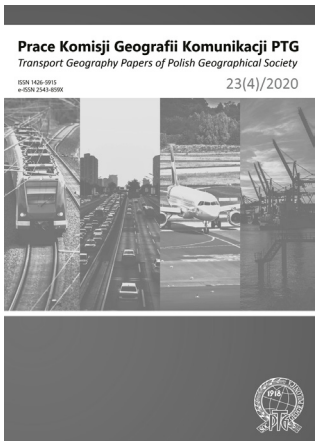


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# SENIORS' USE OF ICT TO OBTAIN ACCESS TO CARS FOR FULFILLING THEIR TRANSPORT NEEDS – AN EXPLORATORY STUDY

## *Wykorzystanie ICT przez seniorów w celu uzyskania dostępu do samochodów umożliwiających zaspokojenie ich potrzeb transportowych – badanie rozpoznawcze*

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**Abstract:** The ageing society and the necessity to meet the needs (including transport ones) of elderly people are a challenge for an increasing number of countries, including the EU Member States and Poland. Different types of modern ICT solutions are being proposed as a way of improving the meeting of the needs of elderly people in order to prevent their social exclusion. The growing popularity of solutions and services that use information and communication technologies (mainly the Internet and mobile applications) can also be observed in transport services and is perceived as a means to better meet transport needs. The aim of the article is to examine the extent to which seniors use ICT solutions to meet their transport needs when, for example, obtaining access to a car or car ride. A literature review, statistical data analysis and results of primary survey studies carried out on a sample of U3A students were used. The results of the analysis do not allow generalization on the entire population of elderly people but point to some interesting conclusions. For instance, at least one of the considered solutions (e.g. sharing travel by car as a driver or passenger) was used by almost two-thirds of those that responded using the Internet. Also, the solutions given were rated rather positively by the respondents in terms of their usefulness and ease of use. Those findings, apart from indicating further directions of research, allow for a cautious statement that these types of solutions can actually serve to better meet the transport needs of seniors.

**Keywords**: car travel, modern ICT solutions, ICT, transport needs, seniors

## Introduction

The use of the possibilities offered by modern solutions using the Internet and other information and communication technologies (ICTs) in meeting the diverse needs of citizens is present in the discourse of the European Union practically from the initial documents and strategies devoted to this topic. A Europe-wide strategy for better use of ICT potential is reflected in documents and actions at the national level (Lewandowska, 2018). Prolification of access to the Internet and other ICT affects various areas of economic, political and social life. Of course, attention is also paid to the risks and threats associated with these effects with equally broad impact occurring usually as digital exclusion (van Dijk, 2010). The elderly are counted among the groups that are particularly at risk of this digital (and social) exclusion, which in the light of the progressive ageing of the society may pose a significant challenge in the near future. Especially since the problem of an ageing society concerns a growing group of countries, including Poland and other EU member states (United Nations, 2017; World Health Organization, 2018; Główny Urząd Statystyczny [GUS], 2014b). The increase in life expectancy and lower mortality rate (resulting from more widespread access to health care and progress in many branches of medicine) (Eurostat, 2019a) as well as the decreasing birth rate and fertility (Eurostat, 2019b) are considered to be the main reasons for the intensification of this process.

The needs of seniors concerning various aspects of life (such as access to adequate quality medical care, housing, transport needs and issues of social inclusion of seniors) differ from the needs of other social groups (Ministerstwo Rodziny, Pracy i Polityki Społecznej, 2018). The transport or mobility needs of seniors result from the fact that maintaining physical and social activity and independence affects their perception of the quality of life and can reduce the risk of social exclusion and loneliness (Berg, Kemperman, Kleijn B. & Borgers, 2016). The seniors are not a homogeneous group, and their transport needs vary depending on factors such as gender, age, family situation or other factors (Su & Bell, 2012; Hahn., Kim, Kim & Ulfarsson, 2016).

Research concerning the relations between the aging society and transport are gaining in the importance and interest from the scientific and administrative points of view. More and more comprehensive studies, especially concerning elderly transport users from developed countries, which are predominantly facing the problem of an aging society are being conducted (Haustein, Siren, Framke, Bell, Pokriefke, et al., 2013; Cirella, Bąk, Kozlak, Pawłowska, Borkowski, 2019). Various aspects of the transport needs of seniors are being examined, such as mobility (Shergold, Lyons, Hubers, 2015; Ryan, Wretstrand, Schmidt, 2019), unmet transport needs (Luiu, Tight, Burrow, 2018a), requirements for the transport system (Johnson, Shaw, Berding, Gather, Rebstock, 2017; Martens, 2018), factors affecting preferred modes of transport (Böcker L., van Amen & Helbich, 2017; Mifsud, Attard & Ison, 2019), attitudes towards particular modes of transport (such as a cars, bicycles, public transport or walking). Also in Poland, research concerning the transport needs of seniors and the need for adaptation of the public space to their needs (Hebel, Wyszomirski, 2018; Szołtysek & Trzpiot, 2019; Załoga & Kłos-Adamkiewicz, 2019) is being conducted.

The existing research indicates on the one hand the complexity and multidimensionality of the problem. On the other hand, it points out the changing behaviour and expectations of seniors, especially compared to the previous generation, shown in the research on the American generation of the so-called "Baby boomers" (Siren, Haustein, 2013; Coughlin & D'Ambrosio, (eds.), 2012). Seniors as drivers are an important part of this line of research, taking into consideration the car-centric culture of travel in the United States (Mattioli, Roberts, Steinberger, Brown, 2020), but this thread is also clear in research conducted in the EU (Shrestha, Millonig, Hounsell & McDonald, 2017). Seniors themselves often declare their preferences for cars (Luiu, Tight, Burrow, 2018b), both as drivers and passengers, as the most suitable transport mode. In the case of seniors traveling by car as a passenger, there are several options available, ranging from traveling with a family member (be it a partner or a child), with a family friend or colleague, by voluntary drivers (Rahman, Strawderman, Adams-Price, Turner, 2016) by increasingly popular demand responsive Transport (DRT) services (Jittrapirom., van Neerven, Martens, Trampe, Meurs, 2019) or finally by a commercial transport service (e.g. taxis or other types of transport services like Uber or Lyft).

Currently, when considering the issue of transport, it is becoming increasingly difficult to talk about it in isolation from the issue of the use of common solutions based on information and communication technologies (ICT), which directly affect the provision of transport services and indirectly the transport needs expressed by potential users, including seniors. In the case of indirect impact, ICT can substitute, complement, or improve the transport choices of individuals (Mokhtarian, 2009). Considerations regarding ICT solutions for the elderly are especially important – as a group, they are particularly vulnerable to the occurrence of digital exclusion (Scheerder, van Deursen, van Dijk, 2017), but at the same time can potentially

benefit very much from ICT use, e.g. in healthcare (Khosravi & Ghapanchi A.H., 2016) or by better access to services and goods (Hodge, Carson, Newman, Garrett, 2017).

It seems logical to make an attempt to combine these two strands of research in an attempt to identify potential ICT solutions that may affect the fulfilment of the transport needs of seniors. Technologies related to improving the safety of seniors in road traffic, e.g. assistance systems allowing for longer independent use of the car (Braun et. al, 2019), potential impact of autonomous vehicles (Harper, Hendrickson, Mangones, Samaras, 2016, Fitt, Curl, Dionisio, Ahuriri-Driscoll, Pawson, 2019), or applications and devices assisting seniors during the planning and traveling when using various means of transport (Mifsud, Attard, Ison, 2019) are good examples of such solutions. A potential research gap regarding the transport behaviour of seniors in the light of the aforementioned preferences for the travel by car and the proliferation of various types of applications and new transport services is to examine the degree in which ICT is used to gain access to a car or travel opportunities by car. Examples of such new solutions include both commercial systems and services (e.g. Uber, Bolt, ordering a taxi using dedicated applications) and solutions in the field of sharing economy (e.g. carpooling or carsharing).

The aim of the article is to approximately gauge the effect of using the indicated ICT solutions to gain access to a car or travel using a car to meet seniors' transport needs. Two issues will be considered and checked in the article; firstly to what extent seniors use information technologies, including mainly the Internet and mobile applications, and secondly to what extent various types of ICT based services enabling access to the car are used by them in fulfilling their transport needs. The results of the nationwide GUS research on the information society (GUS, 2017; GUS, 2019) will be presented first to serve as a basis for comparison to the results of the subsequently described primary research carried out on a sample of active seniors, students of the Third Age Universities (U3A) from the Silesian region. The article ends with a discussion on the results obtained and a short summary.

## 1. Seniors using ICT – results from CSO research

The issue concerning seniors' use of various types of ICT (and thus also indirectly regarding the occurrence of digital exclusion) is a complex and ambiguous issue (Barnard, Bradley, Hodgson, & Lloyd, 2013). Considering the already mentioned diversity of seniors as a group, it should not come as a surprise that also the potential barriers they indicate for using ICTs will be diverse. Socio-economic factors hindering access to the solutions themselves (e.g. lack of appropriate devices resulting from the financial situation of the individual), general psychophysical state (factors that may or may not depend on the age of the individual) and lifestyle or experience and skills (factors that are slightly dependent on lifestyles) (Kania-Lundholm & Torres, 2015) are reported as significant barriers influencing seniors' use of ICTs. Research on the acceptance of ICT solutions, also in meeting transport needs, indicate the importance of a person's predisposition (which age may or may not have an impact upon) (Peek et al., 2014) and the features of individual ICT solutions (their usefulness, cost, ease of use) (Harvey, Guo, & Edwards, 2019). With reference to the cited studies, in the latter, primary research on the use of various ICT solutions in transport, respondents were asked to assess their usefulness and ease of use.

To be able to freely use the opportunities offered by ICT (not only in terms of meeting transport needs), Internet access and the ability to use various types of communication and information services are required. Of course, it is still possible to obtain support from family (Szweda-Lewandowska, 2017) or arrange to travel together with a given group of friends or neighbours (the most popular types of mobility-sharing are joint commutes to or from work or joint transportation of children to or from school by different parents); also on the Internet, specialized websites or applications allow access to a much larger pool of potential travel opportunities (carpooling, car-sharing, ride-sharing, taxi-sharing, transport on demand services or mobility as a service). To be able to take advantage of these possibilities, Internet access is necessary. Indicators describing the use of the computer, the Internet and mobile access for individual age groups are presented in Table 1. For each indicator, taking into account the available data, border values have been presented to illustrate occurring changes.

Two conclusions can be drawn from the data presented in Table 1. Firstly, with age, the share of people from particular age groups decreases for all indicators and is the lowest for the last age group included in the referenced study. Such low value is not surprising in the light of the issue raised earlier regarding the particular risk of digital exclusion of elderly people. Secondly, for virtually all age groups and indicators (except for regular computer use by a group aged 16-24), the values of the all referred indicators increased. What's more, in most cases these changes exceed 10% and for the age groups 45-54 and 55-64 these increases exceed 20%. The

Tab. 1. Use of computer and Internet by particular age groups (percentage) in Poland.

| Age | 16-24 | | 25-34 | | 35-44 | | 45-54 | | 55-64 | | 65-74 | | Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 2013 | 2019 | 2013 | 2019 | 2013 | 2019 | 2013 | 2019 | 2013 | 2019 | 2013 | 2019 | 2013 | 2019 |
| Regular computer use | 95.9 | 95.3 | 89.5 | 90.6 | 76.7 | 86.8 | 52.8 | 72.9 | 33.3 | 55.0 | 16.5 | 30.6 | 60.8 | 72.8 |
| Regular Internet use | 95.6 | 99.3 | 88.0 | 97.0 | 76.2 | 94.5 | 51.8 | 78.1 | 32.4 | 59.9 | 15.2 | 33.3 | 64.8* | 78.3 |
| Year | 2017 | 2019 | 2017 | 2019 | 2017 | 2019 | 2017 | 2019 | 2017 | 2019 | 2017 | 2019 | 2017 | 2019 |
| Internet connection via mobile devices | 82.0 | 93.5 | 61.3 | 81.1 | 46.4 | 73.3 | 25.7 | 51.7 | 13.0 | 34.7 | 6.4 | 15.1 | 39.9 | 58.7 |

*data for 2015

Source: based on (GUS, 2017) p. 110, 125, 146 and (GUS, 2019) p. 147, 161, 182.

largest increase can be seen in the case of Internet access with the use of mobile devices, despite the fact that the data for this indicator relate to a shorter period (2017 and 2019) than for the other two (2013 and 2019). As the study lacks representatives of two extreme age categories: the young (people under 16 years old) and the old (over 74 years old) there is no certainty if the observed trends (about the share of users decreasing with age, and about an overall improvement in the indicators' value with time) will be similar in the case of the latter group (relevant for this paper). Of course, having the possibility to access the Internet is not a sufficient condition for using the options offered by modern solutions in terms of satisfying transport needs or gaining access to a car. Basic communication skills with the use of available services should also be taken into account; data on the use of communication services are presented in Table 2. As in the case of the previous table, the data were prepared for individual age groups and for two different years in order to track changes.

Data presented in Table 2 point to the same trends as in the case of indicators describing the use of computers and the Internet, i.e. with age, the proportion of people using a given service decreases, but a significant increase in use can be observed for all groups and indicators with passing time. However, some differences can be observed, e.g. for telephone calls over the Internet the largest increase is visible for "younger" age groups (over 30% increase for groups aged 16-24, 25-34 and 45-54) as well as for social media, the largest increase applied to the age group 35-44, not as in the case of previously presented indicators of the 55-64 age group. Still, it can be said that the increase for the oldest groups (aged 55-64 and 65-74) is significant and in the best case (group aged 55-64, email correspondence) exceeds 15% and in the worst (group aged 65-74, social network) is over 7%. The widespread popularity of mobile applications enabling phone calls via the Internet in recent years most probably can explain the increases observed concerning that indicator. The referenced national

Tab. 2. Individuals using Internet communication services during the last 3 months in Poland for years 2013 and 2019.

| Age | 16-24 | | 25-34 | | 35-44 | | 45-54 | | 55-64 | | 65-74 | | Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | 2013 | 2019 | 2013 | 2019 | 2013 | 2019 | 2013 | 2019 | 2013 | 2019 | 2013 | 2019 | 2013 | 2019 |
| Telephone calls via the Internet | 47.6 | 82.8 | 35.5 | 69.4 | 26.0 | 56.8 | 18.2 | 40.0 | 13.0 | 27.0 | 5.7 | 15.9 | 24.1 | 48.6 |
| Sending and receiving e-mails | 86.2 | 89.0 | 80.2 | 87.6 | 65.8 | 80.4 | 41.3 | 61.5 | 25.1 | 41.5 | 10.8 | 22.6 | 51.5 | 64.8 |
| Social network use | 80.1 | 91.5 | 63.1 | 81.9 | 38.2 | 65.9 | 20.3 | 41.9 | 10.0 | 23.5 | 4.5 | 11.8 | 35.3 | 53.0 |

Source: based on (GUS, 2017) p. 134-135 and (GUS, 2019) p. 171-172.

studies focused on the use of opportunities offered as part of the sharing economy in meeting transport needs and did not examine the use of individual ICT-based solutions.

Describing the meaning of "sharing economy" is not a simple task, owning to a lack of one generally accepted definition of this practice. In both the scientific and business environment, various terms (often overlapping or mutually exclusive) related to this practice, such as 'sharing paradigm', 'collaborative economy', 'access economy' or 'circular economy' and others, are simultaneously in use (Sobiecki & Poniatowska-Jaksch ed., 2016). The premise underlying the sharing economy is that various entities (both individuals and organizations) possess different types of resources (time, services, real estate, tools and many others) that are not fully utilized. The introduction of these resources into the economic circulation, "sharing / lending them" without changes to their ownership is the most commonly accepted element common to the differently defined facets of a sharing economy. From the point of view of this study (regarding transport needs), aspects such as sharing of things, mainly vehicles (including carsharing or car clubs) and services (ridesharing or taxisharing) will be considered (McLaren &Agyeman, 2015). Data on the use of the sharing economy are presented in Table 3 in the same way as in Tables 1 and 2.

for the oldest age group participating in the study there is no data available for the year 2019.

Comparing all the cited indicators, both regarding access and the use of individual communication services, such low use of the opportunities offered by the sharing economy for the elderly should not come as a surprise. For example, in order to use the dedicated mobile application, one needs to use the Internet on mobile devices, and as the data in Table 1 indicate, this is not common for elderly people. The access to commercial transport sharing services, currently limited mainly to large cities, can provide another explanation for the presented data. Results of primary research aimed at gaining insight into seniors' use and perceptions of different services (also in terms of their usefulness and ease of use) will be presented in the next section.

## 2. Methodology and results

This part of the study will address the issue of seniors' use of specific ICT solutions (mainly based on the Internet and mobile applications) to meet their transport needs based on the results of primary research. The study concerned the transport needs of seniors and their use of these modern ICT solutions to meet them. It was conducted in December 2018 and January 2019 using an auditorium survey

Tab. 3. Use of websites or applications within the framework of sharing economy for the purpose of transport organisation in years 2017 and 2019 (in per cent) in Poland.

| **Age** | | **16-24** | | **25-34** | | **35-44** | | **45-54** | | **55-64** | | **65-74** | | **Average** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | | 2017 | 2019 | 2017 | 2019 | 2017 | 2019 | 2017 | 2019 | 2017 | 2019 | 2017 | 2019 | 2017 | 2019 |
| Total usage | | 11.5 | 12.9 | 10.2 | 10.9 | 6.7 | 8.2 | 4.2 | 6.1 | 2.5 | 2.7 | 0.7 | 1.0 | 6.2 | 7.0 |
| Users of | dedicated websites or apps | 7.5 | 10.1 | 8.3 | 9.2 | 5.1 | 6.7 | 3.0 | 5.1 | 1.7 | 1.7 | 0.5 | - | 4.6 | 5.6 |
| | other websites or apps | 6.2 | 5.7 | 3.7 | 3.5 | 3.0 | 2.6 | 1.7 | 1.8 | 1.1 | 1.1 | 0.4 | - | 2.7 | 2.4 |

Source: based on (GUS, 2017) p. 136 and (GUS, 2019) p. 173.

Available data on the use of the opportunities offered in the framework of a sharing economy, whether using dedicated tools (websites or applications) as well as other communication services indicate a small and slow increase in their use. Unfortunately, the possibilities of drawing conclusions for elderly users are limited; in the observed period the change for the 55-64 age group was practically imperceptible and

on a sample of 400 students of seven Universities of the Third Age (U3A) from five cities of the Silesian region (Bieruń, Dąbrowa Górnicza, Katowice, Rybnik, Sosnowiec). Respondents were asked to answer a number of questions about their transport preferences (e.g. regarding the choice of preferred means of transport relative to specific travel destinations), the use of various modern ICT solutions increasingly

common in transport services (such as e.g. mobile timetables or relevant (for this study) applications enabling access to a car or travel opportunity by car) and their evaluation.

After verification of the answers received, only 5 questionnaires were rejected (due to the respondent's failure to indicate their age); such a large number of correctly completed questionnaires resulted from the presence of an experienced interviewer during the study, providing assistance to the respondents in case of problems and/or doubts. In addition, the questionnaire and questions before the survey were consulted, which resulted, among others in reformulation of the question on the economy of sharing (which was modelled on previously cited studies) as well as providing examples of specific services and applications included in the questions. It should also be noted that the admissible age of recruitment at U3A is usually 50+, which does not meet the criteria usually adopted when defining seniors as a group (the most commonly age used is 60+ or 60/65+) (Solecka, 2018). 22 of those under 60 were present in the sample and their responses were also not included in the further analysis.

In order to check the possibility of using modern solutions, respondents were asked about the possibility and frequency of accessing the Internet using both stationary devices (computer, laptop) and mobile devices (mobile phone, smartphone, tablet). In the case of Internet access via a computer or laptop, as many as 55.5% of respondents declared frequent use and 20.91% sporadic use. In the case of Internet access via mobile devices, frequent use was declared by 63.54% and sporadic by 15.01% of respondents. The lack of access to the Internet in both cases was declared by over 20% of respondents, 23.59% (fixed access) and 21.45% (mobile access) respectively. Interestingly, the total lack of Internet use was declared by only 10.19%, but it can be observed that with increasing age the share of people declaring no Internet use also grows - in the case of the oldest group of respondents (age 81+) as much as 31.82% of respondents declared having no access to the Internet.

Respondents who declared the use of the Internet (regardless of the type) were then asked whether they ever had (with the use of the website and/or mobile application) searched for the possibility of joint/shared car travel in the desired direction (along with examples of the most popular services of this type) as either a vehicle's passenger or driver. Both this and the next question were formulated in this way due to the specificity of the research sample and the popular incorrect classification of various known sharing economy services (e.g. ongoing discussions on whether Uber is a part of sharing economy or not?)[1] (Munger, 2018). The answers to the first question (regarding the use of options for sharing car travel) are presented in Table 4.

Tab. 4. Using the option of finding joint/shared travel options by the respondents on the Internet

| | As a passenger | As a driver | As a driver and passenger | Only as a passenger | Only as a driver |
|---|---|---|---|---|---|
| Often | 17 | 13 | 3 | 14 | 10 |
| Occasionally | 32 | 13 | 5 | 27 | 8 |

Source: own study.

According to the results obtained, 14.63% of respondents searched for shared travel as a passenger and only 7.76% as a driver. The more detailed look at the obtained results show that only 8 respondents used the option of finding a joint/shared journey in both roles (both as a passenger and a driver). Considering this fact, the overall number of respondents using the option of finding a joint/shared car drive increased to 20% of the total number of respondents, which significantly differs from the results obtained by the GUS (2017;2019). Nevertheless, one can also notice a certain similarity with the GUS (2017) data – for the oldest groups of respondents, the share of people using the option of finding a joint car drive drops by more than half from about 20% for respondents under 75 years old to about 9% for older ones. The vast majority of respondents (32 people) declaring

[1] In the beginning, new services allowing ICTs enabled sharing originating in the US like Uber and Airbnb were presented as a part of widely and imprecisely defined "sharing economy". Over the time, as they grow in coverage and expanded to other markets, they were increasingly often considered just a new type of services (transport ones in the case of Uber) which needed regulation but were not so different from the old ones (i.e. Uber like a new type of taxi corporation or Airbnb like a type of guesthouse). Still, there are some arguments that Uber and Airbnb can be perceived as a part of sharing economy from the perspective of the provider of the transport service or flat – as those people are sharing the underused commodity (car, time or flat). Munger (2018) argues that both Uber and Airbnb are platforms enabling a reduction of transaction costs within the framework of sharing economy more than just a modern form of providing transport or housing services.

the use of the option to search for a shared car ride only as a passenger declared also to not owning a car. Using the chi-square test, the relationship between the respondent's declared use of different forms of vehicle sharing and the use of different devices to access the Internet was examined. The results obtained for the examined cases, presented in Table 5, indicate no significant relationship.

ful (to a large extent - 35 responses, to a small extent - 12 responses), only one respondent indicated the lack of usefulness of this solution (while declaring its frequent use as a passenger). Regarding the assessment of the ease of use of the discussed solution, most of the responses indicated that the given solution is very easy to use (23 answers) or easy but time-consuming (20 answers). Only a single respondent stated that

Tab. 5. The relationship between the declared use of various forms of vehicle sharing and the device used to access the Internet

| | Vehicle sharing | |
|---|---|---|
| Internet device | As passenger | As driver |
| computer/laptop | $\chi^2 = 5{,}062; p = 0{,}281$ | $\chi^2 = 7{,}206; p = 0{,}125$ |
| mobile phone/smartphone/tablet | $\chi^2 = 2{,}860; p = 0{,}581$ | $\chi^2 = 3{,}226; p = 0{,}521$ |

Source: own study.

Of course, it should be emphasized that any attempts to look for dependence, due to the specifics of the sample (larger then expected number of tech-savvy and active seniors with female overrepresentation) will not translate into the general population and should not be used as the basis for generalization. Taking into account these reservations, an attempt was made to typify a senior who is a user of travel sharing services without distinguishing between the roles of passenger and driver. It is not a surprise that a typical user in this case is a lone or a two-person household female with at least a secondary education, professionally inactive, who cares for her health rather well and does not own a car.

People using the discussed sharing economy solutions (regardless of the declared role and frequency of use) were then asked to assess the usefulness of this solution and the ease of its use (as an optional question). In most cases, the respondents described the possibility of finding a shared car journey as use-

they needed help or advice when using the solution or that someone had to do it for them.

Next, the respondents were asked to indicate whether and how often they perform one of the activities related to gaining access to the transport service using mobile applications. The question concerned renting a car from the car-sharing system, ordering Uber, and ordering a taxi (the provided answers are presented in Table 6). This wording of the question resulted from the similarity of the default effect of a given action - access to the car or the possibility of travelling by car and frequent comparison of services offered by Uber (or Bolt) and taxis (Kokłowska, 2018). Choice of Uber for the question resulted from two facts, firstly the abovementioned difficulties with the explicit classification of Uber (whether sharing economics, access economics or transport service) and a longer presence in the Silesian region compared to competing Bolt, which made its debut in Silesia only in September 2018 (Tomaszewski, 2018).

Tab. 6. Use of mobile applications by respondents to obtain access to a transport service.

| | **Renting a car from the car-sharing system** | **Calling Uber** | **Ordering a taxi** |
|---|---|---|---|
| Often | 0 | 7 | 52 |
| Occasionally | 5 | 17 | 98 |

Source: own study.

Data on the use of mobile applications enabling access to the car from the car-sharing system indicate very little interest (only 5 people declared taking such action sporadically) in this possibility, which is puzzling in the light of the answers to the question about using the option of searching for the option of sharing travel (which was declared by 67 people in total). Interestingly, three of those declaring the use of the car-sharing system did not declare their willingness to share the journey. Uber was also not very popular - only 6.58% of respondents using mobile Internet access declared using the mobile application to order it. It should be noted that 8 of the respondents (a third) declaring the use of Uber also declared searching for the possibility of sharing travel by car as a passenger (which could suggest that either both options are used interchangeably to make a car ride or there was a case of equating Uber as a sharing economy service). Considering the specifics of the surveyed sample and the partial overlap of sub-groups of respondents declaring the use of travel sharing and Uber, it should not be surprising that the profile of a typical user of Uber will be the same (a woman from a small household, 1 or 2 people, without a car, with at least secondary education, etc.). No respondent declared the simultaneous use of the application to order Uber and a car from the car-share system.

The largest group of respondents (51.19% of the total population using mobile Internet access) declared that they would use a mobile application to order a taxi. In this case, also such a declaration was most often made by women, but here it was possible to indicate two groups of typical respondents, outnumbering as before the group without a car (80 respondents) but also a clearly marked group that, despite declaring having a car, uses the mobile application for ordering taxis. The vast majority of people using mobile applications for ordering a taxi do not use them for other purposes. Only 14 respondents declared simultaneous ordering of Uber, equally often or using one of these two solutions as an alternative to the other (e.g. frequent ordering of Uber and sporadically taxis or vice versa) and two declared obtaining access to a car in a car-sharing system. As a result, the assessment of the usefulness and ease of use of mobile applications for the three purposes collectively (another optional question) can largely be assessed as ordering a taxi using a mobile application. Evaluations, as in the case of using the Internet to search for the possibility of sharing a car ride, indicate a positive perception of mobile applications. Respondents declared that they are useful (to a large extent - 70 answers, to a small extent - 28 answers) and very easy to use (65 answers) or easy to use but time-consuming (30 answers). Only 10% of all answers regarding the assessment of the use of mobile applications could be considered neutral (I did not notice the difference, I needed advice or help to use it) and negative (they are a hindrance, someone had to do it for me).

Earlier, it was suggested that respondents would simultaneously declare two alternatives while searching for a possibility to share a car drive or ordering a taxi and Uber interchangeably via an app. But what transpired for all analysed ICT solutions used for transport (sharing a journey as a passenger, sharing a journey as a driver, ordering a taxi through the application, ordering Uber via the application, gaining access to the car in the car-sharing system via the application)? It turned out that none of the respondents declared the simultaneous use of all five discussed solutions. It looks the same for four solutions and only 7 respondents declared using three different solutions. 14.03% of respondents (47) using the Internet declared using two different solutions (the combinations mentioned before, often one of the solutions is ordering a taxi). Almost half of the respondents (166 people or 49.55%) using the Internet (stationary and/or mobile) declared using only one solution. Nevertheless, this means that in total 65.67% of respondents declared the use of some type of ICT solutions to meet their transport needs.

## 3. Discussion

There are various works trying to investigate the use and/or acceptance of ICT by older adults like e.g. Zhang, Grenhart, McLaughlin, Allaire (2017), or Schehl, Leukela, Sugumaran (2019) but not many concern both the ICT and transportation or mobility needs of elderly. Those that do deal with both – with the use of the ICT and transport/mobility needs like e.g. Meurer et. al (2018) – are either focusing on particular mobility concerning behaviour that can be improved by the use of ICTs (way-finding practices in this case) or like Harvey, Guo & Edwards (2019) on what should be done to increase seniors' mobility through the use of either dedicated transport-oriented or general technologies.

Results obtained regarding the use of the Internet by seniors differ significantly from the previously quoted research results (GUS, 2017; GUS, 2019), which is understandable as in most cases, students of U3A are offered computer-use classes in order to develop or improve their skills. In addition, it should be remembered that U3A students are considered to be more active, interested and engaged seniors, making them less at risk of digital (and social) exclusion than average representatives of their age group. Stated characteristics of U3A students together with the

over-representation of women in the study group (84.99% of respondents) are a clear limitations, that do not allow generalization for the entire senior population.

The low declared interest in using mobile applications to gain access to cars in the car-sharing system may be due to the immaturity of this market and the low availability of this type of services in the Silesian region (Keralla Research, 2018). In addition, it should be noted that renting a car in the car-sharing system requires registration and providing personal data (as well as registering an account in the Uber application), which may cause concerns about privacy and data security (Mazur, 2018). Research on the potential of car-sharing and carpooling systems in Poland has pointed to the considerable development potential of this type of solutions, subject to a number of potential barriers (Kos-Łabędowicz & Urbanek, 2017), which general reports about the situation of car-sharing in Poland seem to confirm (Car-sharing po polsku…, 2020). Relatively frequent declarations of using the Internet to search for a possibility of sharing car travel indicate emerging needs that seniors cannot (or do not want to) satisfy (for various reasons) by using other means of transport (Raczyńska, 2017; Kos-Łabędowicz, 2019). In many studies regarding the needs and preferences of seniors, the car is indicated as the most preferred means of transport, which translates into the need for various types of adaptations, both of vehicles and road infrastructure (Coughlin & D'Ambrosio (eds.), 2012). Meurer, Stein, Randall, Rohde & Wulf (2014) work on how seniors' mobility can be improved by ridesharing and ridesharing ICTs is the closest in scope to the study undertaken by the author. That said, the referenced study focused more on seniors' mobility and daily ridesharing experience in an area with low access to public transport than on ICTs enabling it. The data was collected with the use of a problem-centred interview from 21 active seniors. The results of this study are interesting but hard to compare to obtained results as they deal with topics that are important to seniors, like mobile independence, decisional autonomy, and how to mitigate those psychological needs during sharing a ride that requires a certain degree of mutual dependency. To sum up, ridesharing was a commonly reported practice in that group, but most arrangements were made in a more informal way, as social factors like joint-activities and ride reciprocity were stated as important to seniors. ICT mediated ridesharing experience as a part of a broader mobility system catering to needs to elderly people should take into consideration a broader set of factors than just the enabling technology (Meurer et. al, 2014). Limited amount of research focusing on seniors' use of ICTs enabling access to car or car travel suggests it is a research gap requiring further study.

The noticeable separation of the desire to share travel by car and obtaining access to a car is a certain surprise, but it relates to too few cases to discuss the reasons for that divide (if it really exists, and is not a sampling error). The lack of accurate information on which portals the respondents used to search for travel options (was it a dedicated website, e.g. blablacar, an online forum for those interested in a given topic or a group on Facebook) does not allow to draw far-reaching conclusions about how respondents attempt to make an appointment to ride together. Nevertheless, the assessment of the discussed solutions in terms of their usefulness and ease of use (Harvey, et.al, 2019) indicates that these solutions, if used by a given senior citizen, can improve the fulfilment of their transport needs (Curi & Musselwhite (eds.), 2018).

The small declared use of Uber may be due to the fact that to use this service registration is required (including providing credit card details). This is especially visible in comparison to the declarations regarding the use of mobile applications for ordering taxis - most of the available applications either do not require registration or do not require providing such a large amount of data (selected applications allow for cashless payment from a card connected to the account but this is not a popular solution). In addition, in the perception of users, it is only an extension of the previously available service (ordering a taxi) offered by a given corporation with a new communication channel and not a completely new service. From this perspective, declarations regarding the use of mobile applications for ordering taxis should not come as a surprise - it is just one step from ordering a taxi by calling by phone to ordering through the application.

## 4. Conclusion

The discussed research on the use of various options for accessing a car as driver or passenger based on ICT (mainly concerning the Internet or mobile applications) conducted among U3A students in the Silesian region allows observing several interesting differences from the general results on the information society in Poland conducted by the GUS (2017; 2019). Respondents participating in the survey declared both using Internet access (whether fixed or mobile) and modern ICT solutions to organize transport more often. Also, the declared use of mobile applications to provide access to individual transport services by respondents is higher than the observed use of the Internet by mobile devices in GUS researches (2017; 2019). Almost half of the respondents declared

using at least 2 solutions (out of 5 discussed) and over 65% declared using at least one solution. In addition, respondents assess the solutions used rather well in terms of their usefulness and ease of use.

Of course, the research has significant limitations. The main limitations of the presented and discussed results are the inability to make inferences about the behaviour of all elderly people (U3A students are considered active seniors, which was visible in relation to the frequency of Internet use they declared compared to the GUS research and the already mentioned overrepresentation of women in the study sample) and some restrictions of the methodology used (e.g. no questions about the reasons or goals of using given solution). None the less, the results obtained can serve as a starting point for further research directed either at specific solutions (e.g. the sharing of car travel or the use of car-sharing systems) or the reasons for using (or not) ICT solutions in meeting the transport needs of seniors. Especially the factors influencing the choice or potential barriers hindering the use of solutions based on modern ICT technologies in meeting the transport needs of seniors (e.g. concerns about security, privacy, unwillingness to use new solutions, ingrained habits) can be a promising further research direction. The relatively high share of respondents' use of the solutions included in the study (especially against the background of the seniors in general) and their mostly positive assessment may suggest that factors other than the technology itself are the biggest barrier in using this type of service to meet the transport needs of seniors. Summarizing the obtained results and conclusions related to the use of ICT solutions by seniors in meeting the transport needs points to an interesting and relevant research area from the point of view of economic practice, especially taking into account the necessity of meeting the needs (including transport ones) of an ageing society.

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