

## RESIDENTS OF SMALL TOWNS AS USERS OF PUBLIC TRANSPORT DURING COVID-19 – PRACTICAL RECOMMENDATIONS TO CITY MANAGERS

Świtała M., Łukasiewicz A., Urbański M.\*

**Abstract:** The research results presented in the paper are devoted to the mobility of small-town residents in Poland under pandemic conditions. It aims to identify and evaluate public transport user behaviour with particular reference to determinants of urban public transport development. The subject is embedded in the COVID-19 pandemic situation. In the article, the query about the pandemic's impact on changing travel demand is posed. The research was performed among the residents of small towns using an online survey questionnaire. Results indicate that respondents' mobility was accomplished through a narrow range of transport means, most often walking. Effects of the pandemic appeared to be felt most strongly for travel related to cultural life and the pursuit of hobbies, including physical activities. Studies show that the development of urban transport requires numerous investments. The city managers, within the framework of interventions undertaken, in accordance with the principle of a system approach, should take into account three interrelated areas of activity, i.e. improvement of accessibility of the transport offer, modernisation of passenger services and investment in rolling stock and nodal elements of road infrastructure.

**Key words:** small towns; public transport, mobility, Covid-19, practical recommendations

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### Introduction

The paper addresses the urban mobility implemented under pandemic conditions. Furthermore, the main focus of the study is to identify and evaluate the small towns residents' travel behaviour. Particular emphasis is put on the determinants analysis of urban public transport development and the impact of the COVID-19 pandemic on changing travel demand. The reason for undertaking the subject is the results of research indicating that small towns now constitute more than 76% of the country's settlement units, and the population living there is exceeded 20% of the total

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population (SP, 2018). However, in such kinds of towns, specific living conditions for their residents are created, and they often experience depopulation and economic migration due to their peripheral location concerning large urban centres (Świtała and Łukasiewicz, 2021). An important problem often faced by inhabitants of small towns is either limited transport accessibility in a town or even transport exclusion existing in its area, which creates a significant barrier to mobility. The problem should be recognised to a greater extent in the literature, as other researchers have also pointed out (Bański ed., 2022; Marais et al., 2016). For example, Silva et al. (2022) emphasize that the literature on mobility is mostly limited to large cities, creating the need to gain an understanding of smaller population sizes.

As stated in the paper, according to the authors' opinion, the residents of small towns constitute a crucial but poorly recognised group of public transport users, characterised by specific needs and preferences connected with the mode of travel. Moreover, as Ramsey et al. (2016) emphasised, towns play an important role in regional environment development. There they act as settlement centres. Thanks to their economic, administrative and service nature, they support the development and quality of the surrounding rural areas (MoDFaRP, 2019).

### **Theoretical Outline**

In just 65 years, the world has seen a population shift from rural to urban areas, as evidenced by the global increase in the urban population, from 29.6% in 1950 to 54% in 2015 (UN-HABITAT, 2020). The uniqueness of urban form, the fragmented and inter-nodal nature of the urban tissue, the spatial and functional blurring between urban and rural areas, together with the complex development trends that generate diverse patterns and conditions, make it difficult to delimit urban areas and create a one-size-fits-all definition of a town/city. In the literature today, many examples of definitions that vary depending on the country and region under study can be found. Such definitions vary from those that use a single criterion (e.g., population, population threshold) to those that use a combination of multiple criteria (e.g., combination of population size, population density, administrative boundaries). The wide variety of definitions and the multiple criteria used therein (some of which are incompatible) make it difficult to develop a single, consistent concept of the term. Moreover, the term town/city is used interchangeably with other terms such as town/city proper, functional urban area, urban agglomeration and metropolitan area, which further complicates the explanation of this concept (UN-HABITAT, 2020). According to the encyclopaedic definition of PWN (2021), a town/city is “a human concentration, as opposed to a village, characterised by dense buildings, a diverse social structure of residents, making a living mostly from non-agricultural activities — trade, craft, industry and services”. The definition of a town/city is also provided by the Statistics Poland (SP). According to the SP (2021) towns/cities are defined as “local administrative units (in Poland these are municipalities) classified in the degree of urbanisation (DEGURBA) as towns (densely populated areas)”. DEBURGA (degree of urbanisation), in turn, denotes the degree of urbanisation of

an area and is a method developed by the EU and OECD (JRC, 2021). It is used to classify local administrative units into three groups of units: “cities”, “towns or suburbs”, and “rural areas” (PS, 2021). In addition, groups of neighbouring cities (the so-called greater cities) can also constitute a single city.

However, large agglomerations are the main centres of social and economic activity, and the location of small towns in relation to them is an important factor affecting the level of development and the importance of small towns in regional systems (Konecka-Szydłowska, 2016; Zhang, Qi, 2021). Small towns remaining in the influence zone of a big city, in the era of developing suburbanisation in Poland, are the subject to activate spatial and functional changes, which in turn lead to strengthening their socio-economic potential. Nevertheless, the development of small towns located on the periphery is much weaker. Quite often, depopulation and migration are associated with work acquisition and better living conditions, education and development. However, the process of metropolisation of space is associated with the concentration of settlement and economic activity in the suburban zones of large cities. They often have functions complementary to the large centre, primarily residential. That state of affairs can be observed in centres adjacent to larger Polish cities such as Warsaw, Poznan, Wroclaw and Krakow.

It is difficult to clearly define the role of small towns, as there is a wide variety of them. While the development of some is going smoothly, others are facing major demographic and economic problems. That is the case, among others, because of the proximity to large urban centres on the one hand and the functions performed for the benefit of the countryside on the other hand (He et al., 2020).

The literature is contained various studies and opinions on the role of small towns in the settlement layout of Poland, which is not surprising, considering their great heterogeneity. On the one hand, there can be found viewpoints that small urban centres in Poland, with a population of up to 20,000, have changed their usual positions in local economic systems due to global economic changes. Thus, detachment from their traditional economic hinterland has become a problem for most small towns, and their traditional local functions have been taken over by larger centres. The importance of small towns being treated as part of the rural economy has also evolved, and their functions are increasingly overlooked (Hefner and Halama eds., 2012). On the other hand, in the literature, opinions that small towns play an important role in local development especially through their function as service centres and concentration of business activity, have been found (Brzostowski et al., 2019). In the development of small urban centres, it is important to provide good housing conditions, access to services, health care and education, care for the natural and cultural environment, increase in business activity and development with respect to spatial order and sustainable development principles (Szarek-Iwaniuk, 2019).

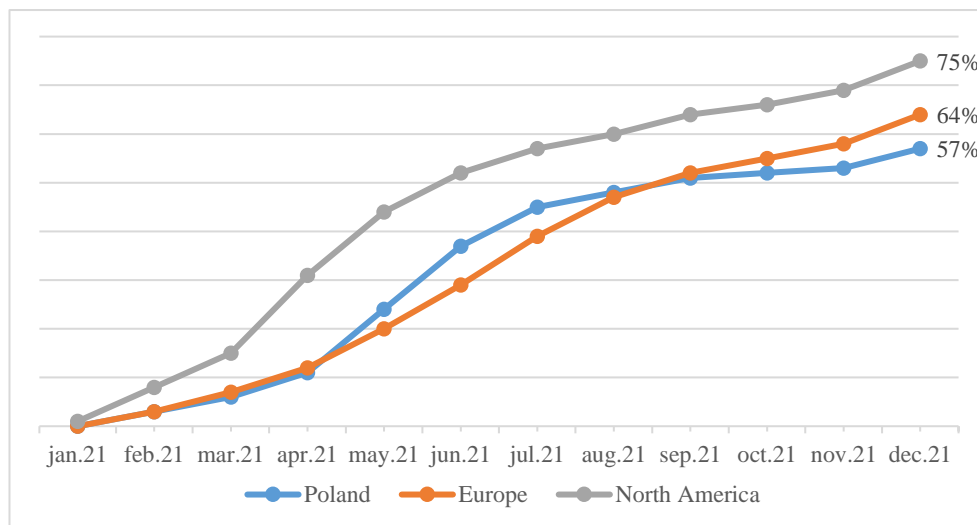
The Strategy for Sustainable Transport Development (STR2030) until 2030 (CoM, 2019) indicates that the progressive suburbanisation of large urban centres generates transport problems that constitute one of the development barriers. There is a need

to optimise the functioning of public transport systems in cities, as well as to increase their accessibility for residents of functional areas of these cities. That state of affairs is due to, among others, suboptimal spatial and functional integration of the public transport offer as well as insufficiently exploited Smart Transport Systems. There is still work to be done to develop the infrastructure and backup facilities of modern, low-emission rolling stock (Łukasiewicz and Świtała, 2020). The document also pointed out the shortcomings in coordination of the work of entities involved in planning changes in the area of cities and their functional areas.

**The COVID-19 pandemic**

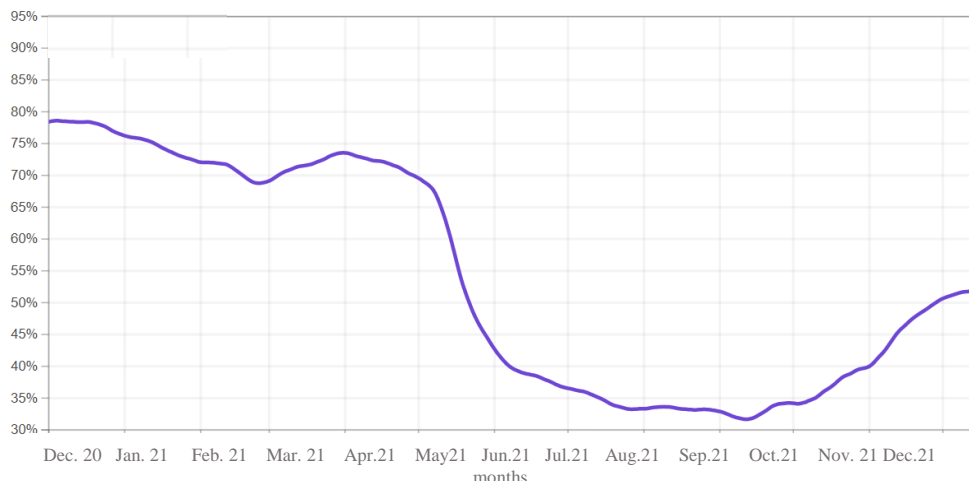
The year 2021 was marked by the spread of the SARS-CoV coronavirus pandemic in Poland and worldwide. According to the data from the covid19.healthdata.org platform, managed by experts of the Institute for Health Metrics and Evaluation of the University of Washington (2021), a total of 2,802,381 residents of Poland were confirmed infected with the coronavirus that causes Covid-19 disease during the twelve months of 2021, representing 68.21% of the total number of infections since the onset of the pandemic – amounting to 4,108,216 cases as of 31 December 2021. A total of 68,098 deaths were reported throughout 2021, which accounted for 70.17% of the deaths from the onset of the pandemic to 31 December 2021 – during that time, a total of 97,044 deaths were reported.

Results indicate that by the end of 2021, 57% of the country's population was vaccinated with a single dose. As shown in Figure 1, that percentage is 7% lower than the proportion of people vaccinated in Europe as a whole and 18% lower than the North American vaccination programme. Regarding the rate of fully vaccinated population at the end of 2021, it is 53% for Poland, 59% for Europe, and 64% for North America (Świtała, 2021).



**Figure 1: Percentage of people vaccinated with the first dose in the society**  
Source: (Świtała, 2021)

The results of the Covid-19 risk reduction measures indicate that in 2021, the percentage of people reporting to cover their mouths and noses in open spaces was highly variable, ranging between 32% and 76% during the analysis period, as shown in Figure 2. Social behaviour related to the discipline of wearing masks is clearly correlated with government restrictions on safety compliance. It turns out that along with lifting the obligation to wear masks outdoors, which occurred in mid-May 2021, the percentage of respondents using this form of protection dropped sharply to 30%-40%. Importantly, that level continued until the end of October, with only a modest improvement in the last two months of the year, most likely due to a significant increase in infections due to the Delta variant, which has proven to be much more contagious than earlier mutations of the virus. However, the use of precautions to protect the public from coronavirus infection appears to be driven more by external conditions in the form of formal obligations and bans than by a sense of personal responsibility.



**Figure 2: Percentage of people declaring to wear masks in open space**  
Source: (Świtała, 2021)

The above conclusion is moreover confirmed by the results of studies related to the spatial mobility of society. Mobility index derived from mobile phone data provided by platforms Google, Facebook and Apple ranged from -44% to +13% in 2021. The obtained result informs about the mobility of Polish society during the pandemic in comparison to the typical mobility recorded before its outbreak (Świtała, 2021). In the first months of 2021, the population mobility remained quite low, below the typical mobility level recorded in pre-pandemic conditions; however, an upward trend began at the beginning of May. During the months of June through December, the mobility index was fairly stable, ranging from +4% to +13%, except for the

second week of November, when mobility dropped below the typical pre-pandemic value. It can be noticed that mobility patterns, like wearing masks, have also changed with the relaxation of social distancing measures.

Based on the literature studies conducted so far, two research questions have been formulated to provide a direction for the research:

*RQ<sub>1</sub>: How and to what extent did the coronavirus pandemic change small-town residents' mobility behavior?*

*RQ<sub>2</sub>: What are the determinants of urban public transport development in small towns?*

### **Research Methodology**

The survey was conducted in March 2021 with a sample of 217 respondents representing residents of small towns. The data were obtained from an online questionnaire, and purposive sampling was used to select the respondents based on size of their place of residence. The research was designed to answer the research questions with a concentration on small towns. They were found significant in Polish regions' geographical, economic and social issues.

According to the classification of Statistics Poland, the group of small towns includes settlement units with a population below 20 thousand (SP, 2018). In 2016 700 units had the status of such towns, which accounted for more than 76% of the total number of urban units in Poland. Considering the urbanisation index and population structure, the study results show that the percentage of population in the surveyed towns was 21.5%, and the most urbanised provinces were Lubuskie and Opolskie, where residents in small towns accounted for more than 40% of the total population. Among the representatives of the study population, 54.8% were women. More than 25% were young, i.e. 18-25 years old. 20% of the study participants, on the other hand, were between the ages of 26-35, and 17% were between the ages of 36-45. People aged 46-55 and 56-65 were represented by 15% of respondents. In contrast, the share of the elderly, i.e., those 65 and older, was 5%. Of those surveyed, 49% had secondary education, and 35% had higher education. Vocational education was indicated by 10% of respondents, and primary education by less than 5% of respondents. Considering household size, respondents were most likely to be part of 3- or 4-person households, and the response rate was 27.2% in both cases. Two-person households were represented by nearly 23% of respondents, and one-person households were represented by nearly 10%. In contrast, over 15% of those surveyed indicated households with 5 or more people.

When evaluating their health, most respondents spoke positively. Over 55% rated their health as good (40.6%) or very good (15.2%). Poor health was reported by 12% of survey participants, including 3% who described their health as very poor. In contrast, 32% of those surveyed believe that their health condition is neither good nor bad.

The survey was conducted using an online questionnaire that was created using a form available at the ankieto.pl system. The respondents' responses were measured

using two types of measurement scales, i.e., nominal and ordinal. An 11-item scale was used for the question on motivators for increasing the frequency of urban transport use, and a 9-item scale for the change in travel motivation, which was then subjected to reliability analysis using Cronbach's  $\alpha$  coefficient, with values ranging from 0 to 1. In the first case, the  $\alpha$  score was 0.862, and in the second case, the  $\alpha$  score was 0.879, indicating that both scales have very good reliability.

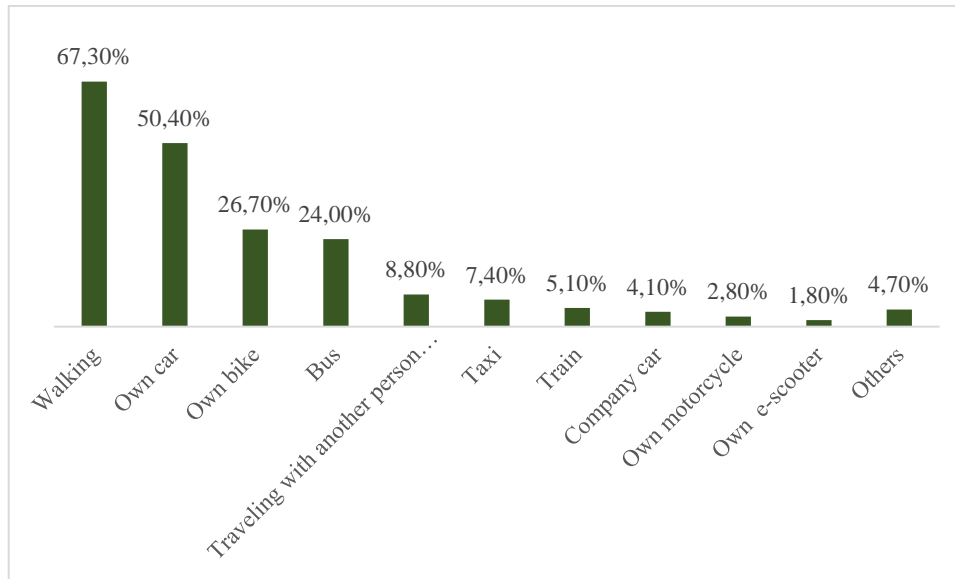
In order to answer research questions, the research material was statistically analysed using the SPSS package. Standard measures of descriptive statistics were used in the data analysis. Spearman's rho test was used to examine the relationship between the variables. Factor analysis with principal components method and Varimax rotation was also conducted. The result was assumed to be statistically significant at  $p < 0.05$ .

### Research Results

As the study was conducted in March 2021, it proved to be challenging in terms of the epidemic. The average daily number of infections, as reported by IHME (2021), was 19,830 cases during that time, ranging from 4,785 to 35,145 infections. During the study period, the mobility rate was well below typical mobility for pre-pandemic conditions and ranged from -23% to -30%.

The research results indicate that, on average, each respondent habitually travelled within the town by more than two means of transportation during the analysed period (2.36). There are deviation values significant relative to the mean standard shown, stipulating a wide dispersion of results within the analysed indications. Analysing the frequency distribution of the answers, it should be indicated that 38.2% of the respondents moved around the town using only one means of transport, 26.7% used two means of transport, 18% made trips using three means of transport, and 6% - used four means of transport. Just over 10% of surveyed participants reported they habitually travel by more than four means of transport within the town, with two respondents indicating no travel option. Those respondents appeared to be 56-65 years old, rating their health as rather poor and very poor. However, it should be noted that overall, subjective health rating was not reported to be correlated significantly with the number of respondents' indications. However, there was a significant negative correlation (rho coefficient = -0.203 at  $p < 0.001$ ) between the number of modes of transport and the age of the respondents.

The results shown in Figure 3 indicate that walking was found to be the most popular way of moving around the town, indicated by over 67% of respondents, followed by private car use, declared by over half of surveyed people. Relatively and frequently, respondents took a private bicycle, as well as bus services; in both cases, the frequency of indications exceeded 20% and was significantly higher than the next most frequent modes of transportation, i.e., making a trip with another person in their car (8.8%) and taxi services (7.4%). Even less popular were journeys by train and company car and those made using private motorcycles or electric scooters. In contrast, less than 5% of indications were in the "other" response category, where shared transportation modes were included.



**Figure 3: The customary way of moving around within a town**

According to the chi-square independence test results, it is concluded that in most of the analysed cases, the declarations of the respondents are not differentiated by gender and age. The exceptions are bus trips, which turned out to be more often indicated by women ( $\text{Chi}^2=4.29$  at  $p<0.05$ ), as well as business car and cab trips, in both cases, more often declared by representatives of the other sex (respectively:  $\text{Chi}^2=4.03$  at  $p<0.05$ ,  $\text{Chi}^2=3.88$  at  $p<0.05$ ). The education of the respondents differentiates the travel behaviour in the area related to travelling with another person in his/her car, which was found to be more frequently indicated by those with secondary and higher education ( $\text{Chi}^2=10.59$  at  $p<0.05$ ). Household size, on the other hand, was found to significantly differentiate respondents' declarations of making trips by private car ( $\text{Chi}^2=18.81$  at  $p<0.01$ ). While in one-person households, the indicator is at the level of 31.58%; in 4-person households, it increases to 69.49%, and in households with 5 persons and more – it is at the level of 82.76%.

An important part of the research is the analysis of the results concerning the determinants of urban public transport development in small urban centres. Respondents were asked which elements of the public transport service offer might motivate them to use public transport more often. Respondents indicated their level of agreement with each statement using a 5-point scale, where 1 meant “definitely yes” and 5 meant “definitely not”. Overall, the differences between the elements studied were found to be small, ranging from 2.71 for an increase in the number of connections to 3.14 for the repair or replacement of rolling stock.

The study revealed the existence of several relationships between the selected development determinants and the variable describing the respondents in terms of



modes of transport used. Although rather weak, highly statistically significant correlations occurred for lower ticket prices, improved punctuality, more connections, reduced travel times, and the construction or renovation of parking facilities at interchange centres. Spearman's rho coefficients were as follows: -0.248, -0.246, -0.205, -0.172 and -0.178 for  $p < 0,01$ . That means the propensity of respondents to attribute greater influence on the frequency of public transport use to the aforementioned factors increased as the number of modes of transportation increased.

Table 1 presents the results of the factor analysis by which three main factors encouraging respondents to use urban public transport services more frequently were distinguished from the original eleven determinants, containing 82.71% of the shared variation. The reduction of variables was based on the principal components method with Varimax rotation and Kaiser normalisation, which is responsible for maximizing the weight variance between variables within each factor.

**Table 1. Factor analysis – rotated factor matrix results**

No.	Specification	Component		
		1	2	3
1.	Lower ticket prices	.815	.322	.196
2.	Improved punctuality	.785	.328	.328
3.	Increasing the number of connections	.812	.279	.262
4.	Reduced travel time	.728	.390	.342
5.	Construction or renovation of car parks for cars at interchange centres	.357	.761	.249
6.	Construction or renovation of car parks for bicycles at interchange centres	.305	.809	.327
7.	Overhaul or replacement of rolling stock	.324	.836	.269
8.	Construction or renovation of stops	.372	.690	.455
9.	Better management of traveller information	.583	.303	.600
10.	Provision for automated parking access control options	.374	.464	.715
11.	Provision for automatic toll collection	.285	.335	.827

The first component, which accounts for 31.75% of the variance in the original dataset, is most strongly associated with four passenger service elements relating to the extent of the transportation offer. It is adapted to transportation needs of small-town residents. That component strongly correlates with ticket price, punctuality, number of connections and travel time. It is worth noting that respondents who are particularly price-sensitive, i.e. respondents who marked “definitely yes” and “rather yes” answers to the question, turned out to be mainly young people under 35 years old (53.1%), with secondary (51%) or higher education (35.4%) and having families of three or four people (54.3%), mainly women (60%). A similar profile of metric variables was noted when assessing the impact of other determinants.

The second component accounts for 29.73% of the total variance. High weights are assigned to determinants connected with nodal elements of the urban transport system, such as the construction or renovation of car and bicycle parking facilities at interchange centres, investment in stops, and the modernisation or replacement of rolling stock. Those elements can be described as amenities that encourage the more frequent choice of public passenger transport for daily mobility for urban residents. The results of the research indicate that the renovation or replacement of the rolling stock is a motivation factor for young people (50.9%), with secondary (47.4%) or higher education (36.8%), and members of three- or four-person households (54.4%), more often for women (52.6%). A similar distribution of metric variables was obtained for the analysis of observations meeting the “definitely yes” and “rather yes” response conditions to the nodal elements of transportation infrastructure questions.

The third component, which explains 21.22% of the variance, includes three elements related to automation and computerisation of passenger service. The results of the conducted analysis indicate that component is most strongly related to factors referring to providing passengers with the possibility of automatic fare collection and control over parking spaces, e.g. in transfer hubs, as well as to improving the passenger information management system and thus providing passengers with constant access to information on public transport journeys based on the GPS vehicle geolocation system. Surveys indicate that the improvement related to effectiveness may be an incentive to use public transport services more often for young people (60%), for people with secondary (48.9%) or higher education (36.7%), and members of three- or four-person households (56.8%), more often for women (57.8%). A similar profile of respondents was obtained in the analysis of responses to the other questions.

The following table presents the results on the respondents' views on the COVID-19 pandemic considering their attitudes towards the risk of contracting coronavirus, adherence to epidemic safety recommendations, and the restrictions in place in the country. When analysing the overall assessment regarding the risk of contracting coronavirus, it can be seen that the mean score (2.94) was around the middle of the scale, indicating that the COVID-19 pandemic was unlikely to cause a high sense of fear among the majority of respondents, as it was feared by only 38.7% of survey participants in total, while one in three respondents stated that they did not feel or rather did not feel fear of contracting coronavirus.

The study indicates that age determines the anxiety level associated with the Covid-19 pandemic (rho coefficient= -0.355 at  $p < 0.01$ ). This means that as we move to the next age groups, the respondents' sense of the coronavirus threat increases. While the mean score of the 18-25-year-olds was 3.32, the mean score of the age group 65 and more was 2.18, which is close to the “rather yes” response.

**Table 2. Respondents' views on the COVID-19 pandemic**

No.	Specification	$\bar{x}$	$\sigma$	Score distribution				
				Definitely yes	Rather yes	Neither yes nor no	Rather not	Definitely not
				[1]	[2]	[3]	[4]	[5]
1.	Fear of contracting coronavirus	2.94	1.311	14.3%	24.4%	27.2%	17.1%	16.1%
2.	Compliance with restrictions	2.20	1.135	33.2%	31.8%	22.1%	7.8%	5.1%
3.	Attitude towards restrictions	3.11	1.281	15.2%	15.7%	28.1%	25.3%	15.7%

The results showing respondents' attitudes towards the restrictions applicable in 2021 are also not the best. Although more than 40% of respondents thought that the restrictions introduced in connection with the Covid-19 pandemic were not too restrictive, more than 30% of respondents held the opposite view, and 28% did not express their opinion on the subject.

Age (rho coefficient= 0.209 at  $p < 0.01$ ) and household size (rho coefficient= -0.179 at  $p < 0.01$ ) were found to be the variables influencing respondents' declarations. While the percentage of respondents who are positive about the restriction issue increases as we move into older age categories, the opposite occurs as household size increases. What seems interesting is that more than 70% of those representing an unfavourable attitude toward the restrictions say they are complying with the restrictions associated with the pandemic. In general, it can be noted that in the case analysed, the mean score (2.20) was clearly below the middle of the scale, and the percentage distribution of responses confirms the compliance of the vast majority of respondents with the applicable safety rules (65%). Two negative correlations were noted between the compliance with safety rules by respondents and their age (rho coefficient=-0.257 at  $p < 0.01$ ) and education level (rho coefficient= -0.185 at  $p < 0.01$ ). Thus, respondents who were more likely to comply with pandemic restrictions were in older age groups and those with higher education.

The following table shows the respondents' opinions on how public transport works during the Covid-19 pandemic. The data show that the average score oscillates around the middle of the scale (3), which indicates that respondents most often gave neutral responses of "neither good nor bad" (51.6%) with a slight advantage of positive over negative ratings. Opinions on the pandemic were not found to differentiate how respondents perceived public transportation performance under pandemic conditions. However, there was a strong positive relationship between the aforementioned rating and how respondents rated the actions taken by towns to combat the Covid-19 pandemic (rho coefficient=0.564,  $p < 0.001$ ). The more negative

the rating of the town's performance against the pandemic, the worse the rating of the way public transport works. Spearman's rho test also showed that there was a statistically significant negative relationship between the aforementioned rating and household size, meaning that multi-person households were more prone to negative ratings than 1- or 2-person households ( $\rho = -0.213$ ,  $p < 0.01$ ). The mean score for 1-person households was 3.21, while for households of 5 or more, it was 2.83.

**Table 3. Overall assessment of public transport performance during COVID-19**

$\bar{x}$	$\sigma$	Score distribution				
		Very poor	Poor	Neither poor nor good	Good	Very good
		[1]	[2]	[3]	[4]	[5]
3.02	0.955	9.3%	11.1%	51.6%	24.0%	4.1%

Next, respondents were asked to indicate the extent to which the Covid-19 pandemic contributed to changes in their travel demand across nine motivation areas relating to work, health, social and family visits and religious fulfilment, among others. A summary of the results is shown in Figure 3. with four response options, i.e., "I travel less", "I travel a lot less", "I stopped travelling", and "I did not travel and do not travel". Survey results indicate that under pandemic conditions, the greatest change in travel demand occurred in the cultural life area, with over 36% of respondents resigning completely from this kind of travel and another 30% reducing their travel activity. In contrast, nearly 30% of those surveyed abandoned travelling related to hobbies/physical activity.

The impact of the pandemic was also strongly felt for travel associated with getting to public offices, where the percentage of "I travel a lot less" statements was 30%. There was also a high percentage of "I drive less" statements for travels motivated by social and family visits (32.7%) and those related to travels to retail outlets (29%). In the case of places of worship, nearly 30% of respondents reduced related activities to a greater or lesser extent, and 20% stopped attending church altogether. It is worth noting that nearly half of the respondents reported that they now travel less or much less frequently to healthcare facilities, and more than 20% stopped going to educational facilities. In terms of demand for work-related travel, 26% of survey participants reported a decrease in demand, and nearly 10% stopped travelling to work as a result of the pandemic.

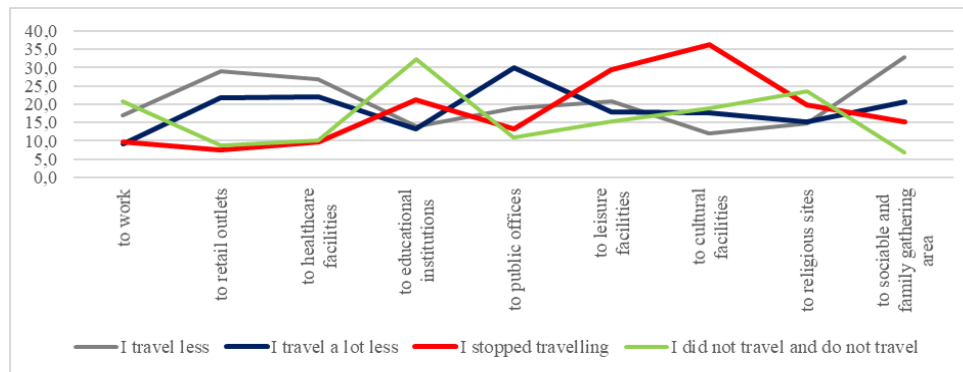


Figure 4: Impact of Covid-19 on change in travel demand in selected life areas (%)

## Conclusion

The study results allow us to formulate some important conclusions about the mobility of small-town residents in the area related to the use of public transportation. First, however, it is important to note that social mobility patterns, regardless of town size groups, underwent significant changes in 2021 due to the Covid-19 risk reduction efforts undertaken by the towns. In the case of residents coming from small towns, the results indicate that under pandemic conditions, the mobility of the respondents was carried out by a narrow spectrum of transport modes, most often taking the form of walking. The impact of the pandemic on mobility appeared to be particularly evident in the decline in travel demand in many areas of life, primarily in the travel related to cultural life and hobby/physical activity pursuits, and to a somewhat lesser extent in areas related to getting to offices, travel motivated by social and family visits, travel to retail outlets, places of worship, educational and health care facilities, and work-related travel. In this case, the results are consistent with the findings of Holotova et al. (2023), which give evidence that the travel behaviour of citizens does not show the elements of sustainable urban mobility, as the current infrastructure and opportunities for travel are limited. However, this does not mean that small-sized cities are not required to undertake any action regarding urban development. Magalhães and Santos (2022) highlight that mobility transformation plays an important role in urban strategy development regardless of the size of the city.

It appears that respondents' propensity to use more modes of transportation for daily mobility decreased as their age increased. In this context, it is worth citing the results of the study on the aging of the Polish population, which indicates a significant increase in the proportion of people aged 65 and more in small towns (SP, 2018). In 2016, compared to 2010, the old-age ratio, which depicts the number of people aged 65 and older per 100 people aged 14 and under, increased from 82.8 to 112.8. The highest value of the index was recorded in Działoszyce (227.5) and the lowest in Siechnicowice (43.2). The age factor also proved to be a variable that significantly differentiated respondents' opinions on the COVID-19 pandemic itself. The study

found that as one moved into the older age categories, the percentage of respondents who were positive about restrictions and those who said they adhered to social distancing rules increased.

The results of the studies using factor analysis provided cognitive material on the determinants of public transport development in small urban centres. City managers should be aware that this development is not only necessary but also feasible. At this point, however, the need for towns to adopt a system approach when planning road interventions is worth noting. The key issue here seems to be the interdependence between elements of the urban transport system, e.g. transport offer, passenger service and the condition of the rolling stock and road infrastructure elements. It is worth mentioning that as the mobility of the respondents increased, measured by the number of means of transport used in their daily travel, their tendency to ascribe greater influence to the aforementioned factors on their decisions related to the choice of the means of transport also increased.

It seems that appropriate changes in the transport offer in all key areas for passengers, i.e. ticket price, punctuality and frequency of connections as well as travel time, while taking into account the leading demand generators that decide on the place of starting and ending travel, may constitute a significant impulse to change current habits of moving around the town, directing the demand attention of its inhabitants towards urban public transport, all the more so as in pandemic conditions it did not enjoy the best opinion among the respondents. On the other hand, activities related to the construction or renovation of parking lots and transport stops, as well as to the modernization or replacement of rolling stock, may, to a large extent, contribute to the increase in travel comfort and accessibility of the transport offer, taking into account its adaptation to the mass size of transport needs occurring in a given area, as well as the related phenomenon of transport exclusion, especially if travelling involves the need to use multimodal transport, which – according to previous studies – is a frequent travel practice of inhabitants of small towns (Świtała and Łukasiewicz, 2021). It should be borne in mind that residents of small towns, due to the distance of their place of residence from a large urban centre, are often obliged to make long distant journeys.

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## MIESZKAŃCY MAŁYCH MIAST JAKO UŻYTKOWNICY KOMUNIKACJI MIEJSKIEJ W DOBIE PANDEMII COVID-19. REKOMENDACJE DLA ZARZĄDCÓW MIAST

**Streszczenie:** Badania, których wyniki prezentujemy w niniejszym artykule zostały poświęcone wybranym problemom związanym z mobilnością mieszkańców małych miast w warunkach pandemicznych. Ich celem było rozpoznanie i ocena zachowań użytkowników komunikacji miejskiej ze szczególnym uwzględnieniem determinant rozwoju miejskiego transportu zbiorowego oraz wpływu pandemii COVID-19 na zmianę zapotrzebowania na podróże. Badania wykonano wśród mieszkańców ww. miast z zastosowaniem kwestionariusza ankiety internetowej. Wyniki wskazują, że mobilność respondentów realizowana była za pomocą wąskiego spektrum środków transportów, najczęściej w formie pieszych przemieszczeń. Skutki pandemii okazały się najsilniej odczuwalne w przypadku podróży związanych z życiem kulturowym oraz realizacją hobby/uprawianiem aktywności fizycznej. Badania dowodzą, że rozwój transportu miejskiego wymaga podjęcia licznych inwestycji. Zarządcy miast, w ramach podejmowanych interwencji, zgodnie z zasadą podejścia systemowego, powinni uwzględnić trzy wzajemnie powiązane ze sobą obszary działań, tj. poprawę dostępności oferty przewozowej, unowocześnienie obsługi pasażerskiej oraz inwestycje w tabor i punktowe elementy infrastruktury drogowej.

**Słowa kluczowe:** małe miasta, transport publiczny, mobilność, Covid-19, rekomendacje praktyczne

## 小城市居民作为19世纪大流行病时代的公共交通使用者。对城市管理者的建议

**摘要:** 我们在这篇文章中介绍的研究结果，是专门针对与小城市居民在大流行条件下的流动有关的一些问题。他们的目的是确定和评估公共交通用户的行为，特别关注城市公共交通发展的决定因素以及COVID-19大流行病对旅行需求变化的影响。研究是在上述城市的居民中进行的，采用的是在线调查问卷。结果表明，受访者的流动性是通过狭义的交通方式实现的，最常见的是步行方式。大流行病的影响似乎在与文化生活和追求爱好/体育活动有关的旅行中感受最为强烈。研究表明，城市交通的发展需要大量投资。城市管理者在其干预措施中，根据系统方法的原则，应考虑到三个相互关联的行动领域，即改善交通服务的可及性，使客运服务现代化，投资于机车车辆和道路基础设施的点对点要素

**关键词:** 小城市，公共交通，流动性，Covid-19，实用建议