ISSN: 2029-4913 / eISSN: 2029-4921

VILNIUS TECH
Vilnius Gediminas Technical University

TECHNOLOGICAL and ECONOMIC DEVELOPMENT of ECONOMY

2025
Volume 31
Issue 1
Pages 310–340
https://doi.org/10.3846/tede.2025.22824

ECONOMIC CONSEQUENCES OF THE PHENOMENON OF UBERIZATION ON THE EXAMPLE OF THE SERVICES OF SELECTED CARRIERS IN THE TRANSPORT INDUSTRY

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Article History:
- received 25 March 2024
- accepted 28 October 2024

Abstract. Uberization is a process, phenomenon, trend, and direction that emerged in the 21st century economy thanks to Uber Technologies, Inc., which was the first to introduce a mobile application that connects drivers and passengers. Although the name of the trend was not formalized by the Uber corporation, it appeared a few years later to describe certain dependencies that emerged in the economy and that gained importance not only in the field of transportation services, but also in the field of finance, in the labor market, or in relation to the real estate market. The purpose of the study was to determine the impact of the progressive phenomenon of uberization on the competitiveness of the transportation industry in the pre-pandemic period and in the post-pandemic period. The study assumed the hypothesis that carpooling services, which are one of the important models of uberization, implemented in Poland through the BlaBlaCar app, can be a significant competitor to transportation services provided through traditional forms and models of communication, i.e., train and bus connections. The results of the study showed that BlaBlaCar services are a cheaper alternative to other means of transportation, i.e., public transport (Polskie Koleje Państwowe, PKP Intercity) and bus connections, although not always. As a rule, their competitiveness is higher for those routes and trips where there are many drivers offering free space in the car. On the other hand, on the routes less frequently visited by BlaBlaCar drivers, fares with a BlaBlaCar driver are higher than rail and bus fares. The considerations of the article meet the objectives of the cognitive goal and the application goal and showed that uberization in the transport industry is a significant phenomenon that is still developing and, in the future, may threaten traditional forms of transport, i.e., rail and bus travel.

Keywords: BlaBlaCar, carpooling, economy, management, uberization, transport industry.

JEL Classification: B55, O14, O17, O35, Q01, R40.

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1. Introduction

The term "uberization" (also called: uberized, uberizing, uberisation, uberization, or uberification and Uberification syndrome) was first used by Maurice Lévy in an interview with the Financial Times on 14 December 2014 (Massotte, 2017; Stępnicka et al., 2023; Di Fabio & Cooper, 2023). The term "uberization" refers to "the Uber platform and its negative impact

on the passenger transport sector and the labor market in general (cf: Daidj, 2021; Stępnicka, 2017; The Numberssmith, 2023). It is used to describe the threat that employee platforms are to the labor market and the economy (precarization of labor relations or tax avoidance)." (Rogalewski, 2020; cf: Glaser, 2021; Montalban et al., 2019). In the Cambridge English Dictionary, uberization is defined as "the act or process of changing the market for a service by introducing a different way of buying or using it, especially using mobile technology (cf: Iblaev, 2023; Paterson, 2023; cf: Hamid, 2023). Collins English Dictionary states that the verb "uberize" means "to subject (an industry) to a business model in which services are offered on demand through direct contact between a customer and a supplier, usually via mobile technology" (Guillén, 2021; cf: Davis, 2017).

By some authors, uberization is also seen as a form of cyberattack but a perfectly legal one, and this type of phenomenon has been made possible by, among other things, smartphones, geopositioning, and online payments (Dal Pont, 2020), and by other authors as an example of the sharing economy, which includes unused assets such as goods and services that are shared or exchanged for monetary or non-monetary benefits (cf: Borsenberger, 2017).

Uberization also relates to the sharing economy and the collaborative economy with the first platforms that enabled direct contact with customers and service providers, thus massively connecting people and enabling them to exchange expertise, value, assets, services, etc. (Tormen, 2019; Ilbiz & Kaunert, 2023). For Mathieu (2022), uberization is the questioning of the economic model of a business or industrial activity through the emergence of a new player offering the same services at a lower price.

According to the authors, the phenomenon of uberization can be nowadays classified as the economy of cooperation, i.e., "new and constantly evolving, complex and diverse phenomena, mutually reinforcing, with significant scale and consequences. (…) An important role in the emergence and development of the cooperative economy was played by the technological revolution that we are currently witnessing, manifested by the development of mobile technologies and social media. It changes organizational and distribution models – moving from a one-to-many model to a peer-to-peer model where people can directly exchange goods and services, by passing intermediaries" (Jastrzębska & Legutko-Kobus, 2017; cf: Burke et al., 2023).

A well-known example besides Uber, Inc. of a service/app that operates based on uberization principles is France's BlaBlaCar. It is also a platform for so-called ride-sharing, which allows drivers and passengers who are traveling in the same direction to get in touch (cf: Nguyen & Llosa, 2023; Yurdakul et al., 2023). This means that a person traveling in his or her own car may carry other persons in the car heading to the same destination (cf: Belleflamme & Neysen, 2023; Danatzis et al., 2024; Kodama et al., 2023). BlaBlaCar was established in 2006 in France, while it did not appear on the Polish market until 2012. As of January 31, 2024, the average monthly number of active BlaBlaCar customers for the period from August 2023 to January 2024 was about 4.82 million in the European Union (BlaBlaCar, 2024).

The main aim of the study is to determine the impact of a new trend in the transport industry in Poland on its competitiveness in the period before the pandemic (i.e., during 2017–2018) and in the post-pandemic period (i.e., since 2023).

The paper poses the following research questions:

1. What is uberization, and what is the genesis of this term and phenomenon?

2. What are the criteria and levels of uberization in terms of its range?
3. What is the uberization of the economy, and what are its criteria and implications?
4. How does uberization influence the changes taking place in the passenger transport industry in Poland, using the example of rides carried out through the BlaBlaCar service, train and bus connections between different voivodship cities?

The authors adopted the following main hypothesis: "Carpooling services, which are one of the essential models of uberization, provided in Poland through the BlaBlaCar app may constitute significant competition for transport services provided through traditional forms and transport models, i.e., train and bus connections. The main determinant of the aforementioned relationship is the lower price of a ride via BlaBlaCar compared to train and bus connections".

The article also presents three theses that are complementary to the hypothesis formulated above:

1. Uberization, including the uberization processes taking place in the field of transport, contributes to a change in preferences in terms of the means of transport people use to get around and travel. This may result in an increased demand for alternative transport and travel models (e.g., carpooling) and at the same time a decrease in interest in traditional travel models (i.e., public transport, regional transport, etc.).
2. Uberization in the transport industry, including carpooling, may be a major source of threat to traditional transport models in Poland (i.e., train or bus travel), but not in every case, which depends on the frequency of attendance of BlaBlaCar carriers on a given route between voivodship cities.

The article consists of a theoretical part and an empirical part. In the theoretical part, the authors characterized the phenomenon of uberization in the economy, listed the criteria and application of uberization in practice, and characterized the phenomenon of uberization in the transport industry. The empirical part presents the results of the study in terms of travel cost analysis to selected cities in Poland via selected modes of transport.

The main methods used in the article were the critical literature analysis method, the comparison method and the statistical method, among others: test U Manna Whitneya and test ANOVA Kruskala Wallisa. The article uses data on travel costs from two Polish voivodship cities: Poznań (Greater Poland Province) and the capital of Poland, Warszawa (Mazovian Province) to all other voivodship cities: Białystok, Bydgoszcz, Gdańsk, Gorzów Wielkopolski, Katowice, Kielce, Kraków, Lublin, Olsztyn, Opole, Poznań, Rzeszów, Toruń, Warszawa and Zielona Góra. Data for the study was obtained in the period 2017–2018 and 2023 – till March 2024 from the online portals BlaBlaCar (https://www.blablacar.pl/), Polskie Koleje Państwowe S.A. [PKP] https://www.pkp.pl/) and https://www.e-podroznik.pl/ owned by Teroplan S.A.

2. The genesis of the term "uberization" and literature review

Uberization (uberized, uberizing, uberization, uberization, or uberification and Uberification syndrome, ubernomics) is a process, phenomenon, trend that has recently emerged in economic practice and the literature of the subject (cf: Stępnicka, 2017; Button, 2020). Lambin (2018) states that "uberization is a business model in which services are offered on demand

through direct contact between a customer and a supplier, usually via mobile technology" (cf: Dunne, 2018; Meier, 2021; Sohoni, 2021). According to Maksaev et al. (2021), "Uberization is becoming an increasingly large-scale economic phenomenon and is spreading to various areas of economic activity" (cf: Tormen, 2019; Webster, 2020). For Battu (2016) "uberization refers to the adoption of the trading model (...), consisting of, in the short term, making resources available to customers through their smartphones, of the Internet and geolocation resources in every pocket" (cf: Bhushan, 2023). For Zimpel-Leal (2022), uberization has become shorthand for any business model that profitably applies unused resources to completely disrupt the existing ecosystem. It disrupts the traditional social and regulatory framework, replacing labor with the free enterprise initiative of service providers (Alban, et al., 2019).

The term is commonly used to describe a phenomenon in which a start-up or new economic model specific to the digital economy replaces the traditional economic model (cf: David et al., 2016; Capello et al., 2023). This means that uberization refers to the provision of mobile services based on the Uber business model, combined with app support (cf: Cramer & Krueger, 2016; Hutson, 2018; Turi, 2020). Therefore, the described phenomenon means the modification of the market model by using a cheaper and more efficient alternative (cf: Gross, 2017; Sutherland, 2019).

An interesting concept of uberization was presented, among others, by Simonovits and Balázs (2022), who relate it to the concept of sustainable development and a cooperative form of consumption, especially the so-called food sharing, i.e., donating surplus food via online communities or offering food donations to groups in need via food banks. Such a concept of uberization has become very popular and fashionable nowadays, especially in relation to sharing food items with people in need. In Poland, this form of uberization is realized in the form of campaigns of the so-called "social fridges" which are located in various places (in the street, in university buildings, etc.), where one can put various food products, which can be used by people in need, who are hungry, in a difficult life situation, etc. (cf: Stępnicka, 2019).

Uberization, identified as innovation in the light of innovation theory, has determined lots of socio-economic changes in the economy in the light of sustainable development (Musiał & Chrzanowski, 2018; Daidj, 2018). These include:

- entry of new operators and entities to the industries, which, due to the structure of the market or the legal regulations, were regarded as extremely stable until the development of the new trend;
- the use of mechanisms and tools typical of the collaborative economy that enable the use of resources generally held by private individuals, giving them the opportunity to enter those markets where the existing law restricts or prevents commercial activity (cf: Paterson, 2023; Majka, 2018);
- the provision of services, including on-demand work, under conditions of optionality, mobility and high utility for the customer (so-called uberization of business, including retail);

The revolution that is uberization is affecting almost every sector of the economy (cf: Juenemaïtre, 2023; Özkaya Marangoz, 2023; Wolfram et al., 2019). Uberization symbolizes the secondary effect of the Network's influence and its economic repercussions (Derian, 2018; cf: Andro, 2018; Alvarez, 2018). Uberization processes are occurring in, among others:

the banking and finance, marketing, fashion and beauty, travel, work, cab industry, business school and education, hotels, trucking and transport, takeaway and food delivery services, grocery and convenience store delivery, healthcare through telehealth services, libraries, delivery services, news interpreting and language services etc.) (cf: Farah et al., 2022; Douay, 2018; Francoa et al., 2023).

For the uberization process to occur, several important conditions must be met. Thus, the following ones are required: the presence of a digital platform, automation of business processes, reduction or limitation of intermediaries in the supply chain of products and services to the financial user, implementation of a rating system that allows evaluation and assessment of services provided (Maksaev et al., 2021). According to Schneider (2017a), the uberization phenomenon includes several dimensions of convenience. These mainly concern: decision, access, transaction, benefit and post-benefit.

Uberization, as an innovation, also contributes to the emergence of new trends and directions in the employment market, including the labor market flexibility under the influence of digital technologies (increasing the role of freelancing, co-working, digital nomadism, etc.), in the area of so-called on-demand warehousing, e-commerce distribution, etc. Uberization takes on particular importance in the context of a decline in the share of permanent employees in favor of an increase in self-employment (Khusyainov, 2022; cf: Abílio, 2023; Pestieau & Lefebvre, 2018) or workflows in the public sector (cf: van der Wal, 2017; Christiaens, 2023; Bakalarz, 2019). On the other hand, uberization is tantamount to a flexible work model and an emerging way of increasing job insecurity as a result of the latest technological innovations, which in turn paradoxically represent an opportunity to access income for populations facing various barriers to entering the formal labor market or when changing their professional position in it (cf: Andrade et al., 2022; Krause, 2023). Hence, uberization is fundamentally about informal, flexible and "on-demand" work styles (cf: Watzeck, 2023), as well as the shift from an employment relationship – a protected bond between workers and companies – to a contractual relationship (cf: Bose, 2022; de Moura et al., 2023; Oliviera & Luna, 2023).

Uberization can be identified as one of the stages of the CSCW system evolution, i.e., computer-aided cooperation, which was part of the area of interactive systems, enabling multiple stakeholders (identified or anonymous stakeholders) to cooperate, coordinate activities and communicate through the computer system, and perform tasks of different natures (e.g., production, design, management). Today, CSCW systems are more mobile and proactive and can work locally (at the same place) or remotely (at different locations), synchronously (at the same time) or asynchronously (at different times), in the short term (short time to solve a problem) or long term (David et al., 2016).

2.1. Criteria and application of uberization in practice

Sedkaoui and Khelfaoui after Deloitte (2020) give seven criteria that should be taken into account when defining the phenomenon of uberization. These are:

- distortion (so-called creative destruction or disruption), which makes traditional models obsolete and questionable and leads to the situation that large companies are threatened by individuals who distort the market in record time (traditional models change);

- innovations and a new approach to the problem, mainly through the experience of a new generation of users called Z Generation;
- use of a product or services that take precedence over their possession;
- exchange, in the form of swapping, sharing, renting, or selling;
- digitality, which makes products and services exchangeable through digital platforms;
- interdependence between consumers in the spotlight and minimizing the intermediary links between them;
- price, which is informational, depending on the demand and supply for the product or service (cf: Sedkaoui & Khelfaoui, 2020).

Initially, the phenomenon of uberization was related to the Internet application Uber and was associated only with peer-to-peer transport. With the spread of applications and other social networking sites, referred to as GAFA (Google, Apple, Facebook and Amazon) and NATU (Netflix, Airbnb, Tesla and Uber) (cf: Corlosquet-Habart & Janssen, 2018; Barsky & Gagliardi, 2023), this phenomenon has become present in other areas of life and is distinguished by various paradoxical situations, such as these (Shah & Kelly, 2016; cf: Dvorkin, 2021):

- the world's largest taxi company Uber does not have any taxis;
- the world's largest accommodation provider Airbnb does not own any real estate;
- the world's largest communication companies such as Skype, WhatsUp, Facebook, and Messenger do not have their own infrastructure;
- the most popular media platform Facebook does not create content;
- the biggest software providers Apple, Facebook, Google do not write applications;
- the fastest growing payment systems Apple Pay has no money;
- the world's largest cinema house Netflix does not have its own cinema;
- the largest seller Alibaba does not have its own stock;
- the world's largest food supplier, Delivero and Foodora have no restaurants.

The described trend can take various forms of coverage, covering the whole economy as well as its individual elements: industries, markets, sectors, companies or Internet platforms. Characteristics of particular levels of uberization are presented in Table 1.

Uberization is a phenomenon, a trend, and a process based on three fundamental pillars: the common economy (i.e., the sharing economy), the so-called gig economy, and digital innovations. The popularization of the phenomenon of uberization in economic practice has become a contribution to the definition of benefits and threats resulting from it. In the light of literature, uberization, also understood as an alternative approach to the economy, contributes to destabilization and destructive processes in the modern economy (cf: Massotte & Corsi, 2017). According to Barns (2020), uberization concerns everything. The so-called uberization of the economy, which is gaining importance in this way, may on the one hand be considered a stimulator of its development, and on the other a threat to, among others, selected industries and sectors that implement their models in the traditional manner.

According to Kalinowski (2017), the uberization of the economy is an element of the economy of cooperation and "consists in receiving income in exchange for sharing tangible goods, free time, creativity, free money (...) It is an element of distributed networks within individuals and communities. It aims to blur the boundary between producer and consumer by having these groups interact with each other through shared spaces and online networks and P2P platforms".

Table 1. The levels (range) of uberization (source: own elaboration after Shah & Kelly, 2016; Stępnicka, 2017)

range	characteristics
national economy	the impact of uberization on the economies of individual states depends on the legal regulations adopted by the state. In this respect, uberization is an economic phenomenon that is a function of the globalization of the digital economy and the development of the Internet of Things and is based on the sharing of resources and the blurring of traditional divisions between consumers and producers
industry and market	uberization affects all sectors of the economy, contributing to the creation of new market players, creating new market opportunities, determining changes in the market and changing the competitive environment, as well as affecting the degree and scope of competition in the market. However, industry and market uberization are not free of threats. They concern, among other things, the level of costs incurred by market participants (usually new entrants, online platforms, etc. incur lower costs than participants who have been operating on the market for many years), as well as maintaining the strength of monopolists, despite low barriers to market entry or the use of new technologies
enterprise	uberization may prompt most large companies to review their future operating strategy in order to adapt it to new market rules, new competition and achieve sustainable competitive advantage based on diversity
platforms	uberization refers to an economy based on a platform that changes the boundaries of companies and sectors. Companies operating on the basis of communication and information platforms adapt to new market conditions and have to face the emerging competition in which business models are implemented with the support of new technologies

The uberization of the economy raises a number of implications. The most important ones include:

- social implications, such as the emergence of a new generation of users, focused on access to products and services rather than ownership, and the emergence of companies that have adopted the uberization model, based on digital mobile platforms. Social implications are also expressed in the blurring of the space between the professional and private spheres of people who provide their services through the platform, as well as the penetration of uberization assumptions to other areas of life: finance, medicine, education, etc.;
- organisational implications manifested, among others, by changes in the behaviour of people in the organisation and the ways of conducting business in the XXI century economy, not always in line with the concept of corporate social responsibility (CSR) or organizational culture based on respected values and norms. Some of the essential features of uberization are the flattening of organizational structures, greater focus on the customer, speed of response to customer needs and cost reduction;
- managerial implications, which require managers of various undertakings to respond to market changes determined by new technologies, e.g., the Internet, new business models and new entities;
- implications of a destructive nature (the so-called uberization's discontents), challenging society, contributing to the instability of actual service operators, disrupting previous models and structures from the real world, and translating into the fact that uberization

processes threaten traditional business because they create new opportunities for entities that operate according to different rules than those typical of a market economy (cf: N'guyen, 2019; Szoniecky & Bouhaï, 2017; Bhat, 2023).

In summary, the concept of "uberization", including the "uberization of the economy" is evolving and entering different areas of economic life. Uberization issues are strongly interrelated and their analysis requires a multidisciplinary and comprehensive approach. The model of uberization has emerged due to the growing importance of an economy based on access, open, allowing sharing and other forms of collaborative activity, including so-called "bottom-up" activities. Uberization of the economy reveals a reconstruction of processes that functioned in the traditional economy, as well as those that can be included in the catalog of features typical for the centrally managed economic system. From the point of view of the transformations taking place in the 21st century, the uberization of the economy contributes to the emergence of new business and e-business models in entities operating in various sectors of national economies: from transport, industry, trade to health care, education, culture and art, and finance.

Taking into account the consequences resulting from the progressive process of the uberization of the economy, the role of entities implementing the assumptions of the aforementioned trend, such as GAFA and NATU, should be pointed out. On the one hand, these entities contribute to the creation of innovation distortions and the so-called creative destruction on the market but on the other hand, they contribute to the elimination of those entities that until recently could be considered representatives of a given market or sector.

2.2. Uberization in the transport industry

The uberization, which is an implication of society digitalization, manifests itself not only in the emergence of new digital tools, but also in the transfer of traditional offline services with their specificity (stores, banking and finance, public and administrative services, education, business) to the Internet space (Daidj, 2018). It is a transition to such an economic system, in which entities carry out economic transactions with consumers through modern communication technologies. In the literature this system is also called people-to-people economy (i.e., P2PE) (Hadi et al., 2019) and is also present in the transport industry, from which it takes its name. This means that classic taxi services transfer their functionality to the Internet, while the traffic itself functions in real space. What really creates the process of uberization is the combination of innovative operations such as: Internet payments, geolocation, workforce management, distribution to carry out the work ordered through the application (Bodiroga-Vukobrat et al., 2018). Uberization refers to the business model of the Uber Company, a pioneer in the area of sharing economy innovation and urban mobility systems (Andrade et al., 2022). Uber introduced the concept of the gig economy to cab transportation, offering a diverse range of services and usually cheaper prices (Rowles & Brown, 2017). According to Schneider (2017b), Uber has become, in part, an agent of creative destruction, which is indicative of the impact that uberization is having on the entire economy.

The term was suggested as a common practice in urban taxi companies and describes "a process of elimination of agents and dealers in supply chain: modern computer and mobile technologies allow simplification of contacts and negotiations between producers and con-

sumers. Uberization is a new principle of organization of transport system based on a special multifunctional IT platform." (Degtyareva et al., 2021). According to the authors uberization is a new organizational model of transport systems, that is "based on modern information and communication technologies, including mobile services, cloud storage, distributed computing, management and protection of high-loaded data processing systems, streaming data analysis, etc. To develop all of these technological blocks of uberization it is necessary to elaborate and support virtual models describing the movement and the state of vehicles in the relevant infrastructure." (Degtyareva et al., 2021).

The analyzed trend identifies the Uber application not only as a taxi application, but as a plan to use convenient technology. The Uber phenomenon is about a deep understanding of convenience: what it is and why it matters. In the light of the uberization assumptions, Uber is not a cab application but comes as a project to implement technology to provide convenience (Schneider, 2017b; Wells et al., 2023). Uber did not create a new product, i.e., it did not create a new application, for example, by entering cooperation with taxi companies. Uber has completely changed existing business models based on transparency, use of top technologies, working time flexibility of people involved and lack of intermediaries, while distribution and consumption are carried out according to the latest standards. Following Uber's model makes sense only with a strategy of reducing costs and increasing productivity. This means, therefore, that uberization may result in the cannibalization of one's own business (Chica et al., 2019).

The disruption and creative destruction done by Uber Inc. has changed the entire market and economy (cf: Boden, 2019). This American corporation has contributed to the fact that in the section of the economy such as transport, where new business models were born, existing ones were transformed and/or old business models and e-business models were returned, which have become a kind of competition for traditional models. Examples of changes in transport in the 21st century include the emergence of different business models with different mobility objectives. For example, the carsharing model is defined as a system of car sharing provided for a fee by fleet operators and is similar to car rental companies (e.g., Car2Go). On the other hand, the model of services referred to by the authors as "parataxing" includes vehicles providing a paid service of transporting people within a city, like taxi services, but until recently omitting the need of a taxi licence to provide this service (e.g., Uber). The last model analyzed – carpooling – offers the possibility to carpool by sharing spare seats in a car over long distances in exchange for reimbursement of fuel costs (e.g. BlaBlaCar). This model falls into the area of the so-called cooperative economy, especially the so-called "bottom-up" activities that bypass the issue of taxation and is gaining more and more importance, among others due to the search for cheaper alternative modes of transport (cf: Chica et al., 2019). An example of the world's most popular service offering the above-mentioned service is the French BlaBlaCar, which enables car sharing for drivers and passengers.

The analyzed trend, which is a new phenomenon both in the transport industry and in socio-economic processes, also influences the urbanisation process, providing a basis for local development. The cooperative economy and new trends and directions derived from it contribute to the spread of the urban lifestyle and the development of urbanised forms of

economy. According to the theory of Castells (2003), they are undoubtedly derived from the IT revolution and the networked economy, including the emergence of Internet applications (cf: Korenik, 2011).

Uberization in the transport industry, especially carpooling can also have a role in reducing transport congestion, promoting alternative modes of travel (cf: Çolak et al., 2016), sustainable and resilient cities, generating innovation and ultimately economic growth (cf: Kammen & Sunter, 2016; Jacobs, 1961; Stępnicka et al., 2023). The phenomenon of uberization in the transport industry can be considered from the point of view of the revolution of Internet technology and computer networks, the sharing of knowledge and experience of users and its involvement in production and innovation processes (Corona-Trevino, 2017).

Uberization, especially in relation to the transport sector, can also be applied to the subject of smart cities and their further development (cf: González-Zamar et al., 2020). The optimal digital transformation realized in an entity, a company, or a city, requires digitalization, which affects, among others, optimal decision-making, improved efficiency, increased competitiveness (cf: Stępnicka et al., 2023).

3. Methodology and research findings

BlaBlaCar is a carpooling service and application that enables people looking for transport on relatively long journeys and drivers who travel on these routes to take part in the journey and participate in its costs. The service appeared in the world in 2006, while in Poland it has been operating since 2012 and is considered to be one of the entities typical for the uberization.

According to the hypothesis, carpooling services, which are one of the essential models of uberization, implemented in Poland through the BlaBlaCar application, may constitute significant competition for transportation services provided through traditional forms and models of transportation, i.e., train and bus connections. The main determinant of the above-mentioned relationship is the lower price of a ride via BlaBlaCar compared to the ticket prices of train and bus connections." Carpooling activities carried out using the BlaBlaCar app provide the demand side (i.e., users, passengers) with economic benefits compared to transportation carried out through traditional transport models carried out by train and bus services.

The study covered transport provided in Poland via BlaBlaCar and selected rail operators PKP Intercity and bus operators during the periods 2017–2018 and 2023–2024 (cf: Wiączek, 2019; BlaBlaCar, n.d.; PKP, n.d.; E-podroznik, n.d.).

The minimum and maximum prices for domestic travel between all voivodship cities in Poland via the BlaBlaCar service for the periods studied were examined and averaged. The significant restrictions in the implementation of the study were the so-called single-channel nature of the data acquisition (the data came from the websites of the carriers: BlaBlaCar, PKP Intercity, Bus Flixbus and others) and the variability of the cost of a journey over several days to the same place in Poland via the BlaBlaCar application (por.: cf: Stępnicka et al., 2023). The study compares the cost of travel between two voivodship cities: the capital of Poland – Warszawa (Mazovian Voivodship) and the capital of Greater Poland and one of the most important regions in Poland – Poznań (Greater Poland Voivodship) and twelve other

voivodship cities in Poland (Białystok, Bydgoszcz, Gdańsk, Gorzów Wielkopolski, Katowice, Kielce, Kraków, Lublin, Olsztyn, Opole, Poznań, Rzeszów, Toruń, Warszawa and Zielona Góra).

The study used, among others:

- Mann Whitney U test also known as the Wilcoxon Mann-Whitney test – this test is used to verify the hypothesis about the lack of shift in the compared distributions, i.e., most often the insignificance of differences between the medians of the variable under study in two populations (we assume that the distributions of the variable are close to each other – the comparison of rank variances can be checked using the Conover rank test);
- Kruskal Wallis ANOVA test – this test is a non-parametric alternative to one-way analysis of variance. With this test we compare the distributions of several (k) variables. This test, like the Mann-Whitney U test, is based on the ranks of observations. If all samples come from the same population, we expect that the average ranks in each group will be similar. This test is used to verify the hypothesis about the lack of shift in the compared distributions, i.e., most often the insignificance of differences between the medians of the examined variable in several populations (we assume that the distributions of the variable are close to each other – the comparison of rank variances can be checked with the Conover ranks test).

Considering BlaBlaCar, PKP Intercity and bus rides between Poland's capital, Warszawa and other voivodship cities in Poland, the box plots in Figure 1 show average ticket prices on individual routes in the two periods 2017–2018 and 2023–2024. Comparing the two periods, one sees a clear increase in ticket prices on individual routes. In the 2017–2018 period, the highest ticket prices were recorded on the routes Warszawa – Gorzów Wielkopolski (average

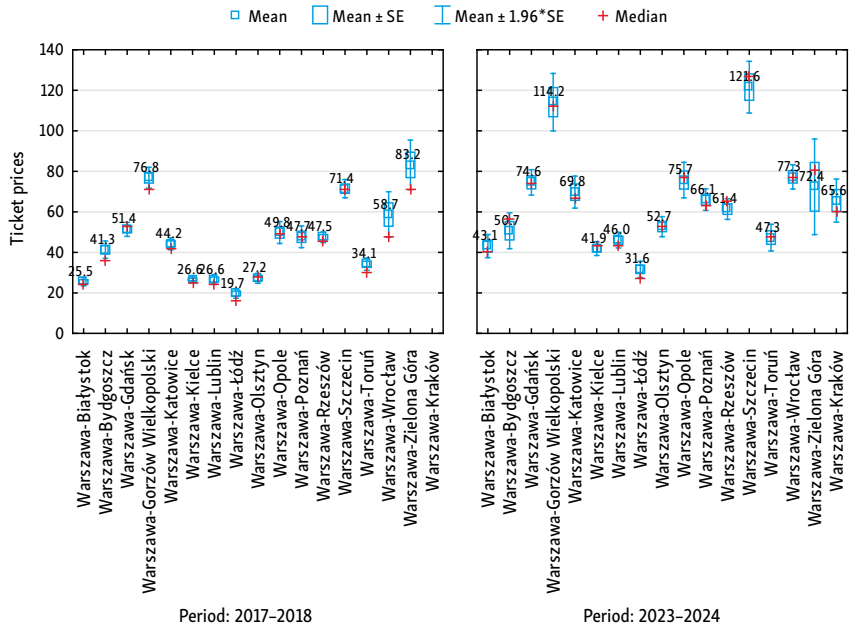

Figure 1. Average travel costs on selected routes between Warszawa and other voivodship cities in 2017–2018 and 2023–2024

76.8) and Warszawa – Zielona Góra (average 83.2). In 2023–2024, the highest fare costs were on the routes Warszawa – Szczecin (average 121.6) and Warszawa – Gorzów Wielkopolski (average 114.2).

It was tested whether there were statistical differences in average travel costs during the periods studied. The Mann Whitney U test was used for broadcasting, while the test was conducted at a significance level of $\alpha = 0.05$. The test shows that in most cases the differences were statistically significant $p < \alpha$. The exception is the route from Warszawa to Zielona Góra for which $p > \alpha$ ($p = 0.9669$). The price increase (change) was not statistically significant. In other cases, the test showed significant differences in average travel costs (ticket prices) (see Table 2).

Figure 2 shows average ticket prices by means of transportation by the analyzed periods. In this case, too, one can observe an increase in prices for each means of transportation by the periods studied. It is clear from the chart that the highest average price increase occurred for bus transportation.

In addition, it was checked whether the differences in average fare costs between Warszawa and other voivodship cities in Poland were statistically significant in the periods studied for each group of carriers. The Mann-Whitney U-test was used, and the significance level of $\alpha = 0.05$ was used for the study. The analysis showed that statistically significant differences in ticket prices occurred for BlablaCar $p < \alpha$ ($p = 0.0000$) and for bus travel $p < \alpha$ ($p = 0.0004$). On the other hand, the differences in the cost of transportation by rail PKP Intercity by study period were not statistically significant – changes in fare prices were not significant. Analyzing the above data, it can be observed that average fare prices increased the most for bus travel in 2017–2018, when the average was 40.1 and the median was 39, while in the 2023–2024 period the average price was 65.1 and the median was 59.9 (cf: Table 3).

Figure 3 shows average ticket prices between Warszawa and other voivodship cities by different means of transportation in the two periods studied. In 2017–2018, there was a large variation: the lowest ticket prices were recorded for bus trips, while the highest average prices were recorded for train trips (e.g., PKP Intercity). Between 2023 and 2024, average fares for the surveyed carriers evened out, but the lowest fares were recorded for BlablaCar rides (60.6), while the highest averages were achieved by bus rides (average 65).

In addition, it was examined whether differences in average fare prices between Warszawa and other voivodship cities were statistically significant between carriers during the periods studied. The Kruskal Wallis ANOVA test was used for the study. The test was conducted at the significance level of $\alpha = 0.05$. The test shows that the differences between carriers in 2017–2018 were statistically significant $p < \alpha$ ($p = 0.0000$), while in the 2023–2024 period, prices showed no statistically significant differences between carriers $p > \alpha$ ($p = 0.4178$) (see Table 4).

It was also examined whether the type of carrier and the study period have a simultaneous effect on the level of ticket prices. ANOVA analysis for factorial arrangements was used for the analysis. The results showed that both the survey period and the type of carrier together have an effect on the cost of transportation $p < \alpha$ ($p = 0.00598$). The results are shown in the interaction plot (see Figure 4).

Table 2. Results of Mann Whitney U test

	2017–2018						2023–2024						
	N	Me	Average	σ	Min	Max	N	Me	Average	σ	Min	Max	p-value
Warszawa-Białystok	32	24	25.5	5.8	16	46	19	40	43.1	12.6	32	77	0.0000
Warszawa-Bydgoszcz	34	36	41.3	12.7	27	89	16	57	50.7	18.1	12	77	0.0193
Warszawa-Gdańsk	34	53	51.4	10.2	20	71	21	74	74.6	14.7	40	107	0.0000
Warszawa-Gorzów Wielkopolski	19	71	76.8	11.4	65	108	12	112	114.2	25.0	70	160	0.0001
Warszawa-Katowice	62	42	44.2	11.9	28	113	21	67	69.8	18.5	53	140	0.0000
Warszawa-Kielce	33	25	26.6	3.8	22	36	18	43	41.9	7.4	20	53	0.0000
Warszawa-Lublin	41	24	26.6	7.9	9	52	21	43	46.0	9.0	34	75	0.0000
Warszawa-Łódź	36	16	19.7	7.1	10	42	25	27	31.6	10.1	22	70	0.0000
Warszawa-Olsztyn	37	28	27.2	7.7	10	55.5	15	53	52.7	9.7	40	78	0.0000
Warszawa-Opole	12	49.5	49.8	9.5	36	72.5	11	77	75.7	14.8	50	105	0.0005
Warszawa-Poznań	31	48	47.7	15.2	30	113	21	63	66.1	12.5	53	100	0.0000
Warszawa-Rzeszów	40	45.5	47.5	8.5	24	60	23	65	61.4	12.5	39	85	0.0001
Warszawa-Szczecin	27	71	71.4	11.9	45	90	10	127	121.6	20.6	69	139	0.0000
Warszawa-Toruń	34	30	34.1	8.8	24	62.5	18	48	47.3	14.2	11	67	0.0004
Warszawa-Wrocław	34	48	58.7	33.5	30	229	23	77	77.3	14.7	60	120	0.0000
Warszawa-Zielona Góra	11	71	83.2	20.7	63	134	8	81	72.4	34.0	30	115	0.9669
All Grps	524	38.5	41.7	21.1	0	229	282	59	61.7	26.1	11.2	160	0.0000

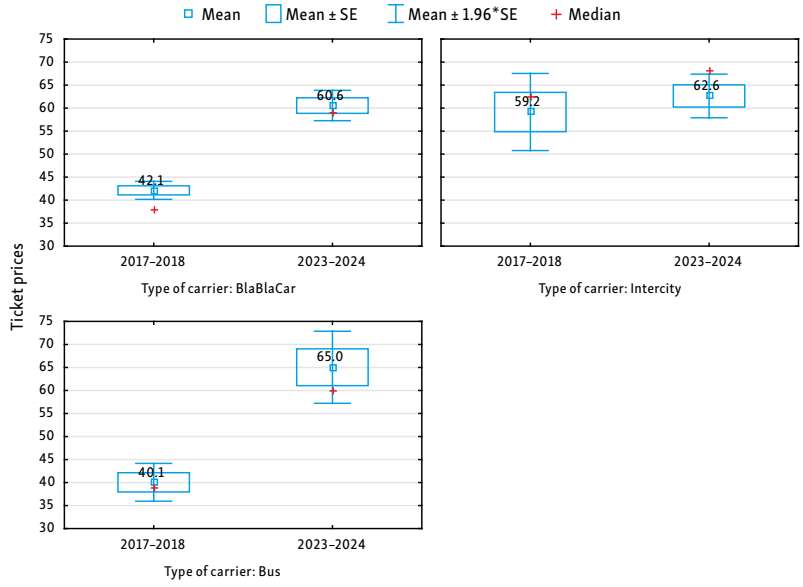

Figure 2. Average cost of travel by selected means of transport between Warszawa and other voivodship cities in Poland by periods

Table 3. Results of the Mann Whitney U test

	2017–2018						2023–2024						
	N	Me	Average	σ	Min	Max	N	Me	Average	σ	Min	Max	p-value
Blabla Car	295	32	36.9	17.6	9	113	204	48	54.8	25.3	24	229	0.0000
PKP Intercity	9	62.5	59.2	12.8	37.5	75	31	68	62.6	13.5	35.5	80	0.4178
Bus journeys	51	39	40.1	14.9	10	60	75	59.9	65.1	34.6	11.2	159.9	0.0004

Table 4. Results of Kruskal Wallis ANOVA test

		Blabla Car	PKP Intercity	Journeys Bus	p-value
2017–2018	N	295	9	51	0.0004
	Me	32	62.5	39	
	Average	36.9	59.2	40.1	
	Σ	17.6	12.8	14.9	
	Min	9	37.5	10	
	Max	113	75	60	
2023–2024	N	204	31	75	0.4178
	Me	48	68	59.9	
	Average	54.8	62.6	65.1	
	Σ	25.3	13.5	34.6	
	Min	24	35.5	11.2	
	Max	229	80	159.9	

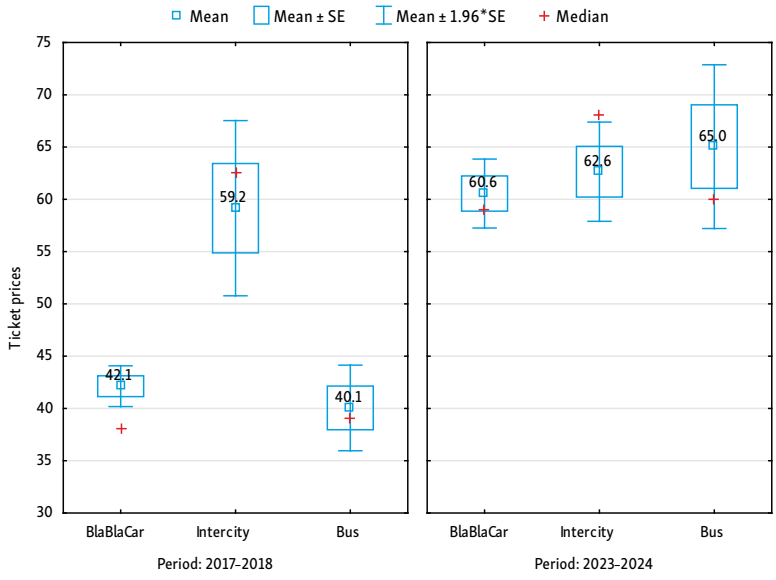

Figure 3. Comparison of average ticket prices between Warszawa and other voivodship cities in Poland at individual carriers by the two periods studied

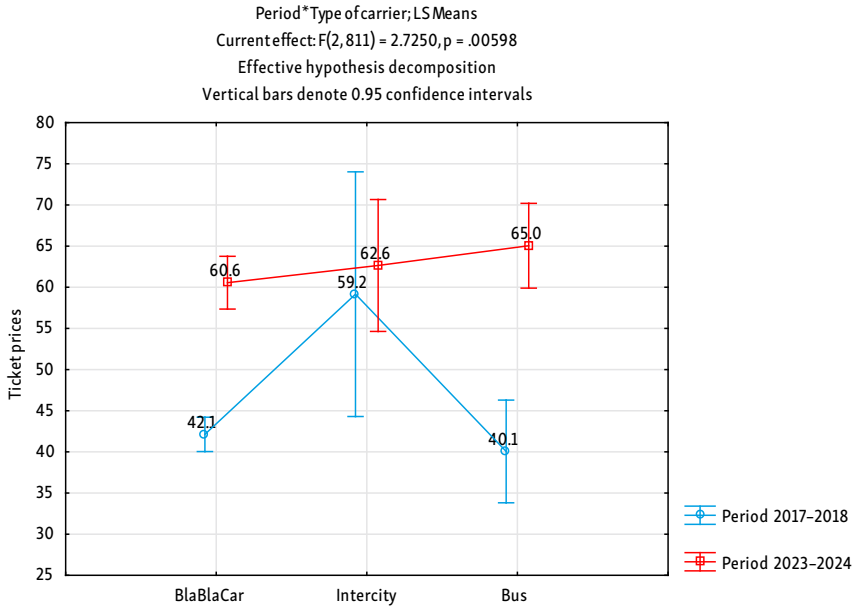

Figure 4. Interaction graph between carrier type and period and ticket price between Warszawa and other voivodship cities in Poland

In order to check the dependencies that occurred in the studied periods for BlaBlaCar trips, rail and bus trips from the capital of Poland, Warszawa, to other voivodship cities, trips from Poznań – one of the largest cities in Poland and the capital of Greater Poland, to other voivodship cities in Poland were also examined. With regard to the trips made via BlaBlaCar, PKP Intercity and selected bus services (e.g., Flixbus) from Poznań to other voivodship cities in Poland, the box plots in Figure 5 show average ticket prices on individual routes in the two periods 2017–2018 and 2023–2024. Comparing the results presented within the two periods under study, one sees a clear increase in ticket prices on individual routes. Both in the first period and in the second, the highest ticket prices were on the route Poznań – Białystok (on average about 76.30 PLN) and Poznań – Rzeszów (82.20 PLN) in 2017–2018 and Poznań – Białystok (on average about 101.50 PLN) and Poznań – Rzeszów (by 102.80 PLN in 2023–2024). In the second period, travel costs were also high on the Poznań – Lublin (PLN 100.80) and Poznań – Olsztyn (PLN 92.50) routes (see Figure 5).

It was examined whether there were statistical differences in the average cost of travel in the studied periods from Poznań to other voivodship cities in Poland. The Mann Whitney U-test was used for the study, and the tests were conducted at a significance level of $\alpha = 0.05$. The study found that in most of the cases studied, the differences were statistically significant $p < \alpha$. The exceptions were the routes from Poznań to Białystok $p > \alpha$ ($p = 0.1502$), from Poznań to Bydgoszcz $p > \alpha$ (0.1557) and from Poznań to Rzeszów. The price increase (change) was not statistically significant. In other cases, the test showed significant differences in average travel costs (i.e., ticket prices) (see Table 5).

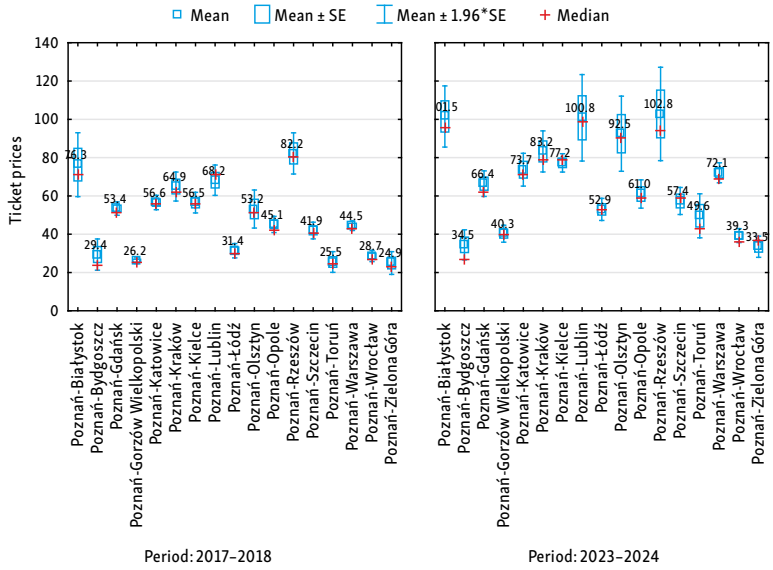

Figure 5. Average travel costs on selected routes from the city of Poznań to other voivodship cities in 2017–2018 and 2023–2024

Table 5. Results of Mann Whitney U test

	2017–2018						2023–2024						
	N	Me	Average	σ	Min	Max	N	Me	Average	σ	Min	Max	P-value
Poznań-Białystok	3	71	76.3	14.7	65	93	10	95.5	101.5	25.8	68	139	0.1502
Poznań-Bydgoszcz	8	24	29.4	11.7	22	54	13	27	34.5	14.4	20	72	0.1557
Poznań-Gdańsk	20	51.5	53.4	8.0	45	81	12	62	66.4	11.8	55	94	0.0004***
Poznań-Gorzów Wielkopolski	30	25	26.2	4.1	20	37	11	40	40.3	7.5	29	49	0.0000***
Poznań-Katowice	23	56	56.6	9.2	43	84	10	71	73.7	13.8	54.9	99.9	0.0005***
Poznań-Kraków	11	62	64.9	12.8	48	93	8	79	83.2	15.5	59.9	109.9	0.0146*
Poznań-Kielce	8	56	56.5	7.8	43	71	8	78.5	77.2	6.9	69	87	0.0027**
Poznań-Lublin	14	71	68.2	15.1	36	91	10	98.5	100.8	36.4	30	157	0.0023**
Poznań-Łódź	32	30	31.4	10.8	15	75	19	53	52.9	12.8	34	85	0.0000***
Poznań-Olsztyn	6	51	53.2	12.4	42	77	8	90.5	92.5	28.3	63	144.9	0.0081**
Poznań-Opole	15	42	45.1	8.3	38	72	7	59	61.0	10.0	51	81	0.0013**
Poznań-Rzeszów	5	80	82.2	12.3	67	99	4	94	102.8	24.9	85	138.2	0.1779
Poznań-Szczecin	24	40.5	41.9	10.9	27	62	10	59	57.4	11.4	40.6	71	0.0015**
Poznań-Toruń	6	24.5	25.5	6.8	16	37	11	43	49.6	19.4	26.9	95	0.0056**
Poznań-Warszawa	31	43	44.5	7.1	33	70	23	69	72.1	12.8	53	99.9	0.0000***
Poznań-Wrocław	32	26.5	28.7	8.4	15	56	19	36	39.3	8.1	29.9	63	0.0000***
Poznań-Zielona Góra	17	23	24.9	12.5	11	64	14	36.9	33.5	10.5	11.9	47.4	0.0223*
Total	285	42	42.2	17.5	11	99	197	61	62.5	26.9	11.99	157	0.0000***

Figure 6 shows the average prices of tickets on the route Poznań – individual voivodship cities in Poland qualified by the type of mode of transport by and for the analyzed periods. In this study, too, one can observe an increase in prices for each mode of transportation by the periods studied.

It was examined whether the differences in average fare costs between Poznań and other voivodship cities in Poland were statistically significant in the periods studied for each group of carriers. The Mann-Whitney U-test was used for the study, and the significance level of $\alpha = 0.05$ was used for the test. The analysis shows that statistically significant differences in ticket prices occurred only for BlablaCar $p < \alpha$ ($p = 0.0000$). On the other hand, the differences in the cost of PKP Intercity and bus fares by the periods studied were not of a great significance.

Analyzing the data, it can be noted that the average prices of travel from Poznań to other voivodship cities for PKP Intercity train connections slightly decreased in 2017–2018 – their average price was 70.1 and the median – 71, while in the period 2023–2024 the average price was 66.1, and the median – 69.5. The test showed no significant differences, but the prices decreased slightly (see: Table 6).

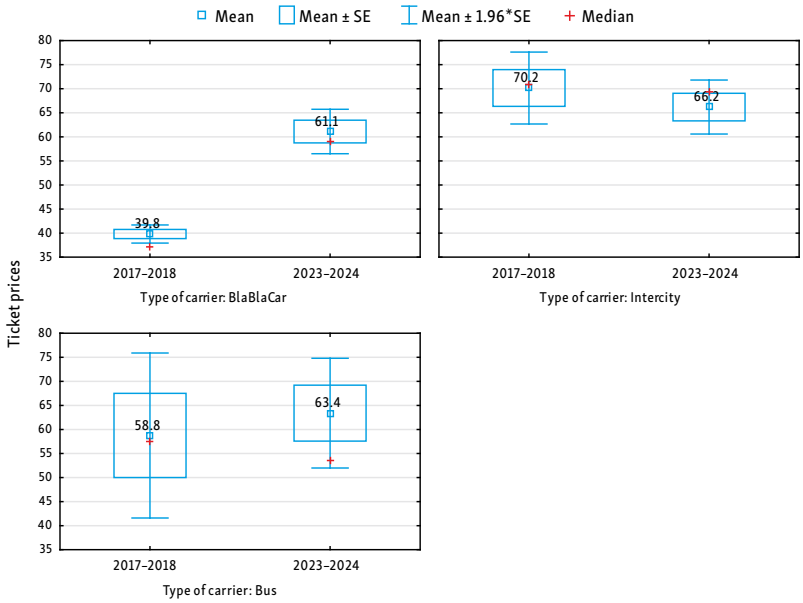

Figure 6. Average cost of travel by selected means of transport between Poznań and other voivodship cities in Poland by periods under study

Table 6. Results of the Mann Whitney U test

	2017–2018						2023–2024						
	N	Me	Average	σ	Min	Max	N	Me	Average	σ	Min	Max	p-value
BlablaCar	261	37	39.8	15.5	11	89	123	59	61.1	26.2	23	157	0.0000
PKP Intercity	20	71	70.1	17.1	37.9	99	36	69.5	66.1	17.3	22.6	90	0.5957
Bus carriers	4	57.5	58.8	17.5	40	80	38	53.5	63.4	35.9	12.0	145.0	0.8638

Figure 7 shows the average ticket prices from Poznań to other voivodship cities in Poland by different means of transportation in the two studied periods. As the study shows, high variation occurred in 2017–2018. The lowest prices for a trip between Poznań and other voivodship cities were recorded for BlablaCar transport, the highest average prices – for PKP Intercity train connections. Between 2023 and 2024, the average fares of the surveyed carriers equalized.

Therefore, it was investigated whether differences in average fare prices between Poznań and other voivodship cities were statistically significant considering carriers in the periods studied. To achieve this, the Kruskal Wallis ANOVA test was used. The test was conducted at

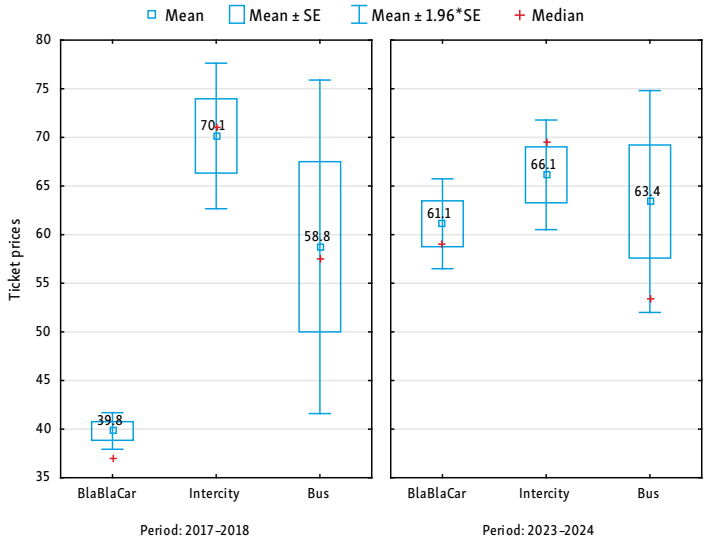

Figure 7. Comparison of average ticket prices for individual carriers between Poznań and other voivodship cities in Poland for the two studied periods

Table 7. Results of Kruskal Wallis ANOVA test

		BlablaCar	PKP Intercity	Bus journeys	p-vale
2017–2018	N	261	20	4	0.0000
	Me	37	71	57.5	
	Average	39.8	70.1	58.8	
	Σ	15.5	17.1	17.5	
	Min	11	37.9	40	
	Max	89	99	80	
2023–2024	N	123	36	38	0.1229
	Me	59	69.5	53.5	
	Average	61.1	66.1	63.4	
	Σ	26.2	17.3	35.9	
	Min	23	22.6	12.0	
	Max	157	90	145.0	

the significance level of α = 0.05. The test shows that the differences in 2017–2018 between all carriers: BlaBlaCar, train connections and bus connections were of a great significance p < α (p = 0.0000). In the period 2023–2024, prices do not show statistically significant differences between carriers p > α (p = 0.1229) (cf: Table 7).

It was also examined whether the type of carrier and the study period had a simultaneous effect on the level of ticket prices. ANOVA analysis for factorial arrangements was used for the study.

The test showed that both the survey period and the type of carrier together influenced the cost of transportation p < α (p = 0.00018). The results are shown in the interaction plot (see Figure 8).

The final step of the analysis examined whether fares between Warszawa and other voivodship cities differed from other cities. 17 routes from each city were considered. Figure 9 shows a comparison of the total cost of travel in the two study periods by means of transportation. The study was conducted using the Mann-Whitney U test. A p-value, which indicates whether the differences between costs are statistically significant, is placed in the lower left corner next to each component graph. The results of the study showed that there were no differences between cities, with one exception. It concerns the first period of the study (2017–2018), where the differences are related to the cost of bus tickets p < α (p = 0.0462). In other cases, the differences are not of great value. This shows that regardless of the city studied: Poznań and Warszawa, prices remained similar in both the first and the second study periods and by means of transportation: BlaBlaCar, train and bus rides (see Figure 9).

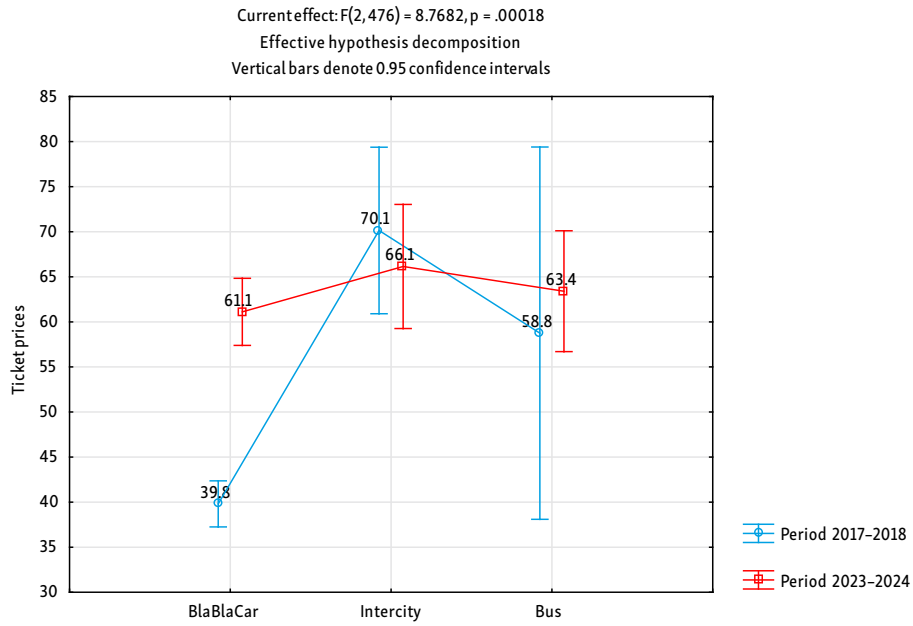

Figure 8. Interaction chart between carrier type and period and ticket price on the route Poznań – other voivodship cities in Poland

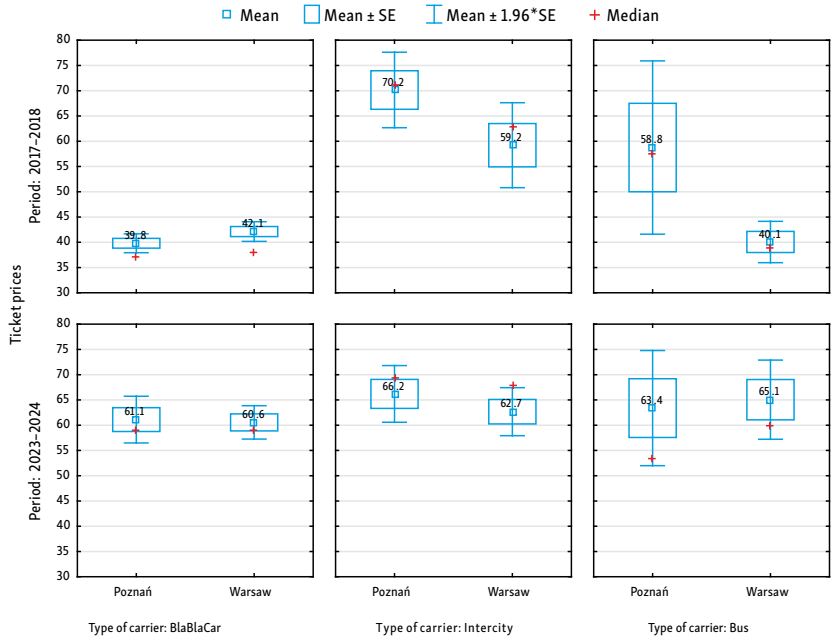

Figure 9. Average travel costs in the studied periods 2017–2018 and 2023–2024 by type of transportation and the analyzed cities of Poznań and Warszawa

In conclusion, the business model adopted by BlaBlaCar during the researched period (before COVID-19), based on the principles of uberization, sharing, cooperation and savings proved to be effective and used by customers. The business model of the analyzed company and the uberization in the transport industry between 2017–2018 and 2023–2024 resulted in the increased popularity of the analyzed traveling form.

The research shows the competitiveness of the transport services offered by the analyzed application in relation to the prices of rail and bus transport (in terms of demand). The cost of a BlaBlaCar trip between Warszawa and other voivodship cities in Poland and between Poznań and other voivodship cities in Poland is lower in most of the studied cases. This price competitiveness results, among other things, from the business model adopted by the company, based mainly on P2P relations, including the implemented point system with gameplay elements.

4. Results and discussion

The main objective of the study was to determine the impact of the new trend in the transport industry in Poland on its competitiveness in the pre-pandemic period (i.e., 2017–2018) and in the post-pandemic period (i.e., from 2023). This objective was achieved, among other things, by conducting a study of the cost of travel from Warszawa and Poznań to other voivodship cities in Poland (Białystok, Bydgoszcz, Gdańsk, Gorzów Wielkopolski, Katowice, Kielce, Kraków, Lublin, Olsztyn, Opole, Poznań, Rzeszów, Toruń, Warszawa and Zielona Góra) via the BlaBlaCar, rail transport (PKP Intercity) and bus transport in the pre-pandemic period

(2017–2018) and in the post-pandemic period (from 2023 to March 2024). In order to achieve this goal, statistical data from the BlaBlaCar, PKP Intercity and e-podroznik websites, among others, were used, as well as using statistical test methods: the Mann Whitney U test and Kruskal Wallis ANOVA test.

The theoretical and empirical considerations of the work also provided answers to all the research questions. These considerations made it possible to obtain answers to questions about how Uberization manifests itself in the economy and how this phenomenon affects changes in the passenger transport industry. The theoretical part of the article indicates what Uberization is and the genesis of this concept and phenomenon. As the discussion shows, Uberization, among other things in the transportation industry, is a model that allows drivers to offer rides between different cities to connect via an app with travellers heading directly or indirectly to those cities that are on the drivers' route or to which they are also heading directly. The contemporary trend of uberization of the economy is gaining in importance and generates a variety of (both positive and negative) economic, social, urbanisation and other consequences for the recipients of traditional and new-age business models.

As shown in the theoretical considerations, the genesis of the Uberization phenomenon emerged with the development of the Uber application and the spread of this model in the area of passenger transportation. With the development of similar applications and services, the term was also implemented in other areas of people's lives and activities.

The uberization of the transport industry has contributed to the emergence of competitive modes of mobility for users (e.g., carpooling), both in the period before and during the COVID-19 pandemic. This competitiveness stems from one of the essential features of the cooperative economy, the so-called "bottom-up" activity, which allows passengers to contribute to the costs of the trip (more precisely: the fuel costs) borne by the organiser of the trip (i.e., the driver).

In response to the next research question about the criteria and levels of Uberization from the perspective of coverage, the authors pointed out that the phenomenon of Uberization can be related to the national economy, industry and market, as well as businesses and platforms. The scope of uberization refers to the size of the facility into which this type of phenomenon has begun to penetrate.

The next research question was related to another question about the Uberization of the economy and its criteria and implications. Theoretical considerations have shown that the Uberization of the economy is a trend, a phenomenon, a tendency in the economy, consisting of its current rule reformulations in favor of a new approach in thinking and acting related to the implementation of the processes and services that occur in it. The criterion for such a division is undoubtedly the diversity of areas and selected aspects of economic and social life affected by this process. The main implications of Uberization's entry into the economy include a paradigm shift in terms of ownership, possession, approaches to service provision and the costs associated with its implementation, as well as reference to sustainability in various areas of life, including the transportation industry.

The uberization in the transportation industry contributes to several trends that go beyond traditional business models. It is also a kind of creative innovation that makes Internet applications and services from the transport industry (which also includes BlaBlaCar) gain

popularity thanks to lower on average 40% costs of destination journeys (from the point of view of travellers – users) and shared transport costs (from the point of view of the drivers offering free seats in the car), compared to other forms of transport (rail, bus).

In traditional transport models, service costs (i.e., travel costs) are valued on the basis of other variables than in the case of models whose assumptions are based on the trend of uberization (these depend, among other things, on the extensive catalog of fixed and variable costs typical of rail and bus transport operations). This is confirmed, among other things, by the results of conducted research, in the light of which traditional forms of travelling are usually more expensive, compared to the forms based on applications and sharing economy.

Changes taking place in the transportation industry, including: the impact of Uberization and the opportunities arising from the use of new technologies are setting new models and patterns, which, if they work and are cheaper, begin to gain popularity. This means that BlaBlaCar's services of uberization and so-called social travel through carpooling have become a cheaper alternative to rail and bus passenger travel. By definition, a BlaBlaCar trip should be cheaper compared to other forms of transportation, not least because the cost of it is divided by the number of travelers. This means that the more people are traveling in one car using BlaBlaCar on a given route, the lower the cost of the trip for each passenger should be. Moreover, the cost of the trip should be affected only by the purchase price of fuel, without adding the cost of transportation services. Hence, when traveling on routes between the two main provincial cities in Poland: Warsaw and Poznan, as well as other provincial cities, the price of BlaBlaCar's transportation service was lower than that of PKP Intercity and bus services in most of the cases studied. The correlations formulated in this way also make it possible to answer the fourth research question about the impact of Uberization on changes taking place in the passenger transport industry in Poland.

The relationship formulated above allowed the authors to confirm the main thesis that carpooling services, which are one of the basic models of Uberization, provided in Poland through the BlaBlaCar app, can be a significant competitor to transportation services provided by traditional forms and models of transportation, i.e., train and bus connections. As the results of the survey for the voivodship cities of Warsaw and Poznań show, the main determinant of the above relationship in most of the surveyed trips from Warsaw and Poznań to other voivodship cities was the price of a BlaBlaCar ride compared to rail and bus connections. This relationship was confirmed in both surveyed periods, although in the post-pandemic period the differences in the prices of BlaBlaCar, PKP Intercity and bus trips did not show significant differences, and in many cases the BlaBlaCar service was more expensive compared to train and bus trips.

Theoretical considerations also confirmed the validity of the first complementary thesis, which was expressed in the formulation that the processes of uberization taking place in the area of transportation are contributing to a change in preferences for the means of transportation by which people move and travel, which may result in an increase in demand for alternative models of transportation and travel (e.g., carpooling) with a decrease in interest in traditional models of travel. It is possible that travel costs are important to travelers, as well as the comfort of traveling by car, the opportunity for social interaction with other travelers in the same direction, as well as the ability to arrive at a given address.

According to the second supporting thesis, Uberization in the transportation industry, including carpooling, may be a source of threat to traditional transportation models in Poland (i.e., rail or bus travel), but not in every case, which depends on the frequency of BlaBlaCar carriers' presence on a given route between provincial cities. The results of the survey also confirmed this thesis, although BlaBlaCar rides in the post-pandemic period from Warsaw and Poznań to other provincial cities in Poland became less price-competitive compared to train and bus trips. This could be due to, among other things, rising fuel prices during the post-pandemic period in Poland or the desire of travel operators to provide an additional source of revenue through BlaBlaCar.

The results of the conducted research lead to the following conclusions:

- the transport model proposed by the BlaBlaCar application, with respect to the two cities of Warszawa and Poznań and other voivodship cities in Poland is usually beneficial to its users (passengers as well as drivers) from an economic point of view during the normal operation of the economy and in the post-pandemic period. These benefits are usually expressed in the lower cost of travelling with BlaBlaCar from Warszawa and Poznań to other voivodship cities, compared to other means of transport, although not in each of the analyzed trips;
- most of the services offered by BlaBlaCar in Poland for the two voivodship cities of Warszawa and Poznań and other voivodship cities in Poland are cheaper by 30%–40% in comparison with rail and bus services. This relationship has been proven in usually all examined periods: 2017–2018 and in the post-pandemic period 2023–2024, hence the popularity of BlaBlaCar application is growing;
- in most of the studied BlaBlaCar journeys, train journeys and bus journeys in 2023–2024, prices for each of the analyzed forms of transport were higher by 10%–30% than in 2017 and 2018;
- the price of traveling using BlaBlaCar in Warszawa and Poznań and other voivodship cities in Poland in each of the researched periods depends on various factors, including:
  - the number of connections on the route (the more connections on the route, the lower the fare),
  - the number of connecting cities along the route (the more connecting cities there are along the route, the lower the fare),
  - the date of the journey (the closer the departure date, the lower the price),
  - the nationality of the people offering a seat in the car (generally higher travel costs are set when the driver is from a western European country; travel costs with a driver from a central and/or eastern European country are generally similar or higher than with a national driver);
- in 2018 and 2019, Poland was dominated by BlaBlaCar connections provided by domestic drivers (around 90%); from 2020, a systematic increase in the share of transport provided by foreign drivers is observed (to around 30% per year);
- specific national and global situations (i.e., COVID-19) have not reduced the demand for BlaBlaCar services. The applications and tools offered by the high-tech companies are increasingly popular regardless of the economic constraints and inhibitions.

The results of the research reveal not only many advantages resulting from the uberization of the transport industry in Poland, but also point to numerous disadvantages. While from the point of view of the platform and the entity, the analyzed phenomenon in the transport industry generates benefits (such as the described decrease in travel costs), from the point of view of the economy as a whole, the industry, the market or companies operating under typical market economy rules, these benefits are much less.

BlaBlaCar and other services that implement business models that are in line with the trend of uberization and benefit from subscription fees. The travellers pay a non-tax amount of money for the journey and the same amount is given to the carriers (because according to the service regulations, the amount of money proposed by the driver is only to compensate for the cost of fuel and is not a source of income). For market players, as well as for the state budget, the uberization of transport services results in the lack of tax revenues, unequal competition and generates losses (cf: Stępnicka et al., 2023, p. 341–346).

Another and significant limitation of the subject matter undertaken, including the results of the study, are the difficulties associated with conducting a comparative analysis for the cost of travel in selected cities in Poland in relation to travel by the studied forms and modes of transport in selected European countries. These difficulties mainly relate to the ways and tools for obtaining and uninterrupted interpretation of data on the cost of so-called traditional travel, i.e., rail and bus travel between selected cities in selected European countries. The lack of data with which to determine the selected correlations only gives rise to the conjecture that, given the trends in the use of BlaBlaCar ridesharing that occurred in Poland during the period under study, i.e., before the pandemic and in the post-pandemic period, they may have been similar or perhaps even identical in other European countries. This is due, among other things, to the characteristics and peculiarities of carpooling, which, with regard to the formulated regulations and rules of operation, is similar in nature to the studied form of communication and travel in European countries. The BlaBlaCar application operates in several European countries, hence the need to unify the conditions of use for analyzing the selected form of communication (travel).

The lack of the possibility of conducting a comparative study that would characterize in an even more precise and substantive way the trends that occur in the market for carpooling services in Poland and selected European countries generates a certain research gap in the field of comparative analysis, which undoubtedly requires a methodical and effective solution.

Despite the advantages and limitations, uberization is a new form of cooperation between consumers and suppliers through an Internet platform that combines features typical of an economy of sharing, digital innovation, competitiveness, and independence. The uberization influences social, legal, economic (including fiscal) aspects of life. On the one hand, it generates benefits, while on the other hand, it can harm entities whose business model and development scenario differ significantly from Uber's, application that contributes to increasing efficiency and reducing costs (cf: Stępnicka et al., 2023, pp. 341–346).

5. Conclusions

The idea of uberization, as so-called disruptive innovation, is to provide on-demand services for as many needs and preferences as possible. This process of using advanced telecommunication technologies to introduce new ways of buying or selling is supported by unsatisfied and growing demand in all business segments. Entities implementing business models, which fit into forms of cooperation based on uberization, match the excess demand with other means of supply and expand various segments of transport. In addition, the uberization is more likely to be successful if there is no supplier of any size that can meet the new requirements, as well as in case of inflexible demand (i.e., if the demand volume is not sensitive to price changes).

The common travels are seen through the prism of benefits in the macroeconomic dimension, among others, in the dimension of broadly understood sustainable development and eco-development of society. The example of BlaBlaCar and its role in the development of uberization in the Polish transport market, apart from positive micro-economic effects (for customers as well as carriers), generates various risks: lowering costs or omitting intermediaries, especially on a macro scale – for the aggregate labor market or the state's tax policy. In special situations, e.g., during a crisis or an epidemic, uberization, including the carpooling model, is an economic alternative to travelling in a traditional way.

Uberization of transport services has an important impact on the development of the transport industry in Poland, in particular on the functioning of entities that pursue traditional business models. The phenomenon of uberization in relation to the transport industry requires further detailed research. It is particularly important to analyse this phenomenon in the context of modernisation and further development of the transport industry (in particular, urban transport, as well as intercity, regional, and national transport) in Poland and all over the world. Uberization in the transport industry has contributed to a change in the perception of users of the role and importance of urban and regional means of transport, as well as a transformation in their preferences regarding travel modes. A pandemic situation has caused that one important model of uberization, i.e., carpooling, has gained importance, among other things, due to the cost of local journeys as well as regional and national travel, but also the quality of the means of transport.

From the point of view of further detailed research and the phenomenon of uberization in the transport industry and carpooling, the following directions seem to be relevant:

- the development of a conceptual framework that defines, for example, uberization in the transport industry and carpooling in a substantive and unobjectionable formal way;
- determining what is the impact of uberization in the transport industry, including carpooling, on the economic and social aspects of life;
- demonstrating whether the forms threaten the economic security of the city, region, or country, and if so, to what extent, and how to mitigate or minimise the effects of these threats;
- determining what real benefits and losses in connection with the popularisation of uberization in the transport industry are carried by those implementing traditional models of communication, and developing solutions that would contribute to functioning in conditions of complementarity of these competing models of transport;

- indicating, from the point of view of economic practice, realistic scenarios (optimal, optimistic, and pessimistic) for the further functioning of this model in the next 5-year perspective, with particular emphasis on the functioning of the described industry under conditions of uncertainty, including COVID-19 and its economic and social implications.

Uberization in the transportation industry, including carpooling, have changed the approach to traditional business models not only in the transportation industry but also in other areas of life. The authors' findings show that alternative means of travel and communication should be kept in mind. The results of the study also confirmed that persistently high ticket prices for rail and bus services in Poland contribute to the search and the emergence and increased interest in alternative transport solutions, such as carpooling with the BlaBlaCar app. On the one hand, new transport models (such as carpooling) are an excellent economic alternative to the generally more expensive bus and train services, but also tram and taxi services, while on the other hand they are seen as a source of risk for these operators, mainly due to the lower costs associated with the involvement and use of means of transport in the carpooling model and the lower tax and administrative obligations compared to the fiscal burden, charges, etc. that must be carried by operators using traditional transport models.

The topic taken up by the authors can be the basis for further research and analysis on the topic of uberization, the consequences of which affect contemporary life and functioning of various industries and sectors almost all over the world.

Funding

This research was co-financed by the Minister of Science under the "Regional Excellence Initiative".

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