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Mykhaylo Hamkalo[1], ***Arkadiusz Przybyłka***[2]
[1] Ivan Franko National University of Lviv
[2] University of Economics in Katowice

Transport and infrastructure in the development of the tourist region

Transport i infrastruktura w rozwoju regionu turystycznego

Abstract. The challenges of the modern economy mean that enterprises are increasingly forced to use the solutions offered by logistics. The possibility of using such solutions reduces costs and offers better and better quality services. The article presents selected solutions related to the matter discussed in the Ukrainian ski resorts in the Carpathians. The aim of this article is to indicate how logistics management is used to increase competitiveness and better functioning of Ukrainian ski resorts in the Carpathians. The work was based on the analysis of source materials and statistical data.

Key words: logistics, logistics management, ski resorts, Carpathians

Synopsis. Wyzwania współczesnej gospodarki powodują, że przedsiębiorstwa są zmuszone coraz częściej korzystać z rozwiązań oferowanych przez logistykę. Możliwość stosowania takich rozwiązań przyczynia się do obniżenia kosztów oraz oferowania coraz lepszych jakościowo usług. W artykule przedstawiono wybrane rozwiązania związane z omawianą materią, stosowane w ukraińskich ośrodkach narciarskich w Karpatach. Celem artykułu jest wskazanie, w jaki sposób zarządzanie logistyczne jest wykorzystywane do wzrostu konkurencyjności i lepszego funkcjonowania ukraińskich ośrodków narciarskich w Karpatach. Podstawą pracy była analiza materiałów źródłowych oraz danych statystycznych.

Słowa kluczowe: logistyka, zarządzanie logistyczne, ośrodki narciarskie, Karpaty

Introduction

The Ukrainian Carpathian Mountains belong to the Eastern Carpathians located in western Ukraine. The north-eastern chain is 280 km long and over 100 km wide. The Ukrainian Carpathians occupy the territory of the Transcarpathian, Lviv, Ivano-Frankivsk and Chernivtsi regions. They occupy 4% of Ukraine and 10.3% of the total area of the

Carpathians. This region is one of the most visited in Ukraine. The advantages of this part of the Carpathians are a natural impulse for the development of tourism in this country [Wiesner and Kinash 2016]. One of the areas of tourism that has been developing dynamically in this region lately is skiing.

Nowadays, not only the product but also customer service is important for the increase in competitiveness of the services offered. The effect of this approach is the need for logistics technologies. For the efficient management of tourist services, it is necessary to use logistics as a science covering planning, control and control processes in space-time real processes in which the enterprise has its share performed with the intention of effectively achieving the objectives set. The mass nature of tourist services means that tourist services are served by specialized economic entities duplicating and improving their activities. This makes the process of providing services similar to the logistics supply chain and requires the use of logistics tools whose goal is to systematically reduce the cost of product flow in the supply chain. At the same time, it is assumed to maximize profit in every chain link company while maintaining the level of customer service expected on the market [Bentyn 2013]. Therefore, more and more often new solutions are sought that would ensure that tourism companies not only survive, but mainly develop their activities. Such opportunities give the use of elements of logistics management that will allow more efficient functioning of tourism companies.

The article was based on the analysis of facts. The research problem undertaken is aimed at systematizing knowledge about the logistics management of tourist ski resorts in the Carpathians.

Logistics in tourism

The market success of a tourist enterprise depends on the quality, characteristics and price of its product, as well as services and related marketing tasks, and especially on the level of customer service, timeliness and completeness of services offered. A well-functioning system called logistics is helpful in correcting this. Logistics itself is a scientific research field about organizing handling processes and storage of raw materials, materials and finished products in a system approach, aiming at optimization of supply chains as well as dealing with the management of post-consumer products [Abt 2001]. Logistics is the science of organizing the process of goods moving, services, resources etc. from the supplier to the final consumer. It also manages the circulation of products, services, supplies of goods. Logistics in tourism means the use of an innovative tool for managing infrastructure and tourism superstructure, bringing evident benefits both in the sphere of production and in the sphere of consumption of its services [Reczyński 2003]. Logistic infrastructure is defined in a material sense as a defined networking economic area, e.g. a national economy, in which goods and can flow information between enterprises and households [Rokicki and Roman 2011]. Logistics management of tourist services includes planning and performing services taking into account the analysis of needs, possibilities and ways of providing services throughout the entire chain, whose starting link is a producer and the final consumer. All these activities must be carried out in such a way as to ensure a cost-effective way of performing the service, and above all that it meets

the customer's requirements and expectations. Due to the characteristic features of tourist services (inability to create service reserves, immateriality, volatility, simultaneous production and consumption, diversity of place and time of service provision), their logistic management is significantly different from product management. Therefore, the choice of logistics management strategy should be based on such premises that can ensure the optimal level of meeting customer needs. The most important premises include [Gajewska 2009]:

- unity of market position, according to which services should not be provided in two differing markets;
- unity of production volume, according to which services should not be provided either on a large or on a small scale, otherwise it may lead to significant organizational difficulties and increase operating costs;
- unity of production complexity, according to which simple services should not be provided by organizations offering complicated services;
- size of companies providing tourist services should be determined in a way that technology and market allow;
- type and organizational structure of the enterprise providing tourist services, which should be tailored to the client's needs.

The main element of logistics that gives meaning to its activities and processes is, as already mentioned, customer service. Customer service is usually treated as a tool of one of the marketing mix instruments – distribution. The distribution of tourist services takes place through various distribution channels. A two-tier channel containing a tourist operator and agent is a classic resulting from high specialization in the provision of services. Due to the emerging organizational possibilities and the need to reduce costs, such a channel is often reduced to one intermediary, which is an agent also called a travel agency [Bentyn 2013]. However, this concept has changed over time. According to the theory of logistics, the separate operations of enterprises should be connected by supply chain management mechanisms. As far as marketing is focussed on "creating the consumer", logistics is on efficiently satisfying his needs. Logistics focuses on methods to improve consumer service in order for the company to gain a competitive advantage and ensure customer satisfaction. At the heart of marketing tourism are three components: quick response to customer needs, reliable service and good relationships. Customer service is therefore seen as the ability to meet customer expectations [Kempny 2001].

Supply chain relationships allow for better coordination of tourist services and minimise conflicts between individual links of the tourist supply chain. The characteristics of tourist services affect the dynamic of the supply chain coordination process. Offering partial services requires coordination between their individual suppliers in order to shape the tourist product appropriate for the final customer. The inability to store services and the need to leave at your disposal for their provision is associated with specific costs of securing the service potential. The presentation and evaluation of a tourist product effect of its popularity. Thus, it creates the need to understand the essence of information services related to the sale of a tourist product. In addition, the complexity of the tourism product means that its management must be based on the cooperation of individual links in the tourist supply chain.

Uncertainty associated with the variable, associated with many economic factors of countries generating tourism demand and the seasonal nature of demand increases the risk of providing tourist services [Bentyn 2013]. In the case of tourist enterprises, a significant problem is also the selection and simultaneous definition of criteria of logistic customer service. For some companies, tourist customer service is the time that the tourism organizer needs to build an attractive tourist offer. For another group of enterprises, this is mainly the availability of tourist products. Still another group will perceive this problem as a minimization of damages and losses that may occur during the service of a tourist event or an indicator of the response of a service seller to customer complaints [Wiktorowska-Jasik 2010].

Therefore, companies from the tourism industry face numerous problems related to logistics activities that can support the overall development strategy of the enterprise. These strategic logistic problems may include [Gajewska 2009]:

- the selection of strategic suppliers of materials (food, fuel, spare parts, equipment, etc.) and services (e.g. communications, access to utilities, cleaning services);
- decision on own or external transport service of logistics processes;
- development of own distribution network or using the network of other enterprises (e.g. reservation systems, sale of airline tickets, holidays, etc.);
- shaping the subjective structure of sales of tourist services (or tourist goods).

The proper solution should result in the fact that the criteria that the logistic customer service meets should provide the service in such a way that it is timely, of adequate quality, reliable, flexible and adequate to the order placed. This can guarantee that the customer will again use the services offered and not those offered by competitors.

Historical aspects of the development of transport routes in the region

The emergence and development of ski resorts in the 19th and 20th century resulted from the development of transport infrastructure. A popular means of transport within the investigated area in the second half of the 19th century became a narrow-gauge railway, which led the intensive development of the forest industry (harvesting and primary processing of raw materials). The first steam locomotive traction railway was built in 1873 by the Austrian timber manufacturer Leopold Popper on the territory of Eastern Galicia between the towns of Dolyna and Vygoda, with a length of 8.6 km [Klapczuk 2012].

The construction of railway lines along the route Khyriv–Drohobych–Stryi (1872), Stryi–Skole (1885) and Skole–Lavochne (1887) has played a significant role in the development of tourism in the mountainous part of the Lviv region [Klapczuk 2012].

In the second half of the 1930s, the ski resort Slavske had a direct railway connection with Warsaw, Lódź, Gdynia, Poznań, Vilnius, Kraków and Lviv. Slavske was the main point of four special ski trains of the League for the development of tourism, which for two days allowed visitors to use the ski areas of the Eastern Beskids. In the early 20th century, the Sambir–Syanky railway was laid, which contributed to the development of the ski resort of Syanky [Quirini-Popławski 2017].

For the purpose of serving the growing flow of tourists in 1932, popular tourist trains were introduced, which ran on the route Lviv–Slavske and Lviv–Skole in summer and winter. Based on the experience of transportation on the route Kraków–Zakopane, in the second half of the 1930s on the route Lviv–Stryi–Lavochne high-speed trains "lux-torpeda" with a maximum speed of 108 km/h were used. With the development of highways, the role of individual transportation grew [Quirini-Popławski 2017].

Since 1884, the tourist development of the mountainous part of Ivano-Frankivsk region began. This was supported by the opening of the Stanislaviv–Vorokhta–Voronenka railway. In 1922, a ski-jump was built in Vorokhta by specialists from Zakopane (Poland), which is currently used with certain modifications. During the interwar period, a special train with the unofficial name "Narty, dancing, brydż (Skies, dancing, bridge)", ran from Warsaw to Vorokhta. Next to the sleeping cars there were cars in which musicians performed and dance parties were held; there were gaming tables for fans of bridge. As a rule, steam locomotives of such trains were decorated with wreaths of spruce in winter, they had inscriptions on the front part "Ski raid to Vorokhta" [Łoziński and Łozińska 2010].

Logistics of air transport

The military conflict in eastern Ukraine had a significant impact on the tourist flow. This is clearly reflected in the number of flights performed in the airspace of Ukraine. The largest number of flights – 534,581 were served by the State company UkSATSE in 2013, a substantial proportion of the flights were performed by foreign airlines (81%). Over the next years (2014–2016), there was a decrease in the number to 214,262 [UkSATSE 2019]. The sharp decrease in the number of flights relates to the closure of part of the airspace over the temporarily occupied territory of Crimea, with the territorial waters, the closure of the environmental protection zone, including the buffer zone, as well as the termination of air traffic between Ukraine and Russia.

From 2017 to 2019, a positive tendency was being observed. From January to November 2019, UkSATSE provided 313,195 flights, which is 11.8% more than the corresponding period of the last year. Ukrainian airlines performed 102,889 flights, while foreign airlines made 210,306 flights. Both indicators have a positive trend compared to the same period of the last year – an increase of 3.4 and 16.4% [UkSATSE 2019].

Ski resorts in Ukraine may expect the arrival of domestic and foreign tourists at the airports of Lviv, Ivano-Frankivsk and partially Uzhgorod and Chernivtsi. As shown in Table 1, the ski resorts Slavske and Play are the closest to the Lviv airport. The Ivano-Frankivsk airport has the most optimal location in relation to the ski resorts of the region, but the airport infrastructure does not allow to receive a large number of flights, especially from abroad. The effective functioning of the Uzhgorod airport can significantly improve the transport accessibility of the Krasiya resort.

Currently, Bukovel is the only ski resort in Ukraine, which is actively improving its transport accessibility by airline services. Skorzonera LLC, which deals with the development and management of the resort of Bukovel, since 2010 obtained the concession of the Ivano-Frankivsk International Airport. Despite the economic crisis, transportation is carried out in two directions within Ukraine: Kyiv–Ivano-Frankivsk, Dnipro–Ivano-Frankivsk. A new flight from Bucharest has been introduced on 27 December 2019. The

Table 1. Distance from airports by main roads in Ukraine
Tabela 1. Odległości od lotnisk głównymi drogami na Ukrainie

Ski resort	Distance (km)			
	Lviv	Ivano-Frankivsk	Uzhgorod	Chernivtsi
Bukovel	239	89	264	168
Dragobrat	259	112	246	189
Slavske	137	168	177	304
Play	136	165	136	303
Krasiya	189	264	65	397
Pylypets-Podobovets	200	153	124	291

Source: actual study on the basis of the Google maps website https://www.google.com.ua/maps [access: 30.12.2019].

flights operate twice a week, on Monday and Friday, by Windrose company. The usual price for a one-way ticket is about EUR 100 [IFO 2019].

In recent years, Lviv International Airport named after Daniel Galitsky ranked among the three largest airports in Ukraine in terms of passenger flows. During 2018, passenger traffic amounted to 1.6 million people, 12 new flights were opened. As at December 2019, the airport accepts flights from 14 airlines that cover 29 countries in Europe, as well as Israel and Azerbaijan. In the summer, the number of flights is growing. In January––November 2019, passenger traffic at Lviv airport amounted to 2.05 million passengers – this is 39.4% more than in the same period of 2018, when the airport served 1.27 million passengers. For 11 months of 2019, passenger traffic on international flights totaled 1.86 million (+45.5%) tourists, on domestic flights – 188.6 thousand (–1.6%) tourists; during this period, the airport served 17,540 flights, which is 24% more than a year earlier, when this number was 14,148 [Fel'metsher 2019].

Logistics of railroad transportation

Railway transport in Ukraine is the leading industry in the road transport complex of the country, which provides almost 82% of freight and 36% of passenger traffic carried out by all means of transport. The operational railway system in Ukraine is approaching almost 19.8 thousand km (excluding the occupied territories, the network of which is not currently in operation), of which more than 47.2% is electrified. In terms of freight traffic, the railways of Ukraine occupy the fourth place on the Eurasian continent, second only to the railways of China, Russia and India. The load capacity of Ukrainian railways (annual traffic volume per 1 km) is 3–5 times higher than that of developed European countries [Ministry of Infrastructure of Ukraine n.d.].

Within the Carpathian region, Ukrainian railways interact with the railways of Poland, Romania, Slovakia and Hungary. Forty international railway crossings have been organized for international traffic. Most railway checkpoints (freight and passenger) are located on the border with Poland (7), the fewest number (3) – on the border with Slovakia and Hungary. International passenger rail transport is carried out on the routes: Kyiv–Lviv––Przemyśl, Lviv–Wrocław, Mukachevo–Budapest. In December 2019, the international

route Lviv–Przemyśl–Berlin – a joint project of Ukrzaliznytsia JSC and Polish State Railways Inc. was implemented [Kravtsov 2019].

Regional branch Lviv railway serves the territory of seven Ukrainian regions: Lviv, Ivano-Frankivsk, Volyn, Zakarpattya, Chernivtsi, Ternopil, Rivne. For domestic passenger traffic, Lviv railway serves 49 pairs of trains that provide connection with all regions of Ukraine.

The only major element of the transit transport infrastructure of Ukraine, which was created during the years of independence of Ukraine is the Beskid tunnel with length of 1,764 m. The project was financed by loans from the European Bank for Reconstruction and Development and the European Investment Bank. Construction lasted from 2013 to 2018, and it allowed to increase the turnover to 100 pairs of trains per day at a speed of up to 70 km/h [Kravtsov 2018].

The best railway connection has Slavske ski resort, on the territory of which there is a railway station. This resort has a railway connection with Slovakia (Kyiv–Lviv––Slavsko–Kosice), Austria and Hungary (Kyiv–Lviv–Slavskoe–Budapest–Vienna) – Table 2. Every day the railway station Slavskoe takes 16 trains on internal routes, which allows to provide connection with the cities: Kyiv, Lviv, Odessa, Kryvyi Rih, Lysychansk, Zaporizhia, etc. The worst railway connection has the Krasiya resort, because of the small number of trains (2) and inconvenient (night) time of arrival and departure.

Table 2. Aspects of railway connection of ski resorts in Ukraine
Tabela 2. Aspekty połączenia kolejowego ośrodków narciarskich na Ukrainie

Ski resort	The nearest station	Distance (km)	The number of trains in international traffic	Number of passenger trains per day
Bukovel	Tatariv/Vorokhta	16/22	–	16
Dragobrat	Yasinya	14	–	8
Slavske	Slavske	0	2	18
Play	Scole	27	1	11
Krasiya	Kostryna	6	–	2
Pylypets-Podobovets	Volovets	15	1	19

Source: actual processing based on data from Lviv Railway (Lvivska Zaliznytsya) website http://railway.lviv.ua [access: 30.12.2019].

Logistics of road transportation

The public highways system in the western region of Ukraine reaches 42,308.2 km, 98.2% of which are hard-surface roads. The longest length of public roads in the region has Lviv, the shortest roads are in Zakarpattya region. Within the study area, 13.7% are state roads, 86.3% are local roads. The maximum length of international roads is typical for the Lviv region (547.9 km), and the length of national roads typify Ivano-Frankivsk (352.4 km) and Lviv regions (347.1 km) [Derzhstat 2019].

Over the past five years, there has been an improvement in the quality of roads in the western region of Ukraine, which affects the transport accessibility of ski resorts. For passenger transportation to the ski resorts of the Lviv region (Slavske, Play), the international

road M-06 Kyiv–Lviv–Chop is used. This road crosses the territory of Kyiv, Zhytomyr, Rivne, Lviv and Zakarpattya regions. In Hungary, it continues as highway 4. Territorial road T-1424 connects the resort Slavske with the highway M-06, which is 23 km long. These roads are in good condition. The resort Slavske has a regular bus service to Lviv (126 km).

Bukovel and Dragobrat ski resorts are located next to the national highway N-09, which runs through the territory of Lviv, Ivano-Frankivsk and Zakarpattya regions: Mukacheve–Rakhiv–Ivano-Frankivsk–Rohatyn–Lviv (423.6 km). The road condition within the Lviv and Ivano-Frankivsk regions is good. In order to relieve pressure on the road, an additional road was built from the Yablunytskyj Pass, which combines the resort of Bukovel with the H-09 highway, Bukovel ski resort has regular bus service to Ivano-Frankivsk, Lutsk, Kolomyia, Zbarazh. In winter, bus services are provided from Lviv, Kyiv, Odessa, etc.

In many ski resorts, there is a problem with the condition of the roads, on which travelers get directly to the ski areas. Especially important is the problem of comfortable internal resort routes in Slavsk. The main ski area, where the best and longest ski runs run, is located on the hillside of Trostyan mountain at a distance of 2–4 km from the village Slavske It is possible to drive there only with four-wheel-drive cars. Local residents informally provide paid transport services with their own four-wheel drive cars to car owners who do not have such cars.

A similar situation is observed in the resort of Dragobrat, which is located at an altitude of 1,400 m a.s.l. From the international highway N-09, the distance to the resort is more than 8 km, which can only be reached by four-wheel-drive cars. Adverse weather conditions can cause landslides fully or partially destroying the road.

Ski resort infrastructure

Modern ski resort infrastructure is typical for the resorts of Bukovel and Play. These resorts continue to develop, but a wide range of accommodations, food, and appropriate ski infrastructure were formed in 2010–2011, during the first 8 years of existence.

Bukovel ski resort is located near the village Polyanytsya (Ivano-Frankivsk region) within the altitudes of 850–1,372 m a.s.l. The ski season lasts from December to the end of April. According to the complexity of the skiing runs, there are 14 blue runs (easy for beginners), 41 red runs (medium in complexity, for experienced skiers), 7 black runs (for athletes and experts). The total length of the runs is 68 km, artificial covering with snow is carried out on all runs. The main means of transport within the resort are 15 chairlifts and 1 T-bar lift. Most of the installed lifts are of the new generation of well-known world manufacturers Doppelmayer and Leitner. The total carrying capacity of the lifts is over 33 thousand passengers hourly[1].

Bukovel ski resort is characterized by high-quality information logistics, which is due to the mobile Internet of the fourth generation (4G), the ability to track the load of lifts in the online mode, information schemes and signs on the tracks, printed information materials.

[1] http://bukovel.com [access: 30.12.2019].

As can be seen from Table 3, the Dragobrat ski resort is characterized by a high--altitude position among the studied resorts. On the main slope of Stig mountain there are two T-bar lifts, each about 1 km long; there are also several old short lifts, which are located on mild slopes for children and beginners. Top of the Carpathians tourist complex belongs the T-bar lift and chair-ropeway (commissioned in early 2010), which are located in the right part of the natural boundaries of Dragobrat. Another chair-ropeway Leitner (1,200 m) belongs to the Carpathian Seagull tourist complex, has been put into operation in the 2010–2011 season. For professionals, free-ride tours are offered from the top of Blyznytsia (1,883 m) – the length of the route is more than 3 km. Dragobrat does not differ significantly from the existing ski resorts of Ukraine in terms of length and variety of trails, in particular in their latitude. The maximum length of the skiing run is 2,080 m. The difference in altitude is the smallest among the studied resorts and is 355 m high.

Table 3. Characteristics of skiing infrastructure in Ukraine
Tabela 3. Charakterystyka infrastruktury narciarskiej na Ukrainie

Resort	Lifts		Snow generation system	The highest lift station (m a.s.l.)	Maximum trail length (m)
	T-bar lifts	chair lifts			
Bukovel	1	15	+	1 372	2 353
Slavske	13	2	+*	1 232	1 800
Pylypets-Podobovets	9	1	–	1 160	2 000
Play	1	2	+	1 060	1 200
Dragobrat	4	1	–	1 704	2 080

*Skiing runs on the Pogar mountain.

Source: author's development on the basis of data from ZymaGhory.com portal http://zymaghory.com [access: 30.12.2019].

The oldest ski resort Slavske leave behind all existing Ukrainian resorts in the number of lifts and the length of runs. However, the main problems of the resort remain poor quality of skiing runs preparation, outdated skiing infrastructure, short ski season due to the lack of artificial covering with snow most of the runs, etc. A single snow generation system is installed on two runs on Pogar mountain. For transportation of tourists, chair lifts are used, which were installed about 40–50 years ago. The main source of water for snow generation in Slavske resort are the rivers Slavka and Opir. However, it is necessary to build artificial reservoirs. Most routes have no information schemes and pointers and 4G Internet capability is not fully used.

The nearby location allows to combine the skiing areas of Pylypets and Podobovets into a single resort. The most developed skiing infrastructure is typical for the Pylypets ski area, the total length of the skiing runs is more than 20 km. The runs are provided with 7 lifts: 1 chair lift (double) and 6 T-bar lifts. The total carrying capacity of the lifts is over 5 thousand passengers hourly. The resort's runs are of all types of complexity, there are significant opportunities for freeride skiing. Organized groups are offered for snowcat trips to the Hymbu mountain (1,491 m). Within Podobovets 4 km of runs are laid which are served by three T-bar lifts with length of 400–1,250 m. Most of the lifts are outdated.

Summary

Transport logistics plays a crucial role in the development of ski resorts. Tourist development of this region was associated with the development of the railway network in the 19th century. In the 1930s, the speed of rail transport has increased significantly and the number of transported tourists has increased. Given the realities of the Ukrainian railway, the speed of trains has not changed significantly over the past 80 years. The highest logistics potential among the studied ski resorts has Bukovel. This is due to high-quality transport infrastructure, well-targeted passenger transportation logistics, information support, and modern skiing infrastructure. Despite the good transport accessibility of the Slavske and Pylypets-Podobovets ski resorts, they do not provide quality logistics in general. This should lead to the introduction of new solutions that will eliminate these inconveniences.

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Correspondence address:

Mykhaylo Hamkalo, PhD
(https://orcid.org/0000-0002-0019-7400)
Ivan Franko National University of Lviv
Geography Faculty
Department of Tourism
Doroshenka St. 41/4, Lviv 79000, Ukraine
e-mail: hamkalo.m@gmail.com

Arkadiusz Przybyłka, PhD
(https://orcid.org/0000-0001-9427-6232)
University of Economics in Katowice
Department of Labour Market Forecasting and Analysis
1 Maja St. 50, 40-287 Katowice, Poland
e-mail: arkadiusz.przybylka@ue.katowice.pl