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The importance of ticket price in public transport in non-metropolitan rural areas in Poland

Łukasz Fiedeń[1, CDFMR], **Daniel Štraub**[2, CDFMR]

[1]*Jagiellonian University*, Faculty of Geography and Geology, Institute of Geography and Spatial Management, ul. Gronostajowa 7, 30-387 Kraków, Poland, e-mail: adam.lukasz.fieden@uj.edu.pl (*corresponding author*), https://orcid.org/0000-0002-8979-9968;
[2]*Jagiellonian University,* Doctoral School in the Social Sciences; Faculty of Geography and Geology, Institute of Geography and Spatial Management, ul. Gronostajowa 7, 30-387 Kraków, Poland, e-mail: d.straub@doctoral.uj.edu.pl, https://orcid.org/0000-0003-1084-1260

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Abstract. The need to move is an inherent feature of every human life. Public transport should be one of the means of transport available to every human being. A fare-free public transport (FFPT) policy is under constant debate. Research among residents in rural areas provides an opportunity to discover whether FFPT is a key element of socially equitable development and understand the role of price, which can, at the same time, reduce car dependency. This research aims to understand the role of public transport fares in the travel decisions of people living in non-metropolitan rural areas in Poland. The primary data source used in this study is a survey conducted with the residents of 12 peripheral communes. This study revealed that price might not be as crucial in mobility strategies regarding free or paid public transport in non-metropolitan locations. This is mainly due to the poor quality of public transport.

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1. Introduction

As resources of various kinds are distributed unevenly in space, the need to move is an immanent feature of everyone's life. Without it, one can hardly satisfy the diverse array of life needs. To improve or sustain such a quality, urban and transport experts have agreed that public transport should play a key part in daily life and be a backbone of urban and rural settlement systems. But public transport is not only an essential pillar of day-today activities for many but also a critical element of strategies following sustainable development (Banister, 2008; Taczanowski et al., 2018; de Oña et al., 2021; Zijlstra & Verhetsel, 2021) being one of the elements that promote sustainable transport (Gärling & Schuitema, 2007). It is thus essential to ensure the good quality of public transport, including its environmental friendliness supported by, for example, low-emission bus technology (Taczanowski et al., 2018; Guzik et al., 2021), as well as punctuality, cleanliness, information and acceptable fares (de Oña et al., 2021)

Although there is a growing list of public transport advantages and policy recommendations on how to make public transport more efficient and attractive (Redman et al., 2013; Rohani et al., 2013; Chowdhury et al., 2018), due to the steadily growing popularity of cars, public transport is unfortunately playing a secondary role in the majority of transport systems around the world (Hensher, 1998; Steg, 2003; Wang et al., 2021). Although recent technological innovations related to expanding the shared transport sector, such as carpooling and carsharing, are strongly emphasizing their mission to support sustainable development, they reinforce the prevailing dominance of the car industry, and it is not certain yet whether they compete with or complement public transport (Schaller, 2021; Cats et al., 2022).

In addition, the rapid decline in both ridership and farebox revenue due to the Covid-19 pandemic worsened the situation of public transport, and transport practitioners, together with scholars, are facing the problem of how to get people back on board (Gutiérrez et al., 2020; Jenelius & Cebecauer, 2020; Beck et al., 2021; Vickerman, 2021). This is a challenge for non-metropolitan rural areas where the transport system generally offers fewer options for moving. Whereas people in urban areas might find it easy to work from home or switch to walking, cycling, carpooling or carsharing, the rural areas, due to their particular socio-economic and spatial characteristics, do not always enable such a shift (White, 2009). The growth of private car use or social exclusion due to transport poverty is thus a critical issue on the agenda of many municipalities.

This paper joins the traditional transport and rural geography, which currently focuses on, among other things, analysing the adverse effects of demographic and spatial change. This is inextricably linked to the issue of public transport performance. Depopulation of peripheral areas, combined with the dispersion of buildings, leads to a deterioration in the public transport offering (Wolański et al., 2016). The main problem arises from the need to travel long distances and to transport a small number of people, thus incurring high costs while obtaining small profits. Consequently, this leads to a deepening of transport exclusion, which in turn affects the emigration of young people and an even stronger decrease in population density (Kwarciński, 2016) – a problem noticed in Poland after the deregulation of the passenger transport market that allowed private companies to provide transport services. Unfortunately, it turns out that, especially in non-metropolitan areas in Poland, the market mechanism does not satisfy residents' basic needs in the context of public transport (Cullinane & Strokes, 1998; Taylor & Ciechański, 2017; Ciechański & Taylor, 2021).

The main aim of this research is to understand the role of public transport fares in the travel decisions of people living in non-metropolitan rural areas in Poland. By demonstrating the importance of public transport fares in non-metropolitan rural areas in Poland, this study brings more clarity to the issue of how public transport needs to work to meet current and future demand. We focused on assessing the quality of public transport from the residents' point of view with the following selected features of public transport performance that pose the greatest problems for users. Particular emphasis is placed on the importance of fare levels, which are considered an important tool to control public transport ridership and influence the dynamic between the mobility of poor and rich (Pereira et al., 2019), the fundamental challenge of transport research (Knowles, 1990; Lucas, 2019).

2. Literature review

Public transport is considered to be a sustainable means of transport (Holmgren, 2007) as it represents an alternative to private cars, meaning it could carry more passengers than cars for lower economic, social and environmental costs. This aspect of public transport is crucial in urban areas where a growing level of private car use still prevails. However, the

role of public transport has the same importance also in rural localities. In this article, rural areas are understood as non-metropolitan rural areas, e.g., areas located outside the functional zones of cities of more than 10,000 inhabitants. Even though rural localities also struggle with the growing use of cars, another critical issue is limited public transport accessibility.

To effectively optimize public transport service, insight on the various public transport qualities must be obtained. It is no surprise that ongoing transport research continually addresses various elements of public transport, including price. The importance of fare costs stems from the direct influence of ticket price on public transport ridership and ticket revenue essential for the operation and further development of a public transport system (Balcombe et al., 2004; Borndörfer et al., 2012; Redman et al., 2013).

As car popularity has steadily grown since the late 1960s and public transport ridership has decreased, transportation research has started to examine what could change this trajectory. Influenced by the neoclassical paradigm, fare levels, like the price of petrol, were examined, as they were understood to be a determinant of the use of cars or public transport (Baum, 1973; Scheiner & Starling, 1974; Cervero, 1990; Haire & Machemehl, 2007). Unfortunately, the impact of fare levels was not seen to be as remarkable as the price of petrol in triggering the shift from car to public transport. However, the premise of homo-economicus on which the mentioned findings are grounded lowers their validity, as it examines the complex array of travel behaviour through narrow mathematical models, as noted by Owens (1997) or, recently, Kębłowski & Bassens (2017). Further research thus covers the relationship between fares and public transport ridership in a more comprehensive way that includes the understanding of the effects of car ownership, residential area, design of the public transport network, purpose of journey or questions connected with income, gender, age or race (de Witte et al., 2006; Brand, 2008; de Witte et al., 2008; Schein, 2011; Brie, 2012; Redman et al., 2013; Cats et al., 2016; Gebaldón-Estevan et al., 2019; Tuisk & Prause, 2019).

In ongoing transport research, it is traditional to explain the influence of the price using fare elasticities, which explain the relationship between public transport ridership and revenue (Cervero, 1990; Balcombe et al., 2004; Litman, 2004). The fare level is thus dependent on the aim of the public transport operator and its other financial resources besides ticket revenue, as the public transport service is subsidised from the public budget or, in some cases, also from the private sector. If the public transport operator aims to provide an attractive and feasible alternative to private means of transport, adjustment in price and public transport quality has to follow (Thøgersen, 2009; Zhou & Schweitzer, 2011; Borndörfer et al., 2012; Redman et al., 2013).

Although there is a slowly growing shift to abolish fares in public transport worldwide (Dellheim & Prince, 2018; Kębłowski, 2020), Poland including (Štraub, 2019), to address various environmental, social but also economic challenges (Fearnley, 2013; Gabaldón-Estevan et al., 2019; Kębłowski et al., 2019; Štraub & Jaroš, 2019), the feasibility and (un)effectivity of the fare-free public transport policy (FFPT) are under constant debate. While the critic of FFPT is directed to its low potential to reduce car use levels (Brand, 2008; Cats et al., 2016; Hess, 2017; Štraub, 2020), the proponents of the policy see it as a fundamental element of transition towards a more inclusive society (Cats et al., 2016; Tomeš et al., 2022). Speaking about the latter, such an understanding of fare-free public transport is used in a peripheral location in Poland with FFPT (Štraub, 2019). End-user-based research in rural areas with no fare has thus the potential to uncover whether FFPT is a crucial element of socially just development that could at the same time decrease car dependency in such locations and the role of price, among other public transport attributes.

Similarly, like zero-fares in public transport, reduced fares also positively impact the ridership and satisfaction of public transport services (Hay, 1986; Wallin Andreassen, 1995; Andrews et al., 2011; Redman et al., 2013). Especially for low-income groups, parents, students and pupils, the elderly or people with physical disabilities, reduced public transport ticket cost improves their mobility. Besides, the reduced price of public transport for the aforementioned groups is a crucial element of social welfare policy, as it lowers the rate of transport-induced social exclusion (Borndörfer et al., 2012). Eliminating or reducing ticket prices can also reduce social exclusion in other ways. Reduced prices may increase the number of users of public transport, making its operation more profitable (Tomeš et al., 2022). This, in turn, may lead to a desire to increase the accessibility of public transport – i.e., to increase the number of journeys, thus further reducing exclusion. It also should be noted that fare levels matter for the anti-exclusionary effect of public transport (Yigitcanlar et al., 2019). This is particularly evident in large families, where the cost of tickets can be very high (Lucas, 2011). Therefore, the availability of public transport is economically conditioned from the point of view of local and

regional authorities, but also of users (Truitt, 2008), as addressed in this study.

Overall, reduced or abolished fares in public transport increase public transport ridership, support essential participation in daily life and reduce car use. It has to be remembered that the overall extent of those effects is derived from the accessibility and feasibility of the public transport service (Beirão & Sarsfield Cabral, 2007; Eboli & Mazzulla, 2012; Sharaby & Shiftan, 2012; Redman et al., 2013; Rohani et al., 2013; Berg & Ihlström, 2019). With public transport that operates twice a day or less frequently, one cannot expect the effects mentioned above to be fulfilled.

This represents a particular issue for rural areas, where people generally tend to rely more on cars, despite rising costs (Gray et al., 2001; Balcombe et al., 2004; Shergold & Parkhurst, 2012; Berg & Ihlström, 2019). This growing share creates a vicious cycle in rural areas where public transport frequently operates, progressively limiting the operation of public transport. This is due to the low population density in those areas, which results in a decline in public transport activity (White, 2009). The need to travel long distances and to carry a small number of people causes high costs while providing small profits. Consequently, it leads to a more profound transport exclusion, which in turn contributes to the emigration of young people and an even greater reduction in population density. This problem was noticed in Poland after the deregulation of the passenger transport market and the admission of transport services to private enterprises (e.g. Ciechański 2020).

The problem of overly far-reaching and uncontrolled liberalization of the extra-urban bus service market was addressed in Poland by Taylor & Ciechański (2007, 2008a, 2008b, 2010). Their research concludes that all the ownership transformations of formerly state-owned enterprises have primarily led to a regression in the bus service network. It is, therefore, reasonable to ask how to make public transport more user-friendly. If this does not happen, there will be more and more transport-excluded people in peripheral areas (Ciechański 2020).

3. Research methods and area

The main source of data allowing the quality of public transport according to residents to be assessed is a survey conducted with the residents of the location. Respondents were asked to state their main mode of transport and standard set of socio-economic and demographic attributes. As the main interest lies in understanding the public transport fares, the filtering question for our respondents was their responses to the question related to their main mode of transport. This means that the study sample accounts only for public transport users. The survey also explored the residents' attitudes towards selected attributes of public transport (e.g. price, accessibility, feasibility, reliability, comfort) that are fundamental elements of travel behaviour research (e.g. Bohte et al., 2009; Redman et al., 2013). Respondents were asked three questions

Table 1. Respondents' characteristics

Municipality	N	Man	Women	Age structure				Economic status			
				19-25	26-45	46-64	65+	Student	Employed	Pensioner	Others
Klukowo	98	43	55	3	24	37	34	2	54	38	4
Lutowiska	65	24	41	6	21	16	22	4	31	23	7
Mędrzechów	81	44	37	6	30	27	18	2	48	21	10
Mikołajki	110	58	52	5	23	42	40	3	42	50	15
Narewka	146	55	91	3	27	46	70	2	46	88	10
Ochotnica Dolna	210	72	138	13	52	64	81	7	82	94	27
Radków	101	37	64	14	20	34	33	10	42	44	5
Świeradów-Zdrój	89	25	62	2	14	24	46	0	34	49	4
Telatyn	107	43	64	7	38	26	36	5	49	45	8
Terespol	180	84	96	12	37	77	54	7	74	77	22
Tykocin	94	36	58	4	21	40	29	2	45	41	6
Żmudź	95	33	62	4	28	30	33	1	37	42	15

Note: Others – people receiving welfare benefits or unemployed
Source: own elaboration

relating to different aspects of their choice of public transport as their primary mode of transport. The first concerned the motivation for choosing public transport. The second was the disadvantages of this mode of transport and the third was the advantages. In total, 1376 surveys were collected (Table 1).

To conduct the survey, 12 peripherally located municipalities with low public transport accessibility in Poland were selected (Fig. 1). Firstly, based on existing typologies of Polish municipalities (Bański, 2009; Śleszyński & Komornicki, 2016), ten non-metropolitan municipalities were selected (Mikołajki, Tykocin, Narewka, Klukowo, Terespol, Żmudź, Telatyn, Lutowiska, Mędrzechów, Ochotnica Dolna) with the lowest bus-rail accessibility with paid public transport (Rosik et al., 2017). Those municipalities are completed by two additional municipalities (Radków and Świeradów-Zdrój) that have similar characteristics in terms of the public transport provision quality, but the distinctive element being that the public transport is fare-free for residents. The reason why the number of municipalities with paid and fare-free public transport is not equal results from the limited number of FFPT municipalities suitable for such a comparison. Lastly, it should be noted that, while the public transport is fare-free for users in Radków and Świeradów-Zdrój, in the remaining municipalities passengers must pay according to a valid price list. This also means that, in paid municipalities, some might be benefitting from discounted fares (e.g., the elderly, students, people with impaired mobility). Although significant fare entitlements could result in tickets being perceived as almost free (Tomeš et al, 2022) and affect ridership levels, the extent is based on other variables such as public transport accessibility, quality or reliability (e.g., Redman et al., 2013; Rohani et al., 2013; Berg & Ihlström, 2019). As this research explores price and other public transport features, it distinguishes only among fare-free and paid public transport that includes discounted fares. However, the unequal number of municipalities with and without fares, and the fact that fare entitlements are considered as paid public transport, should not be perceived as a significant limitation, as this study is exploratory.

4. Results

In general, residents of non-metropolitan rural areas indicate that connection frequency is the most important factor influencing their choice of public transport as the primary mode of transport (Fig. 2). Respondents indicate accessibility as the second most important factor, and safety as third, while travel time, price and comfort are amongst the less popular factors. This signals that expectations towards public transport in rural areas are low and thus reflect the local context influenced by poor public transport quality. For the respondents, it is enough that there are at least some connections and

Fig. 1. Research area
Source: own elaboration

the journey is safe. Interestingly, the fact whether there is paid or fare-free public transport does not play a significant role, as the opinions are almost identical but in slightly different orders. In both types of areas, price is indicated as one of the less important factors influencing public transport choice.

Respondents from the localities with paid public transport are willing to choose public transport if there are direct, high-frequency connections suited to their needs. Other factors are of marginal importance (Fig. 3). The situation is different when it comes to locations with FFPT. Here, comfort of travel is the most important advantage encouraging people to choose public transport. The importance of other features is similar but much lower compared to respondents who pay for public transport. As before, in rural areas, the existence of connections is the most important factor. In those municipalities with fare-free public transport, the quality of the trip is the most important factor for the inhabitants. Price is an additional but not key factor here. This means that accessibility should come first in general, followed by adequate service quality and various fare policies.

Other conclusions are drawn from the analysis of Fig. 4, where a slightly different view is seen in terms of the disadvantages of public transport that discourage people from choosing it as a mode of transport. The most important factors are: lack of this transport, travel times and lack of direct connections, whereas inadequate travel comfort is of secondary importance. Meanwhile, in the case of advantages, there were differences between the indications of people from localities with paid and free public transport, in the case of disadvantages there are none (apart from the obvious one related to the existence of public transport). The price factor was indicated as the least important.

Finally, it is worth considering whether factors unrelated to the functioning and quality of public transport might influence the role of price as a factor influencing public transport choice. To this end, the basic metric data such as gender, age and activity of the respondents were analyzed (Fig. 5, 6, 7), focusing on localities with paid or fare-free public transport. According to the results, there are almost no gender and age differences between the respondents with paid or fare-free public transport. Price is important mainly for older women.

A greater variation (but not very high) is seen when the economic status is considered (Fig. 7). Among residents with paid public transport, price is more important mainly for unemployed respondents. The opposite is true in municipalities with fare-free public transport. This may mean that working people, whose taxes pay for public transport operations, have higher price expectations.

5. Conclusions

This study uncovered that price might not be as crucial in mobility strategies regarding fare-free or paid public transport. Although it follows the results of similar studies, the authors argue that the reasoning underpinning such a decision differs amongst metropolitan and non-metropolitan locations. While in Štraub (2019) the price is not considered necessary because users are used to a fare-free scheme that was embedded into a well-functioning urban public transport network more than ten years ago, the low importance in non-

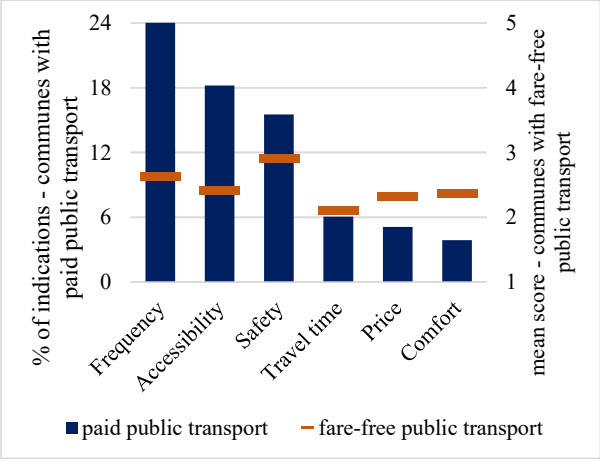

Fig. 2. Main factors influencing the choice of public transport as a mode of transport (n=1362)
Source: own elaboration

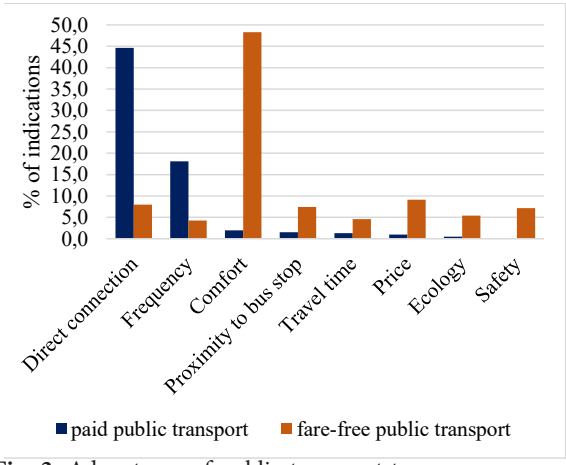

Fig. 3. Advantages of public transport to encourage people to choose it as their primary mode of transport (n=1343)
Source: own elaboration

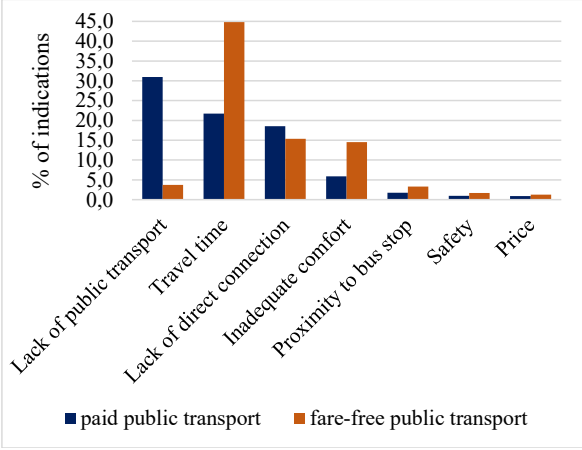

Fig. 4. Disadvantages of public transport that discourage people from choosing it as their primary mode of transport (n=1352)
Source: own elaboration

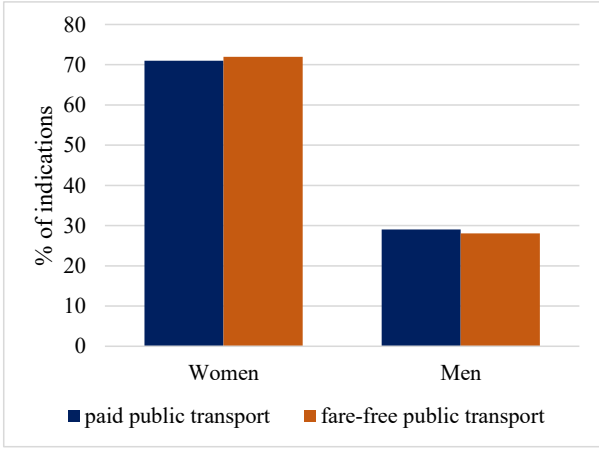

Fig. 5. Sex structure of people indicating price as a feature of public transport that influences their choice of primary means of transport (n=113)
Source: own elaboration

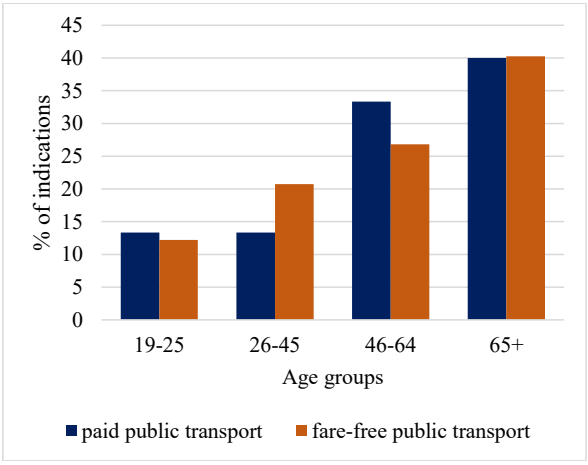

Fig. 6. Age structure of people indicating price as a characteristic of public transport that influences their choice of primary transport mode (n=112)
Source: own elaboration

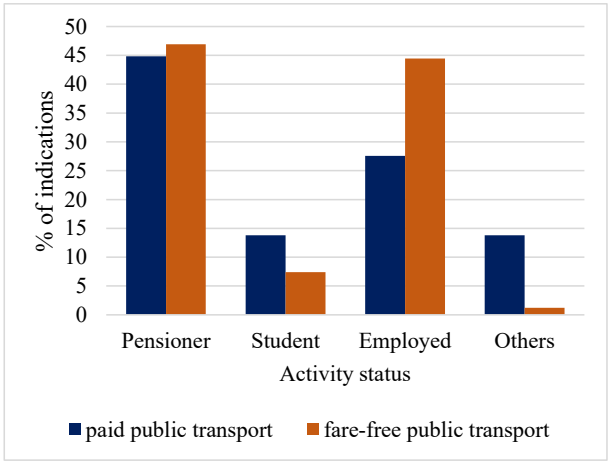

Fig. 7. Economic status of respondents indicating price as a characteristic of public transport that influences their choice of primary transport mode (n=110)
Source: own elaboration

metropolitan locations stems from the poor quality of public transport as such.

The results thus correspond with the ongoing debate over public transport quality attributes. While the fare levels could improve the total ridership in public transport (Tomeš et al., 2022), it seems that, to cause a significant shift in a modal split, other public transport qualities are more important (Baum, 1973; Redman et al., 2013; Fearnley et al., 2017), such as safety, frequency and comfort. This is particularly important in non-metropolitan areas where people tend to travel longer distances and rely more on cars. For such people, as uncovered in this study, price is not the most important element, whether they have paid or fare-free public transport at their disposal. This reflects the current quality of public transport in non-metropolitan locations, which is low according to the residents – especially the available connections and on-board comfort discourage people from using public transport.

Although the price is not essential for people from non-metropolitan locations, as they have already accepted their situation by paying extra for a car that suits their mobility needs better than poor public transport, the results indicate that fare levels are seen as an element reinforcing social inequalities. In this sense, fare-free or significantly subsidized public transport for those with a complicated economic situation has the capability to improve their daily participation in life. This notion is in line with similar studies that consider FFPT as an element of social justice, as it reduces transport-

induced social exclusion (Jin et al., 2019). The problem is common not only to metropolitan areas but, as shown, also to non-metropolitan areas.

Overall, fare levels are important for their anti-exclusionary character and their potential to improve ridership levels. However, based on this study result, it might not be the most fundamental element when considering the study locations. The results provide a brief sketch of current public transport problems like limited accessibility, missing connections and poor comfort representing a significant barrier to opting for public transport as a primary mode of transport. Various fare policies have the capability to improve public transport ridership and the welfare of users, but not in a public transport system that does not respond to the needs of users. This means that public transport organizers could use various fare discounts or zero fares to improve ridership, but significant changes should follow in public transport operations. The authors argue that if the quality is satisfactory, the fare-free policy could help not only in attracting new users but in legitimizing (increased) public subsidies for public transport, which might be necessary for further public transport operation.

Transport behavior is a complex and wide discipline, and certain topics, although worth investigating, were beyond the scope of this paper – in particular, adding other modes of transport into the analyses or distinguishing not only between paid and fare-free public transport but also reduced fares. Further research should thus take this exploratory study as a point of departure and continue investigating the possible role of price in different settings (urban and rural localities), or what the differences are between the impacts that regular, discounted and paid fares have on ridership.

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