



**II INNOVATIVE BEHAVIOR OF THE POZNAŃ  
AGGLOMERATION INHABITANTS  
IN THE TRANSPORT SERVICES MARKET**

## INNOVATIVE BEHAVIOR OF THE POZNAŃ AGGLOMERATION INHABITANTS IN THE TRANSPORT SERVICES MARKET

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### Summary

The development of information and communication technologies, including in particular the modern development of mobile technologies, has an undeniable impact on people's lives and, consequently, on consumers' market behaviour. The growing popularity and capabilities of mobile devices, as well as the increasing availability of mobile Internet access, mean that in many markets companies are redefining their business models, in which the activities conducted via the Internet play an increasingly important role. This is particularly visible on the market of individual and public transport services, where thanks to mobile devices, as well as in consistency with trends in consumer market behaviours and the development of cities in accordance with the smart city concept, for several years now we can observe the emergence of innovative alternatives to traditional forms of transport. The pace of appearance of product innovations on the market depends, of course, to a large extent on the level of acceptance of innovation by consumers. The aim of the article is to determine the degree of innovativeness of the inhabitants of the Poznań agglomeration in the use of transport solutions available in Poznań. The research part presents the results of own research conducted in 2019 on a sample of 795 respondents. They showed that the inhabitants of the Poznań agglomeration are not afraid to use product innovations on the market of transport services and use them to a greater extent than in the case of the general population.

**Keywords:** consumer innovativeness, smart city, sharing economy, prosumption, trends in consumer behaviour, smart mobility



## Introduction

The article presents the behavior of the Poznań agglomeration inhabitants in the scope of using the available services offered by the City of Poznań and institutions and sub-entities operating in the field of transport. The development of sustainable transport systems in cities, characterised to a large extent by innovative solutions, determines the assessment of the quality of life in the city [Wyszomirski 2017]. New proposals to facilitate the daily life of the residents in the city are a testimony to, on the one hand, the city's openness to technological novelties and striving to improve the level of public service provision, on the other hand, building the image of the 'smart city' and developing the public service offer. The dynamic development of information and communication technologies and their widespread availability induces new business solutions in the process of providing individual and public services. As a consequence, the benefits associated with improving the quality of life are manifested in the ease, convenience and freedom of access to various transport services. Increasing capabilities of mobile devices together with growing access to the Internet (especially mobile Internet) and increasingly lower costs of using it, not only affect the development of e-commerce (and m-commerce), but also result in progressive virtualization of using various types of services, the emergence of new categories of products, or the growing importance of new trends in consumer behavior. Two of them — presumption and the economy of sharing — are developing particularly dynamically in relation to the market behavior of the inhabitants of Polish cities.

The main aim of the article is to show the degree of innovativeness of behavior of the inhabitants of the Poznań agglomeration in the use of new solutions offered on the market of transport services in Poznań. The first part of the article discusses the dynamic development of information and communication technologies (ICT) in Poland, trends in consumer market behaviors, the degree and scope of use of mobile technologies by Poles, as well as changes occurring on the e-commerce and m-commerce market. Further attention was focused on the economics of sharing its essence and discussion of the research results on

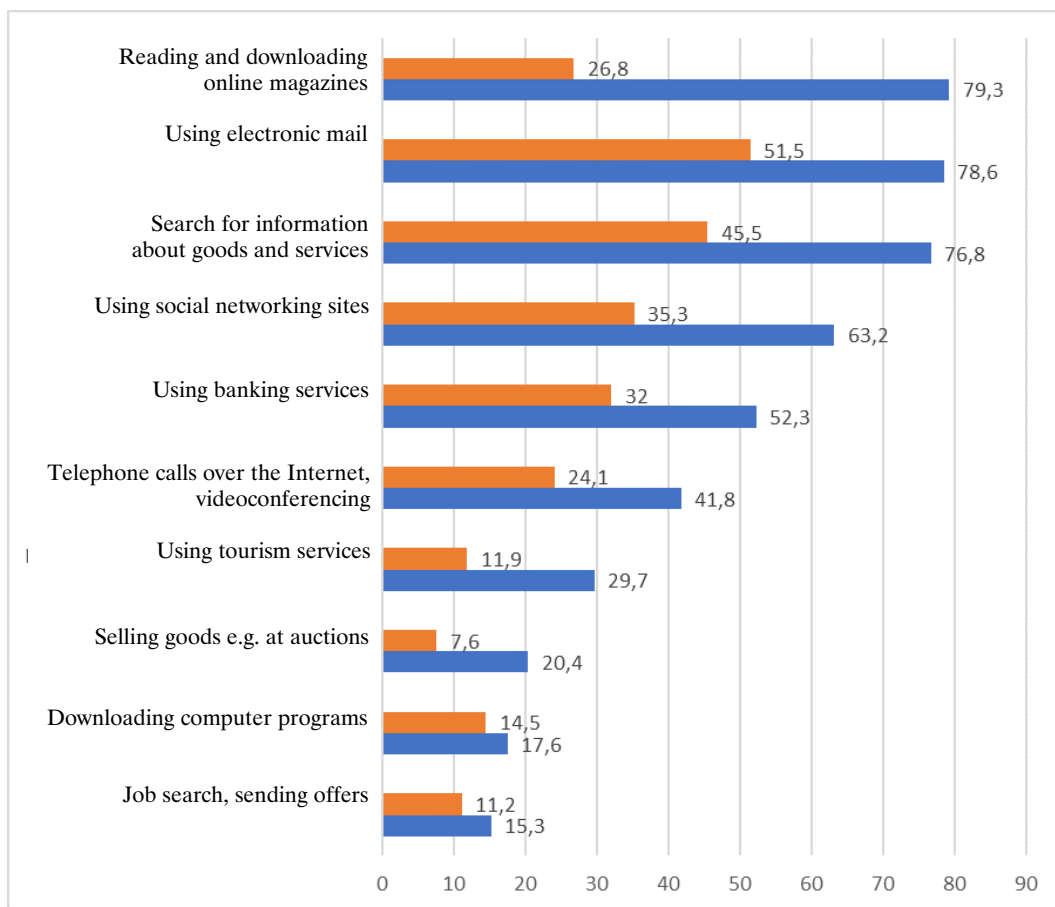
the participation of Poles in this form of consumption. The research part presents selected results of research on the innovativeness of the inhabitants of the Poznań agglomeration in the field of using new transport solutions available in the city, carried out in the Department of Product Marketing at the University of Economics in Poznań, and reflecting practical solutions for the economy of sharing and prosumption implemented in the city<sup>1</sup>.

### **ICT development in Poland and its impact on the life and market behaviours of Poles**

The changes in consumer market behaviours, the appearance of new product categories or the general virtualization of life, which have been taking place in Poland for many years, are a consequence of the dynamic development of ICT. In 2008, only 58.9% of households in Poland were equipped with computers, where in 2018 this percentage increased to 82.7%. The size of this indicator still (although to a lesser and lesser extent) depends on the place of residence — in 2018 a computer at home had 86.6% of inhabitants of large cities and 80.5% of smaller cities and 81% of rural areas, and a decade ago it was respectively: 64%, 59,6% i 52,8%. In the last decade there has been a rapid development of the Internet in Poland. In 2008, 47.6% of households had access to it, and in 2018 it was already 84.2%. It should be noted, however, that in 2017 the indicator of households with access to the Internet was by 5 percentage points lower than the average for the European Union and by 16 percentage points lower than the Netherlands, which is the leader in this respect in the EU [CSO 2012, 2018]. The percentage of households having access to broadband Internet is also increasing year on year — in 2018 it amounted to 79.3%. In 2017, this indicator in Poland was 7 percentage points lower than the EU-28 average. The frequency of "being on-line" is also increasing — every day or almost every day in 2018 as many as 63.9% of Poles used the Internet, i.e. by 6.7 percentage points more than in 2016 [CSO 2018].

Changes in the market behavior of Poles related to the Internet development to a certain extent are illustrated in Chart 1 which presents the objectives of network use in 2013 and 2017 [CSO 2017]. The changes are very visible, which is reflected in a dynamic increase in the percentage of people reading or downloading online magazines, which is an obvious reason for the decline in the popularity of the printed press. The Internet is increasingly becoming a place of searching for information about goods and services, e.g. by means of dedicated price comparison engines.

Chart 1. Goals of Internet usage by Poles in 2013 and 2017 (in %)



Source: own elaboration based on: CSO, 2017, Information society in Poland. Results of statistical surveys from 2013–2017, Zakład Wydawnictw Statystycznych, Warsaw.

For many years, the so-called ROPO effect (Research Online, Purchase Offline) has been observed, consisting in collecting information about products (including services) on the Internet by customers before making a purchase in a stationary outlet. Along with the dynamic development of e-commerce in Poland<sup>2</sup>, a reversed effect of ROPO (Research Offline, Purchase Online) is also observed in the purchasing process of customers, consisting in collecting information about products in a stationary outlet (e.g. watching, trying on a product or talking to the seller) and making a purchase on the Internet (mainly due to the lower price).

Simplicity and speed of obtaining information about products contributes to the development of the smart shopping trend which is associated with consumers devoting their time and effort to searching for information about products (including services) in order to find the most attractive price offer and achieve savings [Koniorczyk 2014]. At present, it is particularly easy to do so using Internet price comparison engines or applications with commercial (promotional) magazines for smartphones. There is also a clear increase in the frequency of using Internet banking, which is a result of growing access to mobile Internet and improving the functionality of dedicated applications for mobile devices. For some customers, they significantly reduce or even eliminate the need to visit stationary banking outlets, as almost everything or even everything they want to do in the context of banking can be done at a convenient moment from the smartphone level.

According to the Digital 2019 report, Poles spend an average of 6 hours and 2 minutes on the Internet using any device on a daily basis. Virtualization of life is also visible especially in relation to the popularity of social networking sites, where Poles spend on average 1 hour and 45 minutes a day. In Poland in 2019, 18 million (1 million more than in the previous year) active users used social media, including 16 million via mobile devices (2 million more than in 2018) [DataReportal 2018 and 2019]. The growing popularity of social networking sites is connected with the creation of so-called network communities — i.e. groups of people creating social interaction, recognizing similar standards of behaviour or practices in virtual space [Grzega, Kieźel 2017]. Although these virtual communities become a

source of information on products, it is worth emphasizing that there has been a general change in the way of working, living and spending free time, including communication with one another — with one's family or friends. More and more often this communication becomes virtual — "traditional" telephoning is replaced by video calls made using mobile applications, sending SMS is replaced by "chat" on social networks, which can be created for whole groups of friends. What is important, in the context of changes in shopping habits and blurring of the border between the consumer and the seller, in 2017 as many as 20.4% of Poles used the Internet to sell goods (Chart 1).

In 2017, 64% of Poles had a smartphone [Mobee Dick 2018], and according to the Digital 2019 report, 80% of Polish Internet users watch movies on their smartphones, 48% play games, 51% use them for online banking and 36% buy products through them [DataReportal 2019]. The Gemius data show that smartphones are the second most popular device used for e-shopping. A laptop is used for this purpose by 74% of shoppers, a smartphone by 61%, a desktop by 54% and a tablet by 27% [Gemius 2019]. The development of mobile Internet and the growing popularity of smartphones make consumers more and more often referred to as mobile consumers or 24/7 consumers who can be reached anywhere with Internet access at any time of day or night [Grzego, Kiezel 2017]. The pace of technological changes taking place in recent years, the development of 5G networks, or visible changes in the patterns of purchasing and consumption behaviour of residents, suggest that the virtualization of Poles' lives will continue, and using mobile devices we will perform more and more activities — related to various spheres of life — starting from now popular shopping, using e-banking, through healthcare, public administration, entertainment, or managing smart homes or flats. It should also be borne in mind that the development of technology and the way in which it is used will probably be strongly determined by the progress of work on artificial intelligence.



## Participation in the economy of sharing and prosumption as a manifestation of innovativeness of Polish consumers

The use of social media by Poles, the emergence of the so-called 24/7 consumers or smart shopping are trends in behaviours that prove their innovativeness. Apart from them, innovative consumer behaviours are connected with many other trends, including, among others, prosumption and sharing economy [Baruk 2017, Zalega 2016]. An in-depth analysis of the literature on the subject by S. K. Curtis and M. Lehner indicates that the development of sharing economy was/is primarily related to the so-called economic crisis initiated in 2007, the increase in social inequalities, increasing environmental awareness, development of information and communication technologies and simply convenience. Hence, the motives for participation in this sharing economy are primarily economic, environmental and social [Curtis and Lehner 2019]. The concept of sharing economy itself has been present in the literature for many years, but there are still differences in defining it or its relationship with other concepts. Some point out that shared economics is also referred to as peer-to-peer economy, mesh economy, collaborative economy, or collaborative consumption [Zgiep 2014]. Other researchers point out that using the above terms, as well as other terms (e.g. access economy, circular economy, gift economy, gig economy, rental economy, on-demand economy, collaborative economy, mesh economy, alternative finance) interchangeably with sharing economy is not entirely legitimate. On one hand, these concepts are in some cases strongly interrelated and intertwined, but on the other hand, the scope of individual concepts is sometimes clearly different and, for example, one concept goes beyond the framework of the other [Sobiecki G. 2016]. According to J. W. Pietrewicz and R. Sobiecki (2016), sharing economy is a form of organisation of conducting business activity with the use of Internet platforms, based on the use of available and unused resources owned by other entities, whether for a fee or free of charge. According to A. Sundarajana, sharing economy consists of an Internet platform (commission) through which payments for goods and services,

entrepreneurs and consumers are made. G. Petropoulos points out that sharing economics is about connecting online users who want to share their goods and services with each other [Banaszek 2018].

Here two fundamental questions arise. The first one is whether the sharing of unused resources has to be done using / via an online platform? The second question is perhaps more controversial, as it is related to the essence of the discussed concept — do the products offered on the market, which have the name "sharing" and are becoming more and more popular in Polish cities, such as car-sharing or bike-sharing, distort the idea of the economy of sharing in a way? Giving as flagship examples of the economy of sharing are, after all, only forms of renting offered by companies to interested customers. Finally, the idea of sharing economy is to enable others to use unused resources, i.e. resources that are not used by a given entity at a given moment in time. However, can we talk about unused resources in the case of a business model based on providing the market with a product in the form of short-term car rental, in which the number of cars available in a given city per minute is simply adjusted to the demand for this service? The idea of sharing economy assumed first of all "sharing" surplus resources / unused resources (especially private individuals), and not adjusting the amount of resources (supply of cars, bicycles, scooters...) to the demand for them. Referring to a very interesting list of definitions of terms made by G. Sobiecki (2016) who assumes that sharing economy are: systems that facilitate the sharing of underused resources or services — against payment or free of charge — directly between individuals or organizations — is not the rental of cars / bicycles / scooters / scooters per minute simply a form of "rental economy" (according to G. Sobiecki — Systems that enable the rental of resources against payment so that they do not have to be purchased)? or "accessibility economy" (according to G. Sobiecki — Systems that allow to pay for access to goods instead of receiving goods owned by the owner). Otherwise, renting a tennis court per hour of playing with a friend should also be treated as participation in the sharing economy. In the literature, there are also opinions that sharing economy refers to consumers who give themselves temporary

access to unused resources, including for money (e.g. by renting, exchanging or lending) [Vaskelainen and Piscicelli 2018]. Curtis and Lehner [2019], trying to define the concept of sharing economy in the context of sustainable development, postulate that B2C exchange models, including car sharing and bike sharing, should be excluded from the scope of the discussed concept. As mentioned earlier, such an approach to understanding what sharing economy is, excluding from this concept the aforementioned forms of "sharing" on the one hand, may be perceived as controversial, due to the number of scientific papers, commercial reports, or even GUS research, in which they are included in the economy of sharing, but on the other hand, it allows to highlight the idea of this concept and its systematic subjective and subjective development. Regardless of the position taken in this respect, the use of cars, bicycles, scooters or scooters per minute, using mobile applications for this purpose is undoubtedly a sign of innovation (at least at present) in consumers' market behaviours.

According to the methodological assumptions adopted by the Central Statistical Office (GUS), the research conducted by this institution shows that Poles are more and more often participants in the economy of sharing (Table 1). They increasingly utilise websites or applications used to connect private persons offering accommodation or transport services with private recipients of these services. In 2017, 15% of Poles used websites or applications related to the organization of accommodation, where a year later it was 17.1%. Analogous percentages in relation to the use of websites and applications related to the organisation of transport were 6.2% and 7.2%. Central Statistical Office data show that women and men are very similarly involved in the economy of sharing in product categories included in the scope of the survey. Clear differences in this respect can be observed in terms of place of residence or age, which should not come as a surprise.

Table 1. Participation of Poles in selected forms  
of the economy of sharing in 2018

	Organisation of accommodation	Organisation of transport
Total	17.1	7.2
Gender		
Women	16.9	6.5
Men	17.3	7.9
Age		
16–24	16.3	12.5
25–34	26.2	11.9
35–44	25.3	8.8
45–54	16.5	5.6
55–64	8.4	2.8
65–74	3.9	—
Place of residence		
Big cities	27.6	12.7
Towns	17.3	6.5
Rural areas	9.3	3.8

Source: own elaboration based on: CSO, 2018, Information Society in Poland. Statistical research results from 2014–2018, Zakład Wydawnictw Statystycznych, Warsaw, Poland.

On the one hand, people in the youngest age group may simply not have adequate financial resources to use various types of products (including services) related to accommodation or transport, while on the other hand, the group of people aged 55+ is generally characterised by a relatively low level of use of information and communication technologies, hence the use of websites and applications in the economy of sharing is also relatively low. Participation in the economy of sharing is determined by the size of the place of residence — it may result from the availability of products included in the sharing economy, which are available mainly in large cities (they are increasingly popular also in smaller places of residence).

Speaking about the economy of sharing, we should not forget about the prosumption mentioned at the beginning of this point, whose roots, thanks to A. Toffler, go much further back in the years than the economy of sharing. But also for over fifty years the notion of prosumption (prosumer) has changed its essence and scope due to social

and economic development, and above all due to the revolution in ICT [Baruk, Iwanicka 2015, p.40]. The contemporary dimension of the functioning of each market is mainly the result of dynamic changes in relations and their scope among its participants. And the contemporary approach to relations and its multidimensionality between producer/supplier and consumer has changed the essence of prosumption, which has become one of the essential elements of improving living conditions, and in fact improving its quality in the individual and public dimension. Prosumption has also become a source for creating new solutions or improving the existing ones, so the ICT tools and their availability have changed the nature and possibilities of communication within the relationships and relations between market participants. Therefore, it became not only important to offer specific solutions satisfying the needs of consumers, but also the activity of consumers in the scope of using, creating ideas for improvement and the appearance of new goods and services satisfying new needs or old in a different way. What is important in the relation between the bidder/supplier and the consumer is the common aspiration to increase the value of goods and services provided/received [Szul 2018, p.64]. Increasing value is nothing else than creating added/additional value, which cannot be created without learning the opinion of the participants of the relation about the achieved results and examining the level of satisfaction of its participants with the value provided at the basic level, as well as satisfying additional expectations and desires. In creating added value, mutual communication of this value by the parties of the relationship is invaluable, because economic practice is rich in cases where the lack of communication activities, or care for creating space for the exchange of experiences or exchange of views translates into a lack of satisfaction of the parties with the relationship (the best known is Segway/Ginger — urban transporter). On the other hand, a good example can be Uber, which takes a relatively reliable approach to shaping consumer relations through a systematic assessment of the level of satisfaction with services. In addition, it strives to expand the range of services offered, starting with the Uber Pop standard, then Uber Black (a car of a higher standard), Uber Eats, Uber Health, Uber Bike or Uber Freight.

## **Innovative behaviour of the inhabitants of the Poznań agglomeration in the light of research on the use of means of transport in the city**

In the article it was assumed that K. Gutkowska (2011) that consumer innovation is the consumers' stand for market innovation and thus their readiness to purchase innovative products (including services). Innovation is a feature of a person's personality and, consequently, it may constitute a basis for differentiating consumers, due to their attitude towards innovation and presented attitudes towards innovation, which are primarily manifested by the pace of acceptance of product innovations. In the classical model of innovation diffusion, E.M. Rogers (1983) specified 5 groups of consumers — innovators, early followers, early majority, late majority and marauders. The innovation in the behaviour of the Poznań agglomeration inhabitants will be manifested in the acceptance of product innovations in the area of urban travel, i.e. primarily in the degree of using platforms connecting drivers and passengers (e.g. Uber), or short-term rental services via mobile applications (e.g. cars, bicycles, scooters).

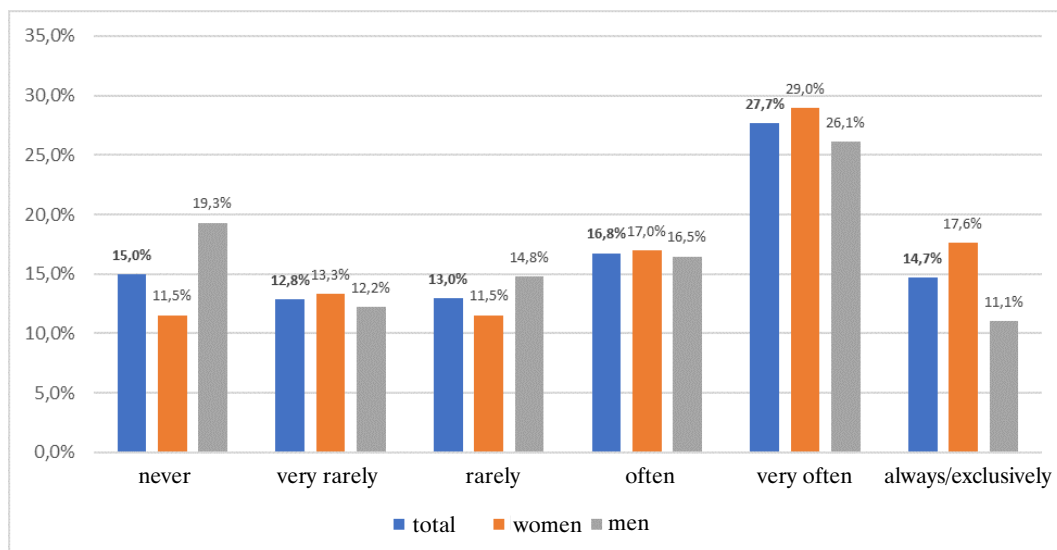
The survey conducted by the ARC Market and Opinion Institute (commissioned by Straal and Digital Poland) among city dwellers with a population of over 100,000 people shows that in 2018 in the group of people declaring to use services of the "Mobility-as-a-Service" type (MaaS), the most popular was renting city bikes per minute (61% of responses). Subsequent places in terms of percentage of indications were occupied by: ordering a licensed taxi using a mobile application (47%), ordering a ride by car using a mobile application associating drivers with people in need of transport (35%), occasional one-vehicle ride with the division of costs by its participants (24%), car rental for minutes/hours (18%) and scooter rental for minutes/hours (5%) [Straal and Digital Poland 2018].

For people who do not use MaaS, the most frequently indicated deterrents from using this type of services were mainly: preference for own vehicle (48% of indications), preference for using traditional urban

transport (39%), lack of adequate knowledge / unclear rules of use (22%), location of vehicles / rental stations (15%), low availability / too poor offer of service providers (15%), or fears related to incorrect calculation of service charges (14%).

The conducted research shows that despite the extremely dynamic development of the segment of transport products related to short-term rental of vehicles, among the inhabitants of the Poznań agglomeration using public transport (tram, bus) and driving one's own car are definitely the most popular means of transport in Poznań.

Chart 2. Using public transport (MPK) as a means of transport

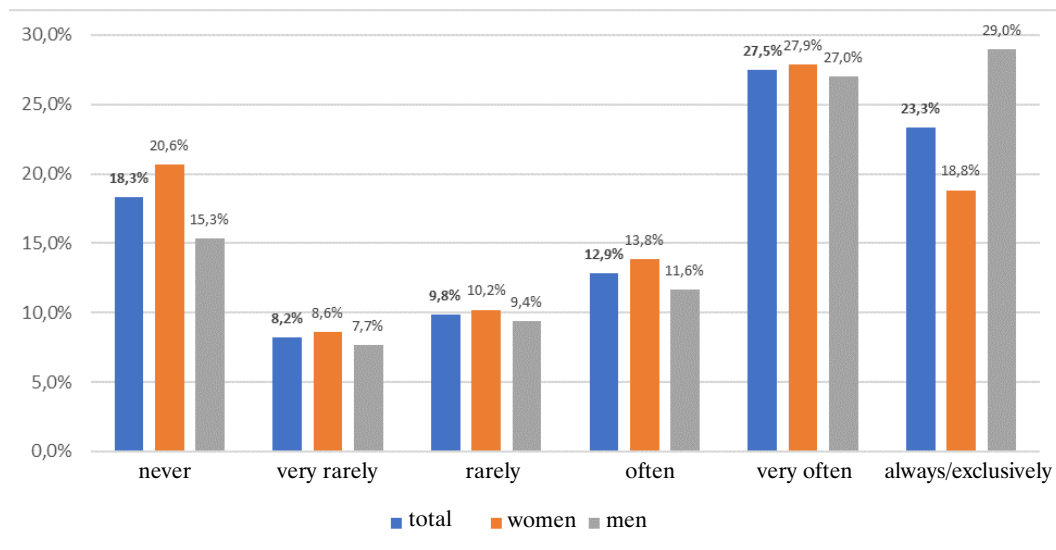


Source: Own research.

As many as 85% of the inhabitants of the Poznań agglomeration use public transport, 42.4% of whom declare that they do it very often or exclusively. Some differences in the popularity of the discussed form of transport are visible due to the sex of the respondents. Communication is not used at all by 19.3% of men and 11.5% of women, and it is always

/ exclusively used by 17.6% of women and 11.1% of men in Poznań. At this point, it should be noted that the fleet of the municipal carrier was enlarged in 2019 by electric buses and it should be expected that as a result of each subsequent purchase of bus fleet only low-emission vehicles will be ordered. The fact that cities have an innovative, sustainable and safe transport system is a very important aspect of smart mobility, i.e. an area which is one of the pillars of city development in accordance with the smart city idea. However, problems with punctuality and travel time on many routes, both trams and buses, are the reason for choosing other travel offers.

Chart 3. Using a private car as a means of transport



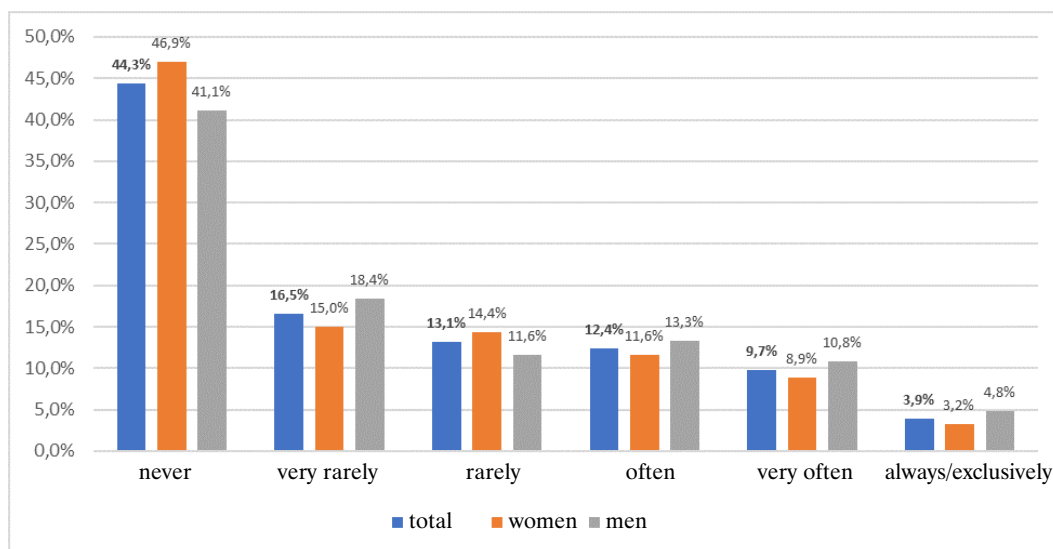
Source: Own research.

In Poznań, only 18.3% of respondents do not use a private car as a means of transport, while very often or exclusively this means of transport is used by as many as 50.8% of respondents. Similarly as in the case of public transport, also in the case of private car driving, there are visible gender differences. It is the only form of transport in Poznań for



as many as 29% of men and 18.8% of women. And this is not surprising, because it is a convenient and accessible means of transport at any time, despite the increasing difficulties with parking.

Chart 4. Using a private bicycle or scooter as a means of transport

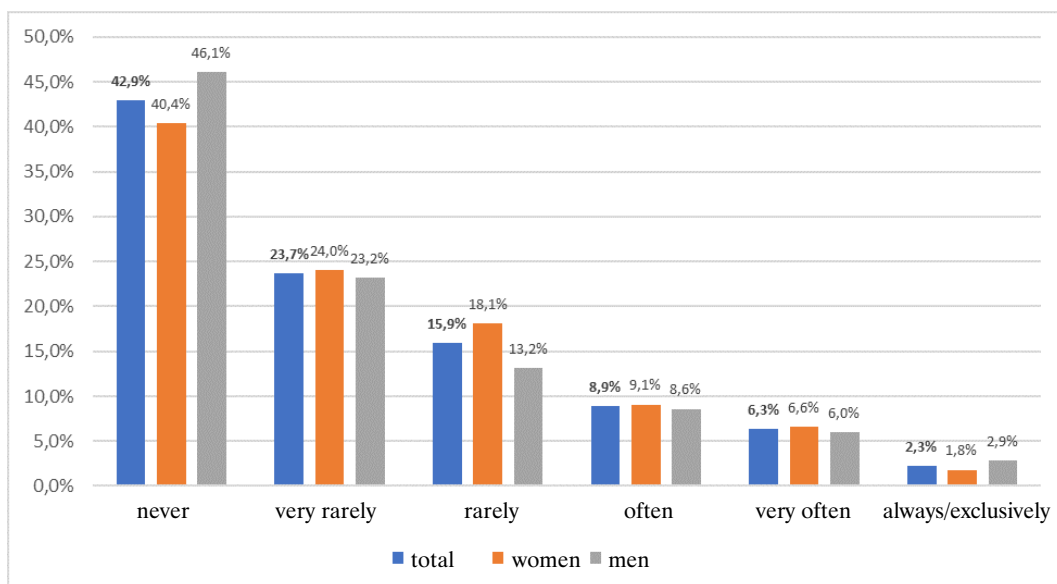


Source: Own research.

As much as 55.7% of the agglomeration's inhabitants use a private bicycle or scooter in Poznań, but it should be noted that most of them do it very rarely or rarely. Very often or only these two forms of transport are used by 13.6% of the respondents. Of course, it should be remembered that the frequency of using (both private and rented) bicycles and scooters is strongly conditioned by the weather or simply by the season. It should also be borne in mind that in recent years Poznań has been developing its cycling infrastructure. In 2017, about 140 kilometres of roads for bicycles, pedestrian and bicycle routes and lanes for bicycles were available. The adopted Cycling Programme of the City of Poznań 2017-2022 with the perspective until 2025, whose main objectives assume the implementation of a coherent network of cycling

routes, ensuring the possibility of safe and comfortable cycling, as well as achieving a 12% share of cycling in the distribution of the tasks of the route by 2025 (10% by 2022), assumes the establishment of a network of cycling routes connecting the city centre of Poznań with its suburbs by 2022 [Poznań City Council 2017]. The implementation of this project, improving the conditions and possibilities of cycling in Poznań, should of course have a positive impact on the increase in popularity of this form of transport.

Chart 5. Using a taxi-services as a means of transport

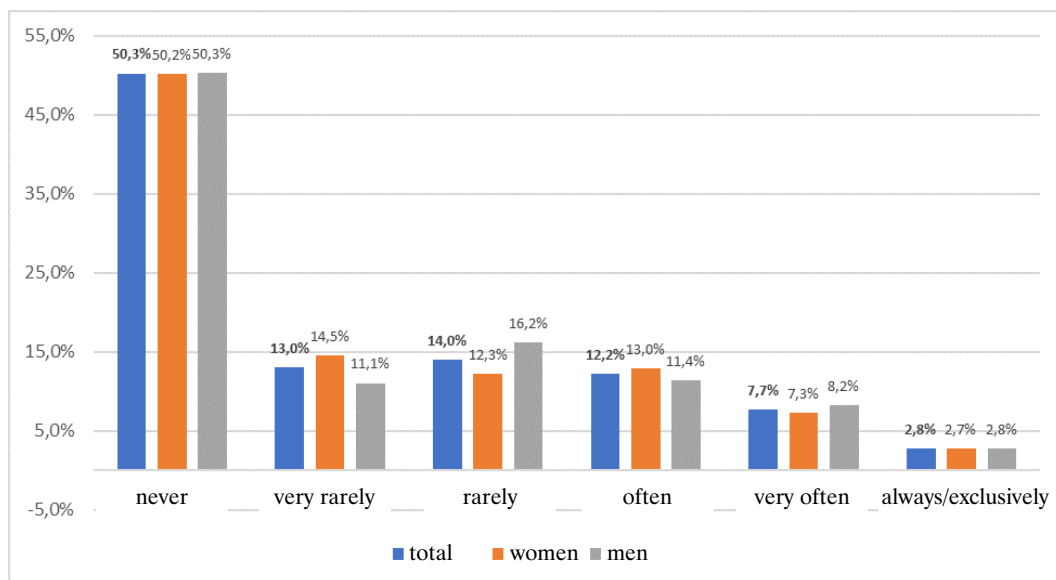


Source: Own research.

In the case of taxi companies, 57.1% of the respondents (59.6% of women and 53.9% of men) use taxi services, but they usually do it very rarely (23.7%) or rarely (15.9%). It can be assumed that the share of this form of transport in the way of moving around Poznań (as well as in other cities) will decrease. Due to the emergence of competition in the form of applications connecting drivers and passengers (e.g. Uber),

"traditional" taxi corporations will be forced to redefine their business model, introduce mobile solutions and, above all, improve the quality of services provided.

Chart 6. Using Uber as a means of transport

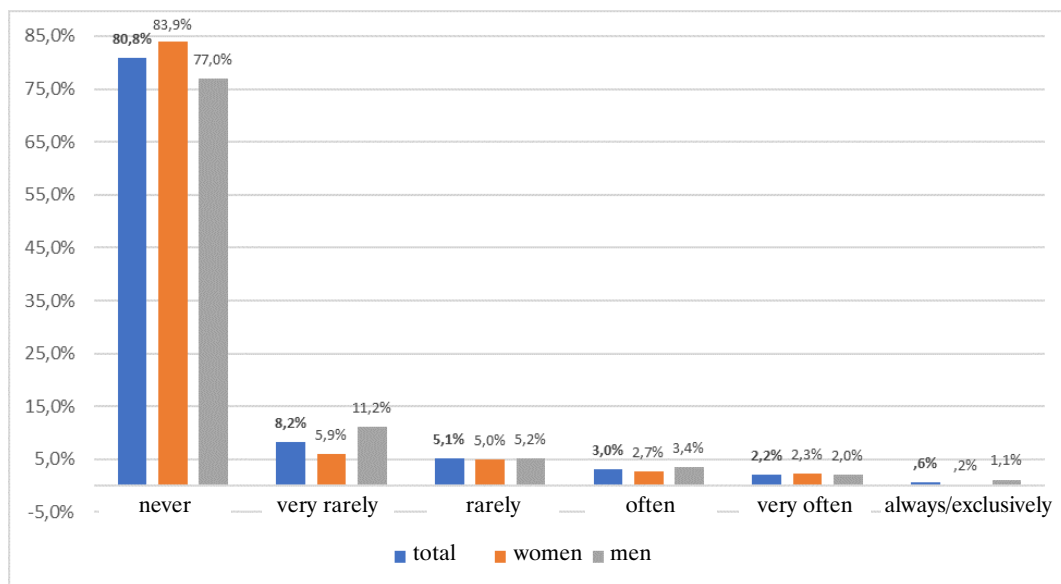


Source: Own research.

Uber has been present on the Polish market since 2014, and since 2015 it has been possible to use this service in Poznań. In 2019, approximately half of the residents of the Poznań agglomeration used Uber's services, and more than in the case of taxis. It is worth noting, however, that often, very often or only 22.7% of respondents travel with Uber, when in the case of services provided by taxi drivers this percentage is 17.5%. It should be recalled that in the ARC Market and Opinion for Straal and Digital Poland surveys (2018), "only" 35% of people using MaaS ordered a car ride through a mobile application associating drivers with people in need of a ride (which includes Ubera), and the research of the Central Statistical Office showed that only 7.2% of Polish citizens aged 16+ used websites or applications

related to the organization of transport in 2018. Our own research has shown that the inhabitants of the Poznań agglomeration are relatively more innovative in their market behaviours in terms of using mobile applications such as Uber than all Poles. Further development of Uber and similar applications will depend primarily on legal issues, changes in the functioning of taxi companies and the innovativeness of Polish consumers, as well as (which is equally important) the profitability of work for drivers cooperating with Uber (and similar companies).

Chart 7. Use of cars for minutes (car sharing) as a means of transport



Source: Own research.

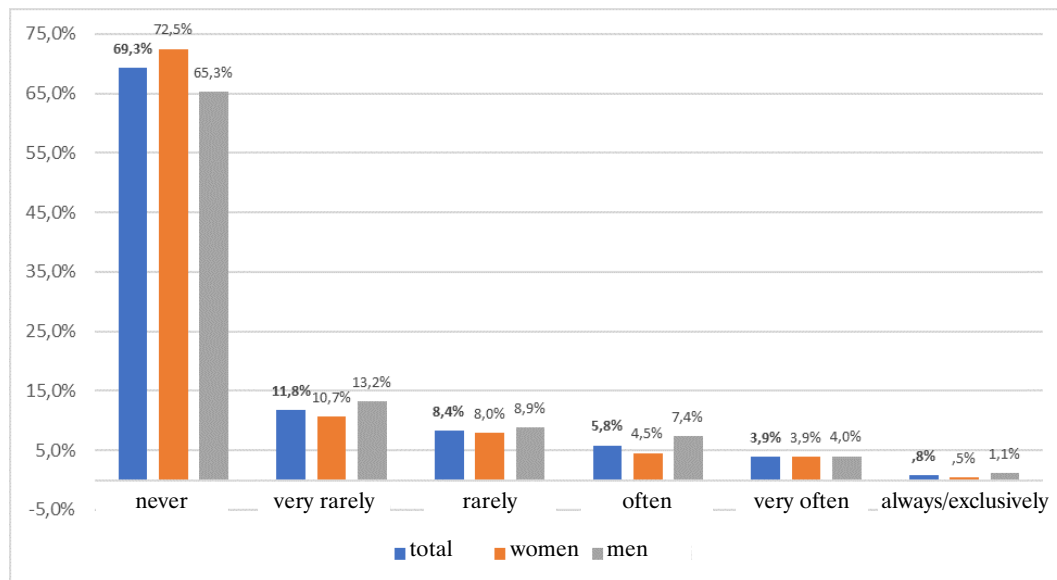
The conducted research shows that 19.2% of the agglomeration's inhabitants use car sharing services. It should be emphasized that the frequency of driving by car for minutes is relatively low — only 2.8% of users travel around Poznań in this way at least very often. It should also be remembered that these services have been present on the Poznań market only since mid-2017, hence the growing popularity of

this form of transport should be expected in the coming years. The more so as the Poznań authorities are also in favour of the idea of car sharing as an alternative to private cars and take actions that may affect the development of this service, e.g. they allocate dedicated parking spaces for cars for minutes in the city. It is also worth recalling the nationwide ARC Market and Opinion for Straal and Digital Poland (2018) research, in which 18% of people using MaaS declared their car rental per minute/hour, so similarly as in the case of Uber, also in relation to car sharing, the behaviour of the residents of the Poznań agglomeration shows a higher level of innovation than that of the general population of Polish cities (with a population of more than 100,000 people). At the same time, it should be remembered that the availability of a fleet of cars for minutes (as well as scooters per minute) varies significantly from city to city, and services of this type were launched only in the largest cities in Poland.

According to the Mobility-as-a-Service report [Straal and Digital Poland 2018], the Poznań agglomeration is one of the most developed regions (after Warsaw, Lublin, Kalisz, Zielona Góra and Łódź) in terms of the number of public bicycles. The number of inhabitants per one public bike was 439, with 3487 in Zabrze, 2137 in Tychy and 1897 in Rzeszów. Last year (2018) of the Poznań Municipal Bicycle the inhabitants of the agglomeration cycled over 1.65 million times and the number of users approached 150,000 [Poznań Municipal Bicycle 2018]. Our own research shows that in 2019, 30.7% of Poznań agglomeration inhabitants (27.5% of women and 34.7% of men) cycled in Poznań for minutes, which is basically the same as in other cities with more than 100,000 inhabitants. However, this means of transport was usually used very rarely or rarely.

Another novelty in the offer, which are electric scooters for minutes moved 14.5% of the respondents, 11.3% of which very rarely or rarely. This is another example of low-emission form of transport and, similarly as in the case of bicycles, it should be borne in mind that the use of scooters for minutes is strongly dependent on weather conditions. Moreover, since the introduction of electric scooters on the market (including Poznań), electric scooters are also available in an increasing number of electric scooters for minutes. Again, however, it should be

Chart 8. Bicycle use per minute (bike sharing) as a means of transport



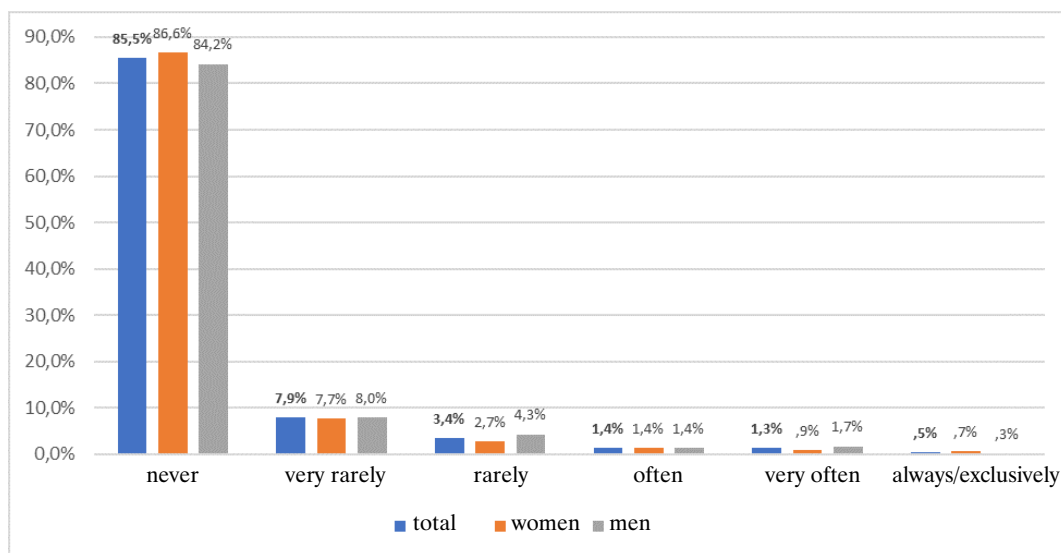
Source: Own research.

stressed that the inhabitants of the Poznań agglomeration use this mode of transport to a greater extent than it is the case with all the inhabitants of cities with more than 100,000 inhabitants.

At the end of 2018, the possibility of renting electric scooters for minutes was introduced in Poznań, and their number is steadily increasing. The results of the research confirm that electric scooters were used for minutes by 18% of the agglomeration's inhabitants in 2019. At this point, it should be noted that consumers may have legitimate concerns connected with the use of this means of transport, mainly resulting from the lack of appropriate (unambiguous) legal regulations governing the classification of electric scooters into which category of vehicles they should be classified, who can be their user, how / where to move them, what speed they can be driven at, etc. (Legislative work is currently underway in this area). On the one hand, electric scooters are another example of low-emission means of transport available to residents of Polish cities, but on the other hand, their

emergence poses certain risks related to the safety of not only users but also bystanders. Moving at relatively high speeds on pavements poses a direct threat to the health of pedestrians, and leaving scooters on pavements at the end of their use poses a direct threat to other users, e.g. blind people or people with other physical disabilities.

Chart 9. Using electric scooters per minute in Poznań

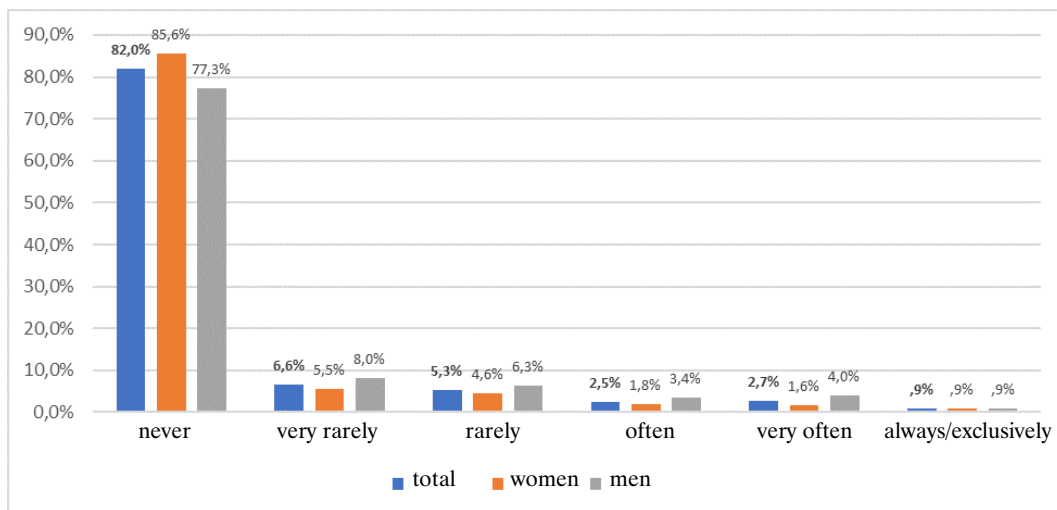


Source: Own research.

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Chart 10. Using electric scooters for minutes in Poznań



Source: Own research.

## Summary

The development of MaaS in Poznań should be treated as an element of transport policy in the city and should be considered in the context of sustainable development of the entire Poznań agglomeration and the city friendly to its inhabitants. With the tendency to systematically decrease the number of inhabitants in Poznań and move to the surrounding municipalities, the importance of mobility in their everyday life is



growing. If the level of urban public transport service provision is assessed as relatively low by the inhabitants of Poznań, actions are necessary to extend the offer of MaaS [Styś, Tubis, Zaborowski 2016, p. 59]. Apart from the benefits in the form of increased mobility of the agglomeration's inhabitants, it undoubtedly brings many benefits, mainly of an ecological nature, as well as the availability of new communication solutions in the public space. Both the increase in popularity of renting city bikes, as well as cars, scooters and scooters per minute leads to an increase in the importance of low-emission transport, which is part of the city's development in line with the smart city idea. In the coming years, depending on legal conditions and infrastructural solutions, we should expect a further increase in the popularity of alternative means of transport within the city. Some of the solutions that are just entering the market or that are relatively short on it, are currently used (referring to the model of diffusion of Rogers' innovations) primarily by innovators, early followers and increasingly early majority. The dynamic development of ICT, availability of mobile devices and their increasingly widespread use should additionally stimulate consumers to try and use product innovations in transport, and companies operating in this market should force them to redefine their business model adjusted to the dynamically changing social, economic, technological and demographic environment. The research carried out showed that public transport and private cars were still the basic forms of travelling around Poznań, but on the other hand the inhabitants of the Poznań agglomeration are not afraid to use new, innovative products, which indicates the innovativeness of their behaviours. This is particularly visible in the case of using the Uber mobile application for connecting drivers and passengers. Despite its relatively short period of presence on the Poznań market, almost half of the respondents declared that they used it. What is more, the percentage of people travelling with Uberem frequently, very often or exclusively is higher than the same percentage of people using its traditional alternative, i.e. taxis. Bearing in mind that currently car and scooter rental companies only operate in the largest cities in Poland, it can be stated that the residents of the Poznań agglomeration, also in the case of car sharing and scooter sharing, have attitudes that prove a high degree

of innovation in their transport behaviour. Moreover, using one's own bicycle or renting one's own for minutes to travel has become an element of the Poznań transport landscape and has been accepted by many residents, particularly visible in the period of favourable weather conditions. And the extension of the offer to include bicycles with electric support may undoubtedly encourage other inhabitants to use this form of transport. On the other hand, scooters and scooters for minutes as means of urban transport should now be treated as testing a new transport proposal in the city, which is of minor importance. However, in times of changes in the lifestyles and behaviours of the inhabitants of large cities, an increase in the number of amenities offered and the importance of ecology may gain acceptance of some segments of the population (especially young people open to new transport opportunities). At the same time, it should be remembered that changing the existing communication habits (behaviours) of inhabitants requires systematic, reliable and increasing their attractiveness (added value) in offering them, as well as ease and reliability in using them. Then the process of acceptance of new solutions will be much faster and will undoubtedly influence the strengthening of the image of the city friendly to its inhabitants.

## References

<sup>1</sup> The survey was conducted in May 2019 with the use of a direct interview technique using a questionnaire and a quantitative selection of a research sample which consisted of 795 inhabitants of the Poznań agglomeration (Poznań — 525 inhabitants, sub-contracting municipalities — 270 inhabitants). The criterion for selecting a research unit was gender, age and place of residence (district, municipality).

<sup>2</sup> According to Gemius reports for e-Commerce Poland [2016 and 2019] — in 2016 48% of Polish Internet users made online purchases, where in 2019 it was already 62%. According to the Central Statistical Office (GUS) data (2018), in 2018, 47.8% of Internet shoppers aged 16-74 (almost 14 million people) made their purchases online, which is an increase of almost 11 percentage points compared to 2015.

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