Hall, 2008). This is due to the fact that individual needs for the free choice of locations and time of stay in some cities are practically not taken into account in organized group bus tours. In addition, the tourist is very often forced to visit not only interesting, but also less attractive places in organized bus tours (for example, cities or locations already visited before). At the same time, there is not enough time for sites of his/her interest or they are outside the route of an organized group excursion. That is, the tourist is actually deprived of not only free time, but also initiative in most of such trips; this does not give an opportunity to explore independently a new city at a pace which is comfortable (Gdańsk Tourist Organization, 2020).

In addition, the risk of possible cancellations or postponements of already planned and even paid excursion tours has recently increased due to quarantine (COVID-19), or incomplete groups. Individual tourists want to be (and can!) free and independent from changes in quarantine conditions. For example, at the beginning of September 2020, 42 states entered the red zone for Poland (prohibited visits, including air traffic), including countries with traditionally developed tourism (Spain, Malta, etc.). In the summer of 2021 Portugal, Great Britain, India, Russia, etc. entered the red zone due to the spread of Delta virus mutations.

Since July 1, 2021, the quarantine rules have been changed upon arrival of travelers from countries such as Turkey, Egypt, Tunisia or Macedonia (mandatory quarantine period has been introduced). All of these and many other restrictive changes were introduced sharply, catching most potential tourists by surprise. An unexpected introduction of quarantine restrictions forces many tourists to abandon the planned tour, as they may have at least two problems: financial (the cost of an antigen test is about PLN 150 / person) and more serious - organizational (the need for isolation from 7 to 21 days upon arrival in the country of destination or back). And although most countries (Germany, Belgium, the Netherlands, etc.) introduced concessions for the

possibility of visiting their countries at the end of July 2021, it is rather unpredictable in current situation which state and at what moment may be closed for visiting.

There is no doubt that the situation in international tourism will be very unstable again in the coming months and even in the next 2022. At the same time, an individual tourist (both vaccinated and not yet vaccinated for some reason) plans his/her vacation independently and, accordingly, the time (date and period) of the trip (Polish tourist organization, 2021).

Such tourists traditionally use their own vehicles (if they have one) traveling around Europe. But having a car is often associated with additional problems and costs (for example, difficulty in parking in central areas, especially in places unknown to tourists, limited sleep and relaxation on the road over several days, etc.). In addition, many tourists, arrive in Poland by plane (that is, without their own car) because of the long distances.

Therefore, a potential customer, cannot often use (or does not want) his/her own car for some reason or prefers a car rental service on the spot. By the way, a potential customer can also receive such a service (even possible with a personal guide-driver) from the certain company, which will be the part of the cluster.

On the one hand, an individual tourist often acts as a logistician of his/her travels when planning a trip on his own. But on the other hand, such a tourist (especially a foreign tourist!) does not have reliable data on the reliability and safety of transport networks, the availability of various types of transport, timetables and routes. And, the most importantly, not every potential client wants to make (or can) extra efforts for this, as well as spend precious time looking for solutions to the problems associated with route planning during the trip. So, in order to support decision-making, organization and coordination of individual (as well as group) flow of passengers and tourists, the tourist logistics cluster should have its own coordination (logistics) center. Then the potential customers, who have made a decision to make a trip on their own (depending on the factors which are the most important for them, as well as on the preferences of transport and other services), will be able to apply for travel services in a single information and management system of TLC. In turn, the cluster's coordination center will offer the most favorable options for visiting locations and tourist sites in terms of price, time and interest, as well as provide transport and, if

necessary, hotel and excursion services for potential clients (Service of the Republic of Poland, 2020).

Thus, the tourism logistics cluster should be completely based on digitalization (digital services) and the Agile system. Agile (Edge)<sup>12</sup> is a new business development system created in 2001. Flexibility is the main feature of the system. Therefore, it is necessary to comply with several terms when organizing the work of TLC:

1) interaction among people is more important than processes and tools;

2) a work product (travel or other) is more important than documentation;

3) cooperation with the client is more important than agreeing on the terms of the contract;

4) being ready to change is more important than the compliance with the original plan.

To implement the planned strategy, the task is set for systematization of the process of selecting competitive railway tourist routes. First of all, such a systematization of the route selecting process should be based on logistics principles. Therefore, an automated system for decision making support can be based on the following algorithm for performing consecutive operations:

1. Analysis of the customer's wishes (Internet survey).

2. Analysis, ranking and comparison of specified tourist destinations (taking into account the season of the planned tour).

3. Selection of places (cities, tourist locations) to visit.

4. Determination of the optimal sequence of visited places.

5. Detailed analysis of the tourist route (SWOT analysis is possible).

6. Simulating the process of selection of the most attractive options.

7. Choosing the best route option, informing a potential client.

8. Conditions negotiating, preliminary services ordering and booking by the TLC information management system.

9. Informative client support before departure, during the tour and after its end.

As it has already been described above, all the indicated operations can be built in a specially developed Internet or mobile application with multilingual support.

When submitting an online application, the customer fills in the questionnaire which gives the information

about the desired departure date, time of the trip, wishes to the carrier (train with places for lying or sitting, buses, etc.) and accommodation (hotel location, conditions or the possibility of overnight stays in transport).

For example, the customer has chosen an inexpensive trip for 4-5 days with the possibility of saving on lodging at the expense of 1-2-night travel (provided that he has at least 4.5-5 hours of free time available to get to know each city). Based on the data of the questionnaire, the analysis and comparison of possible tour options is carried out.

### **Determine the most rated places to visit**

To select the places of visit (based on the list of priorities and wishes of the customer), ABC / XYZ or a more complex analysis can be applied. It will allow determining the most rated places to visit for a particular customer within 4-5 days, taking into account the seasonality factor of demand for each direction (Prawda, 2020).

Based on the criterion for minimizing travel time and other input data, you can calculate the optimal sequence of visited places (for example, using the applications Solver, IBM CPLEX, MathLab (Figure 7)). But it is important to remember about the Agile (Edge) principle, which means that being ready for change is more important than compliance with the original plan.

A thorough analysis of the route, taking into account not only minimizing travel time, but also maximizing free time for visiting cities, the availability of desired attractions, cheapness, travel / accommodation comfort, and other factors is very important for tourists. After analyzing possible options based on available information (for example, on Internet services: <https://koleo.pl/>, <https://www.busradar.pl/>, <https://www.europodroze.pl/>, <https://sp.booking.com/>, [www.airbnb.pl](http://www.airbnb.pl), [www.roomguru.com](http://www.roomguru.com), etc.), a specially developed software application will select up to 10 most optimal route packages that meet the customer's wishes the best (Figure 8).

SWOT analysis can be performed for more accurate assessment of the proposed route packages (see Figure 8). It will determine the Strengths and Weaknesses of each option, as well as the Opportunities and Threats. Moreover, the analysis of potential opportunities and risks is of increased importance during the pandemic. For example, a SWOT analysis for a 5-day option (using

only rail transport (including night trains)) can look as the following (Table 1).

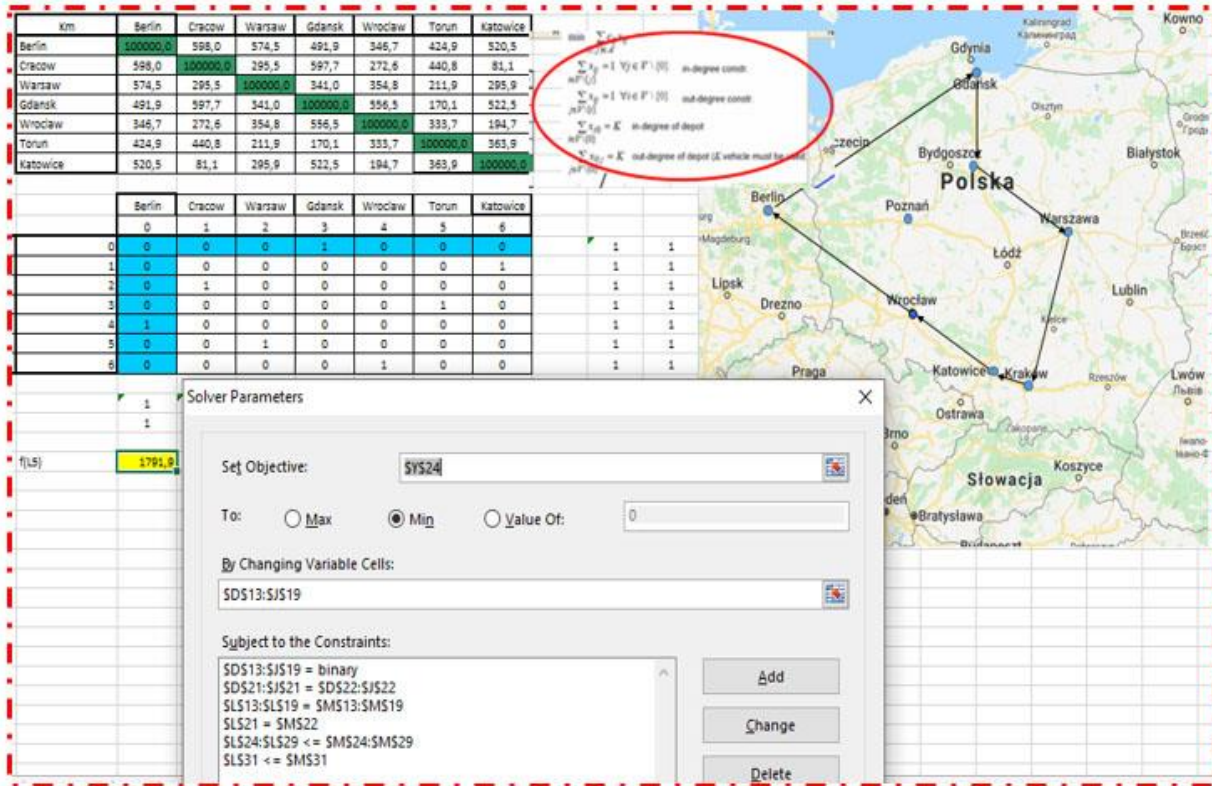


Figure 7. Fragment of the window interface of the software product for calculating the optimal sequence of visiting cities.

5 days	Point of departure	Point of arrival	Passenger carrier	Departure	Arrival	Time in transport	Price of transport, PLN	Free time	Price of hotels, PLN
Day									
1	Berlin	Gdansk	PKP IC SA	22-40	9-22	10.92	119.90	5.80	
	Gdansk	Torun	IC	15-14	17-34	2.33	36.40	4.50	132.00
2	Torun	Warsaw	TLK	8-05	11-20	3.25	38.50	7.50	
	Warsaw	Cracow	IC	18-48	21-32	2.25	42.00		145.00
3		Cracow						9.00	
	Cracow	Katowice	IC	18-50	20-45	1.92	13.00		240.00
4		Katowice						5.00	
	Katowice	Wroclaw	IC	14-51	17-10	2.32	32.20	5.00	159.00
5		Wroclaw						9.00	
	Wroclaw	Berlin	IC + RP	17-02	7-40	14.63	102.00		
SUM						37.62	384.00	45.80	676.00

5 days	Point of departure	Point of arrival	Passenger carrier	Departure	Arrival	Time in transport	Price of transport, PLN	Free time	Price of hotels, PLN
1	Berlin	Gdansk	Flix Bus	7-20	16-45	8.67	77.30	5.00	182.00
2	Gdansk	Torun	Flix Bus	8-30	11-00	2.50	30.00	8.20	
	Torun	Warsaw	Flix Bus	19-18	22-50	3.35	30.00		209.00
3		Warsaw						8.00	
	Warsaw	Cracow	Flix Bus	16-20	20-45	4.42	26.00		145.00
4		Cracow						8.50	
	Cracow	Katowice	Flix Bus	16-25	18-00	1.40	13.00	4.00	240.00
5		Katowice						5.50	
	Katowice	Wroclaw	Flix Bus	9-00	12-15	3.25	20.00		
	Wroclaw	Berlin	Flix Bus	17-45	22-05	4.25	51.50		
SUM						27.84	247.80	39.20	776.00

Figure 8. A fragment of the comparative analysis of routes (rail and bus service).

Table 1. An example of a SWOT analysis of a 5-day travel option (using railway transport (including night trains)).

Impact	Positive	Negative
	STRENGTHS (Si)	WEAKNESSES (Wi)
Internal	S1 – the fastest travel time	W1 – the highest cost of accomodation
	S2 – comparatively much free time	W2 – the highest cost of transport services
	S3 – no need to check in late at night	W3 – minimum free time in Gdansk
	S4 – high level of comfort when traveling	W4 – changes in the cities which are not included in the route
	OPPORTUNITIES (Oi)	THREATS (Ti)
External	O1 – comfortable conditions for recreation and sleep when traveling	T1 – risk of adverse weather conditions during free time at the seaside
	O2 – possibility of reallocation the time saved during the travel for free time at the places of visit	T2 – risk of tour cancellation
	O3 – possibility to spend all evenings in different cities, but not on the way	T3 – risk of timing problems when changing
	O4 – possibility of spending free time on the seaside (hotels in Gdansk and Sopot)	T4 – too little time to visit the city Sopot

Table 2. SWOT/TOWS analysis of 5-day travel option (using railway transport (including night trains)).

SWOT/TOWS		(+1)				(-1)			
		O1	O2	O3	O4	T1	T2	T3	T4
(+2)	S1	0	2	1	1	0	2	1	0
	S2	0	2	1	1	0	2	1	2
	S3	2	0	2	0	0	0	2	0
	S4	2	0	0	0	0	2	0	0
(-2)	W1	0	0	0	1	0	2	0	0
	W2	2	2	0	0	0	2	1	0
	W3	1	2	0	2	2	0	0	2
	W4	2	2	1	0	0	0	2	0

To increase the efficiency of the SWOT analysis, an automatic analysis of the interaction (SWOT / TOWS analysis) can be carried out:

- SO - will this strength allow this opportunity to be used?
- ST - will this strength help eliminate this threat?

- WO - does the weak side limit the ability to use this opportunity?

- WT - Does this weakness heighten the risks relating to this threat?

An example of the analysis results of the factors interaction is presented in the form of a matrix (tab. 2), where 0 - no interaction, 1 - weak interaction, 2 - strong interaction. Total score can be additionally calculated for each of the selected options. The most attractive tour option can be chosen, taking into account the additional opportunities and risks caused by the potential quarantine restrictions. The score for each group (Table 2) contains different impacts of the corresponding significance: positive (+2 points), strengthening (+1), weakening (-1) or negative (-2). The multiplication factor will range from -3 to 3 for each group: SO-positive strong impacts (2 + 1 = 3 points), ST-positive weak interactions (2-1 = 1 point), WO-negative strong impact (-2 + 1 = -1 point),

WT-negative weak impact (- 2-1 = -3 points).

$$P_i = 3 * N_{SO} + 1 * N_{ST} - 1 * N_{WO} - 3 * N_{WT} \quad (1)$$

For example, for cases described in tab. 1-2:  $P_i = 3 * 42 + 1 * 12 - 1 * 15 - 3 * 33 = 6$  points.

A similar analysis should be carried out for all possible tour options. Tour options with the higher score are more preferable for choosing.

In order to reduce the level of subjectivity when choosing an option, basic travel criteria and their significance for the customer are determined using a specially developed software product, based on the data of the customer's Internet questionnaire, at least 10 (preferably more). All of the tour options proposed above are the subject to pairwise comparison according to these criteria (tour cost, availability, travel time, number and reliability of transfers on the way, free time, comfort, etc.) to find the option with the maximum total value of the tourist route attractiveness indicator, which can be formally represented as:

$$K_j = \sum_{i=1}^{10} F_{ij} = f(C_j, D_j, M_j, R_j, T_j, W_j, P_j, E_j, A_j, N_j) \rightarrow MAX \quad (2)$$

Provided

$$0 < K_j \leq 1,$$

$$\begin{cases} C_j = [0: 1], D_j = [0: 1], M_j = [0: 1], R_j = [0: 1], T_j = [0: 1], \\ W_j = [0: 1], P_j = [0: 1], E_j = [0: 1], A_j = [0: 1], N_j = [0: 1], \\ C_j + D_j + M_j + R_j + T_j + W_j + P_j + E_j + A_j + N_j = 1,0 \end{cases}$$

$K_j$  - an indicator of the attractiveness of the  $j$ 'th route option;

$F_{ij}$  - the total significance of the  $i$ 'th criteria for the  $j$ 'th route option;

$C_j$  - price (transport + accomodation);

$D_j$  - indicator of the time spent on the transport component of the tour (on a 100-point scale);

$M_j$  - the number of cities to visit;

$R_j$  - rating of cities to visit;

$T_j$  - tour time, days;

$W_j$  - indicator of time for the excursion component of the tour (on a 100-point scale);

$P_j$  - comfort while traveling (on a 100-point scale);

$E_j$  - catering and other services when traveling;

$A_j$  - carriers' image (on a 100-point scale);

$N_j$  - comfort of accomodation (on a 100-point scale).

Using logistics models (in particular, the point method), it is possible to evaluate all 10 possible route options. It makes it possible to filter out the less attractive tour options for potential users of the tourist service at the early stage. To make a final choice of the best option (Figure 9), simulation can be performed, based on the principles of the analytical hierarchy process (AHP)

method, which is popular in logistics. The results of the simulation and analysis of options should be sent to the potential customer. At the same time, electronic off-line guides of routes for visiting tourist sites with reference to off-line maps of cities and tourist locations can be developed for each option chosen by the tourist (based on the estimated free time in each of the cities).

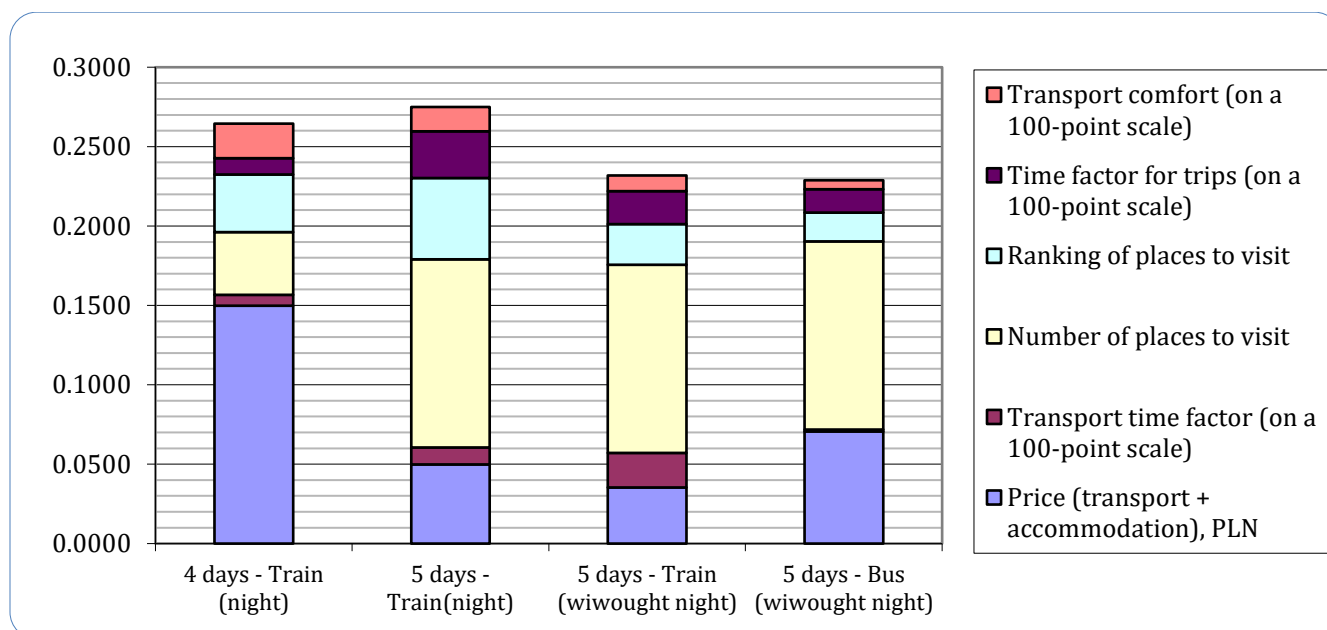


Figure 9. Simulation results of the comparative analysis of the options.

When negotiating the terms via the TLC information center, it is possible to order / book tickets, accommodation, etc. But you should keep in mind that being ready for variation is more important than following the original plan. For example, if a tourist (or a group of tourists), being already in Krakow, decides to spend more time in this city instead of the previously planned move to Katowice and Wroclaw, or to extend the stay in Krakow by 1 day, it is necessary to redistribute tasks quickly and efficiently between TLC members within the cluster. It is this option of flexibility in the approach to the implementation of the package of services that will favorably distinguish the proposed service from the traditional booking service, which often repels many (of course not all) potential clients of travel services during the pandemic. At the same time, it is necessary to seek to maximum mobility of travel so that a potential tourist does not stay in one city for more than two days.

### Experience of other countries

At first glance, such a flexible service does not seem rational for individual (but not VIP) tourists due to the fact that the group tour is more profitable, the risks for the organizers are less, and the locations where group tourists will spend their money are more predictable. But as an example, we would like to refer once again to

the experience of Germany during the preparations for the 2006 FIFA World Cup. In Germany, the main attention in organizing travel by trains was paid not to the organized groups, but to individual journalists, who generally got the opportunity to travel free (!) unlimited (!) across the country in first class carriages. German studies have confirmed that one foreign journalist in his positive impressions is able to advertise the host country much better than hundreds of fans (even with negative impressions), which in turn will attract more and more tourists spending money in Germany again. By the way, this experience was widely used by Ukraine (but again not by Poland) during Euro 2012. As a result, the number of foreign tourists in Ukraine (especially from Germany, Sweden and the Netherlands) increased tenfold both immediately during the European Championship and after it! (Portal of the city of Gdańsk, 2020)

Due to the fact that popular Internet bloggers and ordinary amateur bloggers who prefer individual trips (most often in groups of up to 2-4 people) are increasingly playing the role of modern journalists in the Internet era, servicing individual tourists no longer seems to be something absurd. The working hypothesis is the following: individual tourists and their internet channels have a fairly specific target audience of viewers and readers, who are also planning their trips. There is a

good chance that they will want to repeat the positive experiences of their predecessors.

Although this type of service looks promising, participation in such projects is very risky for ordinary companies (small hauliers, hotels, hostels, etc.), since the conditions and payback periods are not clear and not specific. Thus, only large and stable holdings (TLC is a prototype of one of them) will be able to take risks at the initial stage. Therefore, the tourism and logistics cluster (the strongest participants can be the core of the clusters - the Polish State Railways (PKP) or their specialized branches) has a unique opportunity to help potential passengers and tourists in providing information and logistics services, as well as in choosing and organizing the best transport options within Poland. Mobile application "Jak dojadę", which is very popular in Poland, can be the prototype of the information service. It makes it possible to plan the movement of passengers in municipal public transport networks effectively. An expansion of the offer of the services on railway routes will be the consequence of the introduction of a similar (but larger-scale) digital service from TLC. In time this will allow attracting new passengers or passengers using other modes of transport (including passengers using personal vehicles for tourism), as well as increasing the percentage of local and foreign tourists who plan to visit popular cities and tourist locations in Poland. The mechanism for refunding the risks taken by the railways and other cluster members is described in detail in previous authors works (Aloshynskiy (2012), Aloshynskiy (2013) etc.

Talking into account the synergetic approach to the organizing the work, there is no need to fear that some members of the cluster will be in disadvantage due to the changes in the tour package program, because the main thing in a cluster is not the income of individual participants, but the synergetic (system-wide) economic effect. The working hypothesis is the following: thanks to the synergetic approach, the aggregate income should be subsequently fairly redistributed among all potential TLC participants involved in this tour.

The basic rule for the cluster operation is the following: TLC should provide all consulting and other services free of charge. The rail transport company (which is the core of the cluster) should also support the potential customers and offer discounts on the estimated cost of the trip. At the same time, there is absolutely no need to be afraid of a decrease in revenue from the ticket sales,

because since March 2020, the volume of passenger transportation has decreased by 42.65%, and so, the trains occupancy rate has significantly decreased. At the same time, according to the prediction made by the authors, the train occupancy rate will be restored no earlier than August 2023 (fig. 6).

Due to the fact that trains often run half empty, it is possible to predict the availability of free seats in the carriages for tourist who are the customers of the cluster. In addition, it should be kept in mind that when transporting each passenger (even at the lowest price), you can earn more than when transporting no one. It should also be remembered that having a 30% discount on the ticket price or a 10% discount on the cost of living, the probability of buying a tourist service and, accordingly, getting to new cities (where money will be spent again), increases approximately threefold. In addition, as it was described above, tourists spend 40-50% more money for two days spent in different cities than for two days in one city (Railway Transport Office, 2021).

The networks of hotels/hostels, travel agencies (and other cluster members) should also provide services that are not overpriced. In turn, travel bloggers on their Internet channels (YouTube, etc.) or in some other way should promote information about the pros, cons, risks and opportunities of this type of tourism (in fact, SWOT analysis). Loyal customers can also be offered a TLC Travel Club membership with relevant bonuses. However, the marketing component of promoting this tourist product is not the object of this article. The working hypothesis is that anyone, even the most economical tourist who comes to visit Polish cities, would spend more money than if he did not come at all. Moreover, every PLN 1 produced in the tourism industry can contribute to the generation of additional PLN 4-5 of added value in the economy as a whole.

## CONCLUSION

It has been ascertained that it is necessary to create a network of tourism and logistics clusters for the stabilization and development of tourism. The formation of such TLCs around large carrier companies will expand the opportunities for attracting new (including individual) customers, as well as increase the mobility of potential consumers of travel services.

It has been substantiated that the expansion of the activities of carriers and travel companies (in fact,



diversification of the market) will not only attract new customers, but also allow coordinating additional investments for the development of passenger rail transportation, tourist services, as well as economic growth of macro-regions and the entire state.

The proposed synergetic strategy can become an effective tool to support small and medium-sized representatives of the tourism business, who are most affected by the consequences of COVID-19.

The stabilization (thanks to TLC) of the conditions for doing tourism business, as well as the expansion of the range of tourism and transport services will allow Poland to rise from 42nd place in the world rating of tourist attractiveness and competitiveness. This, in turn, will lead to a further increase in the number of potential tourists, and therefore to an increase in income in all industries related to tourism.

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